SIPRI Yearbook of World Armaments and Disarmament

1968/69

Stockholm International Peace Research Institute

Almqvist & Wiksell Stockholm

Humanities Press

Gerald Duckworth & Co Ltd London

SIPRI

Stockholm International Peace Research Institute

SIPRI is an independent institute for research into problems of peace and conflict, with particular attention to the problems of disarmament and arms regulation. It was established in 1966 to celebrate Sweden's 150 years of unbroken peace. The financing is provided by the Swedish Government. The staff, the Governing Board and the Scientific Council are international.

The Board and Scientific Council are not responsible for the views expressed in the publications of the Institute.

Governing Board

Professor Gunnar Myrdal, Chairman (Sweden) Professor Hilding Eek (Sweden) Academician Ivan Málek (Czechoslovakia) Mr. Leo Mates (Yugoslavia) Professor Joseph Rotblat (United Kingdom) Professor Bert Röling (Holland) Professor John Sanness (Norway)

The Director

Director

Mr. Robert Neild (United Kingdom)

Sveavägen 166, 113 46 Stockholm, Sweden Telephone 08-34 96 00

Many Lecky

SIPRI Yearbook of World Armaments and Disarmament

SIPRI

Stockholm International Peace Research Institute

SIPRI is an independent institute for research into problems of peace and conflict, with particular attention to the problems of disarmament and arms regulation. It was established in 1966 to celebrate Sweden's 150 years of unbroken peace. The financing is provided by the Swedish Government. The staff, the Governing Board and the Scientific Council are international.

The Board and Scientific Council are not responsible for the views expressed in the publications of the Institute.

Governing Board

Professor Gunnar Myrdal, Chairman (Sweden) Professor Hilding Eek (Sweden) Academician Ivan Málek (Czechoslovakia) Mr. Leo Mates (Yugoslavia) Professor Joseph Rotblat (United Kingdom) Professor Bert Röling (Holland) Professor John Sanness (Norway) The Director

Director

Mr. Robert Neild (United Kingdom)

Sveavägen 166, 113 46 Stockholm, Sweden Telephone 08–34 96 00

SIPRI Yearbook of World Armaments and Disarmament 1968/69

Almqvist & Wiksell Stockholm

Humanities Press New York Gerald Duckworth & Co. Ltd. London

Copyright © 1969 by SIPRI First published by Almqvist & Wiksell, 26 Gamla Brogatan, Stockholm 1 in collaboration with Humanities Press, Inc. 303 Park Avenue South New York, N.Y. 10010 and Gerald Duckworth & Co. Ltd. 3 Henrietta Street London, W.C. 2.

11 march and the second second

. . . .

SBN 7156 0519 4

Printed in Sweden by Almqvist & Wiksells Boktryckeri, Uppsala 1969

PREFACE

This book is the work of part of the international staff which has been brought together at this Institute in Stockholm during the past two years; they come from many countries and disciplines. The aim has been to produce a factual and balanced account of a controversial subject—the arms race and attempts to stop it.

The Yearbook was designed to fill a gap. Until now there has been no authoritative international source which provided—in one place—an account of recent trends in world military expenditure, the state of the technological arms race, and the success or failure of recent attempts at arms limitation or disarmament. There are United Nations reports on the world economy, on world food and agriculture, and on the world social situation: but on the question of armaments and disarmament—a question perhaps more central to United Nations purposes—there is no such document.

The Yearbook is in two parts. The first part gives a narrative account of recent developments. The second part gives reference material. It includes a great deal of material which has not, to our knowledge, been brought together before. There are, for example, series for military expenditure over the last twenty years for 118 countries, at current and constant prices, with regional and world totals. The arms trade section of part II presents estimates of the value of exports of major weapons to third world countries since 1950, and a detailed Arms Trade Register for 1968, giving all the transactions we could find with third world countries in that year. There is a full account of nuclear testing before and after the Partial Test Ban Treaty-making the point that in fact the frequency of testing has been higher since the treaty than before it; and a list of accidents to nuclear weapons. There is a comprehensive chronology of disarmament efforts from 1945 to the present day, and a full list of the signatures, ratifications and accessions to the five arms limitation treaties and the Geneva Protocol of 1925. There are lists of conflicts, a set of maps of border disputes, and chronologies of two of the conflicts at present in progressthe Middle East conflict and the Nigerian-Biafran War.

Part I of the Yearbook begins with an account of the trends in world military expenditure—both long-term and short-term. This section is concerned with the *movement* in world military spending, particularly with the very sharp acceleration since 1965. It then selects two aspects of the present

Preface

arms competition: first, the strategic arms race between the United States and the Soviet Union, and secondly, the arms trade between the rich and poor countries of the world.

The second chapter looks at the technological arms race. It begins with some documentation of the tremendously rapid rate of "product improvement" in weapons and the very high input of research per unit of output in the military compared with the civil field. Then it selects four examples, illustrating different kinds of technological development: the big improvements made in United States submarine-launched missiles; the developments, particularly in delivery systems, in chemical and biological warfare; the advance in helicopters; and the developments in one of the new nightfighting devices—the image intensifier.

The third chapter gives an account of what progress was made during the year in arms limitation or disarmament. There is a full analysis of the Non-Proliferation Treaty and a review of all discussions in the Eighteen Nation Disarmament Conference. The chapter concludes with some background to the strategic arms limitation talks.

The Yearbook is factual: but of course the selection of the material and the way in which it is presented implies a set of valuations, and we should make these explicit. Obviously the staff—drawn as they are from many different countries—have differing views on a wide number of questions. But they do not differ much in their views on the question of world armaments and disarmament. The common elements in their approach can be summarized thus: that the rise in world military spending, and more particularly the constant technological acceleration in weaponry, is highly dangerous, and that the attempts so far made to slow down, halt or reverse the process have been incommensurate with the danger; that arms competition, though it is not the sole or main cause of world tensions and conflict, is an important independent factor which increases and exacerbates tensions: and that arms limitation or disarmament could help considerably to reduce those tensions.

Any yearbook of this kind must face the problem of avoiding biases. The main difficulty is that the material about weapons, nuclear testing, and so on, comes to a large extent from United States publications, notably Congressional records and technical journals—material, incidentally, which was not used uncritically. Throughout the book we have repeated the point that far more material about military activity is available for the United States than for other countries. The Soviet Union and China publish little on these subjects. The smaller countries, including those in the West, are not nearly as free with information as the United States examples.

This is the first SIPRI Yearbook. We hope to improve it year by year, and would be glad of all suggestions, corrections, comments and criticisms. The material was sent to the printer at the end of July this year. The main sections were brought up to date at the end of September.

Almost everyone at SIPRI has had a hand in some part of the Yearbook. A particular debt is owed to Frank Blackaby, who directed the preparation of the report with remarkable skill, tact and industry, and to all those here at SIPRI, and especially the editorial staff, who worked through the long summer days and nights when most people in Sweden were on holiday.

We have had help in material and comments from a large number of people outside the Institute, both official and unofficial, in both Eastern and Western countries. (For example, all Governments were asked to check the series we have included for military expenditure.) None of them is responsible in any way for what we put in the final version.

30 September 1969

Robert Neild Director, SIPRI

ATTRIBUTION

The preparation of the Yearbook was directed by Frank Blackaby. The following members of the staff, who come from seven countries, were responsible for the main sections.

Military expenditure, strategic arms competition, research expenditure comparisons	Frank Blackaby Christina Jämtin							
Trade in major weapons	Prvoslav Davinic Eva Göransson Mary Kaldor							
Submarine-launched missiles, nuclear testing, accidents of nuclear weapons	Milton Leitenberg							
Development in chemical and biological warfare	Julian Perry Robinson							
Helicopters and image intensifiers	Hans von Schreeb							
Disarmament efforts and reference material on disarmament	Prvoslav Davinic Jozef Goldblat Jan Prawitz							
Reference material on conflicts	Hari Naidu							
Editorial assistance	Randall Forsberg Rosemary Proctor Mirkku Vuorenkoski							

CONTENTS

Abbr	eviations and conventions	15
PAR	T I. ACCOUNT OF 1968/69	
Chap	ter 1. World military expenditure	18
I.	The general pattern	18
п.	The strategic competition between the two great powers	29
111.	The third world: military expenditure and the trade in major weapons. Introduction General arms trade features South America Central America Middle East Africa Indian Sub-Continent Far East North and South Viet-Nam Debates on national policy	45
Chap	ter 2. The technological arms race	90
I.	Introduction	90
11.	Submarine-launched ballistic missiles	96
III.	Development in chemical and biological warfare	112
IV.	Helicopters	135
v.	Image intensifiers	141
VI.	References and sources	144

Contents

Chap	ter 3. Disarmament efforts	150
I.	Historical background, 1945–1967	150
II.	The start to 1968	154
III.	The Non-Proliferation Treaty	159
IV.	The disarmament agenda following the NPT	166
v.	The Conference of Non-Nuclear Weapon States, 29 August-28 September	171
VI.	The 23rd General Assembly of the United Nations, 24 September-21 December 1968	174
VII.	The session of the ENDC, 18 March–23 May 1969	176
VIII.	Towards Strategic Arms Limitation Talks	188

PART II. REFERENCE MATERIAL

Sectio	on 1. Military expenditure and the trade in arms
1A.	World military expenditure, 1948–1968
1B.	Armed forces of the world, 1960–1968
1C.	Arms trade in major weapons, 1950–1968
1D.	Arms Trade Register: register of major weapons transfers to developing countries, 1968
Sectio	on 2. The technological arms race
2A.	Nuclear weapon testing programmes, 1945–1968
	Number of tests Yield of tests Underground testing and weapons and warhead development Venting US Safeguards Sources
2B.	Accidents of nuclear weapons and nuclear weapon delivery systems 259
	General dangers Evaluation of the danger The Goldsboro accident Number of accidents Possible future incidence of accidents Coverage of the material Sources

Contents

2C. National expenditures on chemical and biological warfare	271
2D. List and certain specifications of modern helicopters	276
Section 3. Disarmament	280
3A. Chronology of major disarmament efforts, 1945 to mid-1969	280
3B. List of states which have signed or ratified the arms regulation treaties	320
3C. List of states which have signed or ratified the 1925 Geneva Protocol	334
3D. List of United Nations resolutions on disarmament and related matters, 1967–68	337
3E. List of regional multilateral defence organisations and treaties	341
3F. Text of the Treaty on the Non-Proliferation of Nuclear Weapons	349
3G. Resolutions adopted by the Conference of Non-Nuclear-Weapon States	355
Section 4. Conflicts	359
4A. Post-World War II armed conflicts and disputes	359
4B. Boundary disputes, 1967 and 1968	374
 4C. Chronologies of two wars:	381 381 414
4D. List of United Nations resolutions on conflicts, 1967–68	429
Glossary of modern warfare	438

ļ

i

1

1

TABLES, CHARTS AND MAPS

PART I. TABLES

Chapter 1

1.1	Long and short term trends in the volume of world military expenditure .	19
1.2	Warsaw Pact: Long and short term trends in the volume of military ex-	
	penditure	20
1.3	NATO: Long and short term trends in the volume of military expenditure	23
1.4	The Viet-Nam War and United States military outlays	30
1.5	US Department of Defense: Annual statement of US versus Soviet inter-	
	continental strategic nuclear forces	33
1.6	Share of strategic forces, general purpose forces, and research and deve-	
	lopment in total US defense expenditure	47
1.7	Exports of helicopters to the armed forces of third world countries	49
1.8	Latin America: Long and short term trends in the volume of military ex-	
	penditure	57
1.9	Middle East: Long and short term trends in the volume of military ex-	
	penditure	61
1.10	Africa: Long and short term trends in the volume of military expenditure	68
1.11	Far East and South Asia: Long and short term trends in the volume of	
	military expenditure	80
1.12	United States military aid and domestic military expenditure in Cambodia,	
	South Korea, Philippines, Thailand and Taiwan	83
~		
Chap	ter 2	
2.1	Average annual percentage increase in "real cost" of certain military items	94
2.2	Research and development expenditure per \$100 of output	95

2.2	Research and development expenditure per \$100 of output	•	•	95
2.3	US Polaris submarines: number commissioned and missile equipped			97
2.4	US Polaris submarines: deployment	•	•	9 8
2.5	Possible number of warheads in the present and future United States b	sal	-	
	listic missile submarine fleet		. 1	104
2.6	Procurement of helicopters for the US Armed Forces	•	. 1	136
2.7	Active aircraft inventory of the US Armed Forces		. 1	136
2.8	Classification of helicopters		. 1	137

PART I. CHARTS

Chapter 1

1.1	World military expenditure, 1950–1968	20
1.2	Military expenditure in Warsaw Pact countries, other than the USSR	21
1.3	Military expenditure in Warsaw Pact countries, other than USSR: rela-	
	tive importance in 1968	21
1.4	Military expenditure in NATO countries	24
1.5	Military expenditure in NATO countries other than USA: relative im-	
	portance in 1968	24
1.6	Military expenditure in major regions outside Europe, North America and	
	China	25

Contents

.

1.7	Military expenditure in European countries outside the two main blocs: relative importance in 1968	25
1.8	The rise in military expenditure in developing countries compared with	
1.0	the world total	26
19	United States Administration's presentation of comparison of US and	
1	Soviet strategic missiles	35
1.10	The spread of long-range surface-to-air missiles among third world coun-	
	tries	47
1.11	The spread of supersonic aircraft among third world countries	48
1.12	Exports of major weapons to third world countries	51
1.13	Exports of major weapons by UK and France to third world countries.	52
1.14	Military expenditure in Latin American countries	56
1.15	Military expenditure in Latin American countries: relative importance in	
	1968	56
1.16	Imports of major weapons by Latin American countries	58
1.17	Military expenditure in Middle East countries	62
1.18	Military expenditure in Middle East countries: relative importance in	
	1968	62
1.19	Imports of major weapons by Middle East countries	63
1.20	Military expenditure in African countries	69
1.21	Military expenditure in African countries: relative importance in 1968.	70
1.22	Imports of major weapons by African countries	71
1.23	Military expenditure in India and Pakistan	77
1.24	Imports of major weapons by India and Pakistan	78
1.25	Military expenditure in Far East countries (excl. China)	81
1.26	Military expenditure in Far East countries (excl. China): relative impor-	
	tance in 1968	82
1.27	Imports of major weapons in Far East countries (excl. China)	84

Chapter 2

2.1	Armed forces of the world				•									•	•		•		•	91
2.2	The amplification tube of an	in	na	ge	in	ter	nsi	fic	ati	ioı	1 ¢	lev	rice	Э				•		143

PART II. TABLES

Section 1. Military expenditure and the trade in arms

Table 1A.1 and even-numbered tables 1A.2–20 are at constant (1960) prices and are converted into US at 1960 exchange-rates. Odd-numbered tables 1A.3–21 are in local currency at current prices.

Α	Official and Benoit-Lubell exchange-r	at	es	fo	r٦	Na	rs	aw	P	'ac	t c	:01	ın	tri	es			199
1A.1	World summary: constant price figure	es								•				•				200
1A.2	NATO: constant price figures																•	200
1A.3	NATO: current price figures							•	•		•				•		•	202
1 A.4 a	Warsaw Pact: constant price figures		•			•		•			•		•					202
1A.4b	Warsaw Pact: constant price figures								•	•	•	•			•			202
1A.5	Warsaw Pact: current price figures .		•		•			•			•							204
1A.6	Other European: constant price figure	es			•	•			•		•		•	•		•	•	204
1 A.7	Other European: current price figures	5	•				•	•	•	•	•	•	•	•	•	•		204
1A.8	Middle East: constant price figures		•	•	•	•				•			•		•	•		204
1A.9	Middle East: current price figures .	•				•	•		•			•	•	•	•		•	206
1 A.10	South Asia: constant price figures .		•	•				•	•			•	•	•	•		•	206
1 A. 11	South Asia: current price figures .		•		•	•	•	•	•	•	•	•	•	•	•	•	•	206

Contents

1A.12	Far East: constant price figures	208
1A.13	Far East: current price figures	208
1A.14	Oceania: constant price figures	208
1A.15	Oceania: current price figures	210
1A.16	Africa: constant price figures	210
1A.17	Africa: current price figures	212
1A.18	Central America: constant price figures	212
1A.19	Central America: current price figures	214
1A.20	South America: constant price figures	214
1A.21	South America: current price figures	214
1B	Armed forces of the world, 1960–1968	216
1C.1	Values of imports of major weapons by certain areas, 1950-1968	226
1C.2	Values of exports of major weapons, to areas listed in table 1C.1, by	
	main suppliers, 1950–1968	228
Section	a 2. The technological arms race	
2A.1	Reported nuclear test explosions, 1945–1968	242
2A.2	Reported nuclear test explosions, 1945–1968, by environment	243
2A.3	Dates of first nuclear test explosions	243
2A.4	Testing areas: past and present	244
2A.5	Vented underground nuclear tests	250
2A.6	United States Department of Defense budget supporting the four "Safe-	
	guards" related to the Partial Test Ban Treaty	255
2B.1	List of major accidents involving complete destruction of a nuclear wea- pon delivery system with nuclear weapons on board, and with destruc-	
	tion, loss or other involvement of the weapons themselves	266
2C.1	Funding for US CBW Research and Development, and Procurement,	
	1947–1970	272
Section	a 4. Conflicts	
4A.1 4A.2	Summary of eleven lists of post-World War II conflicts	366 372
PART	II. CHARTS AND MAPS	
Chart	2A.1 Nuclear weapons tests, 1951–68	245

Chart ZA.I	114666a1 weapons (6363, 1751–00 ,	-
Map 4B.1	Boundary disputes in Africa	76
Map 4B.2	Boundary disputes in Asia	17
Map 4B.3	Boundary disputes in the Middle East	78
Map 4B.4	Boundary disputes in Latin America	79
Map 4B.5	Boundary disputes in Europe	30
Map 4C.1	The four regions and the principal tribes of Nigeria, January 1967 38	33
Map 4C.2	The area and principal towns of Biafra, May 1967 and May 1969 38	33

.

ABBREVIATIONS AND CONVENTIONS

For definitions of some of the weapon terms, see the Glossary, page 438. These abbreviations are used generally throughout the book. Some which are specific to particular chapters are given in the introduction to those chapters.

Abbreviations

Country terminology

For the convenience of the reader, we have on occasion used the geographical rather than the formal official version for certain countries. For example:

German Democratic Republic	•••			•	•	•	. East Germany
Federal Republic of Germany	• •	 •			٠	•	. West Germany
Democratic Republic of Viet-Nam						•	. North Viet-Nam
Republic of Viet-Nam					•		. South Viet-Nam
Democratic People's Republic of Korea	ι.				•		. North Korea
Republic of Korea					•	•	. South Korea
Republic of China	• •	 •					. Taiwan

Conventions

Some conventions used with particular tables only are given together with those tables.

Data not available	or
Nil, or less than half final digit shown	
Million	mn. or m.
Billion (a thousand million)	bn.
Kiloton	kt.
Megaton	mt.
Ton	t.
Fiscal year	FY
Nautical mile	nm or n. mi.

Part I. Account of 1968/69

Chapter I. World military expenditure¹

This chapter is in three parts. Part I describes briefly the general pattern in the world's military expenditure in recent years. It examines the rise that there has been both in the long term (from 1950 onwards) and in the short term (since 1965). It comments on the probable outcome for 1969, on the basis of the figures now available, and includes a short section on longerterm trends since the First World War. The other two parts of the chapter select two components of the upward trend in world military spending. Part II looks at the present state of the strategic arms competition between the United States and the Soviet Union: these two countries between them account for over two-thirds of the world's military spending. Part III (the longest section, since it is comparatively uncharted territory) looks at military expenditure in the third world, and concentrates on the arms supplies from the producing to the non-producing countries.

Part I. The general pattern

There are a number of statistical problems in any analysis of world arms expenditure: problems of the comparability of the coverage of the figures, of selecting prices indices, and of finding appropriate exchange-rates. These problems are discussed in the preface to the figures in the reference section, page 195. In this chapter we have tried to restrict our conclusions to those which are within the margin of error of the figures and the calculations, that is to propositions which would be true on any reasonable basis of calculation. The chapter is illustrated with charts and summary tables: the basic figures are in the reference section.

Introduction

World military expenditure began to rise sharply in 1965 (table 1.1 and chart 1.1). It went up about 10 per cent in both 1966 and 1967, and then

¹ We have avoided the use of the term "defence expenditure": it implies that all nations are simply engaged in self-defence. "Military expenditure" is a more neutral term.

	Average	per cent cl	hange per	year			Size of military	
	Long- term	Short- term	Year-to-	year chang	zes	Budgeted	expenditure in 1968 US \$ bn, current prices and exchange-rates	
	1949-68	1965–68	1965–66	1966–67	1967–68	in 1969		
United States Other NATO	+ 7.7 + 5.3	+ 12.0 + 1.6	+ 19.2 + 0.9	+ 15.4 + 4.7	+ 2.0 - 0.9	0.6 + 0.4	79.5 24.4	
Total NATO	+ 7.1	+ 9.3	+14.1	+12.8	+ 1.3	- 0.4	104.0	
USSR Other Warsaw	+ 4.0	+ 9.3	+ 4.7	+ 8.0	+ 15.5	+ 5.9	18.6 ^b or 39.8 ^c	
Pact	+ 7.1	+10.9	+ 7.2	+ 7.4	+18.5	+12.8	13.4 ^b or 6.3 ^c	
Total Warsaw Pact	+ 4.1	+ 9.5	+ 5.0	+ 7.9	+15.9	+ 6.8	32.0 ^b or 46.1 ^c	
Other European	+ 5.2	+ 2.0	+ 3.1	- 0.3	+ 3.2	+ 0.3	2.5	
Middle East	+12.8	+ 19.9	+ 8.2	+32.5	+ 20.0	••	2.7	
South Asia Far East (excl.	+ 5.2	- 2.5	+ 1.9	-11.7	+ 3.0	••	1.9	
China)	+ 6.5	+ 8.4	+ 0.7	+10.3	+14.8	••	4.0	
Oceania	+ 7.9	+ 17.7	+18.9	+18.2	+16.1	••	1.4	
Africa	••	+ 7.6	+11.5	[+ 1.4]	[+10.0]	••	1.2	
Central America	+ 3.2	+ 5.2	+ 9.7	+ 5.1	[+ 1.1]	••	0.5	
South America	+ 2.7	+ 3.7	- 9.3	+12.8	[+ 8.8]	••	2.1	
World ^d	+ 5.9	+ 8.9	+10.2	+10.7	+ 5.8	••	159.3 ^b or 173.4 ^c	

Table 1.1. Long and short term trends in the volume of world military expenditure

Based on constant price figures

Source: The reference section, page 195. Bracketed figures are estimates.

^a 1957-68 for "Other Warsaw Pact" and Far East, excl. China; 1949-67 for Central and South America.

^b At official basic exchange-rates.

 c At Benoit-Lubell estimated defence purchasing-power-parity exchange-rates. See reference section, page 198.

^d Including an estimate for China of \$7 bn in 1968.

probably by around 6 per cent in 1968.² These estimates are in real terms, excluding the effect of price changes. So the world is now devoting to military uses nearly 30 per cent more resources than it was doing three years ago. This is a formidable rate of increase—not very different from that

² These calculations are SIPRI estimates, from an independent collection of military expenditure figures. They are converted into 1960 dollars, and corrected for price changes with consumer price indices. For three years—1964 to 1967—there are alternative estimates for the changes in *World Military Expenditures, 1966-67* (Research Report 68-52, December 1968), published by the United States Arms Control and Disarmament Agency (ACDA). ACDA uses a different base year and different price indices. Nonetheless the figures match closely, suggesting that the calculations are not highly sensitive to the exchange-rate or price index assumptions made.

Per cent change in volume of world military expenditure

ACDA estimate SIPRI estimate

196465	+0.7	+ 0.2
1965-66	+ 10.8	+10.2
1966-67	+11.0	+ 10.7

Table 1.2.	Warsaw	Pact:	Long	and	short	term	trends	in	the	volume	of	military
expenditure	•											

	Average per cent change per year										
	Long- term	Long- term	Short- term	Year-to-y	/ear chang	es	Budgeted	Size of expendi in 1968	military ture		
	1957–68ª	1965–68	1965–66	1966–67	196768	in 1969	b	c			
Albania ^d	••	+ 1.8	- 5.5	_	+11.6	+ 37.7	0.06	0.08			
Bulgaria	+ 4.7	+ 4.6	+ 3.7	+10.3	_	+14.4	0.2	0.2			
Czechoslovakia	+ 3.1	+ 7.7	+ 5.4	+11.9	+ 5.8	+ 7.5	1.8	1.5			
Germany, East	+13.7	+27.0	+17.9	+ 9.1	+61.0	+ 9.5	2.6	1.7			
Hungary	+11.1	+ 7.8		+ 6.2	+18.4	+28.0	0.5	0.4			
Poland	+ 8.6	+ 6.0	+ 5.4	+ 3.7	+ 8.8	+12.9	7.3	1.8			
Romania	+ 2.8	+ 4.6	+ 5.8	+ 4.1	+ 3.8	+23.5	0.9	0.6			
USSR	+ 4.0	+ 9.3	+ 4.7	+ 8.0	+15.5	+ 5.9	18.6	39.8			

Based on constant price figures

Source: The reference section, page 195.

^a USSR 1949-68 (1957-68, 5.1 per cent); East Germany 1958-68.

^b Official basic exchange-rates.

^c Benoit-Lubell exchange-rates.

^d Albania is included, as it was in the Warsaw Pact during most of this period.





Source: The reference section, page 195.

^b Warsaw Pact countries military expenditure converted to US \$ at Benoit-Lubell exchange-rates. See the reference section, page 198.

^a At official exchange-rates.



Chart 1.2. Military expenditure in Warsaw Pact countries, other than the USSR

US \$ mn, at constant (1960) prices and Benoit-Lubell exchange-rates

which preceded the First World War, though still a good deal less than the increase in the years before the Second World War.

United States military expenditure in Viet-Nam accounts for a good part of the rise. (This is discussed more fully on page 30.) Indeed it accounts for all the increase in the United States' own military spending in the last three years: excluding the cost of Viet-Nam, US military expenditure would have gone down a little, in real terms. But Viet-Nam is not the whole story—at least, not directly.

There has been a big increase in the spending of the Warsaw Pact powers as well. How far this is in reaction to the increase in United States spending is hard to say. The Warsaw Pact rise certainly began later: not much of it came in 1966, the year in which United States spending went up 19 per cent. But given the time-lag between the decision to procure weapons and actual expenditure on them, the sharp up-turn in expenditure in 1967 and 1968 may be the consequence of decisions taken some years earlier. The very big rise in Soviet expenditure came in 1968, with an increase of 15 per cent.

Chart 1.3. Military expenditure in Warsaw Pact countries, other than the USSR: relative importance in 1968





Source: The reference section, page 195.

Source: The reference section, page 195.

World military expenditure

In the other Warsaw Pact countries, expenditure has been rising some 10 per cent a year since 1965 (table and chart 1.2). The rate of increase in East Germany has been particularly formidable.

European NATO countries have not joined in this speeding-up of arms expenditure (table 1.3 and chart 1.4). Collectively, they were spending very little more in 1968 than in 1965. The United Kingdom's military expenditure has been virtually flat since 1965, in real terms. West German military expenditure has been falling: the big increase in its spending came between the years 1958 and 1963. Of the major European countries, the only one to show any significant increase in the last three years has been France: this has been part of a military policy largely independent of NATO. There are two small NATO countries where military expenditure has been rising very fast—Greece and Portugal. Most of Portuguese military spending is incurred in the attempt to preserve its position in Angola and Mozambique. The very rapid increase in Greek military spending followed the military coup d'état in April 1967.

Countries outside the two blocs

The NATO and Warsaw Pact countries account for around 85 per cent of world military expenditure. Less than 15 per cent is incurred in the rest of the world. Trends in military spending in these third world countries matter nonetheless. They can serve as warning of impending conflict. The sums involved, though a small part of the world total, are substantial in the economies of the countries themselves.

In general, the figures for countries outside NATO and the Warsaw Pact have a much wider margin of error: for some countries, there are no reliable figures at all. For China, for example, there have been no official figures since 1960. But some general conclusions emerge.

First, a rapid rise in military expenditure in recent years has been a fairly general phenomenon (chart 1.6 and table 1.1): it has not been restricted to NATO and the Warsaw Pact. The most phenomenal rise has been in the Middle East. Military expenditure there, in real terms, has been increasing at an average rate of 13 per cent a year for nearly twenty years. In the last three years this has accelerated to almost 20 per cent a year. Middle East countries, with a population of under 100 million, are now spending more for military purposes than the whole of Latin America with a population of 250 million, and more than South Asia (India and Pakistan) with a population of 600 million.

In India and Pakistan the big build-up in expenditure was in the years 1961-63: since then there has been a levelling-off. In Australia and New

Table 1.3. NATO: Long and short term trends in the volume of military expenditure

Based on constant price figures

	Average	per cent cl	nange per g	year			Size of military	
	Long- term	Short- term	Year-to-y	vear change	es	Budgeted	in 1968 US \$ bn,	
	194968	1965-68	1965–66	196667	1967-68	in 1969	exchange-rates	
USA	+ 7.7	+12.0	+19.2	+15.4	+ 2.0	- 0.6	79.5	
Canada	+ 6.6	+ 1.6	+ 2.6	+ 7.5	- 4.9	- 2.5	1.8	
Belgium	+ 5.3	+ 3.9	+ 0.9	+ 5.1	+ 5.7		0.6	
Denmark	+ 5.9	+ 1.5	- 1.4	+ 0.5	+ 5.5	+10.9	0.3	
France	+ 5.0	+ 3.1	+ 2.8	+ 5.4	+ 1.0	+ 1.0	6.1	
Germany, West	+ 6.0 ^a	- 4.0	- 1.2	+ 4.1	- 6.1	+ 2.1	5.1	
Greece	+ 6.1	+18.0	+ 8.8	+28.6	+17.4	+11.7	0.4	
Italy	+ 5.0	+ 2.3	+ 8.1	- 2.3	+ 1.5	••	2.2	
Luxembourg	+ 3.7	-12.6	••	- 22.3	14.3	••	0.008	
Netherlands	+ 4.9	+ 2.7	- 2.3	+11.1		+ 3.3	0.9	
Norway	+ 5.8	+ 4.0	••	+ 3.2	+ 9.4	+ 5.3	0.3	
Portugal	+ 9.0	+ 9.9	+ 4.9	+ 22.9	+ 3.0	+ 0.4	0.4	
Turkey	+ 4.9	+ 1.9	- 3.3	+ 0.3	+ 9.0	••	0.6	
UK	+ 2.2	+ 0.7	- 1.0	+ 4.2	- 1.0	- 3.1	5.6	

Source: The reference section, page 195.

^a 1953-1968.

Zealand there has been a rapid upward shift in the level of military spending, occasioned partly by the withdrawal of British forces from the Far East.

The figures for Africa cover only a short period, and for a number of small countries the estimates are rough ones. It seems that military expenditure in that continent is rising by 7–8 per cent a year.

There are only two areas—or groups of countries—outside the two blocs where the rise in military expenditure has been moderate, both in recent years and over a longer period. Among European countries outside the two blocs, the upward movement has been only gradual; this is also true of Latin American countries, when their figures are adjusted for the rapid rise in prices. Even in Latin America, however, there have been some signs of an acceleration in recent years—in Argentina and Peru, for example.

Developing countries

In chart 1.8 the trend of military expenditure in developing countries³ as a whole is compared with the world total. Their expenditure is a very small part of the world total, of course: but since the beginning of the 1960's it has been rising faster than the world average. Whereas from 1960 to 1968, world military expenditure rose 6 per cent a year in volume, developing

³ For definition, see footnote a to chart 1.8.

World military expenditure

Chart 1.4. Military expenditure in NATO countries

US \$ bn, at constant (1960) prices and 1960 exchange-rates



Source: The reference section, page 200. ^a Belgium, Denmark, Italy, Luxembourg, Netherlands, Norway, Turkey.

countries' expenditure rose 7 1/2 per cent a year. This is not simply the consequence of the creation of new states, whose military expenditure naturally rises rapidly when they are building up their forces for the first time. If the comparison is restricted to states which were already in existence at





Source: The reference section, page 200.



Chart 1.6. Military expenditure in major regions outside Europe, North America and China

US § bn, at constant (1960) prices and 1960 exchange-rates

1969

We now have Budget figures covering 1969—and in some cases periods further ahead—for most NATO and Warsaw Pact countries, so that we can make a forward 1969 estimate for some 85 per cent of the world's military spending. If these Budget estimates are fulfilled, world military expenditure in 1969 will rise some 2-3 per cent, in real terms. (The estimates have been adjusted for the probable price trends in the major countries.) Budgets are only a rough guide to actual expenditure, of course. But it is fairly safe

Chart 1.7. Military expenditure in European countries outside the two main blocs: relative importance in 1968



Source: The reference section, page 204.

the beginning of the period, the proposition still holds true—that their military expenditure has been rising at an above-average rate.



Chart 1.8. The rise in military expenditure in developing countries, compared with the world total

Index numbers, 1950 = 100

to conclude that, barring some dramatic change in the political situation, the rise in world military expenditure in 1969 will lie somewhere between 0 and 5 per cent—that is, less than in the three previous years.

This does not of course mean that the "arms race" is over. The term arms race is not a precise one, with a generally agreed definition. If we take it to mean arms competition—the "action-reaction phenomenon"—then at the moment the prospect is that it will be pursued as vigorously as ever. This is particularly true of the strategic arms competition between the two great powers—unless an agreement is reached. The main reason that world military expenditure is rising more slowly in 1969 is that United States expenditure in Viet-Nam is falling: this makes it possible for the United States' spending on strategic weapons to rise without increasing its total military spending.

Most of the increase in 1969 seems likely to be in the USSR and the other Warsaw Pact countries. The USSR is budgeting for a 6 per cent increase in expenditure this year: other Warsaw Pact countries, in aggregate, for an increase of nearly 13 per cent. In the United States, there is uncertainty about expenditure in Viet-Nam. But on balance, the likelihood is that military expenditure, in real terms, will be a little lower than 1968's very high figure. If these Budget figures turn out approximately correct, than in the four years between 1965 and 1969, military expenditure in each of the two great powers will have risen about 40 per cent, in real terms.

The Budget figures which are available for 1969 for eight NATO countries apart from the USA suggest, in aggregate, no change in the level of

Source: The reference section, page 200.

^a Developing countries are defined here as the world excluding Europe, North America and the Soviet Union, Japan, Australia, New Zealand and South Africa. The figures for China were too problematic to be included.

spending compared to 1968. This continues the general tendency established over the last three years for NATO countries outside the United States to keep their military expenditure fairly constant, in real terms.

Outside NATO and the Warsaw Pact countries, not many Budget figures are available. The Budgets for some 22 countries show an average increase in expenditure⁴ of some $8^{1/2}$ per cent. Most of this increase is accounted for by three countries—Israel, the United Arab Republic and South Viet-Nam. For the other 19, the average increase is $2^{1/2}$ per cent.

Long-term assessment

In the period since the Second World War, the world has given over to military uses much more of its output than it did either before the First World War or in the inter-war period. In 1913, even after three years of a competitive arms race among the big powers, probably no more than $3-3^{1/2}$ per cent of world output was going to the military. In the early 1930's, the percentage seems to have been about the same. The average over the last eighteen years, on the other hand, has been around 7-8 per cent—more than double the 1913 figure.

The big change has been in the United States. Traditionally, before the Second World War, the level of United States military spending was very low. It took no more than $1^{1/2}$ per cent of the United States' national product in 1913, and $2^{1/2}$ per cent in the nineteen-thirties. In the post-war period the average has been 10 per cent.

When we combine this increase in the share of world resources going to military spending with the increase in world output itself, the result is a formidable rise over the last fifty years in the quantum of resources devoted to military uses. The world's national product has risen at least five-fold in the last fifty years: military spending, in real terms, has probably risen tenfold. The reason is not so much that the world's standing armies are bigger —though they are bigger than they were fifty years ago. It is rather the immense increase in the cost and complexity of the weapons used.

The actual current dollar estimate of the amount of military expenditure —around \$180 billion—is not by itself very meaningful. A better feel of the size of it is given by such comparisons as those recently presented in the United States' Arms Control and Disarmament Agency's summary: "Global military expenditures ... are equivalent to the total annual income produced by the one billion people living in Latin America, South Asia and the Near East. They are greater by 40 per cent than world-wide expenditures on edu-

* This is a weighted average.

cation by all levels of government and more than three times world-wide expenditures on health". 5

Recent trends

The long-term trend since 1913 has been for the world's military expenditure to rise at around 5 per cent a year. The trend increase in the last twenty years has been, if anything, slightly faster than this—nearer 6 per cent a year. It has not been a steady rise: it has come in spasms, followed by pauses. There was the very big rise after 1948—a combination of the rearmament programme which accompanied the establishment of NATO, and the cost of the Korean War. After Korea, expenditure fell a little, but not much, and then continued on a plateau until 1960. There was then another spasm, with the increases accompanying the new United States Administration, followed by the Soviet reaction to this. Finally, after only two years of stability in 1964 and 1965, there came the recent 30 per cent rise which began with the United States intervention in Viet-Nam.

In the absence of some kind of arms limitation agreement between the two great powers and between the two blocs, the rise in world military spending in the next twenty years will probably be as fast as in the last twenty. There is no automatic economic brake to prevent this. Obviously, world military expenditure cannot go on rising faster than world output indefinitely. Since 1950, world output has probably been increasing at a rate of about 5 per cent a year in real terms,⁶ and there is no reason to expect this to slow down in the future. So world military expenditure can continue to rise at this rate without increasing its share of world output further,^{τ} Put another way, if military spending maintains a constant share of world national output, this is a recipe for an infinite arms race. If things do in fact go on like this, then military spending will continue to double every fifteen years. By the early years of the next century the world will be devoting to military uses a quantum of resources which is equal to the whole world's present (1968) output. This is not so preposterous as it sounds. The world is now devoting to military purposes an amount of resources which exceeds the world's total output in the year 1900.

⁵ World Military Expenditures, 1966-67 (Research Report 68-52), United States Arms Control and Disarmament Agency, December 1968.

^c United Nations Statistical Yearbook, 1967, table 3, p. 28. Most estimates suggest that the annual rate of rise in world output between 1913 and 1950 was appreciably less than 5 per cent.

 $^{^{7}}$ The share of world military spending in world national output is estimated at 6.5 per cent in 1950, and 7.3 per cent in 1968.

Part II. The strategic competition between the two great powers

Introduction

The USA and USSR made up some 70 per cent of world military expenditure in 1968, and between them accounted for over 80 per cent of the rise in world military expenditure between 1965 and 1968.

This section concentrates on the present state of the strategic arms competition between them-since this is potentially the most catastrophic part of the world arms competition. There is one general and important caveat. The figures given for the Soviet side of the strategic arms equation are United States figures: this must be borne in mind throughout. They may well not be right: they have been a long way out in the past-though probably today with reconnaissance satellites the errors are not so great. The reason for using United States figures is quite simply that no others exist. Soviet information about the pattern of their military spending is extremely limited. The Soviet official comment on the 1969 military budget restricts itself to saying: "The Government, taking account of the complicated international situation, is taking the necessary measures for further strengthening the defences of the country and for improving the readiness and might of the armed forces of the Soviet Union. In the State Budget for 1969 17.7 billion roubles are provided for the country's defence expenditure, which makes 13.2 per cent of the total."8

This section, therefore, has in it a good deal about United States views of possible Soviet military capabilities. This does not mean that we ourselves think that these assessments are sound—indeed, as the text makes clear, some seem distinctly alarmist. They are included because they are an essential part of the "action-reaction" phenomenon which goes to make up the arms race. From this point of view, it is what one nation believes that the other nation possesses that is important.

United States Defence Budget

Perhaps the best starting place is to consider the present state and the likely future trend of United States military expenditure. As expenditure in Viet-Nam falls from its present level of around \$25 billion a year, will other military spending—particularly on strategic weapons—take its place?

The precedents are not altogether encouraging. It is true that after the Second World War United States military spending came down very sharply

⁸ Izvestija, 10 December 1968.

World military expenditure

					US \$ bn	, fiscal years
	1965	1966	1967	1968	1969 ^b	1970°
At current prices						
Total ^d	46.2	54.4	67.5	77.4	77.8	78.5
Viet-Nam ^e	0.1	5.8	20.1	26.5	28.8	25.4
Other	46.1	48.6	47.3	50.8	49.0	53.1
Per cent change on previous year						
Total		+17.8	+24.1	+14.7	+0.5	+0.9
Other		+ 5.4	2.7	+ 7.4	- 3.6	+8.4
At constant (1961) prices ^f						
Total ^d	42.9	49.3	59.5	66.2	65.2	64.3
Viet-Nam ^e	0.1	5.3	17.8	22.7	24.1	20.8
Other	42.8	44.0	41.8	43.5	41.0	43.5
Per cent change on previous year						
Total		+14.9	+20.7	+11.3	-1.5	-1.4
Other		+ 2.8	- 5.0	+ 4.1	- 5.7	+6.1

Table 1.4. The Viet-Nam War and United States military outlays^a

Source: The Budget of the United States Government, FY 1967 to 1969; and Defense Industry Bulletin, May 1969. Totals may not add because of rounding.

^a These are actual expenditure figures, not appropriations or obligational authority.

^b Estimate.

^c Initial Budget estimate, prepared in January 1969. Revised estimates presented to Congress on 19 March and 1 April would reduce *new obligational authority* in 1970 by \$3 bn, of which about \$1 bn was for Viet-Nam expenditure. It was estimated that this reduction in obligational authority would reduce actual outlay in 1970 by \$1.1 bn; probably at least half of this would be on Viet-Nam expenditure. On 21 August the Secretary of Defense announced further cuts, which would bring the figure up from \$ 1.1 billion, to \$ 3 billion. Further cuts may still be made. However, as time goes on further reductions in obligational authority are less likely to affect actual outlays in the FY 1970.

^d Includes defence expenditure incurred by the Department of Defense; excludes military assistance, atomic energy and certain other defence-related activities. (The inclusion of these would not alter the general relationship of spending in Viet-Nam to other spending.)

^e Includes special expenditures in other South-East Asian countries.

^f Deflated by the defence price index, with estimates for 1969 and 1970.

indeed; but after the Korean War, which is a closer parallel, this did not happen. There was an even more explosive increase in military spending at the time of Korea than there has been in the last three years: between 1949 and 1953 it rose from $13^{1/2}$ billion to 50 billion. Thereafter it never fell below \$40 billion. There must often be a ratchet effect in a large rise in military spending. Once a new high level has been established, then it has been demonstrated that the country can in some sense afford the resources, and an enlarged military-industrial establishment has come into being. The same thing may well have happened in the country which is considered the potential enemy. So a full reversal of the upward shift is unlikely unless there is either a strong popular reaction against high military spending, or some international agreement. There is no shortage of proposals for expenditure to maintain the \$80 billion level. One indicator of the kind of potential demand which exists is provided by the Armed Services requests to the Department of Defense: they precede the preparation of the Budget. For the fiscal year 1969 these requests exceeded the figures eventually put forward in the President's Budget by \$20 million. Had they obtained all they were asking for, the defence estimates would have been of the order of \$100 billion rather than \$80 billion.⁹ No doubt the armed services pad their requests to some extent: but there is also no doubt that there is a pent-up demand for higher expenditure, particularly on strategic weapons.

It was certainly the intention expressed in the Defense Budget of the last Administration that, as Viet-Nam spending fell, other military expenditure should rise. In the January Budget, whereas "Special Southeast Asian" spending was due to fall by $3^{1/2}$ billion, other expenditure was budgeted to rise by \$4 billion (table 1.4). A prominent American aerospace journal put as the headline to its account of the Budget at the beginning of the year "Viet lull advances new weapons".

However, since the beginning of the year considerable opposition has developed both in Congress and in the press to the high figure for military spending. The Secretary of Defense has been forced, with increasing reluctance, to make successive cuts in the Budget. The first set of cuts, announced in March and April, would have led to a reduction of \$1.1 billion from the figure for actual expenditure which had been in the January Budget. In August a further set of cuts was announced, increasing the size of the reduction from \$1.1 billion to \$3 billion. There may be further reductions to come. It is now clear that, in real terms, and barring some major worsening in the international situation, United States military spending in FY 1970 will be lower, perhaps by some 5 per cent, than it was in FY 1969. This compares with a rise of over 50 per cent, in real terms, between the fiscal years 1965 and 1969.

So far, the announced reductions have been mainly in expenditure on general purpose forces. The size of the armed forces is now scheduled to be 3.3 million at end-June 1970; in January of this year the scheduled figure for mid-1970 had been 3.7 million. The new Administration's plans for strategic weapons have in general survived Congressional scrutiny. Further, from now on there will clearly be strong resistance from Secretary of Defense Laird and from the Pentagon to any further reductions in the total Defense Budget. Mr. Laird said of the August round of cuts, "re-

^o Authorization for Military Procurement, Research and Development, Fiscal Year 1969: Hearings before the Committee on Armed Services, U.S. Senate, 90th Cong., 2nd Sess. (Feb.-March 1968), pp. 138-139.

World military expenditure

grettably, I must say that these cuts will reduce our capability to meet current commitments ... It is clear that our defense readiness will be weakened."¹⁰

The change in the presentation of "the threat"

During the last four months, there has been a very important change in the presentation of "the threat" to the United States. This change is central to the understanding of the impending steps in strategic weapons procurement: for it is of course the belief in an increased "threat" from other powers which leads to increases in military spending.

The most important source for official statements of "the threat" is the annual defense statement, or posture statement, submitted by the Secretary of Defense to Congress at the beginning of each year. During the long period in which Mr. McNamara was United States Secretary of Defense, this posture statement evolved into a fairly standard form. In the part which dealt with strategic forces, before discussing United States plans, he had a section called "the size and character of the threat". Most of this was a statement of United States estimates of Soviet strategic strength: there was also a section on China. In 1967, 1968 and 1969, the statement included United States estimates of the intercontinental strategic balance. These estimates are reproduced in table 1.5.

Since 1967, the main point made in this section on "the threat" has been about the rise in the total number of Soviet intercontinental ballistic missiles (table 1.5). However, this rise did not appear to be unduly alarming to the last Administration. The outgoing Secretary of Defense, Mr. Clark Clifford, at the beginning of this year, said, "We estimate that as of September 1968 the Soviets had approximately 900 ICBM launchers operational, compared with 570 in mid-1967 and 250 in mid-1966—an increase of well over three-fold in a period of a little more than two years. The rate of increase over the past year has been somewhat greater than estimated one year ago. However, we believe that the rate of increase will be considerably smaller over the next two or three years. Beyond that point, our estimates become less firm."¹¹

Further, as Mr. Clifford commented, the comparison showed that the United States still has a very large margin in its favour in the numbers of

¹⁰ John Graham, "U.S. defence spending to be cut by \$3,000 m", *Financial Times*, 22 Aug. 1969.

¹¹ The 1970 Defense Budget and Defense Program for Fiscal Years 1970-74: A statement by Secretary of Defense Clark M. Clifford (Department of Defense mimeograph).

	1 Oct. 1	1966	1 Oct.	1967	1 Oct.	. 1968
	USA ^a	USSR	USA ^a	USSR	USA	USSR
Intercontinental ballistic missiles ^b	934	340	1054	720	1054	900
Submarine-launched ballistic missiles ^c	512	130	656	30	656	45
Total intercontinental ballistic missiles	1 446	470	1 710	750	1 710	945
Intercontinental bombers ^d	680	155	697	155	646	150
Total force loadings: approximate number of warheads ^e			4 500	1 000	4 200	1 200

Table 1.5. US Department of Defense: Annual statement of US versus Soviet intercontinental strategic nuclear forces

Source: Statements of Secretary of Defense Robert S. McNamara before the Senate Subcommittee on Department of Defense Appropriations, 23 January 1967 and 22 January 1968; and Statement of Secretary of Defense Clark M. Clifford on the Fiscal Year 1970–74 Defense program and 1970 Defense Budget (Department of Defense mimeograph).

^a Mid-year figures.

^b ICBM launchers used for training and development are excluded.

^c Excluding Soviet submarine-launched cruise missiles, whose primary targets are naval and merchant vessels. In 1967 and 1968, excluding Soviet submarine-launched ballistic missiles on dieselpowered submarines, whose primary targets the intelligence community estimates to be strategic land targets in Eurasia.

^d Including only heavy bombers which could fly two-way intercontinental missions.

^e Training and development launchers are included in force loadings. Only SLBM's on deployable submarines are included in total force loading.

submarine-launched missiles and also in intercontinental bombers (table 1.5). In the approximate number of warheads, the table gave the United States nearly a four-to-one superiority.

Going beyond the numbers to the capabilities, Mr. Clifford's appraisal of the comparative technology of the two countries suggested that in his view the United States had an unequivocal and considerable lead. (The weapons terms are explained in the Glossary, page 438.)

"It is quite apparent from the foregoing review of the threat that the Soviet Union is moving vigorously to catch up with the United States at least in *numbers* of strategic missiles—both land-based and sea-based. But, it is also apparent that they are still well behind us in advanced missile technology—accuracy, MIRV's and penetration aids. Indeed, their new solid fuel ICBM appears to be no better than our MINUTEMAN missiles, first deployed in FY 1963. Their new ballistic missile submarine is probably most comparable to our earliest Polaris submarines which first became operational about a decade ago. Their GALOSH ABM system resembles in certain important respects the NIKE–ZEUS system which we have abandoned years ago because of its limited effectiveness. Their BISON and BEAR long range bombers are distinctly inferior to our B-52's and we have long since eliminated from our forces the B-47's which were clearly superior to their BADGER medium bombers.

World military expenditure

"Accordingly, it is reasonable to conclude that even if the Soviets attempt to match us in numbers of strategic missiles we shall continue to have, as far into the future as we can now discern, a very substantial qualitative lead and a distinct superiority in the numbers of deliverable weapons and the overall combat effectiveness of our strategic offensive forces."

The new presentation

With the new Secretary of Defense, the presentation of the Soviet threat has become much more startling. The new appraisal was given by Mr. Laird on 22 May in Congressional hearings on the proposed change in the system of deployment of the United States anti-ballistic missile.¹² The changes are not in the appraisal of the strategic balance as it is now. They consist of added statements about possible developments envisaged for the future.

First of all, the present Secretary of Defense has added to the estimate of Soviet operational missiles a figure of those under construction, and has said, "As of March 29, 1969, the Soviets have in being and under construction more ICBM launchers than the 1,054 possessed by the United States."

Second, the possibility that the rate of installation will now slow down is discounted: "On the basis of the intelligence estimates prepared last fall, this force build-up was expected to level off after the Soviets had achieved a rough numerical parity with the United States in ICBM's excluding the older systems. However, if the Soviets were to continue to deploy ICBM's at the rate they deployed them in 1967–68, they could have as many as 2,500 by the mid-1970's. This is the area of judgement I referred to earlier. We have a very good estimate of the number of ICBM silos now under construction, but we can only conjecture as to the number they will start during the next 2 or 3 years."

A chart was prepared and presented (chart 1.9) which showed Soviet missiles increasing in number rapidly in the future, while United States missiles stayed the same. Not surprisingly, this form of extrapolation led to a larger number of Soviet than United States missiles.

Third, within this total of missiles, the new Secretary of Defense lays great stress on the number of SS-9 missiles, and the threat from these missiles to the US Minuteman missiles: "At the present time, the only serious threat to our ICBM force is the large SS-9 ICBM which, with a warhead yield of up to 25 megatons and its presently estimated accuracy, could destroy a

¹² Safeguard Antiballistic Missile System: Hearings before a Subcommittee of the Committee on Appropriations, House of Rep., 91st Cong., 1st Sess., 22 May 1969. Subsequent citations in this section are taken from these Hearings.


Chart 1.9. United States Administration's presentation of comparison of US and Soviet strategic missiles

Source: Strategic and Foreign Policy Implications of ABM Systems: Hearings before the Subcommittee on International Organization and Disarmament Affairs of the Committee on Foreign Relations, US Senate, 91st Cong., 1st sess., part I, p. 279.

Minuteman in its silo. The Soviets now have more than 230 of these missiles operational or under construction. According to the latest intelligence estimates, they are expected to have somewhere around 400 SS-9 types operational by the mid-1970's, including a new version with considerably greater accuracy.

"Currently, about two-thirds of the Soviet ICBM force consists of SS-11's, a small, Minuteman size, liquid fuel missile. With its currently estimated warhead yield and accuracy, this weapon does not pose a threat to our Minuteman force. The Soviets have just started to deploy a new solid fuel ICBM, the SS-13. But again, this missile, with an even smaller warhead yield and no better accuracy, constitutes even less of a threat than the SS-11 to our Minuteman force.

"Our real concern at this time is the prospect that the Soviets might install highly accurate MIRV's on their large ICBM's and greatly improve the accuracy of their small ICBM's. If they were to do so, the survivability of our Minuteman force would be gravely endangered.

"The Soviets have already begun to test multiple reentry vehicles (MRV's) on their SS-9, three RV's (each with payload equivalent to a 5-megaton warhead) per missile, and it is estimated that they might start deploying these weapons in existing silos in the next year or so. A number of these vehicles

have been launched thus far, three out to 5,100 n.mi. into the Pacific. (The third was launched just the other day.) Although we still have no conclusive evidence that these multiple reentry vehicles are independently aimed, the intelligence community considers it likely the Soviets will go on with the development of MIRV's and install them in a new version of their SS-9 type ICBM's. Should they also greatly improve the accuracy of their small ICBM's, which the intelligence community considers possible, the survivability of our Minuteman force as presently deployed would be virtually nil by the mid to late 1970's.

"It is also possible that the SS-9 with the three reentry vehicles will turn out to be a MIRVed missile. If that should be the case and if the Soviets were to back-fit all of their SS-9's with this new payload, three 5-megaton warheads each, the more than 230 SS-9's now operational or under construction would in themselves constitute a severe threat to our Minuteman force. And, if the Soviets were to increase this force to even 420 missiles and improve the accuracy to a quarter of a mile, they would probably destroy 95 per cent of our Minuteman force, leaving only 50 surviving. (I should point out that this calculation assumes a failure rate of 20 per cent and a capability to retarget a second missile for those that fail.)"

On the basis of this presentation, Mr. Laird has said elsewhere in testimony, "They are going for a first strike capability. There is no question about that."

Fourth, the whole flavour of the new Secretary's comment on Soviet ballistic missile submarines differs from that of his predecessor: "As already noted, the Soviet Union has come abreast of us in numbers of ICBM's: evidence is now accumulating that they intend to match us in numbers of submarine-launched ballistic missiles (SLBM's). We knew more than a year ago that they were constructing a new class of nuclear-powered ballistic missile submarines with 16 tubes, and that they were testing a new storable liquid fuel submerged-launched ballistic missile out to a range of about 1,500 n.mi. We know now that this submarine (designated the Y-class) is in full scale production at a very large facility near Archangel, Severodvinsk, and possibly at another smaller yard. These two facilities can accommodate a total of 12 complete hulls. The intelligence community estimates that the two facilities can produce as many as eight submarines per year. I think that as production experience is gained the rate of output from these two facilities might very well increase significantly.

"Eight or nine Y-class submarines have already been launched and several are believed to be operational. (They also have a number of H-class nuclear-powered submarines which carry 3-6 shorter range SLBM's.) Even at a rate of construction of only six Y-class submarines a year the Soviet SLBM force could equal our own, in terms of numbers, by 1975. Nevertheless, with their currently estimated warhead yield and accuracy, these SLBM's would not constitute a threat to our Minuteman force. But given our present radar coverage of the seaward approaches and no ABM defence of our bomber bases, they could constitute a severe threat to the survival of our bomber forces—even those aircraft held on ground alert."

Fifth, the Secretary hints that the United States Polaris (or Poseidon) fleet might become vulnerable: "I want to make it very clear that we have the greatest confidence in the survivability of our SLBM force, at least through the early to mid-1970's. But, in my judgement, it would be entirely too risky to rely upon only one of the three elements in our strategic offensive forces. We cannot preclude the possibility that the Soviets in the next few years may devise some weapon, technique or tactic which might increase the vulnerability of our Polaris/Poseidon submarines. In that event, our strategic deterrent could be dangerously eroded, with all the consequences which would follow such a development."

Sixth, the Secretary suggests that the Soviet Union might deploy a more extensive and effective ABM force. "Furthermore, we cannot preclude the possibility that the Soviet Union might deploy a more extensive and effective ABM defense. Such a defense, in combination with a substantial hard target kill capability in the form of highly accurate small ICBM's or MIRVed large ICBM's, is what has been characterized by my predecessors as the 'greater-than-expected threat' which could seriously degrade our assured destruction, or deterrent capability. As you know, the Soviets are now completing the development of some 60 odd Galosh ABM missiles on launchers around Moscow.

"But more important, we have now hard evidence that the Soviets are testing an improved long-range ABM, which apparently has a 'loiter' capability. In other words, after the initial firing, the missile can coast or 'loiter' for a period of time until a specific target is selected, at which point it can then be restarted and maneuvered to the target."

Alarming picture

This new picture of "the threat", so much more alarming than that given by the previous Secretary of Defense, has not gone unchallenged in Congress or within the Government itself.

First of all, there are the detailed criticisms of the new appraisal. There is the obvious point that if the other side is attempting to catch up from a very low level—and this appears to be what the Soviet Union is doing in the missile field—then any simple extrapolation of the rate of increase

will lead to an eventual superiority. This is just an arithmetic statement, and nothing more. Secondly, the appraisal of the possibility that the Soviet Union may soon put highly accurate MIRVs on their missiles runs wholly counter to the previous Secretary of Defense's appraisal, made only five months earlier, which indicated that the Soviet Union was some years behind the United States. When the possibility is mentioned of the Soviet Union developing three warheads, not individually targeted, for their missiles, no mention is made of the fact that the United States already has this capability (see page 102). The reference to the Soviet Union's deployment of an antiballistic missile system suggests that they are forging ahead in this field. No mention is made of the fact that, according to the United States' own intelligence sources, the Soviet Union has still not completed even a very limited system round one city, seven years after deployment began; and that some of the missile sites have been dismantled. The appraisal of the potential threat from the new Soviet ballistic missile submarines does not make clear that their capabilities, again according to the United States own assessment, are much inferior to those of the existing United States Polaris fleet.

Three more general criticisms have been made. First, the suggestion that the Soviet Union is seeking a first strike posture by developing weapons which could eliminate United States land-based missiles is not credible. Even if one were to assume all the advances set out in the Secretary's speech which led up to the possibility of the elimination of US land-based missiles, this still does not make a first-strike posture. A first-strike posture requires the simultaneous elimination, not just of the intercontinental ballistic missiles, but also of the bombers and the 41 Polaris submarines: and there is no credible description of how, in the mid-1970's, they might have the capability of doing this.

Secondly, the new appraisal seems to be a statement of assumed maximum capabilities under each head. This is the approach which has fuelled the strategic arms competition throughout the post-war period. It is very easy to describe a set of possibilities, or capabilities, which in five years' time would constitute a serious threat. There is no calculation of the resources that would be needed to develop all the suggested strategic systems simultaneously, nor is there a consideration of the strategic and political motives which could cause the Soviet Government to burden their people with such a bill. To assume that a vast build-up will take place on the other side, and to take steps to counter the build-up, is a certain way of forcing the other side to take at least some of the steps that are assumed.

Thirdly, there is no attempt to see the threat from the other side. Over the whole period of time since World War II the United States has had a considerable superiority in strategic weapons. The United States Administration's own chart (chart 1.9) shows how big the missile gap was, in the United States' favour, in the middle of 1965. From the Soviet point of view it must have appeared that it was the United States which was attempting to preserve a first-strike capability. The Soviet missile build-up since 1965 can quite simply be explained by an attempt to catch up and narrow the gap. Given the smaller size of the Soviet bomber and ballistic missile submarine force, and its lack of aircraft carriers equipped with planes with nuclear weapons, it would not be surprising if the Soviet Union considered that strategic parity required it to have a significantly larger number of intercontinental ballistic missiles than the United States.

The direction of US strategic weapon procurement

The reappraisal of "the threat" has been part of the US Administration's defence of its desire to deploy an anti-ballistic missile system. This has probably been the most intensely debated question in the whole history of United States strategic weapons procurement. The ABM was potentially the largest programme proposed by the Administration, and it became the focus for the recent wave of criticism of military spending and policy. There is little need to add to the material about the ABM. The proposal comes at the end of a massive research and development programme totalling some \$5 billion to date. The original decision, by President Johnson in 1967, was to use it for the defence of cities ostensibly against a Chinese attack. The new Administration has switched its proposed purpose to a defence of the Minuteman sites-hence the emphasis on the threat to the Minuteman in the presentation of Soviet capabilities. The first launchers will not be actually operational for some years: but eventually the system will include some several hundred warheads. (The one Soviet system, round Moscow, is said at the moment to have 60-70 warheads.) The cost, including warheads, is now put by the Administration at around \$11 billion over the next seven years or so. The proposal for the new system (called Safeguard) was eventually approved in the United States Senate on 8 August by the chairman's casting vote, after a 50-50 tie in the Senate voting.

To some extent the debate over the ABM has distracted attention from other fields of strategic deployment: for there are a large number of other programmes which are now being advanced. The most important is the extensive programme of replacement of land-based and sea-based missiles. This is the main reason for the increase in the appropriation for missiles, from\$2 billion in FY 1969 to\$3 1/2 billion in FY 1970. (This is the revised proposal of the new Administration.)

There is no present intention of increasing the number of missiles: the

total number of land-based and submarine-launched missiles at present envisaged for 1975 is about the same as the total now. The proposal is that 500 of the land-based missiles should be replaced by Minuteman III missiles, with 3 independently targeted warheads each; and 496 of the submarinelaunched missiles should be replaced with Poseidon missiles each with 10 or possibly 14 warheads, also independently targeted. (The Poseidon programme is discussed on page 104.) The projection of forces for 1975, together with the multiplication of missile warheads, also allows for a substantial reduction in the number of United States intercontinental bombers. Altogether these developments might raise the number of warheads in the United States intercontinental strategic forces from the present 4200 to around 9000.

These multiple warheads (MIRVs) do not, strictly speaking, themselves have independent guidance. They are carried up in what is described as a "bus" which releases them in sequence: after each release, the velocity and direction of the bus can be changed, so that each warhead can be directed to a separate target.

Deployment of the new missiles is likely, on present plans, to begin sometime in the second half of next year. By the end of July 1969, there had been some nine tests of Poseidon and nine tests of Minuteman III. The total research and test programme appears to call for about 50 tests, to be completed around the middle of next year (1970). The assessment of the Department of Defense Director of Research and Engineering, Dr. Foster, is that "the amount of information we have now about the system's performance ... is more important than the information that remains to be acquired. So ... in demonstrating key factors, we are more than half-way there."

Apart from testing, some other steps have been taken towards deployment. A contract has been signed with General Electric for the production of 68 of the multiple individually targetable reentry vehicles for the Minuteman III missiles. Three submarines are in process of conversion to take the new Poseidon missile.

The new Administration has made a small increase in the funding for the development of an improved guidance system for the Poseidon missile. Though the sum involved is a small one, the change is of strategic importance, for this programme, according to the Pentagon's own statement, promises to "improve significantly the accuracy of the Poseidon missile, thus enhancing its effectiveness against hard targets". The proclaimed intention of the move to place multiple warheads on United States missiles was to preserve the United States' second-strike capacity against Soviet cities. That is, if the United States were struck first, it would still be able to penetrate, with the multiplicity of missiles, Soviet anti-ballistic missile defences around Soviet cities. For attacks on cities, no great accuracy is required. The US Administration claimed that it was clear that these multiple warheads did not threaten Soviet missiles, in a potential first strike. However, according to the testimony of Dr. York, former director of Defense Research and Engineering in the Department of Defense, it would only need a further improvement in accuracy of about a factor of 2 to make it possible for these weapons to attack Soviet silos. He added: "Since the ICBM programmes were initiated 15 years ago, we have already achieved an improvement in accuracy of tenfold. Simply by comparing this record of tenfold improvement with the need for less than twofold more, it is very easy to imagine what the Russian Cassandras are saying." In other words, it will appear to some experts in the Soviet Union that the United States, by initiating a programme which would lead to some thousands of nuclear warheads of high accuracy, is trying to develop, or preserve, a first strike capability. This is the "mirror image" of the United States assessment of Soviet intentions, where some experts argue that the Soviet Union is trying for a first-strike capability, in putting multiple warheads on its SS-9 launcher.

MIRVs and an anti-ballistic missile system are the main developments under way in United States strategic weaponry. But they are not the only ones. There is a substantial and continuing programme of penetration aids for the intercontinental ballistic missiles.

Development has started of a new super-hard silo, which would take either Minuteman III or a new ICBM.

To guard against a successful attack on bomber bases from a fractional orbital bombardment system—which the US believes the USSR is developing—the US bomber fleet is being dispersed to a large number of airfields, and a new early warning satellite is being developed. In the new Administration's revisions to the previous Administration's programme, the funds for this satellite development were increased.

A new short-range attack missile (SRAM) is being developed for use with the bombing force. Its range has not been made public: it can be fired from a bomber some considerable distance from the target. These missiles are already being procured—although in the revisions to the old defence programme for 1969 the proposed procurement programme was slowed down a little. Another missile is being developed, also for use with the bomber force—SCAD, a subsonic cruise armed decoy.

Development work on a new bomber—labelled the Advanced Manned Strategic Aircraft—is being increased. \$25 million was appropriated for this in the fiscal year 1969: the old Administration proposed \$77 million

					-	-			-	
	196 2	1963	1964	196 5	1966	1967	1968	1969	1970 <i>ª</i>	
Strategic forces	22.3	20.3	18. 2	13.5	9.9	8.9	9.9	11.2	11.6	
General purpose forces	35.5	35.1	35.2	37.3	44.0	43.7	42.2	40.9	38.7	
Research and development	8.6	9.7	9.9	9.3	7.3	6.5	5.8	5.8	6.7	

Table 1.6. Share of strategic forces, general purpose forces, and research and development in total US defense expenditure

Per cent of obligational authority, fiscal years.

Source: The Budgets of the United States Government.

^a The figures have not been adjusted for the revisions since January 1969.

in fiscal year 1970, and this has been further raised by the new Administration to \$100 million. For a long time, under Mr. McNamara, the Department of Defense resisted Air Force and some Congressional pressure to move towards procurement of a new bomber. It is one of the programmes which might well be pushed forward as Viet-Nam expenditure falls.

All these are further steps—actual or potential—in the US development of strategic forces. The share of the strategic forces in United States expenditure has been rising again since 1967 (table 1.6), and is expected to rise further in the present fiscal year.

The action-reaction phenomenon

The position, then, on the strategic arms race, judging by United States information, appears to be this. The Soviet Union has since mid-1966 been increasing the number of its missiles rapidly: its total strategic capability, however, is still well below that of the United States, which has been making extensive qualitative improvements in its missiles. (One example of this is discussed on page 96.) The new US Secretary of Defense, extrapolating the present Soviet increase into the future has said: "Based upon the information available to me as Secretary of Defense, I must conclude that the Soviet Union has the capability of achieving by the mid-1970's a superiority over the present authorized programmed forces of the United States in all areas —offensive strategic forces, defensive strategic forces and conventional forces." It was on the basis of this view of Soviet future capabilities that Congress was asked to approve the revised anti-ballistic missile system. The Senate—though by the narrowest of margins—agreed to it; and the United States is going ahead with the deployment of both ABM and MIRVs.

This is basically a familiar situation of a kind well described by former

The strategic competition

Secretary of Defense McNamara in 1967: "In 1961 when I became Secretary of Defense, the Soviet Union possessed a very small operational arsenal of intercontinental missiles. However, they did possess the technological and industrial capacity to enlarge that arsenal very substantially over the succeeding several years.

"Now we have no evidence that the Soviets did in fact plan to fully use that capability. But as I have pointed out, a strategic planner must be 'conservative' in his calculations; that is he must prepare for the worst plausible case and not be content to hope and prepare merely for the most probable.

"Since we could not be certain of Soviet intentions—since we could not be sure that they would not undertake a massive build-up—we had to insure against such an eventuality by undertaking ourselves a major build-up of the Minuteman and Polaris forces....

"Thus, in the course of hedging against what was then only a theoretically possible Soviet build-up, we took decisions which have resulted in our current superiority in numbers of warheads and deliverable megatons. But the blunt fact remains that if we had more accurate information about planned Soviet strategic forces, we simply would not have needed to build as large a nuclear arsenal as we have today.

"Now let me be absolutely clear. I am not saying that our decision in 1961 was unjustified. I am simply saying that it was necessitated by a lack of accurate information.

"Furthermore, that decision in itself—as justified as it was—in the end, could not possibly have left unaffected the Soviet Union's future nuclear plans.

"Whatever be their intentions, actions—or even realistically potential actions—on either side relating to the build-up of nuclear forces, be they either offensive or defensive weapons, necessarily trigger reactions on the other side.

"It is precisely this action-reaction phenomenon that fuels an arms race." 13

There was probably an example on the Soviet side—though much less is known about the Soviet process of decision-making—when the so-called Tallinn air defence system was deployed: this may have been in the expectation that the United States would go ahead with deployment of B-70 bombers or SR-71 strike reconnaissance aircraft.

The construction of the Tallinn system (which until recently was thought

¹³ USA Bulletin, United States Information Services, 19 September 1967.

on the US side to be an ABM system), and the beginning of construction of an ABM system around Moscow, led to the next alarm on the US side. The United States was given the impression that the Soviet Union was aiming to build an airtight shield over the Soviet Union. In his posture statement at the beginning of 1967, Mr. McNamara said: "We have been aware for many years that the Soviets have been working on an anti-ballistic missile defense system We must, for the time being, plan our forces on the assumption that they will have deployed some sort of ABM system around their major cities by the early 1970's."¹⁴ At least partially in response to this, the MIRV programme was pushed ahead. The Department of Defense began to insist on the need to increase the number of targetable warheads towards 8 to 10 thousand. Now it is admitted that the Soviet ABM system consists simply of some 60 ABM missiles around Moscow. Nonetheless the MIRV programme goes forward, and vigorous attempts are being made to improve the accuracy of the warheads. This would mean that they could be used to attack missiles rather than cities.

The recent Soviet increase in the number of land-based and sea-launched missiles may be a reaction to the United States MIRV development programme which started several years ago. Now the build-up of Soviet missiles is being used in the United States to justify the anti-ballistic missile system.

It is clear, in retrospect, that there has never been a strategic plateau in the military confrontation between the two great powers. There has been an "action-reaction phenomenon", or arms race. This is the prospect for the future—unless the strategic arms limitation talks or some other approach breaks the vicious circle. (The history of the two-and-a-half years of negotiations which have preceded the strategic arms limitation talks—for which a date was still not fixed at the end of September—and the debate in the United States on a possible interim moratorium on the testing of MIRVs are discussed at the end of chapter 3, page 190.)

¹⁴ Statement of Secretary of Defense before a joint session of the Senate Armed Services Committee and the Senate Subcommittee on Department of Defense Appropriations on the FY 1968-72 Defense Program, 23 January 1967.

Part III. The third world: military expenditure and the trade in major weapons

Introduction

The general picture of military expenditure in developing countries—which make up most of the third world¹⁵—was set out in chart 1.8 on page 26. Their military expenditure is only a small fraction of the world total; but it does seem to have risen rather faster than world military expenditure as a whole, and to have been accelerating recently. This part of chapter I looks in more detail at regional and country experience, and it concentrates particularly on the trade in major weapons with these countries.

There are two reasons for concentrating on the trade in major weapons. First, the spread of existing sophisticated weapons through the third world is a very significant aspect of the arms competition there. This "horizontal" proliferation is the complement to the technological arms race which is perhaps the most important feature of the arms competition in the developed countries. More and more developing countries are acquiring fighters, ground-to-air missiles, and so on. The third world countries do not, for the most part, produce these sophisticated weapons themselves: the weapons are supplied by the industrial nations.¹⁶ A study of the arms trade therefore covers this particular form of the proliferation of weapons.

The second main reason for looking in particular at the arms trade is this. The arms competition in the third world would be very different if it were not for the fact that the great powers are seeking influence there. They may be looking for strategically placed allies, they may be anxious to support regimes friendly to them against internal armed opposition, or they may wish to protect their economic interests, or to gain general support for foreign policy (in the form of votes in the United Nations, for example). One of the main methods of exerting influence is by supplying arms. A study of the trade in weapons thus throws light on the effects of the interests of the major powers on the arms competition in the third world.¹⁷ It shows up the connections between that competition and the competition between the major powers.

¹⁵ "Developing countries" consist of the world *minus* Europe, North America, the Soviet Union, Japan, Australia, New Zealand and South Africa. For some series the figures for China are too problematic to be included; this is noted when so.

¹⁶ Some third world countries—such as South Africa, Israel and India—are beginning to produce more sophisticated weapons; but these weapons are usually produced under licence with a substantial proportion of imported components. The import content is included in the arms trade figures.

¹⁷ The types of weapon supplied sometimes indicate whether the recipient country's military preparations are mainly concerned with an external or internal threat—a decision often influenced by the supplier country.

The sections which follow begin with some cautions about the use of the figures. Then there are two sections which sum up the general trends in the supply of major weapons and the general features of the arms trade. After that, there are comments on arms supplies to each of five recipient areas. Finally, there is some material on the debates on arms trade policy in some of the supplying countries.

Cautions¹⁸

There are some important qualifications about the figures and other information on the flow of major weapons discussed in this part of the chapter. (Some figures are shown in the charts of major weapons flows in this part; a full set of figures is given in the reference section, page 226.) The figures are, to our knowledge, the first comprehensive quantitative estimates which show how the trends have changed in the past two decades. They are based on incomplete unofficial information-official figures are virtually nonexistent. They are provisional; we would welcome any corrections, deletions or additions. The tables are limited to the supply of major weapons: ships, aircraft, armoured fighting vehicles and missiles. Because no support equipment and no other weapons are included, they represent only a part-but an important part-of the arms trade. The figures are constructed to represent the "real" transfer of resources. They are based on comparable values for comparable items, using such criteria as speed, weight, type of engine, date of production. They do not take into account differing prices or differing terms for individual transactions, such as aid, credit, loans or subsidies. That is, they attempt to measure the quantum of resources represented by the weapons, not the cost in foreign currency paid by the recipient country.

In drawing conclusions from these figures, we have allowed for their wide margin of error. In dealing with the arms trade with these countries, it seemed right to construct the best picture we could, using our own judgement on information from all kinds of sources. The alternative—using official information only—would have meant that little or nothing could be said on a matter of great international importance.

There is also a caution on the use of the military expenditure figures. They cover the military expenditure of the countries out of their own domestic resources: military aid is included in the budget of the donor countries. For some purposes, it is illuminating to include military aid with the expenditure of the recipient countries—if, for example, the question is about changes in the total quantity of military resources deployed in an area. In some areas, the addition of military aid figures would not make much differ-

¹⁸ These cautions are expanded in the reference section, page 217.

	acquireu iong		50 341	Jucc	.o-un	7711-01					
	1958	59	60	61	62	63	64	65	66	67	68
China, P.R.									筆		
Greece									n 1		
Taiwan											• •
Turkey			4			67					5
Korea, South						ë. V					
Cuba						s_{0}^{-1}	` ,	[ig]		`	
Indonesia					2-	(A)			10		
United Arab Rep.								÷			
Iraq							2				
Israel											
Australia									5		
India											
Iran									1		
Korea, North									Z		
Viet-Nam, North									1	×	
Saudi Arabia										. 1	٠
Algeria									¢		
Syria										1	
Thailand											

Chart 1.10. The spread of long-range surface-to-air missiles among third world countries

The first shaded year indicates the year when a country first acquired long-range surface-to-air missiles^a

Source: SIPRI unpublished worksheets on arms transfers 1950-1968.

^a The following missiles are the only long-range surface-to-air missiles known to have been supplied to third world countries: Nike Ajax, Nike Hercules, Hawk, Tartar, V 750VK (known as "Guide-line" in Western countries), Bloodhound, Thunderbird, Rapier.

ence in the trend, because they are too small a proportion of the total. Elsewhere—examples are the UAR, Jordan, and the Far East in general they can alter the picture appreciably. For the group of the Far East countries which have received most United States aid, figures are given both including and excluding aid (page 83).

General trends in supply of major weapons

Major weapon supplies to third world countries have been rising even faster than their military expenditures. The long-term trend, from 1950 to 1968, has been for the supply of weapons to increase, in volume terms, by some 9 per cent a year, against 7 per cent a year for military spending. It has not been a smooth rise over the eighteen years: there was a high point around 1958, when United States military aid was at its height, and there has been

	40	440.00	* Sup			c, uj s							
	1956	57	58	59	60	61	62	63	64	65	66	67	68
Israel													
Taiwan			1								۶.		
India							14 M			12 .			
Turkey					41 ⁻¹				8.g.				
China P.R.													
Greece							$r_{1} \in$) .					
Cuba							٠						4
Pakistan							ţ	14					
UAR											•	1.	
Australia													
Iraq													
South Africa								2	e în			ħ.	.9
Indonesia										2	•		
Algeria													
Korea, North										ŕ		1	
Korea, South												I	
Iran												.4	
Могоссо													7
New Zealand													
Philippines													
Argentina													
Lebanon													
Saudi Arabia											12		
Thailand											12		
Viet-Nam, North											۰.		
Afghanistan													
Ethiopia													
Syria													
Viet-Nam, South													
Jordan													
Kuwait													
Peru													

Chart 1.11. The spread of supersonic aircraft among third world countries

The first shaded year indicates the year when a country first acquired supersonic aircraft^a

Source: SIPRI unpublished worksheets on arms transfers 1950-1968.

^a The following are the only supersonic aircraft known to have been supplied to third world countries: F-4 Phantom, F-5 Freedom Fighter, F-100 Super Sabre, F-101 Voodoo, F-104 Starfighter, A-4 Skyhawk, Mystère IVA, Super Mystère, Vautour II, Mirage III, Mirage V, Lightning, Buccaneer, SU-7, MiG-21, G-91.

Average annual number ^a							
1951–55	20						
1956-60	80						
1961-65	160						
1966–68	225						

Table 1.7. Exports of helicopters to the armed forces of third world countries

Source: SIPRI unpublished worksheets of arms transfers, 1950-68.

^a Rounded to nearest 5.

a rapid increase since 1962. In 1968 deliveries of major weapons to the third world countries, at \$1.7 billion, were higher than ever before: they were around \$300 million, or 15 per cent, above the 1967 figure.

Two examples of the proliferation in conventional sophisticated weapons which lies behind this long-term rise are given in charts 1.10 and 1.11. They show how more and more third world countries have acquired supersonic fighters and anti-aircraft missiles. A third example is given by the figures for the export of helicopters for military use in third world countries since 1950 (table 1.7). The helicopter is becoming more and more important in the weapons inventory of the great powers (chapter II, page 135), and this is also true for third world countries.

Trends in recipient countries, 1962 to 1968, and 1967 to 1968

The two main areas responsible for the increase in major weapon supplies since 1962 have been the Middle East and North and South Viet-Nam. In 1968, these two areas accounted for 70 per cent of total major arms deliveries. In the Middle East, it was not only the re-equipment which followed the Six-Day War which made up the massive influx of weapons: there were extensive arms purchases by Saudi Arabia, Iran and Kuwait (page 66). In addition, there were in this period significant increases in major arms supplies to South Africa and the four North African countries.

The pattern of the short-term increase from 1967 to 1968 was a little different. Again, it was dominated by the Middle East, but in addition there were notable increases in arms supplies to the Indian sub-continent and to South America: in both these areas the trend had previously been falling.

Trends in supplier countries19

The United States, the Soviet Union, Britain and France dominate the market for major arms exports (charts 1.12 and 1.13). During the 1950's

¹⁹ These trends are discussed on the basis of totals which do not include supplies to North and South Viet-Nam, for reasons given on page 83.

these four countries accounted for 80 per cent of major arms supplies to the third world. During the 1960's, this proportion had increased to 90 per cent, and it is still rising.

The United States share of major arms supplies to the third world has fallen both absolutely and relatively since the end of the 1950's.²⁰ Since 1960, the emphasis of US military assistance policy has shifted from the defence of states from possible external attack to the defence of governments from possible internal insurrection: developing countries have been encouraged to acquire counter-insurgency equipment rather than sophisticated conventional equipment. Much of the counter-insurgency equipment supplied is too small to be included in the tables. Those items that are included—helicopters, trainers, patrol boats, refurbished World War II combat aircraft are relatively inexpensive. The Arms Trade Register for 1968 (reference section, page 230) shows that a large part of the equipment supplied by the United States in 1968, particularly in Latin America, has consisted of these items.

Major arms supplies from the Soviet Union have risen throughout the period. In the last few years, the Soviet Union has exported roughly the same quantity of major weapons as the United States.²¹ The most rapid increase in Soviet major arms supplies occurred in the second half of the 1950's. Between 1954–58 and 1959–63, major arms supplies from the Soviet Union doubled. Between 1960–64 and 1964–68, they rose by only about 10 per cent. The rapid increase during the 1950's is not surprising.

²⁰ This decline is to some extent shown in official figures for United States grant aid (of which weapons shipments are a large proportion) and weapons sales. Between FY 1958 and FY 1966, military grant aid to developing countries fell by about a third. (Figures for years later than 1966 are not on a comparable basis because of the exclusion of Viet-Nam.) The main fall took place between FY 1958 and FY 1962. After FY 1962, grant aid remained roughly constant while sales—which were insignificant before FY 1962—rose rapidly. The short term rise is also apparent in our figures for major arms supplies.

US military grant aid and arms sales to developing countries, 1958-66

								US \$ mn at 1960 prices			
	1958	59	60	61	62	63	64	65	66		
Grant aid Department of	1440	1295	977	880	995	1325	1045	1010	965		
Defense sales	••	••	••		35	90	80	245	405		

Source: U.S. Overseas Loans and Grants and Assistance from International Organizations (Special Report prepared for the House Foreign Affairs Committee) (Washington, D.C.: Agency for International Development, 1968). Military Assistance Facts (Washington, D.C.: Office of the Assistant Secretary of Defense, International Security Affairs, 1967 and 1969).

²¹ These figures should not be used alone as a measure of the extent of great power intervention in third world affairs. There are of course many other types of intervention—such as foreign bases and direct military intervention—which, in cost, are much more important than major arms supplies.



Chart 1.12. Exports of major weapons to third world countries

\$ mn, at constant (1968) prices. Five-year moving averages. 1968 estimate added

After Stalin's death, a more active policy towards developing countries evolved. The first arms agreement with Egypt was made in 1955; it was followed soon after by a similar agreement with Syria. In 1958 the Soviet Union began supplying arms to Iraq and Indonesia, and a little later to Africa. Arms supplies to India and Cuba began in 1960. Although major arms supplies to India and the Middle East have increased substantially in recent years, the total Soviet rise has been relatively small because of a considerable reduction in supplies to Indonesia and Cuba, which reached their height in 1962.

In the short term, major arms supplies from both the United States and the Soviet Union have risen, particularly in the Middle East. The Soviet Union has been meeting the replacement requirements of the UAR and Syria, while the United States has been supplying sophisticated equipment to Israel, Jordan and Iran.

Britain and France together account for approximately 20 per cent of

^a Excluding North and South Viet-Nam

Chart 1.13. Exports of major weapons by UK and France to third world countries





Source: The reference section, page 228.

total major arms supplies during the period. The British share has fallen since the end of the 1950's. The level of supplies from France has risen throughout the period, though not continuously; it is now approaching equality with the level of British supplies.

During the 1950's, a large proportion of British arms were supplied to countries which had had traditional military ties with Britain, or to excolonies. Many of these traditional recipients have turned to other sources. The UAR and Iraq turned to the Soviet Union. Jordan is receiving more and more weapons from the United States, and India from the Soviet Union. An embargo has been placed on British arms supplies to South Africa, which has consequently turned to France.

In the short term, there have been rapid rises in both British and French major arms supplies, particularly in the last two years. In 1968, Britain and France accounted for 35 per cent of total major arms supplies. France has determinedly expanded its markets in South Africa and in Latin America and South Asia. The embargo on Israel has been accompanied by an increase in orders from and deliveries to the Arab countries. France continues to supply arms to French ex-colonies. A large part of the recent increase in British major arms supplies has consisted of deliveries to the oil rich countries of the Middle East.

Among the other suppliers, Canada, West Germany and Italy have in-

creased their exports in the last few years. Major arms supplies from Italy and Canada were also high during the 1950's, in relation to their current level. Canada was selling Sabre fighters, built under licence from the United States, during the 1950's; it is now selling Canadian built and designed transports. Italy is selling trainers and helicopters. During the 1950's, Italian exports consisted primarily of ships.

The rise in West German major arms supplies to countries outside Europe has consisted of surplus equipment. Iran and Venezuela, in particular, have purchased large quantities of ex-Luftwaffe F-86 fighters.²² The supplies of surplus equipment from Germany have been the subject of much controversy in the United States. West Germany has a purchase agreement with the United States to offset the cost of US troops stationed in West Germany. It is argued that the pressure on West Germany to buy American equipment has forced it to speed up the replacement process and dispose of excess equipment by selling to third world countries.

The Swedish defence industry is comparable in sophistication to those of Britain and France. However, Swedish exports of major weapons to the third world have been extremely low and have fallen to an almost negligible amount during the 1960's. This is probably the result of the increasingly restrictive Swedish arms trade policy.

General arms trade features

Many of the important events of 1968 illustrate general patterns of arms trade behaviour. The most obvious of these is to be found in the Middle East where the big powers, partly through their arms supply policy, have been drawn deeper into the conflict. The Soviet Union has been replacing UAR and Syrian losses, while the United States, in addition to airlifting supplies to Jordan, has become the primary arms supplier of Israel.

A similar pattern is discernible in Nigeria and the Yemen. I"n Nigeria, the Federal forces receive arms from Britain and the Soviet Union, the Biafran forces from France. In the Yemen, Republican forces have been supported by the Soviet Union while the Royalists in 1968 were still receiving arms from Saudi Arabia which in turn, received arms from Britain and the United States.

The supply of arms to these countries represents a competition for influence. Conflicts create a demand for weapons, and political influence can be gained through meeting this demand—or lost through refusing to meet it. The role of the supplying country varies. A supplying country may pro-

 $^{^{22}}$ The 90 F-86's supplied to Iran were later delivered to Pakistan. Most, if not all, have now been returned to Iran.

vide arms for both sides: the United States supplies arms to Jordan and Israel, the Soviet Union supplies to both Pakistan and India. There are other examples where competing supplying countries—in Nigeria, Britain and the Soviet Union—provide arms to one side. In all these cases the presence of the big powers, as suppliers of weapons, alters the nature of the conflict. This is not merely because the wars are fought with the weapons supplied. It is also because the weapons are supplied for political influence, thus subsuming the local issues under world-wide issues—the issues between the supplying countries themselves.

This is not to say that the supplying countries do not want to reduce the supply of weapons or to find settlements for local conflicts. The competition for influence, however, makes this difficult. This is also well illustrated by the events of 1968. In Jordan, the possibility that the Soviet Union might meet the Jordanian demand for weapons led the United States to airlift supplies to Jordan starting in May. In Nigeria the British have justified the supply of arms on the ground of offsetting Soviet influence. And in Iran, the Shah has used his 1966 arms agreement with the Soviet Union as a bargaining point in negotiations for United States equipment. Because recipient countries can threaten to go elsewhere, supplying countries, in the interests of maintaining or gaining political influence, find it necessary to accede to demands for weapons.

A situation of this kind arose in South America. United States attempts to keep supersonic fighters out of the region led certain South American countries to seek other sources of supply. When it appeared that they would be successful, the United States was forced to reverse its policy. (The case is discussed in detail on page 58). Recently, however, the United States has placed itself in a better position to prevent intrusions into its arms markets. The Symington Amendment to the Foreign Assistance Act of 1967 and the Military Sales Bill of 1968 cut off economic aid and arms purchase credit to any country buying elsewhere sophisticated equipment which the United States deems excessive. This legislation has already been applied to Peru.

Another feature of the arms trade which is demonstrated by the 1968 experience is the way in which military assistance and arms sales are being substituted for direct presence. As a consequence of the British withdrawal east of Suez, Abu Dhabi, Muscat and Oman, South Yemen, Malaysia and Singapore have all been receiving aircraft and other equipment from Britain. Countries like Saudi Arabia and Iran have justified many of their arms purchases on the ground that they are filling the vacuum created by the British departure. Similarly, if the proposed policy of Vietnamizing the war in Viet-Nam comes about, one can expect a large increase in military assistance to South Viet-Nam to substitute for the presence of American troops. The motives behind the supply of weapons are not only political. In both Britain and France, there are powerful economic pressures to sell arms. Criticism of the Israeli embargo in France and of the South African embargo in Britain has contained many arguments about the loss of lucrative markets. The deals concluded by Britain with oil-rich but underdeveloped countries bear witness to their economic importance to Britain. In 1968, Britain delivered sophisticated aircraft and missiles to Saudi Arabia and Kuwait and signed an agreement for missiles with Libya which will delay Libya's economic development plan by several years. France has also been finding new markets in the Arab world, in Latin American and the Indian sub-continent.

In several supplying countries there were public debates on arms trade policy in 1968. In the United States, the debate began with the discovery, in January 1967, that the Export-Import Bank was heavily involved in financing arms sales. The Swiss debate was started by the Oerlikon-Bührle scandal of November 1968. In Sweden the debate was the result of reports that Swedish companies were taking part in an aeronautical exhibition in Buenos Aires. The debates all led to action on the part of the respective governments. In the United States, a new Military Sales Bill was presented in 1968. In Switzerland, the Government is submitting a report to Parliament on arms exports. In Sweden, the restrictions on arms exports have been further tightened up especially to prevent countries with oppressive or totalitarian regimes from buying Swedish arms. A commission to look into the whole issue of Swedish arms trade policy has also been appointed. (These debates are discussed more fully on page 85.)

There has been some international debate on the arms trade. Between 21 November and 5 December 1968, the First Committee of the General Assembly discussed a proposal recommending a study of the possible registration of data on imports and exports of conventional arms, sponsored by the Danish representative. Its reception indicated that immense problems would face any proposal to regulate the trade in conventional weapons, particularly in the absence of a more general disarmament agreement covering production as well as trade. It was felt very strongly that the registration of weapons transfers would discriminate against countries which import weapons, and against non-aligned countries.

The five sections which follow, from page 55 to 85, look at the arms trade to five main recipient regions.

South America

South America is one of the few areas of the world where military expenditure has risen relatively slowly in the last 20 years (charts 1.14 and 1.15).



US \$ hundred mn, at constant (1960) prices and 1960 exchange-rates









Source: The reference section, page 214. ^a 1967.

	Average	Size of military						
	Long- Sho term tern	Short- term	Year-to-	year chang	es	Budgeted	in 1968 US \$ mn, current prices and exchange-rates	
trend 1949-	trena 1949–68	trend 1965–68	1965–66	1966–67	196768	in 1969		
South America								
Brazil	+3.2"	+11.9°	- 16.3	+13.8	••	••	1008.54	
Argentina	-0.8	+ 5.6	- 27.8	+23.8	+31.7	••	428.6	
Venezuela	+9.4	+ 6.3	+ 8.6	+11.7	- 1.0	••	195.6	
Реги	+7.1	+12.3	+ 3.4	+ 14.4	+19.8	-11.3	153.0	
Colombia	+8.0	+ 1.7		+ 3.3	+ 1.7	••	135.5	
Chile	+ 3.4	+ 5.1	+ 4.1	+ 10.1	+ 1.2	+ 2.2	109.0	
Central Americ	a							
Mexico	+5.2	+ 8.0	+ 20.4	+ 0.6	+ 4.0	••	182.9	

Table 1.8. Latin America: Long and short term trends in the volume of military expenditure^a

Based on constant price figures

Source: The reference section, page 214.

^a Figures are given only for countries whose military expenditure in 1968 exceeded \$100 million (at current prices and exchange-rates). Because reliable figures are not available, Cuba is omitted. ^b 1949-1967. ^c 1964-1967. ^d 1967.

There has been no external threat to the area and the main border disputes have been for the most part dormant. There has been some prestige arms competition, but only on a limited scale. It is perhaps surprising that the rise in military expenditure should have been so slow in an area with so many military regimes.

In 1968, however, there was quite a sharp rise, especially in Argentina and Peru (table 1.8). There have been erratic year-to-year movements before—sharp rises, followed by falls. It is too soon to say whether 1968 was a turning-point in the long-term trend.

The series for major arms supplies to the region shows the same kind of picture, but in accentuated form. From the end of the 1950's up to 1967 these supplies were falling. Then between 1967 and 1968 they more than doubled (chart 1.16).

There are two important features in this increase. First, it is concentrated on supplies of aircraft, some of which will be used for civil purposes. Many of the air forces in South America undertake civilian transport duties, and nearly half of the aircraft supplied were heavy military transports.

Second, the short-term increase has come almost entirely from non-US sources. During the 1950's half of all arms supplies to South America came from the United States. In the period 1960–67 the proportion rose to two-thirds. In 1968 it dropped to about one-sixth, which is lower than in any year since 1950.

Chart 1.16. Imports of major weapons by Latin American countries



US \$ mn, at constant (1968) prices. Five-years moving average. 1968 estimate added

Source: The reference section, page 226.

This drop in the United States' share is the consequence of its policy of discouraging Latin American countries from buying sophisticated weapons.²³ They have turned to other sources of supply for sophisticated equipment—particularly for the air forces, which have mainly been operating planes acquired in the late forties and fifties. The story of the shift in US supplies shows the difficulties that arise when one nation, acting on its own, attempts to put a brake on the supply of certain weapons to an area. In this instance the nation was the dominant supplier and the dominant power, with a number of possible sanctions which it could use to back up its policy. The policy had some success in imposing delay: it also had the consequence that other nations moved into the market.

Supersonic fighters in South America

In mid-1965, talks took place between Argentina and France over the possible purchase of the French Mystère. The United States then offered Argentina 50 reconditioned A-48 Skyhawks. The offer was accepted, but so far only 25 have been delivered because of shortages due to the war in Viet-Nam. In 1966, Chile expressed interest in the Skyhawk, but, again owing to the war in Viet-Nam, it was offered the older F-86 instead. Chile

²³ In 1968, US aircraft deliveries to Latin America consisted mainly of helicopters, trainers and other aircraft suitable for counter-insurgency and civic action. A civic action project is a non-military project undertaken by the military, such as building roads and bridges and transporting civilian passengers and supplies. It is intended to enable the military to perform a "modernizing" function in developing countries and to alter "the negative image of the military man as the oppressive preserver of the stagnant status quo" (R. McNamara, *The Essence of Security*, London, 1968, p. 152).

refused and requested the F-5 Freedom Fighter—a plane which is just supersonic. It was told that it was US policy not to supply supersonic aircraft to Latin America before 1969. In October 1966, Chile ordered 21 refurbished Hawker Hunters from Britain. These planes were delivered in 1969.

In 1966, Brazil and Peru were also expressing interest in the F-5. There were rumors that Peru was negotiating for the Lightning—a British fighter more than twice as expensive as the F-5. But this was regarded as a ruse to persuade the US to supply the F-5 before 1969. Earlier in the year, the USA had vetoed the sale of 6 British Canberras, built with US financial aid, to Peru, on the ground that Peru could not really afford them.²⁴ The United States had also offered Peru 25 F-86's but Peru had turned down the offer. In 1967, both Peru and Brazil opened negotiations with the French to buy the Mirage V, the French equivalent of the F-5. In October, Peru announced that it was ordering 12 Mirage Vs.

The announcement appears to have caused some consternation in the United States. Two weeks later, the F-5 was offered to Argentina, Chile, Brazil, Venezuela and Peru. At the beginning of November, US officials warned Brazil that the purchase of Mirage fighters might jeopardize the US development programme to Brazil. On 24 November, the Brazilian Air Minister announced that Brazil had decided to buy 15 F-5's and 15 Mirages. He said that this was a technical rather than a political solution. However, no firm orders were placed, though an official communiqué in January 1968 stated that the French had offered the more favorable terms.

In May 1968 it was announced that the United States was applying the Symington Amendment to the 1968 Foreign Assistance Act²⁵ to Peru. This amendment curtails US aid to a country which buys "sophisticated" weapons it cannot afford and does not need. Foreign aid officials said that they would be "unable to come to any decisions" on new US development loans for Peru if Peru persisted in buying the Mirage.²⁶ In addition to the Mirages which have now been delivered, Peru has ordered 78 AMX-13 tanks from France; but according to AID officials tanks do not count as "sophisticated" equipment. Brazil, possibly afraid of similar consequences, has apparently decided not to buy the Mirage. It was reported in February 1969 that it had decided to buy the Skyhawk, but no orders have yet been confirmed.

The main country to gain from United States policy has been France. Its exports of major weapons to South America had been negligible up to 1968:

²⁴ The veto has now been circumvented and the planes will be delivered in 1969. ²⁵ The Amendment was incorporated in a provision under section 670 of the Foreign Assistance Act.

²³ In May 1969 the United States imposed a complete arms embargo on Peru; the embargo was lifted in July.

in 1968 they amounted to some \$30 million. In 1967 Argentina agreed to buy 60 AMX-13's. The French tanks were chosen in preference to reconditioned American tanks after the United States had attempted to put a brake on supplies to Argentina. Argentina is planning to expand its domestic defence industry, and France agreed to permit local assembly of at least 30 of the tanks. Other French weapon supplies in 1968 included some Magisters to Brazil, exchanged for MS-760's supplied to Brazil during the fifties.²⁷

The United Kingdom's supplies to South America were also high in 1968. Britain has traditionally supplied South America with large quantitites of ships, among other things. The increase in arms supplies in 1968 is partly explained by the export of Hawker Hunters to Chile—here Britain also gained from the United States' restrictive policy—and partly by supplies for heavy military transport aircraft. Transport aircraft also explain the high Canadian figures.

Central America

As in South America, military expenditures in Central America have shown no significant upward trend. The exception is Mexico, where defence expenditure has risen by 7 per cent a year since 1960.

Major arms supplies to Central America have been falling, and in 1968 were lower than in any year throughout the period.²⁸

The main item of importance in 1968 is the US supply of six refurbished Mustangs to El Salvador. These World War II fighters are also being supplied to Bolivia and are said to be suitable for counter-insurgency action.

Middle East

Introduction

Military expenditures in Middle East countries have been rising very fast for a long time (table 1.9). There has been a sharper acceleration in the last few years (charts. 1.17 and 1.18), and an explosive increase in major weapon supplies (chart 1.19). In 1968, the Middle East accounted for a quarter of the total military expenditure of all developing countries, ²⁹ and for 40 per cent of their receipts of major weapons.

²⁹ Excluding China.

 $^{^{\}rm zr}$ The agreement was said to be on the understanding that Brazil would buy the Mirage.

²⁸ The peak in major arms supplies to Central America in the years 1960-63 is due entirely to the brief arms build-up in Cuba.

	Average	Size of military						
	Long- term	Short- term	Year-to-	year chang	ges	Budgeted change in 1969	in 1968 US \$ mn,	
	194968	1965–68	 1965–66	1966–67	1967–68		exchange-rates	
UAR	+ 10.7	+ 19.1	+ 3.0	+ 23.3	+ 33.2	+ 17.1	752.8	
Israel	+17.2	+31.0	+ 6.6	+ 60.8	+31.6	+28.2	596.0	
Iran	+12.0	+ 19.8	+ 34.4	+ 21.0	+ 5.8	••	493.1	
Saudi Arabia	••	+ 31.0		+ 107.6	+ 9.0	••	320.9	
Iraq	+14.1	+ 1.0	+ 4.0	- 9.1	+ 9.2	••	252.0	
Syria	+11.8	+ 7.9	18.1	+ 44.6	+ 6.3	••	136.1	
Jordan	+ 9.0	+14.1	+ 19.7	+ 5.8	+17.4	••	77.0	
Kuwait	_	+ 40.0*	+18.2	+ 65.4	••	••	60.2°	
Lebanon	+ 9.9	+12.4	+ 20.5	+ 13.3	+ 4.1	+15.2	42.9	

Table 1.9. Middle East: Long and short term trends in the volume of military expenditure^a

Based on constant price figures

Source: The reference section, page 204.

^a Figures are given only for countries whose military expenditure in 1968 exceeded \$10 million (at current prices and exchange-rates).

^b 1965–1967. ^c 1967.

It is not just the countries involved in the Six-Day War which show this acceleration. Indeed, it is most marked in three countries which were not directly involved in the War at all—Iran, Kuwait and Saudi Arabia. All three countries are using their oil revenues to build up their military forces at a very rapid rate.

Six-Day War

Following the Six-Day War the Soviet Union increased arms supplies to the UAR and Syria; the United States increased supplies to Israel and Jordan.³⁰ French policy towards the Middle East changed: an embargo was imposed on Israel; Mirage fighters were supplied to Lebanon; and a large arms deal may have been concluded with Iraq.

LOSSES AND REPLACEMENTS

During the Six-Day War, the UAR lost all of its Tu-16 medium bombers (25), 29 Il-28 light bombers, most of its MiG fighters, including approximately 150 MiG 19's and 21's, and the major portion of its tanks, many of which were captured by Israel. Jordan lost 18 of its own Hawker Hunters—the remaining four were being overhauled in the UK—together with three

³⁰ Any comparison of military expenditures in Israel and the Arab countries should make allowance for the military aid received by the Arab countries, which is not included in their budgets.

Chart 1.17 Military expenditure in Middle East countries^b





Source: The reference section, page 204.

^a Figures not available before 1961. ^b Since this chart was drawn the UAR figure was revised to \$730 mn. for 1968.

Chart 1.18. Military expenditure in Middle East countries: relative importance in 1968^b

US § mn, at constant (1960) prices and 1960 exchange-rates



Source: The reference section, page 204.

^a 1967. ^b Since this chart was drawn the UAR figure was revised to \$730 mn.



Chart 1.19. Imports of major weapons by Middle East countries

US \$ mn, at constant (1968) prices. Five-year moving averages. 1968 estimate added

Source: The reference section, page 226.

lent to Jordan by Iraq, and about 30 tanks. Israel lost a few Mirages, Vautours and Mystères; in tanks it gained many more than it lost. By the end of 1968 all the aircraft losses and a large part of the tank losses had been made up.

The replacements have not always been of the same type as the losses. The UAR has received replacements for most of its MiGs and Il-28 light bombers, but apparently not for its Tu-16 medium bombers. The UAR has also received 50 Su-7 fighters.³¹ These fighters were probably on order before the War, since the UAR received 14 in early 1967. Syria has received replacements for all of its MiGs.

JORDAN AND COMPETING SUPPLIERS

Not all the Jordanian Hunters have been replaced. But Jordan has received F-104 Starfighters and 60 Patton tanks. The way in which the United States

^{at} President Nasser announced on 23 July 1968 that the arms from the Soviet Union were provided free or against loans to be repaid later.

was persuaded to deliver them illustrates one facet in the competition between supplying countries. Immediately after the Six-Day War, Jordan requested arms from the United States and the United Kingdom. The United States, having imposed an embargo on all arms supplies to the Middle East, was unwilling to release the F-104 Starfighters ordered before the war. Britain had no Hunters available for immediate delivery. At this point the Soviet Union offered to supply arms to Jordan. King Hussein made it clear to the West that he was unwilling to accept this offer: but he was in a difficult position because his senior officers were anxious that he should do so-the possibility of a military revolt was imminent. In September, the United Kingdom supplied seven Hunters: four already belonged to Jordan but had been overhauled in Britain and three were transferred from Aden. In October, King Hussein visited Moscow. As Israeli air raids increased, pressure on him to accept the Soviet offer became stronger. In February 1968, the United States announced that it was resuming arms supplies to maintain US and other Western ties in Jordan. At first the shipments consisted only of spare parts, transports and communications equipment. But followng a renewed Soviet offer of arms in March, the United States signed a new arms sales agreement which provided for the supply of tanks and aircraft, among other items. The first Patton tanks were delivered to Jordan in May 1968, and the first deliveries of the long-awaited F-104's began in August. In May 1968, Britain agreed to supply another 15 Hunters obtained from the Netherlands Air Force. Later on in the year, Britain concluded an agreement with Jordan to supply Tigercat, a missile which is particularly suitable against low-flying aircraft. Jordan has received £65 million worth of financial assistance from Saudi Arabia, Kuwait and Abu Dhabi for arms purchases.

UNITED STATES AND FRENCH SUPPLIES

At the outbreak of the June War, both the United States and France imposed embargos on arms supplies to the Middle East. On 24 October the American embargo was lifted for Israel, Lebanon, Saudi Arabia, Tunisia and Morocco. This enabled the United States to release the 48 Skyhawks which were ordered by Israel in 1966. Hawk missiles, in addition to those supplied in 1962, were also delivered to Israel in the summer of 1968.

After the June War, the French embargo was limited to offensive weapons. This primarily affected the Mirage V, which had been ordered by Israel in January 1966 and was scheduled for delivery in November 1967. At the beginning of 1968, the embargo was further limited to countries directly involved in the Arab-Israeli War. France was negotiating an agreement with Iraq to supply large quantities of aircraft and armoured light fighting vehicles. By February an agreement had been concluded with Saudi Arabia for the supply of Panhard armoured cars. In March, the delivery of Mirages to Lebanon was reported. The French were still able to deliver helicopters and spare parts to Israel, these not being defined as offensive weapons. During 1968, seven Super Frelon helicopters and 25 ex-Bundeswehr Magisters, labelled as spare parts, were delivered to Israel. But in January 1969, following the Israeli raid on Beirut airport, a total embargo on arms to Israel was imposed by France.

The French embargo also affected the medium range surface-to-surface missile MD-660, developed by Dassault especially for Israel. Israel paid for the entire development. Two out of a total order of 50 were delivered before the embargo of January 1969.

As a result of the French refusal to deliver the Mirage V, Israel requested the United States to supply the Phantom F-4, a considerably more advanced aircraft. Although these planes were said to have been requested as early as January 1968 no decision was made until 9 October 1968, when President Johnson instructed Secretary Rusk to open negotiations with Israel. This followed an amendment to the 1968 Foreign Assistance Act, requesting the President to sell supersonic aircraft to Israel. The delivery of the Phantoms began in 1969.

Iran and the Arabian Peninsula

Iran, Kuwait and Saudi Arabia are all receiving sophisticated air defence systems from Britain and the United States. There have also been increased supplies of weapons to other countries in the Arabian Peninsula. Since the Egyptian withdrawal from the Yemen, the Yemen has been receiving larger quantities of weapons direct from the Soviet Union. As a result of the British withdrawal from Aden, South Yemen has been receiving aircraft from Canada and Britain and has signed a military assistance agreement with the Soviet Union. Abu Dhabi and Muscat and Oman have been receiving equipment from Britain, in anticipation of the British withdrawal from the Persian Gulf by 1971.

IRAN

The arms build-up in Iran illustrates two important features of the arms trade. First, in persuading the United States to supply sophisticated weapons, the Shah has exploited the competition between the United States and the Soviet Union. Secondly, the supply of arms to Iran has been justified both by the United States and Iran by the need to find some substitute for the British presence in the Arabian Peninsula.

In 1964, the United States agreed to sell Iran 90 F-5 fighters and a Hawk

anti-aircraft missile system. These were intended as replacements for the F-84's and the F-86's acquired by Iran during the 1950's as a contribution to CENTO. In 1965, Iran concluded an agreement with the Soviet Union for 110 million worth of arms. In 1968, the United States agreed to sell Iran 32 F-4 Phantoms. According to Henry J. Kuss, head of the arms sales programme, the Shah had "made it abundantly clear ... that if the United States were unwilling or unable to meet his major military requirements, he was determined to go elsewhere to acquire what he needed."³²

The US Agency for International Development (AID) objected to the sale on the ground that the funds were needed for development. In hearings before the Senate Foreign Relations Committee in both 1967 and 1968, the sale was defended by Administration officials, who put forward the argument that Iran needed a strong defence capacity to defend its oil installations in the Persian Gulf from possible threats by the radical Arab states —UAR, Syria and Iraq—after the British withdrawal from Aden in 1968. In April 1968 Prime Minister Kosygin visited Iran; and in June 1968, the Shah visited the United States. He is said to have concluded a \$600 million arms deal spread over the next six years.

SAUDI ARABIA AND THE YEMEN

In December 1965, a package deal was concluded between Saudi Arabia, the United States and Britain. It involved Lightning fighters, BAC 167 jet trainers and a Hawk missile system.

In October 1968, the British sent to Saudi Arabia, under an emergency programme, six Hunters, five Lightnings and Thunderbird missiles. The programme was called "Magic Carpet"; its purpose was to deter Egyptian forces in the Yemen from bombing Saudi Arabian-Yemeni supply lines. It followed United States refusal to speed up the delivery of the Hawk missiles.

Since then, however, Saudi Arabian relations with Britain have become strained. In February 1968, Saudi Arabia signed an agreement with France for 220 Panhard armoured cars in preference to the British Saladins it had originally requested.

During the Yemen War, which finally reached a settlement in 1969, the Republican regime received military aid from the UAR and the Soviet Union. The opposing Royalist forces received support primarily from Saudi Arabia, which in turn received weapons from the UK and the USA.³³ (This

³² Kuss made this statement during hearings before the subcommittee on Near East and South Asian affairs, Senate Foreign Relations Committee, which were held on 14 March 1967.

³³ The United States initiated a small military assistance programme to the Yemen in 1962. Unlike the United Kingdom, it recognizes the Republican regime.

is another example of the entrammelling of outside powers in local conflicts.) The Soviet Union has supplied military and economic aid to the Yemen since 1956. Most was channelled through the UAR after 1962—the year of the Republican coup. Egyptian troops were withdrawn, as agreed at Khartoum in August, by December 1967. Saudi Arabia, however, continued supplies to the Royalists and direct supplies from the Soviet Union were resumed.

KUWAIT, THE ARAB STATES OF THE PERSIAN GULF,

AND SOUTH YEMEN

Arms are being supplied in increasing quantities to Kuwait, the Persian Gulf states and South Yemen. In all these countries, arms supplies provide a substitute for direct military presence.

In 1968, Kuwait and Britain terminated a 1961 defence agreement under which Kuwait was entitled to receive British military protection. Kuwait has been building up its own military forces. In 1966, Kuwait ordered 34 Lightnings, armed with air-to-air missiles, which were delivered in 1968. Following the termination of the defence agreement, Kuwait also ordered Vickers 37-ton tanks and six BAC 167 jet trainers.

In the Persian Gulf states, where the British will withdraw by 1971, there are a number of conflicting interests, involving oil, dynastic quarrels, internal insurrections, and border disputes. These not only concern the states of the Persian Gulf themselves but also other countries in the region, including Iran and Saudi Arabia. The Gulf Federation, comprising Bahrein, Qatar and the seven Trucial States, which was provisionally formed in March 1968, broke up in June 1969. Abu Dhabi, the richest of the nine states, is receiving considerable quantities of British equipment, including aircraft, patrol boats and armoured cars. In June 1969, Abu Dhabi ordered a squadron of refurbished Hawker Hunters which will form the nucleus of a small air force to be established before the British leave. Muscat and Oman have received six BAC 167 jet trainers for counter-insurgency action against guerillas allegedly armed by Iraq.

British troops withdrew from Aden (South Yemen) at the end of 1967. South Yemen has received some British aircraft as part of the British aid agreement associated with South Yemen's independence. An agreement for military and technical aid was signed with the Soviet Union and the first Soviet arms arrived in July 1968.

Africa

The rise in military expenditure in Africa since the beginning of the 1960's has been both rapid and widespread (table 1.10 and charts 1.20 and 1.21).

	Average		Size of military					
	Long- Short- term term		rt- a Year-to-year changes				expenditure in 1968 US \$ mn,	
	1949–68	1965–68	1965–66	1966–67	1967–68	in 1969	exchange-rates	
North Africa								
Algeria	+15.2°	+16.3	+10.6	+ 6.6	+33.5	••	172.2	
Morocco	+ 11.9°	+13.0	+ 0.4	+ 7.2	+34.0	••	148.2	
Libya	+ 12.1 "	+11.0	+ 5.4	+20.6	+ 7.6	+24.2	30.0	
Tunisia	+14.2ª	+ 9.5	+ 14.9	- 7.3	+23.2	- 2.0	20.0	
Sub-Saharan Af	rica							
South Africa	+10.4	+ 2.3	+ 9.1	- 0.3	- 1.6	••	353.3	
Congo,								
Kinshasa	••	+ 12.4 ¹	+ 39.4	- 37.1	••	••	75.0 ¹	
Nigeria	+21.0 ^e	+10.4*	+ 6.3	••	••	••	73.4 ^m	
Sudan	+15.7	+20.0	+41.6	+ 1.9	+20.8	••	55.3	
Ethiopia	+12.5	+ 9.6 ^k	+12.6	••	••	••	40.5 ^m	
Ghana	+10.79	+ 8.4	- 7.7	+ 36.1	+ 1.4	+11.2	38.7	
S. Rhodesia	••	+ 8.4	- 7.6	+ 19.9	+ 14.9	••	21.2	
Zambia	••	+ 2.8	+27.0	- 3.2	- 11.6	••	19.6	
Kenya	••	+17.3	+25.6	+ 24.8	+ 2.8	••	17.1	
Ivory Coast	••	+11.4 ¹	- 1.0	+24.3	••	••	16.7 ¹	
Cameroon	+ 3.3"	+ 2.3 ¹	+ 2.5	- 0.8	••	••	16.2 ¹	
Madagascar	••	+ 8.0 ¹	+ 4.4	+ 7.4	••	••	12.21	
Tanzania	+ 37.01	+12.3	+13.9	+16.2	+ 7.0	••	10.8	

Table 1.10. Africa: Long and short term trends in the volume of military expenditure^a

Based on constant price figures

Source: The reference section, page 210.

^a Figures are given only for countries whose military expenditure in 1968 exceeded \$10 million (at current prices and exchange-rates). ^b 1963-1968. ^c 1961-1966. ^b 1960-1967. ^k 1964-1966.

° 1958–1968.	f 1960–1966.	¹ 1962–1968.	¹ 1967.
^d 1956–1968.	^g 1957–1968.	^J 1964–1967.	^m 1966.

There had been some increase in the mid-fifties but this was almost entirely accounted for by Ethiopia, S. Rhodesia, the Sudan and South Africa. The acceleration in the sixties coincided with the independence of new African nations, many of whom were then establishing their armed forces. Another important cause of the increase was South Africa's drive to increase its military forces. South Africa's spending quadrupled, in real terms, between 1960 and 1965. Since 1965 South African spending has levelled off; in the rest of Africa military expenditure has continued to go up fast.

Major weapon supplies have also increased rapidly in the sixties. Most of them have gone to South Africa (chart 1.22), which has received more than double the amount going to the rest of Sub-Saharan Africa. Following a peak in 1965–66, South Africa's imports of major weapons have come down a little. The supply of major arms to the rest of Sub-Saharan Africa



Chart 1.20. Military expenditure in African countries

US \$ mn, at constant (1960) prices and 1960 exchange-rates

has levelled off since 1963, when the establishment of many new armed forces was completed. While imports have increased in Nigeria, they have fallen in the Congo and the Horn of Africa.

Southern Africa

This section looks at the military expenditure and arms supplies of South Africa, Zambia, Tanzania and the liberation movements in Angola and Mozambique. The policies of these countries interact on each other. Zambia and Tanzania feel threatened by the adjacent presence of white settlements armed with sophisticated weapons; South Africa arms against the possibilities of internal insurrection, external attack and success by the liberation movements in Angola and Mozambique. In this section, some comment is also made on weapons going to Portugal, since two-thirds of Portuguese military expenditure is spent in Africa and most of her major weapon imports have been intended for use in the Portuguese colonies.

SOUTH AFRICA

In South Africa both military expenditure and major weapon imports rose very fast up to 1965–66—with the rise in military expenditure beginning about 1960, and the rise in weapons imports coming a bit later. After 1966 military expenditure levelled off, and major weapons imports declined a

Source: The reference section, page 210.

US \$ mn, at constant (1960) prices and 1960 exchange-rates 250 50 100 150 200 300 SOUTH MAHGREB COUNTRIES ALGERIA MOROCCO LIBYA TUNISIA AFRICA WEST EASTERN AND SOUTHERN AFRICA 100 50 50 100 CONGO, KINSHASA)(4) NIGERIA(4) SUDAN ETHIOPIA (a) SOUTH RHODESIA GHANA IVORY COAST(5) KENYA GUINEA 7 AMRIA SENEGAL (4) UGANDA ()) CAMEROON (8)

Chart 1.21. Military expenditure in African countries: relative importance in 1968

Source: The reference section, page 210. ^a 1966. ^b 1967.

little. This decline is not likely to be maintained. South Africa has helicopters, heavy transports and submarines on order. She is also rumoured to be seeking a new fighter.

Perhaps the most significant feature of South Africa's arms procurement policy is the increase in local production and production under licence. In 1967 the Atlas Aircraft Corporation started production of the Atlas-Macchi M.B. 326 jet trainer, under licence from Italy. Three hundred aircraft are to be produced, the first to be only assembled by Atlas, which will, however, gradually take over 80 per cent of the production of each plane. Atlas also handles about 40 per cent of the airframe and engine maintenance and overhaul work for the South African Air Force. Since 1961, South Africa has been producing Panhard armoured cars and machine guns under licence. South Africa has also several munitions factories, and £50 million was voted by Parliament for a new factory in the summer of 1968. A new Marconi factory was opened in the spring of 1968; it is supposed to produce, among other things, the ADF 370 radio compass for the M.B. 326 (Atlas Impala) jet trainer. Other local efforts include a short-range rocket with a maximum range of four miles. Tests firings of the rocket took place last in December 1968; and earlier in the year South Africa established a missile base in Zululand.

Since the British embargo, which took effect in 1965, the main suppliers to South Africa have been France and Italy. French supplies have included a large number of Mirage fighters. After the United States vetoed the supply


US \$ mn, at constant (1968) prices. Five-year moving averages. 1968 estimate added



Source: The reference section, page 226.

of the Beagle 206 (a plane Britain was willing to release)³⁴ because it had an American engine, South Africa ordered the Piaggio P-166 from Italy, and nine were delivered in 1969. (The Piaggio P-166 also has an American engine.)

There has been intense controversy in Britain concerning the embargo on South Africa. In 1967 South Africa requested £200 million worth of arms from Britain to be supplied over the next ten years. It was the biggest order ever requested of the British arms industry. In response to the British refusal to reconsider the arms embargo, Prime Minister Vorster said that South Africa would reconsider British naval privileges under the Simonstown agreement. In March 1969, South Africa is said to have purchased three HS-125 VIP transports from Britain, in place of three Fan Jet Falcons which were vetoed by the USA.

Very little is known about arms procurement in Southern Rhodesia. Rhodesia is thought to have received Italian type trainers and transports and Alouette helicopters from South Africa. The presence of Italian arms has been denied by the Italian Foreign Ministry.

PORTUGAL

Most of the equipment supplied to Portugal has come from NATO countries. In accordance with the UN Security Council resolution of 1963, Bri-

³⁴ The Beagle 206 is a light transport which is widely used for civilian purposes.

World military expenditure

tain, the USA and West Germany officially refuse to give Portugal weapons for use in Africa. But since 115,000 of Portugal's 150,000 troops are employed in Africa,³⁵ it is extremely difficult to prevent or check on the use of particular weapons in the Portuguese colonies.

The primary role of the Portuguese Air Force in the colonies is transport. For this purpose, Portugal uses Dornier Do-27's from West Germany and heavy Noratlas transports from France and West Germany. For attack, Portugal uses American supplied Harvard jet trainers. It is acquiring French Alouette helicopters especially for counter-insurgency duties. Portugal is also purchasing four French frigates for counter-insurgency actions in Guinea.³⁶ Two of these were received in 1968, and can accommodate helicopters.

ZAMBIA AND TANZANIA

Both Zambia and Tanzania are attempting to acquire air defence systems to protect their air space against Rhodesian and Portuguese intrusions. In July 1968, Vice President Kawawa told the Tanzanian Parliament that there were embryonic plans to acquire a fighter force to defend, in particular, the southern border. Certain sources indicate that the planes will be Soviet. In his visit to London in July 1968, President Kaunda of Zambia requested a Rapier anti-aircraft missile system. Britain has agreed, in principle, to supply these weapons on a commercial basis. It will, however, be difficult for Zambia to finance the deal. President Kaunda feels that Britain has a duty to help Zambia in view of Britain's role in creating the Rhodesian situation. Italy has also been providing equipment to Zambia. Zambia has received five Agusta Bell-205 helicopters and some 206 Jet Rangers. Italy has also provided military aid in the form of pilot training and equipment for an air base with capacity for jet fighters. There are negotiations pending for the sale of Macchi M.B. 326 jet trainers.

THE LIBERATION MOVEMENTS

The organizations within the liberation movements recognized by the OAU are FRELIMO in Mozambique, MPLA in Angola, PAIGC in Guinea-Bissau, SWAPO in South West Africa, ANC and PAC in South Africa and ZANU and ZAPU in S. Rhodesia.³⁷ FRELIMO, MPLA, and PAIGC have

³⁵ This estimate comes from *The Military Balance, 1967–1968* (London: Institute of Strategic Studies); other estimates are even higher.

³⁶ The French purchase followed British refusal to build these frigates.

³⁷ ANC: African National Congress. PAC: Pan-Africanist Congress. FRELIMO: Frente de Liberação de Mozambique. MPLA: Movimento Popular de Liberação de Angola. SWAPO: South West African Peoples Organization. PAIGC: Partido Africano da Independencia da Guiné e Cabo Verde. ZAPU: Zimbabwe African People's Union. ZANU: Zimbabwe African National Union.

formed an alliance, CONCP,³⁸ which co-ordinates their political, military and diplomatic action. ANC and ZAPU formally announced an alliance in July 1967 and have close ties with CONCP. The aid to all these organizations comes from the same main sources. The Soviet Union and Eastern European countries give most of their aid to the CONCP organizations. The equipment provided is free and becoming more sophisticated. In Guinea-Bissau and Mozambique, it has included bazookas, mortars and light antiaircraft guns. China is giving equipment, funds and training mainly to FRELIMO and SWAPO. North Korea provides military training and the National Liberation Front in Viet-Nam provides technical advice.

The OAU liberation committee, which consists of 11 African nations, provides material and financial aid. Only a fraction of the requirements of the liberation movements are met this way, and a number of African countries give aid outside the OAU programme. These countries include Algeria, Tunisia, the UAR and the respective neighbouring countries, which primarily aid the organizations by providing bases and a means of chanelling materials. The Angolan organizations are supported by Congo (Kinshasa), Congo (Brazzaville), and Zambia. PAIGC is supported by Guinea-Conakry and Senegal. Tanzania and Zambia aid FRELIMO. Zambia has become more reticent recently about the use of her territory by guerillas.

Military aid from Western countries comes entirely from private sources. All the liberation movements stress, however, the importance of good Western weapons captured from their enemies.

Nigeria

The flow of weapons to Nigeria and Biafra has attracted considerable attention. The variety of rumours and reports makes it difficult to distinguish fact from fiction. This is particularly true for supplies of small arms, many of which have taken complicated and devious routes to reach their destination.

The Nigerian Air Force was established in 1963. Up to 1966, West Germany was the main supplier. Aircraft deliveries had included two Noratlas transports (which were later sold back), 14 Piaggio 149-D and 20 Dornier Do-27's. Aircraft had also been received from Canada and the UK, and over 100 Nigerian pilots, mostly Ibo, had been trained in Germany, Canada and Ethiopia.

At the outbreak of the war, a Nigerian request for a squadron of jet fighters was turned down by the British Government. Between May and November 1967, Nigeria is reported to have received about a dozen L-29

³⁸ CONCP: Conferencia das Organizações Nacionalistas das Colonias Portugesas.

World military expenditure

trainers from Czechoslovakia and a number of MiG 17 fighters and MiG 15 UTI trainers either from Czechoslovakia or the Soviet Union. In 1967 Nigeria also received two BAC Jet Provosts as a gift from Sudan, and eight Austrian Westland Whirlwind helicopters. Two L-29's and one BAC Jet Provost were shot down. During 1968, Nigeria received further supplies of MiGs and four Il-28 light bombers. It is thought that two of the Il-28's were supplied by the UAR and one by Algeria. The UAR is also reported to have supplied some of the MiG's. These reports may have been based on the presence of Egyptian pilots in Nigeria. In May 1969, it was reported that Algeria would send a squadron of MiG fighters, accompanied by Algerian pilots, following a Nigerian decision to dispense with the services of Egyptian pilots.

In addition to the MiGs and II-28's, the Soviet Union has also been supplying army equipment. In October 1968, it was reported that two Soviet freighters unloaded a large number of jeeps and command cars. According to Nigerian sources, they are paying for Soviet arms with convertible currency. It seems likely, however, that after August 1968, when Soviet supplies are said to have intensified, some transactions were on the basis of barter agreements.

Apart from six "Ford" Class Seward defence boats, supplied both before and during the war, British equipment to Nigeria has been primarily for the army. In August 1968, the Commonwealth Secretary told the House of Commons that supplies of military equipment from Britain amounted to 15 per cent of the value of total Nigerian purchases.³⁹ He also said that no military aircraft were being supplied. The supply of military aircraft was again denied in June 1969, by the British Embassy in Stockholm, when Swedish newspapers reported that the Swedish pilots, who had aided Biafra in May, had seen Canberra light bombers. British arms have included Saladin armoured cars, Saracen armoured personnel carriers, Bofors anti-aircraft guns and a variety of small arms and ammunition.

The Biafran Air Force was established in May 1967. At that time it was reported to consist of one Lear Jet 24, belonging to Colonel Ojukwu, and some Alouette helicopters. In July and August, two World War II B-26's were supplied by a French aero survey company. One DC-3 and one Fokker Friendship were captured from Nigerian Airways. The B-26's were captured when the federal troops took Enugu but were replaced in November, probably from Portugal. The Fokker Friendship blew up when attempting to bomb Lagos. Biafra is now said to possess four more Alouettes, three DC-3's

³⁹ According to several sources, Britain was supplying 25 tons of arms a week in July 1968, and 25-30 tons of arms a week in January 1969, out of a total of 155 tons a week.

and two DC-4's. In May-July 1969, 13 Swedish light planes arrived in Biafra, supplied—through France—and flown by Swedish mercenary pilots.

Up to mid-1968, the Biafran army was mainly supplied by private arms dealers operating from Portugal. In August, there were reports that Biafra was receiving technical assistance, military equipment, and mercenary personnel from France. Two Lockheed Constellations, which at that time were maintaining Biafran supply lines with the outside world, were said to be flown by French pilots. In September–October, Colonel Ojukwu reported that more arms had been received in three weks than in the whole of the previous three months. Many of the arms were flown via the Ivory Coast and Gabon, which maintain close ties with France. They included French anti-tank weapons which proved very effective against federal Saladins. The arrival of these weapons coincided with increased French diplomatic support for Biafra. Both France and Biafra deny the supplies of French weapons. The French embargo of June 1968 was imposed on both sides.⁴⁰

There have been many reports of Czech arms in Biafra. This has been denied by reliable sources in Czechoslovakia and it is probable that these weapons were acquired from other sources. There have also been reports of Chinese assistance and arms coming through Tanzania.

A number of countries announced embargos on Nigeria in 1968. The following is a list of such countries with dates:

Czechoslovakia, 25 April Netherlands, 4 June Italy, 7 June France, 13 June Belgium, 17 June

North Africa

There has been an arms race in North Africa in the last decade. Military expenditures have risen at a rate of between 10 and 15 per cent a year since 1959, and there has also been a rising trend in major arms supplies. But it was not until 1963, the year of the border conflict between Algeria and Morocco, that these supplies began to increase very rapidly. During the years 1965–67, the period of major build up in these two countries, Morocco received F-5 fighters, helicopters and a variety of ships, while Algeria received MiG fighters, II-28 light bombers, missile patrol boats, and a few anti-aircraft missiles.

Between 1967 and 1968, defence expenditures in North Africa rose by

⁴⁰ According to some sources, French arms were being delivered at a rate of 30-35 tons a week in August 1968, and at double that rate later in the year.

World military expenditure

some 30 per cent. Major arms supplies declined slightly but one can expect them to increase again in the near future. Libya has signed a \$240 million agreement with Britain for an air defence system, consisting of Rapier and Thunderbird missiles. She has also ordered BAC Jet Provost trainers to supplement 10 F-5's received in 1968-1969. The United States is increasing its aid to Morocco and Tunisia. A \$14 million sales agreement with Morocco was signed in February 1967. Implementation of the agreement was delayed because of Moroccan support for the Arabs in the Six-Day War. A \$10 million aid agreement was signed with Tunisia late in 1967. Both these agreements are likely to consist primarily of small arms and ammunition. Tunisia is to receive in addition 12 F-86 fighters from the United States. In 1968 major weapon supplies to North Africa also included the second batch of 40 Czechoslovak T-54 tanks to Morocco. The deal for 80 tanks, a barter deal worth \$16 million to be paid in primary products was negotiated in the summer of 1967. This is the first time Morocco has received arms supplies from a Warsaw Pact country since 1961.

The rest of Africa

The main areas of importance in the remaining parts of Africa are Ethiopia and Somalia, where the border tension is diminishing,⁴¹ Uganda which has recently received Czechoslovak military equipment, Sudan and Congo (Kinshasa).

In 1968, in accordance with a new policy of detente with its neighbours, Somalia reached agreements with Ethiopia and Kenya. This new policy was accompanied by moves from Somalia towards the West.⁴² Following the Arab-Israeli War the UAR could no longer continue to give substantial aid to Somalia. Very little Soviet equipment has been received by Somalia since the end of 1966. In 1968, the only major weapons supplied to Somalia or Ethiopia were four British Canberras sent to Ethiopia.

Uganda has been receiving extensive aid from Czechoslovakia and Israel. Israel provides training for 24 Magisters which were probably supplied by Israel, although some may have come from France. Czechoslovakia has, since 1966, supplied 8 to 10 L-29 trainers, two MiGs and a number of military vehicles together with training. Official delivery of these items was made in 1968.

A \$100 million arms agreement was signed between the Soviet Union and the Sudan probably at the end of 1967. The presence of Soviet advisers

⁴¹ See the reference section, page 376.

⁴² These moves included a request for more US aid, an aid agreement with West Germany, resumption of diplomatic relations with Britain and recognition of French Somaliland as a French colony.



Chart 1.23. Military expenditure in Indian and Pakistan

US \$ mn, at constant (1960) prices and 1960 exchange-rates

Sources: The reference section, page 206.

and technicians was reported in January and the first arms shipment was due in November 1968. Little is known about the content of the agreement.

Ever since the Congo crisis, Congo (Kinshasa) has been receiving relatively large quantities of major weapons. At present, it is receiving aid from Italy and the United States. Seventeen Macchi M.B. 326 jet trainers are on order.

Indian sub-continent

The big rise in Indian military expenditure came in 1962 and 1963, around the time of the Sino-Indian conflict (chart 1.23): it then doubled in two years. After 1963, it fell back a little in real terms. The rise in Pakistan's military expenditure came later, in 1965 and 1966, at the time of the Indo-Pakistan conflict.⁴³ Both countries raised their military spending further in 1968.

The trends in major arms supplies are different (chart 1.24). They reached a peak in 1958 when India received Hunters, Canberras and frigates from the United Kingdom, and Pakistan received F-86 Sabres, Martin Canberras, and destroyers from the United States. They fell after that, and began to rise again only in 1966.

⁴⁸ Any comparison of the level of military expenditure in the two countries should make some allowance for Pakistan receipt of military aid up to 1965. The figures for US military aid to Pakistan are classified. Between 1954 and 1965 US military support for Pakistan probably amounted to \$1.5 billion.

Chart 1.24. Imports of major weapons by India and Pakistan

US \$ mn, at constant (1968) prices. Five-year moving averages. 1968 estimate added



Source: The reference section, page 226.

There are two main reasons for the differing movement of arms supplies and military spending. First, the main emphasis of Indian expenditure after the Sino-India conflict was on the army: on training troops for warfare in the Himalayas, and on acquiring small arms and inexpensive military vehicles. In the short term, this did not necessitate any further purchases of major weapons. The only major items of equipment imported by India between 1962 and 1966 were six MiG 21's and a number of helicopters from the Soviet Union, and a number of trainers and transports from the United States, Britain and Canada.

Secondly, India has been expanding her own defence industries. The main expansion after the Sino-Indian war took place in the ordnance factories; in particular, India produced its own anti-tank missile. But there was also an expansion in the domestic production of larger items of equipment. The military vehicles acquired by the army were built under licence from Japan and West Germany. Vijayanta, the new Indian tank, is a licence-built British tank. For the Air Force, India had hoped to replace the frontline fighters— Vampires, Mystères and Ouragans—by the Indian built HF-24. But the HF-24 project was delayed because of difficulty in finding a suitable engine and the Air Force is now receiving Indian-built MiG 21 fighters with Indianbuilt air-to-air missiles. In addition, the production line for Gnat fighters has been reopened, following the success of the Gnats in the Indo-Pakistan War. Krishak, the Indian light plane, has been replacing the Auster A.O.P.Mk. 9 for air observation duties. Alouette helicopters and HS-748 transports are being built under licence. There has also been some naval construction including three frigates being built with the aid of a British loan at the Magazon Docks in Bombay.⁴⁴

The increase in major arms supplies after 1966 was not only due to the import element of the items produced under licence in India: there was also an increase in direct imports by both India and Pakistan. The interesting feature of this increase was the change in sources of supply. Before 1962, India refused to receive any military aid, and purchased weapons both from Eastern and Western sources. After the Sino-Indian conflict, India accepted emergency military aid from the United States, Canada, Britain and the Soviet Union. Recently, however, it has increasingly relied on the Soviet Union for arms. In 1968, it received 50 Su-7 fighters, a variety of ships, including one submarine, and some T-54 tanks.

Pakistan, on the other hand, relied on the United States before 1965. During the Indo-Pakistan conflict in 1965, the United States imposed a total arms embargo on both countries. Although this was later lifted for nonlethal spare parts, it led Pakistan to seek other sources of supply. Since 1965, Pakistan has received aircraft and tanks from China, Mirage fighters and Alouette helicopters from France. Both India and Pakistan have ordered French submarines.

Pakistan has also attempted to acquire surplus US equipment from Europe. The most recent example was in the spring of 1968, when Pakistan requested 100 M-48 Patton tanks from Italy. The sale has been authorized by the United States. In reply to an Indian protest, the United States stated that if the tanks lost by Pakistan in 1965 were not replaced, Pakistan would turn to China. Despite the denial of the Italian Foreign Ministry, private Italian sources allege that a large number of tanks were delivered in 1968.

Pakistan has also been pressing the Soviet Union to supply arms. There has been economic co-operation between the two countries since 1961, but the Soviet Union for a long time did not supply arms, presumably for fear of jeopardizing its relations with India. In July 1968, the Commander-in-Chief of Pakistan's Army visited Moscow, and an arms agreement was concluded.⁴⁵ India protested the Soviet Union's decision.

[&]quot;The import content of these domestically produced items is included in the figures for major arms supplies. But very few of the expensive items were delivered before 1966.

⁴⁵ According to the *Statesman of Calcutta* (12 July 1968) the agreement probably consisted of spare parts for Chinese tanks and aircraft obtained in 1965: "It has been known for some time that Pakistan was very badly off for spares because of China's limited production capacity."

	Average	Size of military					
	Long- term	Short- term	Year-to-	year chang	es	Budgeted	expenditure in 1968 US \$ mn, current prices and exchange-rates
	1949–68	trend 1965–68	1965-66	1966–67	1967–68	in 1969	
Far East							
Japan	+ 3.4°	+ 6.5	+ 5.6	+ 8.2	+ 5.8	••	1 145.3
S. Viet-Nam	+ 9.8°	+ 1.9	- 27.5	- 18.1	+ 78.0	+ 35.7	405.9
Taiwan	+ 8.8ª	- 6.0	-17.3	- 1.4	+ 2.0	••	300.0
South Korea	+12.1	+17.1	+23.5	+ 6.9	+21.5	••	232.3
Thailand	+ 9.9	+ 14.7	+ 6.6	+ 19.7	+18.3	••	156.8
Malaysia	+20.0	+ 5.1	+23.2	- 7.2	+ 1.6	••	123.1
Philippines	+ 6.4	+17.1	+ 19.8	+ 11.9	+ 19.9	••	119.1
Burma	+10.1	+ 2.2	- 1.5	+ 1.9	+ 4.1	+ 2.9	113.3
Indonesia	-15.8 ^b	+ 0.4	+ [9.6]	+[15.2]	- 19.8	••	113.0
Cambodia	+ 2.0 ^e	+ 5.0	+ 1.2	+ 13.9	+ 0.4	••	62.9
Laos	••	+ 6.2	+15.5	+ 0.5	+ 3.2	••	40.0
South Asia							
India	+ 5.6	- 3.4	- 2.9	- 2.4	+ 8.7	+0.6	1 338.0
Pakistan	+ 4.3	+ 0.6	+19.6	-18.9	+ 5.1	••	483.1

Table 1.11. Far East and South Asia: Long and short term trends in the volume of military expenditure^a

Based on constant price figures

Source: The reference section, page 206. Bracketed figures are estimates.

^a Figures are given only for countries whose military expenditures in 1968 exceeded \$30 million (at current prices and exchange-rates). Because reliable figures are not available, North Korea and North Viet-Nam are omitted.

^b 1951–1968. ^c 1960–1968. ^d 1953–1968. ^e 1961–1968.

Far East

Domestic military expenditures in the Far East (excluding North and South Viet-Nam) have risen fairly steadily throughout the period (table 1.11 and charts 1.25 and 1.26). In recent years, there has been a particularly rapid increase in Japan, South Korea, the Philippines and Thailand. Indonesian military expenditure has been falling.

However, expenditure from home resources is not the whole story. A number of countries in the area—in particular, Cambodia, South Korea, the Philippines, Thailand and Taiwan⁴⁶—have received between them a great deal of military aid from the United States; indeed, in some years it has been virtually as large as their own military spending. The trend of United States military aid⁴⁷ has also been opposite to the trend of the countries' spending

⁴⁶ Laos is not included in the table which compares United States military assistance and domestic spending, because military assistance to Laos was classified after 1962. ⁴⁷ The decline in United States military assistance would be even more striking if defence supporting assistance were included. This is assistance designed to support the maintenance of military forces and security; 80 per cent regularly goes to the Far East. Between 1957 and 1965, defence supporting assistance fell by more than half, from approximately \$1,900 million to \$400 million. In the last two years it has

Chart 1.25. Military expenditure in Far East countries (excl. China)

US \$ mn, at constant (1960) prices and 1960 exchange-rates



Source: The reference section, page 208.

out of their own resources: so that when military aid is added, the rise from 1958 to 1967 disappears for those five countries (table 1.12). There remains, however, a sharp increase of 30 per cent in the total of aid and domestic military spending in 1968: both components of the total went up considerably.

increased again, but the increase is concentrated in Viet-Nam. See Report of the President's Committee to study the US Military Assistance Program (Draper) 1959; Proposed Mutual Defense and Assistance Programs, FY 1964, 1965, and 1966; Foreign Assistance Program, Annual Report to Congress, FY 1967; Hearings before the Senate Foreign Relations Committee, 13 March 1968.

World military expenditure

Chart 1.26. Military expenditure in Far East countries (excl. China): relative importance in 1968 US \$ mn, at constant (1960) prices and 1960 exchange-rates



Source: The reference section, page 208.

Since most of the major weapons brought into the area came in under military assistance, the trend in weapon supplies roughly follows the trend in military assistance (chart 1.27), rather than that of domestic military expenditure. The reduction in both military assistance and major weapon supplies can be partly explained by the shift in United States policy away from providing sophisticated conventional equipment to the provision of less expensive counter-insurgency equipment. This is particularly true for Thailand, Laos and the Philippines. In all three countries there are armed forces opposed to the existing regime: and in all three it is the supplies of helicopters, trainers and patrol boats which have been increasing. This shift in military assistance has been acompanied by increased aid for economic development, and decreased defence supporting assistance.

Supplies of sophisticated conventional equipment are likely to increase again in the near future. Some of the big increase in military expenditure and assistance in 1968 was probably allocated to the purchase of weapons which were not delivered in that year. Some future deliveries are known. Thailand is to receive Hawk missiles.⁴⁸ South Korea is expected to receive a squadron of Phantom aircraft.

One small element in the increase in United States military assistance in 1968 was the supply of weapons to Burma. In 1968, Burma received 12 F-86 fighters, Cessna T-37's and Kaman Huskie helicopters from the United States under the Military Assistance Program. Although Burma has previously received trainers and helicopters from the United States, these were all part of a sales agreement negotiated with the United States in 1958. The decision to expand the aid programme and to deliver fighters to Burma was a result of the border incidents between Burma and China in 1967.

Military build-ups are also beginning in some of the areas not hitherto covered to any extent by United States military assistance-Malaysia and

⁴⁸ Following the agreement to supply Hawk missiles to Thailand in January 1967, Thailand agreed to send an additional 10-12,000 troops to Viet-Nam.

Table	1.12.	United	States	military	aid an	d domestic	military	expenditure in	Cambodia,
South	Korea	, Philip	pines,	Thailand	and T	aiwan			

US \$ mn, 1960 prices

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
US military aid Domestic military	550	480	380	340	290	340	310	290	270	260	390 <i>ª</i>
expenditure	600	640	620	650	720	680	690	730	760	810	920
Total	1 150	1 110	1 000	990	1 010	1 020	1 000	1 030	1 030	1 070	1 310

Source: See the reference section, page 208. U.S. Overseas Loans and Grants and Assistance from International Organizations (Special Report prepared for the House Foreign Affairs Committee) (Washington, D.C.: Agency for International Development, 1968). Military Assistance Facts (Washington, D.C.: Office of the Assistant Secretary of Defense, International Security Affairs, 1967 and 1969).

^a This figure includes an estimate of \$50 million for military assistance to Thailand. Military assistance to Thailand was \$45 million in FY 1967, and it has been rising at \$5 million per year since 1965. \$50 million is probably an underestimate: the 1968 figure is classified, since military assistance to Thailand has been transferred from the Foreign Aid budget to the Defense Department budget.

Singapore, for instance. Here it is the British withdrawal in 1971 which is leading to increased weapon supplies. Singapore will receive a squadron of Hunters, 16 BAC 167 jet trainers, 10 fast patrol boats, some Alouette helicopters and a radar air warning system. In 1968, Malaysia received CL-41 trainers from Canada, helicopters from the United States and France, transports from Britain and Canada, and patrol boats from Britain. In the next two years, Malaysia will receive more helicopters and transports and a British frigate. In addition, after considerable controversy over the possible purchase of supersonic aircraft, it has decided to acquire 10 Australian Sabre fighters.

The two countries which have received the bulk of Soviet military aid in the Far East (apart from North Viet-Nam) are Indonesia and North Korea. No Soviet material has gone to Indonesia, however, since the overthrow of the Sukarno regime in March 1966; and military expenditure in Indonesia has been falling. There has been some increase in major arms supplies to North Korea, but information about her weapons imports and defence expenditure in general is scanty.

North and South Viet-Nam

The figures for major weapons exports to North and South Viet-Nam are not very meaningful: it is for this reason that they are given separately. They show a large rise, of course: but they include estimates of the major weapons supplied to the North and South Vietnamese forces only. They vastly understate the quantity of weapons in fact used in Viet-Nam, since the



Chart 1.27. Imports of major weapons in Far East countries (excl. China)

US \$ mn, at constant (1968) prices. Five-year moving averages. 1968 estimate added

material supplied to United States troops is not included. United States military expenditure in Viet-Nam in 1968 was over ten times as great as the total value of all exports of major weapons to all third world countries. In addition, the use of major weapons has been largely confined to United States troops. However, during the early 1960's, the United States delivered large quantities of aircraft to South Viet-Nam, including 150 Skyhawks. In 1968, the United States also supplied a squadron of F-5 fighters. Soviet major arms supplies to North Viet-Nam in the last three years have consisted mainly of anti-aircraft missiles, although small quantities of aircraft have been also supplied.

Up to 1968, South Viet-Nam's military expenditure out of its own resources did not rise very much, when corrected for the very sharp price rises which have occurred there. The present United States defence budget, however, included \$1.1 billion for local South Vietnamese forces. \$800 million of it was planned for procurement: \$160 million for aircraft and \$600 million for tracked combat vehicles, trucks, weapons and ammunition. In addition, \$480 million was proposed for supporting assistance to South Viet-Nam under the 1969 Foreign Assistance Program.

The estimates for North Viet-Nam's military expenditure have a wide

Source: The reference section, page 226.

margin of error, and the figures reported for the quantity of foreign aid which North Viet-Nam has been receiving have varied from \$1 to \$3 billion a year. Taking the higher figure, the total quantity of resources employed in the North is very small, compared to the \$25 billion being spent each year in Viet-Nam by the United States.

Debates on national policy

The United States Military Sales Bill

In 1967, there was a considerable debate in Congress and the press about United States sales of military equipment to developing countries. This led to the presentation of a new Military Sales Bill in 1968. The debate centred around three issues: the increase in sales of military equipment to developing countries since 1961; the role of the Export-Import Bank in financing these sales; and the failure of the Defense Department to keep Congress informed of the Export-Import Bank's role.

From FY 1962 until FY 1967, sales of military equipment to developing countries rose from around \$75 million to \$500 million—an increase from 19 per cent to 57 per cent of total military exports to developing countries. In 1961 there had been a shift in United States military assistance policy: weapons exports were supplied on a sales basis rather than a grant basis, in order to offset the cost of maintaining US troops abroad. In theory this policy was directed towards developed countries. In fact, the whole of the increase in total military sales between 1962 and 1967 went to developing countries: sales to developing countries as a proportion of total sales rose from approximately 5 per cent to 30 per cent.⁴⁹ This increase was made possible by certain legislation which allowed the Defense Department to offer favourable credit to developing countries.

In 1957, a military assistance credit fund was set up to finance sales under the Military Assistance Program. This fund was known as the "revolving fund" because repayments of loans went back into the fund. Certain provisions in the 1964 Foreign Assistance Act enabled the Defense Department to guarantee loans from other sources while obligating only 25 per cent, from the Military Assistance Credit Fund, as a reserve to back up such loans. The Defense Department was required to charge a fee for this service. In 1965, this fee was no longer deemed necessary for "any agency of the United States Government."⁵⁰ The Defense Department then came to an agreement with the Export-Import Bank, whereby the Bank extended loans to the

^{*} Sales figures from Military Assistance Facts, 1967.

⁵⁰ 1965 Foreign Assistance Act.

Defense Department under Defense Department guarantee, and the Defense Department used the loans to finance arms sales to countries to which "the Bank was not otherwise prepared to extend credit". Under this arrangement, "the Export-Import Bank provides the financing, but does not deal with the buyer and is not informed of the buyer's identity".⁵¹ These loans were known as the "country X loans". For many of them the interest paid by the recipient countries was lower than the interest paid by the Defense Department to the Bank.⁵²

A Senate Foreign Relations Committee staff study published in January 1967 revealed the existence of the country X loans and voiced considerable criticism of the United States arms sales policy. The study argued that high pressure US salesmanship in Europe forced European countries to adopt their own high pressure techniques in the third world market, and to try to dispose of surplus US equipment; that arms sales to developing countries caused arms races, and thus conflicts, and diverted desperately needed resources from development; and that there was inadequate government machinery to review these sales. The publication of this study was followed by discussion in the press and by hearings in the Senate Foreign Relations Committee and the Senate and House Banking and Currency Committees. The debate culminated in amendments to the 1967 Foreign Assistance Act which place a \$190 million ceiling on Defense Department guaranteed arms sales for FY 1968, abolished the revolving fund as of 31 December 1968, and provided that economic aid to countries diverting resources to unnecessary military expenditures would be cut off. This last amendment (the Symington and Conte-Long amendment) was applied to Peru in May 1968, following the Peruvian purchase of Mirage fighters (page 59).

In 1968, the Congress passed a Foreign Military Sales Act. Henry J. Kuss,⁵³ the man responsible for the Defense Department's sales programme, said in an interview published in *Armed Forces Management* in January 1969: "While our procedures and techniques in the past were most proper, we did, perhaps, lose sight of some of the public relations aspects of delineating to Congress precisely how we have operated and why. Recognizing that there was a lack of understanding, we and the State Department, as responsible agencies for foreign policy control over all sales activities, prepared recommended legislation as well as a detailed explanation to be presented to Congress." The new bill incorporates the amendments to the 1967 Foreign Assistance Act: it abolishes the revolving fund, thus requiring

⁵¹ Linder, President of the Export-Import Bank, Senate Banking and Currency Committee Hearings, 25 July 1967.

⁵² New York Times, 31 July 1967.

⁵³ Assistant Secretary of Defense for International Logistics Negotiations.

new obligational authority from Congress for credit sales each year. It limits the Defense Department's ability to guarantee loans from private banks and abolishes Export-Import Bank military loans to developing countries. It suspends all development assistance, PL-480 sales,⁵⁴ and military credit sales to countries "which buy from foreign countries military hardware which we would regard as excessive".⁵⁵ It requires semi-annual reports to Congress on past credits and sales to developing countries. It formalizes controls over arms sales. It places a ceiling of \$296 million on credit sales for FY 1969, and ceilings of \$75 million on arms exports to Latin America and \$40 million on arms exports to Africa.

Swiss arms trade debate

In November 1968 it was revealed that a Swiss munitions firm, Oerlikon-Bührle A.G., had illegally exported arms for approximately \$20 million. The scandal led to an intense debate in the Swiss press and Parliament concerning the Swiss arms export policy.

In April 1967, the Foreign Office had informed the Defence Department that a Nigerian delegation was to visit Oerlikon-Bührle and that, in view of the situation in Nigeria, no licences for arms exports could be granted. No applications for export licences were made; but in September 1967, the Foreign Office informed the Defence Department that two Oerlikon experts were instructing the Nigerian army. In March 1968, the Defence Department withdrew export licences for guns destined to a neighbour of Nigeria. In June, it began to examine licences for Oerlikon guns granted in 1967–68. When it became clear that forged end-use agreements had been used to export arms illegally to Nigeria and other countries,⁵⁶ the Federal Attorney was charged with the case. In early November, three employees of Oerlikon-Bührle (a sales director, a deputy director and a managing clerk) were arrested.

The Oerlikon-Bührle affair, probably the largest Swiss arms scandal since World War II, provoked wide-spread debate on Swiss arms trade policy. An

⁵⁶ The value of illegal exports is shown in the following table:

~ .

	Swiss francs	
South Africa	52,700,000	(approx. \$12.1 mn)
Israel	19,500,000	(approx. \$ 4.5 mn)
UAR	6,500,000	(approx. \$ 1.5 mn)
Nigeria	5,400,000	(approx. \$ 1.2 mn)
Saudi Arabia	4,300,000	(approx. \$ 1.0 mn)
Lebanon	150,000	(approx. \$35,000)

⁵⁴ Public Law 480 enables countries to purchase US surplus commodities with domestic currency.

⁵⁵ Paul C. Warnke, Assistant Secretary of Defense for International Security Affairs, Senate Foreign Relations Committee Hearings, 20 June 1968.

World military expenditure

important issue was whether it was consistent with Swiss neutrality and the Red Cross ideal to export arms to countries engaged in armed conflict. In Parliament there were many questions and motions. The Government was presented with a text proposal for a modification of the Swiss Constitution to prohibit arms exports to all countries except Europe's neutral states.

In the press there tended to be general agreement that arms exports ought to be permitted in view of the need for a high quality domestic defence industry, but that intensive control measures were called for. A provisional committee drafted two proposals during the preparations for the Swiss Peace Council: one suggested a total prohibition of export of war materials; the other the nationalization of the arms industry. These initiatives were rejected by the big national parties and the trade unions.

The Government has agreed to submit a report on Swiss arms exports to Parliament. The report will be prepared by an independent expert committee, and will clarify the following aspects of the Swiss trade in arms:

(1) The importance of arms exports to the Swiss economy in general and to the Swiss export industry in particular.

(2) The military considerations which play a role in connection with arms exports.

(3) The repercussions of arms exports on Swiss foreign policy, especially on Swiss neutrality and Swiss humanitarian efforts in the world.

(4) The consequences which could result from an arms export prohibition.

Swedish arms trade policy

A debate about Swedish arms trade policy was initiated in November 1968 by press reports that Brazil, Argentina and Venezuela had expressed interest in Swedish military aircraft and that Swedish companies were represented at an aeronautical exhibition in Buenos Aires. At the time, the Youth Organization of the Social Democratic Party was conducting a campaign for solidarity with the socialist movement in Latin America. The Government reaffirmed its official policy that licences were not granted for the export of arms to countries where armed conflict was taking place or likely to arise. In present circumstances licences could thus in principle be granted for arms exports to Brazil and Argentina.

In the debate, those supporting the official policy argued that Sweden must maintain a strong defence industry, and that exports are essential for this. They also suggested that it is an advantage for importing countries to be able to obtain arms from a small neutral country which does not attach political conditions to its arms sales. The main argument in favor of a more restrictive arms export policy was that it was inconsistent for Sweden to sell arms to oppressive regimes while supporting democratic and progressive ideals in the world. Demands were put forward for a reclassification of war materials to include a wider range of goods.

In December 1968 the Government announced that there would be an even stricter limitation on the number of countries eligible for arms exports, and that this had, in fact, been the trend for several years. This referred in particular to countries with totalitarian or oppressive regimes. The Government has since then decided to appoint a commission to look into the general principles underlying Swedish arms trade policy.

Chapter 2. The technological arms race

There are two general caveats in this chapter. First, there is a good deal of use of the terms "improvement" and "advance" in weapons technology. New weapons are spoken of as being "military attractive" and "useful". Stylistically it is very awkward to avoid using expressions of this kind. It does not mean that an increase in the lethal capacity of a weapon is to be considered a good thing.

Secondly, here as in so many other places in the Yearbook, the examples are United States examples. In many fields the same kind of development is undoubtedly going on in the Soviet Union and in other countries: but published information is not available.

Part I. Introduction

The arms competition which lies behind the 5-6 per cent a year growth in military expenditure does not, for the most part, take the form of a multiplication of existing weapons. There has not been a 5-6 per cent a year increase in world stocks of military planes, submarines or aircraft carriers. It has rather taken the form of a very rapid rate of what is called in civil life "product improvement": a constant improvement of existing weapons; a very rapid rate of innovation; and a constant search for new potential environments in which weapons can be used. The arms race is now largely a technological one.

This is not to say that there are no "quantitative" increases at all. There has been a slow rise in the numbers of the world's armed forces. Both in the very long run, since 1914, and in the short run, since 1960, they seem to have risen at about $2-2 \frac{1}{2}$ per cent a year (chart 2.1). This is only about a third as fast as the rise in military expenditure: and a large part of the recent rise in the numbers of the world's armed forces has been in countries whose spending on military procurement is low.

Secondly, there are from time to time sharp quantitative outbursts of increases in the numbers of new weapons. The world stock of intercontinental ballistic missiles, for example, has risen from 500 to 2650 in the seven years from 1962 to 1969; and there has been a huge increase in the stockpile

Millions of men



Chart 2.1 Armed forces of the world

Source: The reference section, page 195.

of nuclear weapons. This can occasionally happen for more conventional weapons as well: the helicopter is hardly a new weapon, but the discovery of new tactical uses for it has led to a three-fold increase in the stock held by the US Army in the last eight years (page 136).

But for other important groups of weapons, the actual numbers in the world have tended to stay the same or indeed sometimes to fall: the increase has been in their capabilities. In 1956 the world stock of aircraft carriers reached a peak of around 130; since then it has declined to some 75. The actual number of submarines in world navies is also lower than it was ten years ago—700 now as against just over 900 ten years ago. Indeed there are roughly the same number of submarines in the world today as there were in 1937. (But one nuclear attack submarine is commonly said to have ten times the capabilities of one conventional submarine.)

A good example of the way in which arms competition has taken the form of product improvement rather than a simple increase in numbers is provided by the development of the United States tactical air force over the last seven years. Over that time, the number of aircraft in the inventory has stayed about the same: but there has been a very considerable increase in capability. The testimony of the Assistant Secretary of Defence in the

The technological arms race

middle of last year makes the point, even allowing for the fact that some of the figures which state the order of magnitude of the improvement are deleted.¹

"Since 1961, there has been a very substantial increase in our tactical air capability despite the fact that we have about the same number of aircraft today as we had then.

"First, we have more than doubled the payload-carrying capability of the force. Although the combat effectiveness of an aircraft involves more than just its payload capability, there can be no doubt that larger payloads do mean more effectiveness. In addition, we have the choice of carrying some of this large payload in the form of external fuel tanks instead of bombs. This allows us to strike deeper targets, or to base our aircraft further to the rear where they will be less vulnerable; to fly farther at low altitudes, or to take a more circuitous route to the target so as to fly around, instead of over, enemy defences; and to have more fuel for full-power operation in combat with enemy aircraft.

"Second, we have developed greatly improved nonnuclear bombs and missiles. The importance of improvements in ordnance cannot be overemphasized. As an example, destroying a typical truss bridge with conventional 750-pound bombs takes roughly [deleted]. Similarly, against personnel targets, modern cluster munitions provide more than [deleted] times as much destructive capability per sortie as general purpose bombs. Considering the increase in payload and the improvement in weapons alone, the current force has several times as much offensive capability as the force we had in 1961.

"Third, we have developed and are developing automated systems that should improve weapon delivery accuracy. Again, even modest improvements in accuracy result in large improvements in target destruction capability. For instance, reducing the mean bombing error from [deleted] feet more than [deleted] the probability of kill against a tank.

"Fourth, we have developed an ability to seek out and attack tactical targets with conventional weapons at night without flares and in bad weather —a capability we did not have in 1961. [Deleted]

"Fifth, we have vastly improved our ability to deal with the enemy surface-to-air missile and radar-directed anti-aircraft gun defense network. In the past 3 years, we have spent over \$2 billion on ECM—electronic countermeasures—equipment for tactical aircraft. The fiscal year 1969 budget request contains over \$500 million for additional ECM equipment. This in-

¹ Dr. Alain Enthoven: U.S. Tactical Air Power Program: Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Forces, U.S. Senate, 90th Cong., 2nd Sess. (6 June 1968), p. 144. Sections of open Congressional hearings which are deemed vital to US security, particularly figures, are often deleted from the public record.

cludes warning and jamming systems carried on fighter, attack, and reconnaissance aircraft, anti-radar missiles such as Shrike and [deleted], specialized jamming aircraft such as the EB-66, EA-6A, and EKA-3B, [deleted].

"Finally, we have also increased our investment in sophisticated air-to-air missiles for our fighters. In 1961, only 15 per cent of our fighters carried radar missiles intended for all-weather use. Today [deleted] per cent of them do."

The rate of product improvement

There is no straightforward measure for the rate of product improvement in military goods. For a piece of factory equipment, one can measure the increase in output per man employed. There is no obvious output measure for a weapon. A measure of the increase in the amount of destruction it can do is not adequate by itself. Often a great deal of the increased complexity of a weapon arises from the requirement that it defend itself against attack. The expenditure of \$2 billion on electronic counter-measures for United States tactical aircraft is an example of this.

One rough approach to a measure of product improvement is to look at the increases in the real cost of certain categories of weapon—Air Force fighters, submarines, and so on. Part of the increase in the money cost of these items can be put down to the general rise in prices; in table 2.1, an adjustment is made for this. The rest represents an increase in the real resources put into the production of the weapon. Sometimes of course the resources put into a weapon are increased, but the new or improved weapon is a failure and there is no commensurate increase in performance. In general, however, it is probable that increased expenditure does buy an increased capability or performance which bears some relationship to the money spent.

The figures for the seven weapons shown in table 2.1, therefore, suggest an average increase in performance of something over 10 per cent a year. This implies a doubling every seven years, and a twenty-fold increase over thirty years. Civil goods do not increase in performance or capability in this way. The performance or capability of a present-day car is not twice that of a 1962 model, or twenty times that of a 1939 model. If calculations were made on the same basis as that of table 2.1 for a typical collection of consumer goods, they would show very little rise at all.

Research and development comparisons

Behind this extremely rapid rate of technological improvement in weaponry, so much faster than that of civil goods, there is an enormous disparity be-

	World Wa	ır II	1968		Average annual percentage increase
Air force fighter	F-51	110	F-111A	6 800	18.0
Air force transport medium	C-47/43	190	C-141	6 300	15.1
Navy fighter	F-4Ú	200	F-4	2 600	10.7
Navy light attack					
aircraft	TBM	200	A-7	1 800	9.2
Attack submarine	SS	9 380	SSN	77 000 ⁵	8.8 ^b
Attack carrier	CVA	109 780	CVAN	454 000°	5.9°
Destroyer	DD	17 370	DLGN-37	180 000	9.8

Table 2.1. Average annual percentage increase in "real cost" of certain military items

US \$ thousands, at 1968 prices^a

Source: Air Force Magazine, November 1968.

^a The World War II cost figures have been inflated by an index showing the general rise in prices since 1943. From 1943 to 1968 the general price index in the United States doubled.

^b Since this figures was given, the cost of the latest nuclear attack submarine is said to have risen to \$181,000, making the average annual percentage increase 12.6.

 c Since this figure was given, the cost of the latest nuclear aircraft carrier is said to have risen to \$537,000, making the average annual percentage increase 6.6.

tween the two fields in research and development. In table 2.2 calculations are presented on the research input per unit of output in the production of military goods: that is, the amount of research and development done for each \$100 of military procurement. Comparable figures are given for the whole of manufacturing industry: once again, figures are only available for Western powers. For every \$100 of military procurement in the United States, Britain and France, there is over \$50 of research expenditure. For the general run of manufacturing, the research input for every \$100 of output ranges from \$1.9 (France) to \$7.5 (United States). The disparity is not as great in other countries, but it exists everywhere.

Further, the military research figures are understated. They exclude space research and atomic energy research, both of which have extensive direct military applications. Making some allowance for this, there is little doubt that the research input per unit of output is at least twelve times greater in the military field than in the civilian field, taking the United States, Britain and France together. It is not surprising, therefore, that the rate of innovation and of product improvement is so much higher in military than in civil goods.

This tremendous research and development drive behind the advance in weaponry has an impetus of its own. Once massive funds are voted for weapons research, and once there are large permanent establishments doing nothing but weapons research, it is inevitable that further improvements will be made and inevitable that new fields of warfare will be explored. Once

	R&D expenditure per \$100 of mili- tary procurement	R&D expenditure per \$100 of manu- facturing output
United Kingdom (1964-65)	62.2	4.9
United States (1964-65)	54.0	7.5
France (1963)	51.0	1.9
Canada (1963-64)	20.4	1.3
Sweden (1964-65)	10.8	3.3
West Germany (1964)	10.6	1.7
Italy (1965)	8.8	1.3
Norway (1962)	6.9	1.3
Netherlands (1965)	4.4	1.5

Table 2.2. Research and development expenditure per \$100 of output

Source: Statistical Tables and Notes in OECD International Statistical Year for Research and Expenditure, II; E. Benoit and H. Lubell, "The world burden of national defense" in Disarmament and World Economic Interdependence, ed. E. Benoit (Oslo, 1967), table 1, p. 31.

some weapon improvement has been discovered it is often inferred, without direct evidence, that a potential enemy will have made the same discovery, and that therefore it is dangerous not to take the next step—the actual development of the weapon. Weapons research proliferates in another way as well: each new weapon spurs the development of counter-weapons. The development of the ballistic missile submarine sets off an immense research programme into techniques of anti-submarine warfare. Here again, there does not have to be evidence that the enemy already possesses the weapon for which counter-measures are being devised: it is sufficient to assume that sooner or later he will do so.

Survey of the fields

Within the space of this chapter, an attempt at a comprehensive survey would result in a catalogue. We have selected four subjects to illustrate the type and range of things that are going on. The first is a survey of the rapid technological advance in a non-conventional weapon—the missile carried by Polaris submarines. This illustrates one aspect of the competition between the two great powers in ballistic missiles. It also illustrates the way in which changes in technology can lead to changes in strategy: the development of the missile has lead to a change in its potential strategic use. The second section is a longer-term survey of the actual development—mainly in the United States—of chemical and biological weapons. This illustrates the spread of weaponry into new fields, and also provides some background to

The technological arms race

one of the present topics for discussions of disarmament. Third, there is an account of the developments in an older conventional weapon—the helicopter—for which new tactical uses have been found. Here it was the discovery of the new tactical uses which led to further technological development, rather than the other way round. Finally, there is a small example of one particular device—a night vision device. It illustrates the constant probing of new frontiers—in this case, to extend the practicability of land warfare over the whole 24 hours; and it is also an example of the smallerscale research developments which are going on.

Part II. Submarine-launched ballistic missiles

Square-bracketed references, thus [1] refer to the list of sources on page 144.

Introduction

United States Polaris submarines have only been deployed since 1960. Even so, there have already been two major developments in the missile installed in them, and a third should begin to come into operation next year. Tables 2.3 and 2.4 show the timing of the developments—the steps by which the A-2 missile succeeded the A-1, and the A-3 succeeded the A-2. The Poseidon missile, to follow in a year or two, is the next step. The present Defense Department plan is that 31 of the 41 Polaris submarines will be refitted with Poseidon by 1975; the remaining ten will by that time have been refitted with the A-3 missile.

These successive steps have increased the capabilities of the missile manyfold. The last step, from A-3 to Poseidon, represents "an eightfold increase in the performance of the missile"—simply from improvements in payload and accuracy, without taking into account the multiplication of warheads. [1, 2]

Increases in range and in payload (including the ability to carry an increasing complement of penetration aids), improvement in accuracy, and the multiplication of warheads have been the main ways in which the missile's capabilities have risen. A doubling of accuracy leads to much more than a doubling of the effectiveness of the weapon. Accuracy is usually measured by the use of the circular probable error, or CEP. A CEP of 1/4 mile means that there is a 50 per cent chance that a missile fired will fall within a radius of 1/4 mile of the centre of the target. If the CEP is halved, then

			Number commissioned equipped with					
Year	Total number commissioned	Total in service	A-1 missile	A-2 missile	A-3 missile			
1959	1	1	1					
1960	2	3	2					
1961	3	6	2	1				
1962	3	9		3				
1963	7	16		7				
1964	13	29) all 5	2	11			
1965	5	34	refitted with		5 $(+5 \text{ old, refitted})$			
1966	6	40	A-3 missile		6 with A-3)			
1967	1	41	,		1			
1968	0	41	Total in servic	e in 1969:				
196 9	0	41	_	13	28			

Table 2.3. US Polaris submarines: number commissioned and missile equipped

the weapon yield needed to eliminate a specific target is reduced by a factor not of 2, but of around 10. [3]

The multiplication of warheads within the same payload also leads to major increase in capacity. The blast effects of nuclear weapons do not increase in direct proportion to the increase in yield. One 10-megaton warhead will destroy large concrete and brick structures over an area of 18 square miles. Ten 1-megaton warheads—the same payload, separately aimed to avoid overlap—would destroy an area of 40 square miles. [3]

The fact, therefore, that the number of US missile-carrying submarines is scheduled to stay the same for some years, at 41, and that the number of missiles is likely to stay at 656, is by itself misleading. The technological developments in the missile have provided and will provide an immense increase in lethal capacity.

There is not room to pursue the exceedingly numerous ways in which defence research has ramified, as a consequence of the development of an undersea ballistic missile. Extensive work on the development of nuclearpowered reactors for submarine propulsion, for example, was necessary before the entire weapon system was feasible. There has been extremely active development of all the techniques of anti-submarine warfare—the strategic submarine detection systems² are only one small part of this. Finally, there has been a very big increase in funds over the whole field of oceanography, all springing from the original development of Polaris and the resulting requirement to understand the effects of the ocean environment on its operation, its weapons and its communications. The Panel on Oceanography of the President's Science Advisory Committee reported as follows in 1966:

² Such as bottom barrier detection systems, world-wide environmental buoy systems and aircraft and satellite reconnaissance systems.

The technological arms race

	A-1	A-2	A-3
Range, nautical miles Range, statute miles Date first deployed ^b	1 200 1 300 15 Nov. 1960	1 500 ⁴ 1 725 26 June 1962	2500 2880 28 Sept. 1964
Date first deployed: Atlantic Ocean	15 Nov. 1960 (SSBN G. Wash- ington)	26 June 1962 (SSBN E. Allen)	28 Sept. 1964 (SSBN D. Webster)
Date first deployed: Mediterranean Sea	May 1963 (3 vessels)		••
Date first deployed: Pacific Ocean	none	none	Dec. 1964 (SSBN Tucumseh) ^e
Date first deployed: Indian Ocean	none	1965–1966	1965–1966

Table 2.4. US Polaris submarines: deployment

^a Kuenne, in an excellent source book, indicates that the A-2 has a somewhat greater range, 1 800 to 2 200 miles [53].

^b There are often confusions in the literature between commissioning dates and the dates of initiation of original operational patrols, but it is not likely that these would differ by more than six months.

^c All seven Polaris submarines assigned to the Pacific since 1964 have been equipped with the A-3.

Because of the possible increased emphasis in our strategic-defense capabilities in terms of the Navy's submarine-based missiles, and because this emphasis would only be well-placed in the absence of any degradation of the submarines or of the enhancement of detection capability, the Navy must support a program which continuously explores all aspects of the ocean environment which conceivably could be exploited or utilized to allow continuous targeting of such submarines. ... It is very possible that the kind of strategic offensive force we may wish to develop for the future will rely even more heavily on ocean-based systems than that which we now have. Such systems may very well require operations at a much wider range of ocean environment and for much longer times than at present. Thus, the need for oceanographic research and support of these weapon systems becomes even greater and will certainly have to encompass a wider problem area in development and maintenance of present submarine forces. These problems will range from ascertaining that the ocean-based systems cannot easily be compromised by an enemy's exploitation of some hitherto hidden effects of the ocean's environment to development of massive ocean engineering capabilities. [4]

The following sections concentrate on the Polaris missile system itself: the general characteristics of the system; the type of technological advance which has improved the performance; and the main elements in that improvement—range, payload, accuracy and so on. In discussing the improvements in accuracy, some of the developments in navigational aids are enumerated. One result of the prospective changes is that now the payload and accuracy are being increased so substantially, the missile is likely to be

capable of a quite different strategic role, of being used against hard targets as well as against cities.

Beyond Poseidon active work has begun on the research and development for the next undersea missile system, known as ULMS—Undersea Longrange Missile System. There are large numbers of improvements in missile technology, in extending range and providing guidance, and in submarine technology as well, which are likely to be incorporated into the planning of the next missile-firing submarine.

The Polaris system

It is perhaps useful to begin with a general—and official—description of the whole Polaris system:

"In the Polaris system ... dependable capability to inflict unacceptable damage, which cannot be decisively reduced by surprise attack, rests upon use of quiet nuclear-powered submarines which are most difficult and costly to detect and destroy simultaneously in decisive numbers; upon a command and control communication system which is difficult and costly to destroy or to interfere with to prevent adequate message reception for a decisive period of time; upon a missile system of sufficient accuracy and warhead-power to assure that a single warhead penetrating active defenses will cause major destruction to urban industrial centers, or that a very small number of warheads will destroy a hardened point military target; and upon a reentry system having such characteristics as to make it very much more costly for an active defense system to destroy a warhead than it is for us to place a warhead over the potential target.

"The capability to inflict damage from a submarine system designed so as to be capable of operating submerged and completely independent of external support, except communications, for a major portion of the time, cannot be decisively reduced by a surprise attack upon its exposed external support such as tenders, supply ships and shore-based facilities. If, in addition, the system is designed, supplied, and manned so that it can be maintained without significant reduction of capability during the entire time it is submerged, that portion of the force is capable of continuous effectiveness. ...

"Such a nuclear submarine must ... maintain the system for a two-month submerged patrol without any external assistance or support; and ... [have] a store of spare parts, operating supplies, and provisions adequate to provide very high assurance that the system would be maintained almost continously ready to launch missiles during this two-month-period. By providing provisions for three months endurance of the crew, and by providing tender repair capability and logistic support adequate to prepare the submarines for

The technological arms race

another patrol in one month, the effectiveness of two-thirds of the deployed force is unimpaired for a period of one month, by surprise attack on all tenders and all shore support facilities.

"The capability of this two-thirds of the deployed force to inflict damage cannot be decisively reduced by surprise attack if it is sufficiently difficult to detect, trail, and near-simultaneously destroy the individual submarines. In order that such a submarine be difficult to detect it must remain completely submerged as much of the time as possible, must be designed and operated to radiate as little acoustic energy as possible, and must have the capability of operating in as large an area as possible, while remaining within range of targets, with minimum necessity of transiting narrow waters where barrier patrols may be easily established. In order that the submarines be difficult to destroy they must be equipped with passive and intercept sonar having at least equal detection-capability to that of hunting submarines, have adequate speed to evade when possible, and be equipped with good defensive armament for use when evasion is not possible. When operated so that the opportunities for detection of one submarine by a single attack submarine or surface ship are essentially random, it will be exceedingly costly to destroy almost simultaneously a decisive fraction of a force of such submarines. ... It is common knowledge that two-thirds of the deployed Polaris

The type of technological advance

The development and deployment of the Polaris ballistic missile system is an excellent example of the absolute dependency of advanced and new generation weapon systems on scientific and technological advances. [6] The technological advances in the Polaris missile were described by an official of the corporation responsible for the development of the system as follows:

"[From] the summer of 1955 ... through spring of 1956, several technological break-throughs made it apparent that it would be possible to develop reduced-size warheads, relatively small inertial guidance systems and increased specific impulse solid propellants with the associated ability to case bond these propellants.... The Polaris A3 is the cumulation of all the design effort, testing, problem solving and state-of-the-art advancements of the Polaris A1 and A2 programs. In fact, some of the later A2 development flight vehicles (A2X) tested hardware and techniques scheduled for the A3. Some of the areas where problems were resolved for A1 and A2 which were reflected in or facilitated the design of the A3 were:

underwater launch;

- first and second stage separation;

- trajectory analysis and simulation;
- base heating on aft end of the first stage motor;
- thrust vector control-rotable nozzle, fluid injection;
- lighter weight motor cases and increased specific impulse propellants;
- lighter weight guidance systems.

"... The Polaris A2 improvements were gained principally by increased size of the first-stage motor over that of the A1, and an increase in second-stage propellant specific impulse. The Polaris A3, however, achieves a major increase in performance due to the use of improved propellants, light-weight motor case materials, advanced thrust vector control means, and by significant conceptual changes throughout the missile. These changes include a significant reduction in the size and weight of the guidance system, a basic advance in the re-entry system configuration, and general miniaturisation of electronic components and subsystems." [7]

The improvements in the motor case materials and the vector control (which controls the missile in roll, yaw and pitch) are described in more detail: "Both stages of the A1 are of steel. The first stage of the A2 is steel and the second stage glass fiber, while both stages of the A3 are of glass fiber. Jetevators are used for control on both stages of the A1; the A2 has jetevators on the first stage and rotating nozzles on the second. The A3 missile employs rotating nozzles on the first stage and fluid injection on the second." [7]

The A-3 required in particular extensive development of propellant in order to achieve its increased range. "It uses a first stage propellant flame temperature exceeding 5000 F: development of this propellant system posed difficult problems solution of which were critical for attaining the missile advance in operational capability." [8]

The same lines of development have been continued with the Poseidon missile (referred to in the early stages of its development as the B-3). "One of the advances that has made possible a B-3 missile is a two-inch reduction in diameter of the insulating blanket around the missile. This means that the missile diameter could be increased from 54 in. to 58 in. Also, advances in materials and thrust-vector control units coupled with higher-impulse propellants, would provide the greater range/payload. At the same time, reduction in the size and weight of the guidance system through microminiaturization would make more weight available for payload." [9]

All these are developments affecting the missile alone. When the submarines were adapted to take a new missile, large numbers of other modifications were made as well. When the A-1 submarines were refitted to take the A-3, a new missile launching system was installed; there were major modifications to the communications equipment and the fire-control equipment; new sonar was installed; the navigation equipment was improved; the hull surface was modified; and there were major modifications to the hydraulic and power distribution systems.

These changes, both in the missile itself and in the Polaris system in general, have lead to improvements in range, payload, accuracy and reliability. Each of these is considered in turn.

Range

The earliest missile, the A-1, with its 1200 mile range could reportedly hit any target within an area of 90 per cent of the Soviet Union. [10] This was increased to 95 per cent with the A-2. From the A-1 to the A-3, the range of the missiles was more than doubled. In describing the advantages that followed from this, Rear Adm. I. J. Galantin, then director of the Polaris programme, explained: "Let's suppose a submarine armed with the 1200mile-range Polaris A-1 is covering a target 1000 miles inland. He has some 690,800 square miles of sea to hide in. When we arm him with the 2500mile Polaris A-3, he can keep the same target covered and his sea room increases to 8,242,500 square miles. Or, if he will settle for keeping to that 690,800 square miles for sea room, he can cover targets 2415 miles inland. Or, of course, he can adjust in either direction. Since no spot on earth is more than 1700 nautical miles away from the sea, he would naturally choose to increase his sea room." [11] 8,242,500 square miles is a surface area equal to more than twice that of the United States. It has been calculated that replacing the A-1 with the A-2 results in doubling the target area. The A-3 expands the A-1 target area by a factor of six. The Polaris A-3 also provides six times as much ocean for the submarine to hide in. [7]

The Poseidon missile could increase the range further. However, there is a trade-off between range and payload, and most of the discussion of the potentialities of Poseidon suggests that it may be used with the same 2500 nautical mile range of the A-3, with double the payload. Some reports have indicated that Poseidon's range may increase to 3500 miles. It is possible that, with higher energy propellants, the range would even approach that of the Minuteman—that is, of the order of 5000 miles or further. [12] Though the range of 2500 miles appears ample, it sometimes requires the Poseidon to be in areas of shallow seas, where detection is easier. Greater range will enable the submarine to stay in deeper seas. [13]

Payload and warheads

An increase in payload can be used for a larger warhead, or more than one warhead; it can be used for guidance stabilisation devices, additional sensors,

counter-measures and other penetration aids; or of course it can be used for any combination of these.

There was probably some increase in the payload of the A-2, compared with the A-1: the A-2 seems to have carried a family of decoys and other penetration aids. [14] These are certainly carried in the A-3 missile. In addition, the A-3 missiles carry three warheads. They seem to have been provided in the first instance under Project Antelope: "Project Antelope, completed in 1966, provided the A-3 missile with improved penetration aids and minor engine modifications. Unofficial reports state that Project Antelope also provided a multiple warhead for some A-3 missiles. The FY 1968 budget included funds for the development of certain desired improvements for the Polaris missile, presumably additional penetration capability and possibly additional multiple warheads." [16]

The British Polaris submarines are equipped with A-3 missiles, and they have been reported to carry three warheads. [41-44, 65] These three warheads are MRVs, multiple reentry vehicles, and not MIRVs, multiple individually targetable reentry vehicles: that is, they are not capable of individual guidance. They are distributed in a scatter pattern. [17]

Poseidon will weigh 65,000 pounds, twice the weight of the A-3, and will be capable of doubling the payload. [12] It is designed to carry multiple individually targetable reentry vehicles (MIRVs) and/or a large component of penetration aids. A recent press report indicated that "at present the United States is developing a three-warhead MIRV for its Minuteman III and a 14-warhead MIRV for its Poseidon missile. Tests of these warheads started last August and are slated to continue into early next year." [18] Other reports suggest 10 warheads as an upper limit.

The options for Poseidon do not require that it always contain the maximum number of MIRVs. Targeting at greater ranges might reduce the number as well as the importance given to its increased penetration aids complement. A report in 1965 implied that a large warhead was being developed. This may be an alternative possibility for the use of Poseidon's doubled payload: "New arming and fuzing systems: Certainly one new design will be needed for the largest warhead, which will be bigger and more sophisticated than any with which the Navy has had to deal. And probably they [the warheads] will all be redesigned—to take advantage of microelectronics, and to render them even less vulnerable to hostile countermeasures."[13]

Number of warheads

The Polaris fleet of 41 submarines carries 656 missiles. The warhead has generally been stated to be of one megaton, though some sources suggest

Table 2.5. Possible number of warheads in the present and future United States ballistic missile submarine fleet

Number of warheads

Present position (1969)	
Number of missiles in A-2 submarines (13 submarines × 16 missiles): 208. With one warhead each: Number of missiles in A-3 submarines (28 submarines × 16 missiles): 448	208
Maximum assumption: each A-3 missile has 3 warheads: Moderate assumption: that half have 3 warheads	1 344
& half have 1 warhead:	896
Total number of warheads: maximum assumption moderate assumption	1 552 1 104
The Poseidon fleet (1975) Number of missiles in A-3 submarines	
(10 submarines × 16 missiles): 160. With three warheads each: Number of missiles in Poseidon submarines (31 submarines × 16 missiles): 496	480
Maximum assumption: each Poseidon missile has 14 warheads:	6 944
Moderate assumption: each Poseidon has 10 warheads:	4 960
Total number of warheads: maximum assumption	7 424
moderate assumption	5 440

that it is higher than that. One source states that the "Polaris carries thermonuclear weapons of 1.1 megatons or better." [13]

The number of warheads is now presumably greater than 656, since it seems fairly certain that some at least of the A-3 missiles carry three warheads. If we assume that half of them do so, the total number of warheads now in the fleet would be 1104 (table 2.5).

When Poseidon comes fully into operation—the present Department of Defense programme requires the conversion of 31 submarines to Poseidon by 1975—the total number of warheads will have taken another step up. The maximum possible number of separate warheads—if we assume that all Poseidons are equipped with the upper estimate of 14 warheads—is 7424 (table 2.5). Senator Saxbe has put forward a figure for the eventual total number of warheads of "over 5100". [19] Mr. Charles Schultze, former Director of the United States Bureau of the Budget, has spoken of "anywhere from 4000 to 6000." [20]

Accuracy

Figures of the accuracy of most missiles tend to be classified: so it is not possible to indicate precisely how the accuracy of submarine-launched missiles has increased between 1960 and 1969. But Poseidon is expected to show double the accuracy of the A-3, so that it would be comparable in

accuracy to the land-based Minuteman II. The CEP of the Minuteman II is probably rather less than half a mile.

Improvements in accuracy come about not simply from improvements in the missile itself, but also from the increased accuracy of information fed into its computer about the position of the submarine and of the target. An examination of the development of navigational aids shows how wide-ranging the changes are which have led to the increased accuracy of the Polaris missiles.

Accuracy of navigation and target location

The Ship's Inertial Navigation System (SINS), and its associated computer system (NAVDAC) are the keys to the launching of the Polaris missile and the navigation of the submarine. [21] They supply the missile fire-control system with the accurate navigation data needed to prepare the Polaris missiles for launching at any time, regardless of the submarine's position or heading. They constantly correct the missile's guidance system in accordance with the ship's movements; at every movement of the vessel the missile's computer must know the ship's location, local vertical, true north, target location, and the trajectory to be flown. Computers on board the submarine are thus continuously inserting information of several types into the subsidiary computers within the missile itself which comprise the missile's ability to find its target. Targets can be changed if necessary within a few minutes.

Any improvements in the estimate of the position of the submarine, which is changing, or in the estimate of the position of its target, which is fixed, can produce great improvements in targeting accuracy with no further improvements in the missile itself. In this group of improvements wholly outside the missile and submarine there are included:

- greater accuracy in geographic measurements, derived from aerial and reconnaissance satellite mapping;
- more accurate positional information supplied by a constant source outside the submarine: VLF (Very Low Frequency) radio systems, navigational satellites, and sea-bottom anchored transponders;
- accurate means of establishing time;
- more accurate knowledge of the effects of geophysical conditions on navigational instruments.

Highly improved geographic techniques developed in the 1950's and the 1960's, which established with great accuracy the curvature of the earth and measured very precisely the distance between specific points on the earth's

The technological arms race

surface, were long realized to be of direct importance to ICBM (intercontinental ballistic missile) targeting. Early post-WWII high altitude aerial reconnaissance, and more recently, satellite reconnaissance and other satellite programmes, such as the Secor satellite programme, have played a similar role.

The effect of gravity anomalies caused by variation in the magnetic properties of rock strata on the sea floor can cause serious errors in the readings of inertial navigation systems unless the anomaly values are known and corrected for. There have been active Navy-sponsored research programmes into the improvement of these geographical parameters and estimates.

The very precise determination of the passage of time is also a direct input into the submarine and missile guidance computer, as the calculation of location depends on it. In the cesium atomic clock programme, the US Navy has long pioneered accurate timekeeping systems and means to distribute such information to all its vessels, above and below the surface of the sea [22–26]. "[The] application [of a sophisticated timekeeping system] is in long-range, space-navigational control systems where, over great distances and at high speeds, small errors in time result in large errors in position. The Navy's far-ranging nuclear submarine fleet would put to good use a time standard that would need virtually no resetting or checking, an important factor to consider in view of the craft's long at-sea and underwater endurance." [26]

Polaris submarines use more than one means of determining position. One of these is the Transit Satellite Program [27-33]:

"The early development of Transit is no accident. It will play an important part in the Polaris system.... The final Transit system will involve four 50-pound satellites probably placed in about 400-mile orbits. They will have a life-span of about five years. A ground station will transmit to the operational Transits their exact orbits for each 24-hour period. The data will be stored on magnetic tape in digital computers and transmitted continously on two stable frequencies.

"A ship will be able to obtain the data from one of the satellites at any time over special receiving equipment. There will be no need to interrogate the satellite.

"The ship's receiving and computing equipment also will be able to measure the Doppler shift of the satellite's signal, thereby enabling the ship's navigator to know his precise distance from the satellite. This combined with exact knowledge of the satellite's orbit will give the navigator a precise fix on his position.

"The system will provide all-weather, global navigation. Navigational fixes obtained from it eventually will be better than two-tenths of a mile-
about as precise as the Sperry Ship's Inertial Navigation System (SINS) developed for Polaris submarines.

"This also is more than coincidence. Transit will provide a precise checkpoint for SINS which must be corrected periodically because of gyrodrift....

"Polaris submarines on station will be able to pick up fixes from Transits without surfacing Such precise fixes only become important for plotting trajectories prior to launching missiles. Otherwise, much less precise navigation systems are more than adequate." [31]

Transit's coded message is transmitted every two minutes. The first position fixes supplied by the system were within a position of one-quarter mile; there is currently a one-tenth mile goal. "The Polaris subs have sharply increased their already phenomenal firing accuracy by using Transit data." [13]

Accuracy of the fire-control system and missile

Information about the location of the submarine and its target makes up one of the inputs into the computer programmes of the missile's fire-control system. In the system itself there have been extensive developments, particularly for the Poseidon missile. This missile will employ a third-generation fire-control system which will evolve from the Mark 84 system presently used with the Polaris A-3. "The missile ... will require a greatly beefed-up high-speed digital computer to satisfy the Poseidon's need for more sophisticated penetration capability. This will be a general-purpose digital computer providing considerably more operational flexibility. Considerable change is expected because the fire-control system included static and dynamic missile alignment equipment, checkout, a display console, operating controls, temperature controls, and power sub-systems." [2]

The accuracy of the missile itself is governed largely by events occurring in the early powered-boost phase of flight and in the separation of the stages. [34] Very small errors of guidance and velocity at this point are magnified manyfold by the time the warhead arrives at its terminus. Separation occurs within a minute or two after launch, when the missile is only one-sixteenth of its way to the target. The warhead carrying stage is separated when the missile is travelling at a speed of 14,000 knots at an altitude of 70 miles and is still climbing. The guidance equipment must be sufficiently precise to correct velocity errors of only a few feet per second and position errors of one foot at this point. "A velocity error of as little as 5 ft/sec at warhead separation will cause the Polaris ballistic missile to miss its target by a mile." [34] An error in lateral position at separation will cause an impact error 15 times as great.

The better the accuracy of a missile, the more difficult it becomes to

make any further improvements. When the CEP for a sea-launched missile is down to a mile, it is a major achievement to reduce it by a few hundred yards. At this stage, re-entry factors become more important—such as the manner in which the ablative material³ burns off, and the effects of wind. Substantial research effort is also going into these questions. [35]

Reliability and speed of firing

The Polaris weapons system seems to have operated with a high degree of reliability. Of the missiles themselves, it is claimed that "at least 15 on each ship have been ready for instantaneous firing 99.9 per cent of the time; all 16, 98.1 per cent of the time." [36]

In 1963 it was reported that 70 two-month patrols had taken place, with none leaving late or returning early, due to malfunction or other cause. [37] In 1964: "Polaris submarines now have patrolled for a total of more than 5000 days and during that time have encountered hundreds of visual or sonar contacts. However, the Navy boasts, there's no evidence that any of these contacts have ever detected a Polaris sub. This has led Navy planners to revise their estimates of the time when the vessels will have to be replaced. They are now looking toward the 1980's rather than the 1970's." [38] By January 1968 over 500 patrols had been completed, and the US Navy has claimed that "none of the submarines—as far as is known has ever been detected after it has submerged to its patrol depth." [38]

Another improvement in performance has been an increase in the speed with which the missiles can be launched. The first Polaris vessels required 15 minutes to launch all their missiles. Now the missiles can be launched within 15–20 seconds of each other. This is important because "submarine locations are easily deduced from the track of missiles which have already been launched, and missiles in powered flight can be tracked by radar carried by either ships or aircraft. . . . The higher the missile firing-rate of the submarine is, the shorter is the time available for use of the detection information before all the submarine's missiles can be launched. The firing tate can be sufficiently high so as to make it necessary that the detecting ships or aircraft carry the antisubmarine missiles themselves and that their numbers be very large."⁴

The strategic consequences

The capability of a missile, in this case its accuracy or CEP, may define the strategic role assigned to it. Strategic assignments, and thus strategic doc-

⁸ A coating that wears away and absorbs heat in the process.

⁴ This possibility would limit the extent to which the Polaris system could be used for a controlled nuclear exchange.

trine, follow technical capability. The present 656 Polaris missiles and their indeterminate number of one-megaton warheads are widely presumed to be targeted on Soviet cities. Submarine-launched ballistic missiles have hereto-fore had poorer CEPs and lower payload capabilities than ICBMs and hence were not considered useful against hardened missile silos.

There is evidence that the increase in the Poseidon's payload and accuracy means that it is now considered as a weapon which could be used against hardened targets. "Accuracy would be increased dramatically so that the Polaris B-3 would be comparable on station to the landbased Minuteman II ICBMs. This would allow Polaris to be used in a damage-limiting role as well as fulfilling the assured destruction mission that it is now assigned." [9] (A damage limiting capability means an ability to knock out the other side's missiles.)

The possible change in role has been mentioned by the new United States Secretary of Defense:

The increase of \$12.4 million for the development of an improved guidance system for the Poseidon missile will advance the initial operating capability (IOC) of that system by about six months. ... This is an important program since it promises to improve significantly the accuracy of the Poseidon missile, thus enhancing its effectiveness against hard targets. [39]

"Recently however as you also know we found ways of improving the accuracy of Minuteman and Poseidon so as to be able to get much greater kill capabilities even though the warhead yields were reduced and so in fact we are beginning to get a rather effective damage limiting capability. [40]

From the Soviet point of view, therefore, the Poseidon will be seen as a potential first-strike weapon.

More advanced developments

The United States is already engaged in studies for a successor to the yet-tobe installed Poseidon. [36, 45-55] The US Navy's Advanced Sea-Based Deterrent (ASBD) study group completed one phase of its studies concerning the proposed forces for the 1980's as early as 1964. Exploratory Development was begun in FY 1961 and Advanced Development was begun in FY 1965. [45] These studies included the basing of medium-to-long range ballistic missile systems in the ocean in specially designed, submersible vessels capable of operating in depths ranging from 1000 ft to 11,000 ft. [46] However, sea-bottom based systems were recommended in addition to submarine-launched systems: "Manned systems are favored over unmanned systems, primarily because of the requirement for positive control of the weapon. The concept of moored unmanned launchers is felt to provide poor security. Low-powered ocean bottom crawlers that will be manned by a relatively small crew which can be moved to different locations to complicate detection are being considered. Mobility is considered a prime requisite."[46]

Feasability studies for the projected use of the ocean floor for missile sites—in the form of Polaris missiles launched from movable silos—was reported to have been completed by October 1963 and have been then continued "on a 'phase II' basis." Further details were supplied in another report:

"Reportedly, under consideration is a wide range of deployment concepts for ASBD, including missiles stored in unmanned silos drilled in the ocean floor, a tracked launch vehicle which could change location on the ocean bottom, a low altitude missile which would be launched from a deep submergence submarine, and missiles deployed in unmanned submarine launchers around a command ship. However, several concepts that are believed furthest along because, from a practical standpoint, they are now within the state of the art, are new and larger FBM [fleet ballistic missile] submarines capable of carrying larger missiles and a proposed force of highspeed, long-range missile-equipped surface ships; other options encompass an improved Poseidon missile with a more advanced warhead and delivery system that could be fitted to present-sized launch tubes or substantially smaller versions, several of which could be fitted for launch from a single tube. This latter concept, it is believed, hinges on development of Augmented Thrust Propulsion. The FY 1967 ASBD funding of \$3 million is devoted to this effort. ... Expected improvements in guidance, enabling a missile to pinpoint the target, would make possible the use of smaller warheads and smaller sized missiles resulting in a corresponding increase in the number of missiles carried aboard a submarine. Thrust augmentation would provide these smaller missiles with the same range capability. ... While certain areas of ASBD technology are being investigated, the Navy will also consider ... expanding the current FBM submarine force beyond the present 41 boats, and standardizing Poseidon to accept interchangeable stages and warheads for varying ranges and missions. It will probably not be before the early 70's when a decision on the various options is firmed." [45]

This report suggested that since Poseidon was not scheduled until 1970-71, a step-up in ABSD funding would probably not come until after Poseidon had been operationally tested: so its forecast was that ABSD funding would stay at around \$3-5 million until FY 1972. In fact, the funding has already been sharply increased. The FY 1970 budget provided \$20 million for research and development of a new undersea long-range missile system and this project (ULMS) has not so far featured in the cuts announced by the new Administration. The 1969 defense statement of the outgoing Secretary of Defense presented a conclusion reached about the new submarine launched strategic missile system: "Any new sea-based system should be designed round a longer range missile in order to avoid having to station the launch platform within the effective operating range of an improved Soviet ASW defense. Also, the submarine design should make it possible to increase time onstation substantially." [47]

All home bases for the submarines would be on the continental United States, and the submarines would have greatly increased ASW capabilities in comparison to Poseidon. [48] The possible range of the missiles has been given as 7000 miles. [49]

One of the improvements which will probably be incorporated in a new undersea missile system is the development of mid-course or terminal guidance for the missiles: "At ranges over 5000 nm, the ability to maneuver on reentry becomes virtually essential. . . . The Navy is considering the use of Transit for midcourse or reentry corrections, and to control terminal guidance onto targets which do not emit their own homing signals. The system might also incorporate a report-back feature. This would tell the launching vehicle, or some central data-collection point, where each missile hit, when, and how." [13] (There have been references suggesting that Poseidon already carries star-tracking instrumentation for mid-course guidance.) [56]

Deep submergence

Any of the various new systems proposed seems likely to involve operations at greater depths than heretofore. The addition of 100 feet to the maximum operating depth of a submarine adds millions of cubic miles to the volume of space in which the submarine can navigate. At the moment, the ballistic missile submarines can only operate from a relatively small percentage of the ocean. If they were able to go down to a depth of 11,000 feet, they would have half the volume of the oceans in which to operate. [46]

The prospective development, therefore—whether of a new submarine or of some sea-bottom based system—presumes the deep submergence capability under major development by the US Navy in its Deep Submergence Systems Project, a project which is separate from the undersea ballistic missile system project.

Two new Navy research submarines have recently become operational, the Dolphin and the nuclear powered NR-1. The function of both is to test further depth capabilities [57-64] and the NR-1 in particular is designed to operate on and near the ocean bottom for periods of time limited only by the provisions carried on board.

Part III. Development in chemical and biological warfare

Introduction and summary

This section on chemical and biological warfare (CBW) covers a rather longer time-span than the other sections on the technological arms race. There is not the same amount of detailed information as there is, for example, for the missile field. Further, it seemed worthwhile to attempt to bring together the evidence about the way in which research and development in this field has evolved since World War II: this is apparently not a subject on which a concise review already exists.⁵

In this field as in so many others, the available information is almost entirely about US programmes. The United States is the only country which acknowledges that it possesses an arsenal of operational chemical weapons, and that it is carrying out an active development programme in offensive BW techniques. Almost certainly other nations also are doing both these things, but they are more secretive than the United States.

The main points that emerge are these.

In the United States, there have been two sharp increases in the funding for CBW research and development since WWII. The first, in 1952, was apparently connected with a growing awareness of the potentialities of BW, and a desire to increase US capabilities in this field. The second, in 1959, seems to have been a consequence of the discovery of the V-agents, a new class of highly lethal chemicals that seemed very suitable for new chemical weapons. In the reference section on page 271 the information available about the United States' and other countries' expenditure on CBW is collected.

Up to about 1960, the United States research and development programme in offensive CW concentrated on the development of manufacturing techniques for newly discovered CW agents, first the German nerve gases and then the British V-agents. More recently, the emphasis has been on the development of munitions better suited to the dissemination of these new agents. An offshoot of this work has been the development of devices which can disseminate "incapacitating" CW agents; as yet it does not look as though militarily useful weapons have been produced. At the present moment, a plateau seems to have been reached—the capabilities of the most

⁵ It is to be noted that this section is not primarily concerned with the details of the use of CB weapons on the battlefield, nor with their effects. It may also be noted that the use of CB weapons in war is prohibited by conventional and customary international law. These topics are considered in a lengthy study of the disarmament perspectives in CBW to be published shortly by SIPRI, and to which the reader is referred for further information about the substance of this section.

potent CW agents are matched by those of their delivery systems. If research is to produce significantly more powerful chemical weapons, it will first have to discover a cheap and stable substance at least ten or a hundred times more toxic than the V-agents.

The entry of biological weapons into the military arsenals has been greatly impeded by the extreme unpredictability of their effects. Attempts to reduce this seem to be centred around a study of the factors controlling the decay of airborne BW agents. If a way is found to lower the sensitivity of the agents to atmospheric conditions, biological weapons may become more attractive to the military.

The most important research work on CBW defensive equipment seems to have been the development of alarm systems that warn of chemical or biological attack. For CW, this work has been successful, but for BW the problems have been only partially solved.

Chemical weapons

÷,

The chemical weapons of WWII

By 1941, three classes of CW agents were stockpiled by the main belligerents: asphyxiants, such as phosgene; blood gases, such as cyanogen chloride and hydrogen cyanide; and blistering agents, such as lewisite and the sulphur and nitrogen mustards. Chemicals for harassing purposes were also stockpiled; these included the tear gases and other irritants such as CN and adamsite. Although at least 16 different CW agents were available in large quantities, only mustard gas and phosgene-both WWI agentswere likely to have been important had chemical warfare broken out. The former wounds by burning and blistering the skin and eyes; the latter kills. Mustard gas is also lethal if inhaled, but the necessary airborne concentrations are difficult to attain. Phosgene is a volatile substance with a delayed action; it dissipates quickly after dissemination. Mustard gas also has a delayed action, but it is involatile and may persist as a contact hazard for long periods. These agents would have been disseminated from a variety of weapons-the most developed were mortar bombs, artillery shells, aircraft bombs and aircraft spray tanks.

By 1945, Germany had acquired massive quantities of a greatly improved type of lethal agent. This was tabun, the first of a series of compounds⁶ that were later to be called "nerve gases". It is much more poisonous than phosgene, and it acts much more quickly. In addition, it can produce

^e Organophosphate anticholinesterase compounds.

casualties by penetration of the eyes or skin (at high dosages) as well as by inhalation.

Post-war chemical weapons: new CW agents

After the War, chemical weapons designers concentrated mainly on the potentialities of tabun and others of the same compound group, such as sarin and soman. Sarin soon emerged as the most promising of these, and production methods were developed to overcome the difficulties that had prevented the Germans from manufacturing the agent on a large scale. Estimates of the dose of inhaled phosgene lethal to man are generally around 50 mg, while those for tabun and sarin are about 2 mg and 1 mg respectively; so in terms of agent toxicity, the capabilities of chemical weapons increased by an order of magnitude with the discovery of the nerve gases. This increase meant that a smaller quantity of chemical munitions was needed to attain a particular objective. By 1955 or so in the United States, three different sizes of artillery projectile and a 1000-pound cluster-bomb⁷ had been adapted from WWII designs to disseminate sarin.

Sarin is a more volatile and more poisonous substance than tabun: it is thus a superior agent for creating a short-term respiratory hazard. For longterm contact hazards, it is inferior to both tabun and mustard, except possibly in cold weather. The requirement of a persistent nerve gas superior to tabun was met in 1955 with the discovery in a British commercial insecticide laboratory of the first of the so-called V-agents. This was a highly significant event.

In 1941, the targets for chemical attack would not have been enemy troops penned into trenches, but more mobile and better protected ones. It would have been very expensive to use existing chemical weapons to attack them effectively. The development of tabun and sarin changed this, and made the use of chemical weapons militarily much more attractive. With the arrival of the V-agents there came another sharp increase in chemical weapons capabilities, for the respiratory lethal dose of these substances in man is thought to be of the order of 0.1 mg. More important still is their increased toxicity through the skin: something like 1500–2000 mg of sarin, or 5000– 10,000 mg of mustard, are probably needed to kill a man by this route, whereas with a V-agent perhaps only 5 mg are needed. An enemy's skin had thus become nearly as vulnerable a target as his lungs. It is harder to protect a man against a contact hazard than a respiratory one, and the V-agents are persistent, and so call for elaborate decontamination measures (which need to be a great deal more efficient than those for mustard). Consequently

⁷ The M34; for further description, see below, page 117.

the V-agents represented a major increase in effectiveness in a given situation and also an increase in the number of tactical situations where chemical weapons might be effective. 1955 was probably the year that chemical weapons stopped being regarded as historical leftovers and began widely to be seen as useful constituents of a modern military arsenal.

The United States decided to manufacture a V-agent (VX) in 1958, and work on the new factory began in 1959. This was a period of successful Congressional lobbying by the US Army Chemical Corps, resulting in quadrupled CBW budget allocations. The emphasis in the Corps' public relations campaigning, however, was less on the capabilities of lethal CBW agents than on the so-called non-lethal ones: it was stated that substances had been found that might enable CBW to be waged without killing anyone, if enough development work were done. The new agents were described as "incapacitators": their rationale lay in their supposed ability to disable people and prevent them carrying out military functions for several hours,8 without causing permanent injury. Although a large number of incapacitating effects, such as temporary paralysis or blindness, were said to be attainable, the only ones that can be produced by drug-dosages small enough to be militarily useful seem to be various forms of mental derangement. The effects of psychotropic drugs are, however, extremely unpredictable, especially on groups of subjects as opposed to isolated individuals; and it is doubtful whether anyone could present military planners with a convincing picture of the military effects they are likely to produce.

However, some work was done on the new incapacitating agents, and by 1961 at least one incapacitating agent was approaching standardization. This was the hallucinogen BZ for which production facilities were erected at Pine Bluff Arsenal in 1962.⁹

For the fifteen years following the end of WWII, American chemical weapons research had been focused primarily on new types of CW agent rather than on munitions design. Almost all the lethal agents of WWII had lost whatever attractiveness they had had; by the early 1960's the important agents were sarin and VX, and, to a lesser extent, mustard. Stockpiles of these agents were built up measurable in tens of thousands of tons. The delivery systems available, however, were little altered from those of WWII, and it was realized that there was little to be gained from developing still more potent agents if their toxicities could not be exploited. Accordingly,

⁸ In contrast to the harassing agents or riot-control agents which disable for little longer than the period of exposure.

⁹ The chemical nature of BZ is a military secret, but the compound is understood to be a glycollate ester related to such drugs as Ditran, with a central and peripheral anticholinergic action similar to that of atropine.

CW weapons designers in recent years have been primarily concerned with developing new disseminating devices.

New disseminating devices for CW agents

The requirement was to adapt existing chemical weapons systems to more potent CW agents. The approach mainly followed in the United States has been to reduce the weight of the individual munitions and deliver them more widely over the target area. This has led to the procurement by the Army¹⁰ and the Navy of multiple rocket launchers firing small chemical rockets, and to the procurement of clustered bomblet devices for delivery by aircraft and missiles.

MULTIPLE ROCKET LAUNCHERS

Multiple rocket launchers were first used during WWII, mainly by the Soviet Union and Germany. Germany had in fact developed them largely with chemical rockets in mind, rather than the explosive and incendiary ones that they actually came to be used with. Modern multiple rocket systems are greatly improved.¹¹ The ranges of the more recent weapons are comparable to those of tube artillery of similar calibre: the Soviet BM 14/40, for instance, fires 40 122 mm rockets at ranges of 12–15 km; the US Bolt system has a 12 km range.¹² They can contaminate wider areas than other chemical ground weapons, and give artillery units a CW capability approaching that of ground-support aircraft.

CLUSTERED-BOMBLET DEVICES

Clustered-bomblet weapons were also conceived during WWII. There were two types of design. In the first, small frangible canisters or bomblets containing the CW agent, held in containers in aircraft bomb-bays, were to be dispensed in a line along the aircraft flight path. (These in-line bomblet dispensers were intended as substitutes for aircraft spray-tanks: while spraying

¹⁰ The US Army was allocated \$35 million in FY 1961 for the purchase of the Bolt multiple rocket system. This consists of the M91 45-tube launcher firing M55 115 mm rockets, charged with sarin or VX. At least 100,000 such rockets are now stockpiled. ¹¹ In the early designs, the rockets were spin-stabilised in flight, being rotated at high speed by angled rocket exhausts. This imposed limitations on the length-to-calibre ratio of the rocket and so did not allow very large payloads; in addition the ranges were short. Post-war designs relied mainly on fins for flight-stabilisation: longer rockets could be fired further.

¹² It may be noted that while multiple rocket launchers are a recent addition to NATO armaments, Warsaw Pact forces have always had them. The Soviet army, for instance, has had at least eight different types; published sources do not confirm that chemical rockets are available for them. There has been no published reference to the availability of chemical rockets for the West Germans' new LARS system (a 36-tube, 115 mm system adopted by the Bundeswehr in 1968): they would in any case be prohibited under the Paris Agreements of 1954.

operations could be highly effective under favourable conditions, they were too inaccurate at high altitudes, because too weather-dependent, and impracticable at low ones in the face of anti-aircraft defence systems.) An example of this type was the Soviet AK-2 aerial release case, which could in less than 2 seconds dispense 240 one-kilogram bomblets containing a mustard/ lewisite mixture. In the second type of design, the bomblet container was dropped as a unit from the aircraft, breaking open at a suitable altitude to scatter its bomblets. Such cluster-bombs were analogous to those frequently used for incendiary bombing in the later stages of the war; and one of the last models developed in the United States for mustard gas was directly based on an incendiary-cluster design. Although it was standardized, it did not in fact remain on the post-war inventory for long. It was modified to disseminate nerve gas, and became the first US aircraft-deliverable sarin weapon,¹³ a device that is still standard.

It is not known how-or whether-other countries developed the clustered-bomblet principle after WWII. In the United States, where chemical munitions design did not advance until the end of the 1950's, the first substantial expansion of the principle came with the requirement for chemical warheads for the various tactical surface-to-surface missile systems, such as Corporal. The WWII cluster-bombs used an explosive charge to break up the cluster unit and to scatter the bomblets. Thereafter the bomblets fell to the ground under the influence of gravity, and the angle and speed of their impact with the ground had to be controlled by retarding devices such as parachutes. In order to fit a satisfactory chemical payload into a missile warhead it was necessary to reduce the weight and bulk of this ancillary gadgetry. This has led to the self-dispersing bomblet: instead of the earlier cylindrical devices that had to strike the ground head first, spherical bomblets are used, and these are provided with small vanes around their outer surfaces. After the warhead opens, the effect of the vanes is to rotate the bomblets, giving them aerodynamic lift. The bomblets thus move sideways and their glide path during descent broadens, increasing their eventual coverage of the target area. The higher the altitude at which the warhead opens, the wider is the ground area covered by the bomblets. Increases in altitude result in considerably greater increases in coverage than with the older cluster-bombs. Warheads of this type are now available for the tactical surface-to-surface missiles Little John, Honest John and Sergeant.

With the allocation of CBW research and development funds to the Navy in FY 1961 and to the Air Force in FY 1962, the self-dispersing bomblet principle has also been used to improve aircraft delivery of chemical weap-

¹⁸ The M34 cluster. Some 20,000 of them were recently discarded by the US Army because they had developed leaks on storage.

ons, for both cluster-bomb units and in-line bomblet dispensers. The Air Force, for example, has recently developed an in-line dispenser for sarin bomblets (the CBU-15/A), and the Navy a cluster-bomb unit for sarin or VX bomblets (Misteve). Additional stimuli to the development of the principle have come from the Viet-Nam War where both in-line dispensers and cluster-units charged with self-dispersing fragmentation bomblets are being used extensively. Possibly to meet counter-insurgency requirements, such as those of the Viet-Nam War, bomblet devices for BZ have been developed: the Air Force SUU-13/A dispenser and CBU-5/B cluster, and the Navy's Padeve dispenser. The principal direct influence of the Viet-Nam War on chemical weapons design has been to encourage development of new munitions for disseminating tear gases and similar substances, such as CS.¹⁴ The devices of the 1950's, such as the bulk agent dispersers and hand grenades, have been augmented with large mortar bombs and artillery projectiles, grenades for delivery by the new rapid-fire grenade-launchers, portable multiple-tube rocket launchers, and in-line canister-cluster dispensers and cluster-bomb units for low-performance aircraft.

All in all, it can be said that the main developments in chemical weapons design of the last five years have been to harness the advances in CW agent potency made during the first post-WWII decade. Aircraft spray-tanks, self-dispersing bomblet devices, multiple rocket launchers and high rate-of-fire tube artillery (of which the US Navy's recent 5''/54 gun is an outstanding example) now appear to provide adequate nerve gas delivery systems. The incapacitators like BZ, and their delivery systems, should probably be seen as aberrants, their development forced for political purposes; neither contemporary military theory nor present psycho-pharmacological knowledge can adequately cope with them. Some authorities, however, consider that they will engage the CW establishments for many years to come.

Possible future developments

The likely continuing interest in incapacitating CW agents has been mentioned.

Chemical weapons based on nerve gases are the most potent yet operational. In the sort of conflicts where they might be used, it appears most likely that nuclear weapons might also be used. Against the possibility of nuclear attack, field armies would be likely to maintain as widely dispersed troop dispositions as possible, with large numbers of small units scattered

¹⁴ CS is an irritant that was developed by the UK during the 1950's for riot-control purposes. Its success in Cyprus and elsewhere quickly established its superiority to tear gases such as CN. It is considerably more potent than CN, and, in laboratory animals at any rate, much less toxic.

over wide areas. Broadly speaking therefore, and setting aside their one or two specialized functions, chemical weapons would be likely to be useful in the attack of two main types of target: rather small individual units of troops, or larger areas containing several such units.

Against the compact target, the principal requirement is for a CW agent that acts quickly, and is sufficiently potent not to demand an impractical weight of weapons to disseminate the necessary quantities. Present nerve gas weapons probably fulfill these requirements adequately. The improvements that can be expected would consist of comparatively minor refinements: additives for increasing the rate of liquid nerve gas skin penetration, better fire-control equipment for high performance aircraft spray-tanks, and such like. The only major improvement that might be visualised is an agent whose vapour is sufficiently toxic to kill a man through his skin; such a development is unlikely. The vapours of the nerve gases can probably do this, but only at militarily impracticable dosages.

For chemical weapons to be effective against a dispersed target there would have to be a vary large increase in agent toxicity. The attack would have to take the form of a CW aerosol cloud drifting over the target area. It would have to remain lethal for several miles of travel. Given the limitations imposed by aerosol generating techniques on the agent concentration of an aerosol cloud at source, and those imposed by logistic feasibility, the toxicity of the CW agent used would have to be at least one order of magnitude greater than that of the V-agents before such an attack could be seriously contemplated. Substances of this toxicity do exist,¹⁵ but they all apparently lack other essential attributes for CW, such as cheapness and stability. Furthermore, as they are all proteins, sub-effective dosages of them might confer immunity against subsequent attack; and they are not easily adaptable to large scale production. It is possible, however, that a deeper understanding of their toxicology could lead to the discovery of other substances that embody their toxic principles, but in which their various shortcomings are reduced.

Biological weapons

Published information about developments in biological weaponry is much more fragmentary than for chemical weapons, and in general national BW programmes are conducted under conditions of more stringent secrecy. However, details have been published of the BW programme conducted by

¹⁵ For example, phytotoxins such as ricin and abrin, zootoxins such as tetrodotoxin, saxitoxin and bobatrachotoxin, and the bacterial toxins such as those of *Cl. botulinum* and *Cl. tetani*.

Japan in the decade up to 1945, and a short description of this is given here to provide a framework for a discussion of the advances that have been made in the last twenty-five years.

The BW programme in Japan, 1935-45

The Japanese programme was conducted chiefly in establishments in Manchuria, from about 1935 until the end of WWII. It reached its peak in 1940, by which time it was occupying some 3000 workers.

The main emphasis was on the development of munitions and delivery systems; less attention was given to improving the agents which these were to disseminate. At least eight types of bomb were designed; aircraft spray-tanks were tested; and the possibilities of artillery shells were examined briefly. Much work was also done on biological sabotage techniques, particularly well contamination. The main interest, however, was in aerial bombs, and more than 4000 of these were used in field trials. The principal one was a 35-kg device made up of a frangible porcelain casing with a small powder charge in the nose to scatter the liquid suspension of BW agent that it contained. It was capable of dispersing the agent in a coarse spray that settled out rapidly over a fairly wide area. Other devices included an antianimal fragmentation bomb scattering shrapnel contaminated with anthrax spores, and an experimental cluster-bomb unit.

Only bacterial agents were considered; there was no interest in the possibilities of viruses, rickettsiae or fungi. The causative agents of dysentry, typhoid fever, cholera, plague (*Pasteurella pestis*), glanders (*Malleomyces mallei*) and anthrax (*Bacillus anthracis*) were manufactured; anthrax was the only one of these used in field trials. Very little work was done on methods of improving the stability of the agents; and with the culture techniques and nutrient media used, their storage life was short. Even the preparations of anthrax spores could not be kept active for more than about three months. Refrigeration and freeze-drying facilities were limited.

The BW programme in the USA during WWII

A post-war American evaluation of the Japanese programme concluded that it could have produced a practicable weapon, had the administrative arrangements been better. The tone of this report strongly implied that the war-time American programme had been successful in this respect: on the face of it, this seems likely. The US programme was started in 1942 with the assistance of the British and the Canadians, who by then had some experience. By 1945, some 4000 American workers were involved. There seems to have been systematic screening of the 160 or so pathogens that might have been made into BW agents. Papers published after the war indicated that close attention had been given to (at least) B. anthracis, P. pestis, M. mallei, M. pseudomallei (the causative agent of melioidosis), Brucella suis and the other brucellosis pathogens, F. tularensis (the tularemia pathogen), and the viruses of psittacosis and meningopneumonitis. Munitions containing live agents were tested on American and Canadian proving-grounds.

Very little is known about the types of munition and delivery system that were designed. The ground work for these had been laid in the CW programme, where there was an interest in disseminating highly toxic solid substances¹⁶ whose fragility towards heat and shock was comparable to that of living micro-organisms. In 1950 it was stated that a cluster-unit of 4-pound bomblets had been developed, 4-ton bomb-loads of which were capable of setting up an effective BW aerosol over 50 per cent of a square-mile target area. The mechanism used in this device for disseminating the BW agent was apparently sufficiently gentle to ensure that 10 per cent of the pathogens remained alive and infective after dissemination.

The BW programme in the USA after WWII

In the years immediately following the war, the American BW programme was sharply reduced. The research and development allocation for 1946–47 allowed only \$6m for both CW and BW work.¹⁷ A substantial amount of basic research continued, however, together with an assimilation of the great mass of experimental data obtained during the war years.

By 1950, field trials were again being conducted, but apparently only with simulant BW agents. In one such trial, carried out in September 1950, it was demonstrated that a downwind area measurable in tens of square miles could be covered with substantial airborne concentrations of *B. globi-gii* spores, a non-pathogen, disseminated along a two-mile offshore course from a ship-mounted commercial aerosol generator holding about 500 litres of a suspension of the agent. It was estimated that anyone within a 30-50 square mile downwind area would have inhaled 1000-10,000 particles by the time the cloud had passed by; it was therefore thought that if the generator had been charged with a pathogen, casualty dosages could have been set up over a similar area.

It thus seemed clear that biological agents could be used to attack extremely large targets: a single aerosol generator constitutes a very modest delivery system. In April 1952, a more extensive trial was conducted to obtain more insight into what happened to rather large aerosol clouds under different meteorological conditions. Two hundred kg of 2-micron fluorescent particles were disseminated along a 156-mile offshore course; under the

¹⁶ Primarily the physostigmine-like carbamates, the bacterial toxins, and ricin.

¹⁷ See the reference section, page 271, for the figures for the entire period.

prevailing weather conditions, it was found that particle dosages in the 1000-10,000 range were received over a 13,900 square mile area.

The British conducted similar field-trials—one series in the Bahamas area in 1954, and another over the UK in 1957–58.

The results of these field trials probably formed part of the evidence presented to US Congressional committees when the Chemical Corps (which at the time was responsible for virtually all US CBW work) was applying pressure to get increased funds for FY 1952–53; certainly the deposed evidence included an account of the potentialities of biological weapons. The Corps also put forward the argument that the Soviet Union had done work in the BW area that had led to major advances. Its testimony was clearly persuasive, for in the budget, substantial funds were voted for the construction of enlarged testing and BW agent production facilities.

With this increased Congressional support for BW work, the Chemical Corps embarked upon two major BW research programmes, one into production techniques for BW agents, and the other into the behaviour of pathogens in the open air.

The simulant-agent field trials had left open the question of how well actual pathogens would have survived the test conditions. It was known from earlier experience that the stresses of aerosolization would kill at least a substantial proportion of the pathogens in a biological munition payload; thereafter, exposure to the elements could be expected to kill the survivors more or less quickly. It was therefore necessary to carry out a great deal of work on aerosol generation techniques (in particular, gentle techniques giving rise to particles in the 1–5 micron size range that is optimum for deep lung penetration), and to determine aerosol biological decay rates under different weather conditions: suitable experimentation might show how these rates could be lowered, or at least predicted.

Much of this type of work was unsuited to the research facilities at Fort Detrick, the center for US BW research. In 1952 a BW programme was initiated at the Chemical Corps' Dugway Proving Grounds, with the assistance of local universities. By at least 1958 it had been shown that guineapigs could be infected 15 miles downwind of an aerosol generator, and this with a pathogen in the vegetative¹⁸ form, rather than the far more hardy spore form. By 1960 field trials with humans had been conducted: volunteers half a mile downwind of a *C. burnettii* aerosol source were successfully given Q fever. In 1962 it was stated that generators existed that could dis-

¹⁸ Under hostile environmental conditions, some bacteria can protect themselves by forming spores, but when they are not sporulated they are said to be in a "vegetative" state.

seminate biological aerosols for which 90 per cent of the particles were less than 5 microns in diameter; the comparable figure for the aerosol generator used in the 1950 trial was only 5 per cent. Nothing was said, however, about the proportion of micro-organisms that remained viable—that is, capable of reproduction and consequently potentially effective.

On the production side, a \$77 million "production development laboratory" was completed at Pine Bluff Arsenal in 1953. In 1957 the laboratory was integrated into the overall function of the Arsenal—essentially, a CW munitions production and storage facility—and designated the "biological operations" element in the mission. In 1966, biological operations accounted for nearly 60 per cent of the real property and investment in installed equipment at the Arsenal.

It is not known to what extent the increased CBW funding from 1959 onwards accelerated the biological weapons programme. However, in the Chemical Corps' testimony on the 1961–62 budget the point was frequently made that while the USA did not possess operational biological weapons, a comparatively small development drive would make it possible to have them. There was discussed, for instance, a new type of BW agent dispenser, which, although existing in prototype, had not been tested sufficiently for its inclusion in the operational inventory. A battlefield scenario illustrating the use of an incapacitating BW agent was presented. Just what the agent was, was off the record; it was described as being sufficiently hardy to remain viable all night long, and to produce few deaths but many casualties. It was stated that no stocks of the agent existed, but that the necessary production plant could easily be built in about a year.

In 1964, a further \$25 million of construction work was completed in the biological operations area of Pine Bluff Arsenal. A 1962 edition of an Armed Services BW manual referred to agent UL, a designation which implies standardization of the agent for possible inclusion in the operational inventory, and "incapacitating agent UC" was referred to in Congressional testimony a few years later. In 1966 it was reported that human volunteers at Fort Detrick had been successfully infected with tularemia by inhalation of F. tularensis aerosol; the similarly successful C. burnettii trials have already been mentioned.

It is unlikely that BW agents are stockpiled on a massive scale in the USA; for most of these agents, the shelf-life is short, so that the depots at Pine Bluff probably contain only enough reserves to support the weapons development programme. There can be little doubt, though, that the Pine Bluff facilities could be turned over in a matter of days to production on a sufficient scale to support a major biological war. The logistics of biological weapons supply, as outlined in a US Army manual, are based on the swift

transfer of BW agents from manufacturing facilities in the continental USA direct to forward areas. It is believed that the anti-personnel¹⁹ BW agents of particular interest are *P. pestis*,²⁰ *F. tularensis*, *B. anthracis*, the brucellosis pathogens, *C. burnettii*, the viruses of yellow fever, dengue²¹ and Venezuelan equine encephalomyelitis, and the fungi of coccidioidomycosis and histoplasmosis.

For agent delivery, the United States is known to have developed selfdispersing bomblets, of both the explosive and the pressurised-nozzle types;²² for these, cluster-bomb units, in-line dispensers and missile warheads are believed to be available. It is said that the warheads are for both tactical missiles, such as Sergeant, and for intermediate and intercontinental ballistic missiles. BW spray-tanks, for both wet and dry agents, are available for high-performance aircraft, and possibly also for unmanned level-flight cruise missiles. One spray-tank, the Marine Corps' Aero-14B unit, is suitable for CW agents as well. A substantial proportion of Fort Detrick's procurement budget goes into the purchase of components for biological munitions.

Background to current BW research programmes

As a background to current research programmes, it is worth considering what forms of BW might prove attractive to the military. The underlying consideration in evaluating the military usefulness of biological weapons, for use either against people or against food stuffs, is not so much whether the weapons will work, as whether they will work in a predictable manner. A military commander is not going to commit his troops or his supply channels to operations involving weapons whose capabilities he is not certain of. It follows that only those weapons whose performance is reasonably predictable are likely to be attractive to the military. This would influence a BW

¹⁰ To be used against people, as opposed to animals or vegetation.

²⁰ Some forty Pine Bluff workers were reported to have contracted plague in the mid-1960's. If this is true, it puts a severe restriction on the suitability of P. pestis as a BW agent. The casualties were presumably highly trained in the handling of pathogens and supported by the fullest possible safety measures. The precautions taken outside Pine Bluff would be unlikely to be as efficient, as regards both training and equipment; and if P. pestis munitions were to pass through military supply channels, a fully effective immunization procedure would be necessary.

Plague immunization at present frequently inflicts a day or two of complete prostration, both with the initial inoculation and with the booster doses that are needed every six months or so. A military commander would presumably be extremely reluctant to accept the logistic and other disruptions which these side effects would cause. ²¹ The recently identified arboviruses of Chikungunya and O'nyong-nyong may well be as attractive as that of dengue.

 $^{^{22}}$ Aerosols can be generated not only by the shattering forces released by an explosive charge, but also by atomisation, in which a liquid dispersion of the agent is forced through fine nozzles under pressure.

programme in two ways. First, little attention would be paid to weapons that involve insurmountably unpredictable factors; and secondly, a great deal of effort would be put into reducing the unpredictability of factors where this does not seem to be inherently impossible.

The first of these counts would seem to argue against the probability of an anti-personnel biological war being waged with highly contagious diseases, at any rate until the basic theory underlying the epidemic spread of diseases has progressed a good deal further. At present, the course of an epidemic is not generally predictable; and, even if it were, it would not be possible for a military commander to control its spread. Thus, although analogies are often drawn between the possible consequences of BW attack and the great pandemics of history, it is unlikely that any military commander in a rational state of mind would try to start an epidemic: once started (assuming that it could be started at will), it could well spread far beyond the confines of the target area, both in space and in time, and there would be little the commander could do to regulate it. There must be few military situations in which this would not be a severe drawback. It can thus be said that for the present the BW research laboratories are less interested in the spreading diseases than in the non-spreading ones.

With the pathogens of diseases that do not generally spread, unpredictability arises from two sources: first, uncertainties about the ability of pathogens to survive outside their normal environment, and, second, uncertainties about their ability actually to cause disease once they get inside a human body. These are uncertainties that look as though they might, in some measure, be resolved.

In the case of potentially lethal pathogens, the second of these uncertainties will always remain unresolved;²³ but this is not so for those that generally cause non-fatal diseases. US experimentation on the effects of C. *burnetii* and F. *tularensis* aerosols in human volunteers has already been referred to; it enabled calculations to be made of the human-infective dosages of these agents, and hence calculations of the quantities of biological munitions needed to engage military targets to be put on a rational basis. Experiments on animals, particularly the higher primates, may allow estimates to be made of human-infective dosages for lethal pathogens; but the reliance placed on the estimates must always be tempered with extreme uncertainty about the validity of extrapolating host-parasite data from one species to another. (Much more faith can be placed in such extrapolation for CW agents, for here the effects do not depend on the ability of the agents to re-

²³ Unless human subjects are used. The Japanese have been accused of testing anthrax on captured prisoners of war.

produce themselves within the target organism.) This uncertainty is compounded by an ignorance of the progress of a disease when the pathogen enters the body by an unnatural route: the course of yellow fever, for example, can be predicted fairly well when the disease is caused by an infected mosquito bite, but yellow fever caused by inhalation of the pathogen may seem a completely different disease.

Despite these uncertainties about effective dosages, a military commander wanting to use a lethal pathogen may feel sufficiently sure of an effect if he spreads a really massive dosage over his target. He may be correct in this; and in terms of weight, the indications are that lethal BW agents are sufficiently potent for an overdose factor of two or three orders of magnitude not to require an uneconomic expenditure of munitions. But the other major area of uncertainty would still remain: would enough pathogen remain alive by the time the BW aerosol reached its target? It is in the resolution of this problem for different pathogens that a BW research effort might have a really significant effect on the development of militarily-attractive biological weapons. The first step is to establish the kill-off rate of the aerosolization process, and then to determine the decay rate of the aerosolized pathogens under all likely weather conditions. Once this has been done, the performance of a biological weapon could be predicted fairly well; it might also then become possible to devise techniques for manipulating the viability of the pathogens to suit military requirements.

The main lines of likely offensive BW research programmes can now be stated as follows:

(a) the selection of promising pathogens, particularly those that do not generally cause spreading diseases;

(b) the development of disseminating devices, and the determination of the viability of BW aerosols immediately after dissemination from them, with particular emphasis on devices which have a low kill-off rate and which size the particles predominantly into the 1–5 micron range;²⁴ and

(c) the determination of the biological decay rate of the aerosol cloud under all atmospheric conditions, coupled with research into methods for predictably increasing or decreasing it.

²⁴ The respiratory virulence of a BW agent depends very strongly on the size of the inhaled particles: in guinea pigs, less than 3 *F. tularensis* bacilli carried in 0.3-1.5 micron particles may constitute a lethal dose, for example, whereas nearly 20,000 are needed of 8.5-13 micron particles. It may be noted that very small particles are always produced when an aerosol cloud is generated by a biological munition, even though the majority of the particles may not be uniform; but it may be that at low aerosol particle-densities, the smaller particles are disproportionately sparse.

These will be supported by work in related areas: production techniques for pathogens, improvement of their storage stability, weather-forecasting, design of munitions delivery systems, and defensive techniques.

THE SELECTION OF BW AGENTS

Only a small proportion of known micro-organisms are pathogenic, and for those that are, the literature contains detailed information on their characteristics and pathogenic properties under natural conditions. It is unlikely that their number will increase very much, although hitherto unknown diseases are occasionally encountered, and are actively sought by BW establishments. In a sense, the scope of BW is thus more restricted than that of CW, where the possibilities of synthesizing new chemical compounds are virtually unlimited. The potentialities of genetic manipulation should not be underestimated, however: new strains of existing pathogens can be grown that have markedly altered characteristics, and it is thus conceivable that by developing a strain that intensified one characteristic of a pathogen and attenuated another, a more useful BW agent might result. At certain levels this has been done, for example with the growth of antibiotic-resistant strains of certain bacteria; but at more important levels, little has been heard. This is perhaps not surprising; if a nation developed a new strain of a pathogen that was very much more virulent, say, than existing strains, it would not advertise the fact. According to the director of the British BW establishment, the chances are small of breeding a pathogen in which some of the factors that make up its virulence are enhanced, while the remainder are unchanged; and if it could be done, the probability would be high that some other characteristic of the pathogen that made it suited to BW would be destroyed.

The dissemination of a combination of different pathogens might possibly prove attractive; while there are some pathogens that are mutually antagonistic in causing illness, combinations are also known in which each pathogen enhances the effects of the other, and more may be found.

An agent that caused disease in a high proportion of the infected individuals after a very short incubation period would be attractive in many situations, for it could bring BW down to a tactical battlefield level. In addition, the longer the incubation period, the longer is the time available for the attacked to take retaliatory or other action, if they can verify the fact of the attack before its effects appear. At present, the quickest acting agents, such as M. mallei and F. tularensis, all need at least a day to take effect, an onset-time that may be spread over several days among the attacked population.

THE GENERATION OF BW AEROSOLS

During storage, the viability of pathogens can be maintained fairly easily, and shelf-lives of several months or even longer are possible,²⁵ but during aerosolization they are invariably exposed to severe mechanical stresses, particularly if aerosols of small particle size are generated. Bacterial or fungal spores may be able to withstand these, but vegetative cells are vulnerable, and for unsporulated pathogens a device that generates an aerosol of even 10 per cent viability would be exceptional. Mechanically robust strains of BW agents can be bred, however, sometimes with undiminished virulence, and attempts at protecting agents by artificial encapsulation have in some instances been successful. The refinement of vacuum-drying techniques for micro-organisms can be expected to guide the design of improved pressurized-nozzle munitions for disseminating wet agent fillings, since the techniques involve the careful design of nozzles that will not destroy microorganisms forced through them.

A munition that kills off even 95 per cent of its agent payload may still be satisfactory. Dissemination by explosive burst is likely to kill off a very high proportion of the payload, but HE burst munitions are much simpler to make and are more reliable than pressurized-nozzle ones. For a given payload, they are also much less bulky, so that although a high proportion of the BW agent spread by the delivery system may be dead, a greater quantity of agent can be spread in the first place.

The accumulated experience of chemical weapons designers in the development of CW aerosol disseminating devices is likely to be of some assistance in the design of biological weapons. However, many of the potential BW agents are so much more fragile than standardized CW agents that this assistance may not extend very far.

THE AEROSOL VIABILITY OF BW AGENTS

After aerosolization, the agent is exposed to an environment that is almost completely hostile. Solar radiation, particularly in the shorter wavelengths, may be quickly lethal; so may an atmospheric humidity that is either too high or too low. In some cases, for example with *P. pestis* and *F. tularensis*, virulence may fall off at a faster rate than viability. In general, it can be said that most pathogenic spores will remain viable for some days if the sky is heavily overcast, or for a few hours in direct sunlight. Vegetative pathogens

²⁵ Freeze-dried samples of dengue virus have maintained their virulence for as long as eight years when stored at 5°C, and similar shelf-lives have been shown by freezedried samples of Yellow fever virus. B. anthracis and C. immitis spores can also survive for years. C. burnettii can remain viable for many months either freeze-dried or in tick faeces. The brucellosis pathogens, F. tularensis and the viruses of Rift Valley fever and smallpox are reported to have survived long periods of storage.

may live for 5–12 hours at night, an hour or so on an overcast day, or a few minutes only in sunlight. These survival periods obviously place restrictions on the operational possibilities of biological weapons. A low decay rate would favour the attack of large targets, but could at the same time render them unoccupiable for long periods. For this reason, an agent with a high decay rate might be attractive in limited tactical situations.

The decay factors are not always independent of one another, and their influence can vary widely from agent to agent. Different agents may be sensitive to different levels of humidity, while over and above this, a high humidity may sometimes protect them from sunlight. Some agents are not affected by humidity at all, for example bacterial spores, some rickettsiae, and often dry agents in general. BW agents occupying large aerosol particles are more resistant to sunlight than those inhabiting small particles, but the smaller the particles, the more deeply they will penetrate the lungs, and the further the aerosol cloud will travel downwind.

The factors that control the biological decay of BW aerosols are not yet understood, and additional ones are being found, for example the "open air factor" (OAF) discovered at Porton in the early 1960's (first described in the open literature in 1968). For many pathogens the effects of humidity and ultraviolet radiation have been studied sufficiently extensively to allow the empirical development of measures for preserving both viability and virulence; and one or two such *ad hoc* stabilization methods seem to work quite well in practice. By encapsulating the micro-organisms with inert materials or by using other additives, it is possible to prevent them from being dehydrated or drowned by humidity changes, and to shield them from ultraviolet light. It is in this area that research is most likely to increase the potentialities of BW.

The necessary work must be done almost entirely inside laboratories, and to simulate field conditions a variety of elaborate test chambers have been developed which allow precise control of temperature, humidity and sunlight-exposure. The extent to which this type of apparatus can accurately simulate field conditions depends on how many of the various atmospheric factors that influence decay it can mimic, and if the apparatus excludes a decay-causing factor altogether, then the simulation will be poor. Porton's OAF is a case in point. This factor seems to be responsible for the unexpectedly high decay rate of vegetative micro-organisms in the open at night. The OAF itself is a metastable chemical such as might be generated during the reaction of ozone with hydrocarbons derived from automobile engines. It disappears almost entirely from open air led into a laboratory. This means that the death rates of micro-organisms when measured inside laboratories are poor guides to those to be expected in the open air. Rather

cumbersome techniques have now been developed for studying the influence of the OAF in the viability of pathogens: a recent report from Porton describes the insensitivity of B. anthracis spores to the OAF, the sensitivity of F. tularensis and Brucella suis, and the extreme sensitivity of the Semliki Forest arbovirus.

If the OAF is indeed due to atmospheric pollutants derived from automobile engines, it can be expected to be especially prevalent in urban areas. This may well mean that BW attacks on cities with vegetative pathogens are not likely to be as successful as is often predicted. There is also the possibility that the OAF might be deliberately generated to provide a BW defence.

THE USE OF INSECT VECTORS TO SPREAD BW AGENTS

The defence against airborne BW agents is comparatively simple, for modern respirators provide adequate protection. A possible way of bypassing this defence, and one which has been examined since the earliest days of BW research, is to use infected animals, particularly insects, to deliver the agent. Many natural diseases are spread by insects, and it is a relatively easy matter to disperse ticks carrying Rickettsia rickettsii, say, or fleas carrying P. pestis over a target area in the hopes that they will search out human hosts. Volunteers have contracted dengue from a single mosquito bite. The chief drawbacks of these vectors are that massive dosages of BW agent-sufficient to overcome natural immunity-cannot be delivered (as they can with aerosol techniques), and that the behaviour of the vectors-that is, the insect carriers—after delivery is not only beyond the control of the attacker, but may also introduce even more elements of unpredictability than would occur in an aerosol attack. Nonetheless, the effective field persistency of BW agents can usefully be increased by this method, as the agents can remain viable for longer periods, and an enemy can be infected through his skin. In addition, a bombload of infected mosquitos has a search-out capability that is not dependent on the vagaries of the weather. All in all, though, this form of BW is probably not as attractive as the aerosol methods. Research into it is, however, continuing,²⁶ and the United States is known to have designed various types of bombs and bomblets for dispersing insect disease vectors.

CBW defensive equipment

The weapons of CBW are the only ones against which protection of a high order can be effected on the battlefield without severe restriction of fighting

²⁸ In 1965, for instance, Dugway Proving Ground personnel are reported to have conducted an extensive trial of a vector system on Baker Island, in the Pacific. The object was to find out how the vectors behaved in a tropical environment.

capabilities; and CB defensive equipment is either issued or held in reserve for most of the major armies of the world. The principal point of attack of these weapons is the respiratory tract, and it is a comparatively simple matter to ensure that any contaminant is removed from air before it is inhaled. Air filters can be provided for collective shelters, and respirators for individuals; nowadays these have an adequate efficiency when used correctly.

For CW agents the protection of an individual's skin outside collective shelters is a less easy matter, at any rate for periods beyond a few minutes. The main problem is to avoid interfering with the temperature-regulating processes of the body, principally the sweating mechanisms. This precludes the use of straight forward impermeable clothing. The alternative is either to incorporate suitable sorbents into air-and-water-vapour-permeable clothing, or to construct special impermeable suits containing built-in heat-regulation units. Both approaches have been tried. The former is obviously the more practical, and when backed up by the decontamination and therapeutic measures that are now available, it provides a reasonably adequate defence. Work is going on to increase the efficiency of the basic sorbents, and the comfort and storage life of the impregnated clothing.

Decontamination

The removal of CB contaminants from terrain or matériel is no great problem, provided sufficient time is available. But in battle, time is generally short, and the main focus in CB decontaminant research is to find faster and simpler methods of coping with the comparatively small-scale CB onslaughts that might be integrated into an enemy's battle-plan. The problems of decontamination outside the immediate battle area are not so complicated.

The most severe problem is posed by on-target attacks with involatile CW agents.²⁷ During warm, sunny weather ground contaminated with mustard can remain hazardous for anything up to a week, while VX has about three times this persistency. During cold weather, persistency is greatly increased: VX hazards may last as long as four months in dry weather at -10° C, and even liquid sarin may persist for a day or two.

The classical decontaminant, introduced in 1917, is bleaching powder (chlorinated lime): this contains active chlorine, which is a powerful oxidizing agent. A major part of the search for better decontaminants has consisted of finding substances that combine a higher and more stable active chlorine content with physical properties more amenable to rapid spreading. The

²⁷ Airborne CB hazards are short-lived and do not generally call for decontaminating operations; neither does the fall-out from a CW aerosol (but not a BW one), for the resulting contact or secondary airborne hazards are slight.

United States present DANC solution²⁸ introduced shortly before WWII is for some purposes an advance on bleaching powder. Since it can be got up in liquid form, it can be sprayed more easily; it is also less corrosive to metals. It is an effective decontaminant for mustard, the V-agents and many BW agents. Its drawbacks are its ineffectiveness against the G-agent nerve gases such as tabun, sarin and soman, and its toxicity.

The main failing of chlorine-type decontaminants is that their effectiveness declines sharply with temperature, so that below about 5°C or so, they are virtually useless. Many other types of decontaminant have therefore been explored; it was not until the early 1960's that this search was successful. The new material was the US DS-2 solution,²⁹ which in the case of CW agents, works principally by hydrolysing the contaminant, rather than oxidizing it with chlorine. It is said to be effective at temperatures down to about -30°C, and against all types of CW agent and most BW agents. At the moment, however, it is very much more expensive than bleaching powder, and it is unlikely to go into service with many armies until its price comes down; in the meanwhile, the various hot air blower systems that have been developed will be relied upon for cold-weather decontamination.

Detection

Modern CBW agents are almost completely undetectable by the senses until too late. To meet this threat, CBW establishments have been developing automatic CB alarms that will warn of the need to don respirators and protective clothing, or seek collective shelter. From all appearances, at least as much effort has gone into this as into any other single aspect of CBW research. The need for CW alarms is presumably less pressing than for BW, as CW agents produce casualties very much more quickly than BW agents so much so that the appearance of the first casualties could give adequate warning to people in the vicinity not yet exposed to the agents. However, the research programme for CW alarms has been varied and extensive. In 1968, the US Army announced its latest one—the XM8 portable nerve gas field alarm—as a breakthrough in CW defence.

BW alarms are much harder to devise than chemical ones. The concentration of a dangerous BW aerosol may be very small, and some way has to be found, first, to detect what may only be a very slight increase in the normal airborne particle count, then to discover whether the increase is due to an abnormal amount of micro-organisms, and finally to determine whether the

²⁸ The principal constituent of DANC solution is 1,3-dichloro-5,5-dimethylhydantoin. Similar substances have been used in anti-gas ointments, and as clothing impregnants. ²⁹ DS-2 solution is based on diethylenetriamine.

micro-organisms are pathogenic. The longer the alarm takes to monitor incoming airstreams, the further upwind must it be placed, or the more remote must be its sensors.

Until recently, the view generally seems to have been that an effective BW alarm was unlikely ever to be developed, but at the beginning of 1969 the British Directorate of Biological & Chemical Defence announced that it seemed that at least a partial solution to the problem would be found. It was not clear whether this was an allusion to anything more sophisticated than long-range particle detecting devices: Porton, like other CBW establishments, had been experimenting with LIDAR³⁰ systems since the early 1960's. LIDAR techniques cannot, so far as it is known from the published literature, distinguish one type of particle from another, except by size; their main asset is in their ability to monitor air several miles distant, for example in the wake of a high-flying aircraft. The only remote-surveillance apparatus that can make any sort of useful discrimination between animate and inanimate particles has a much shorter range, probably less than a kilometer, and requires a reflector on the far side of the air space that is being monitored. Details of a device of this type were published in 1966 by a US Army contractee. The device was a laser long-path infrared absorption spectrometer.³¹ The laser beam was made up of at least four air-transmissible wavelengths in the infra-red, two of which are absorbed to varying degrees by all micro-organisms, and two of which are not. A comparison of the intensities of each of the reflected wavelengths was said not only to indicate whether a micro-organism had passed through the laser beam, but also to give some information about its identity. Various refinements were included to give detection capabilities for CW agents as well.

Preventive defence measures

If a BW attack cannot be detected, the defenders must either live in respirators or collective shelters, while there is a threat, or rely on immunization and accessible stockpiles of antisera, antibiotics and chemotherapeutics.

Prophylactic measures against BW attack are much more feasible than against CW attack, as the body has mechanisms for combatting pathogenic invasion, and in theory these can be stimulated or augmented comparatively easily. In practice, however, they are possible against rather few BW agents,

³⁰ LIDAR, Light Detection and Ranging: the optical counterpart of RADAR, using wavelengths in the visible or near-visible range, rather than radio waves. The shorter wavelengths mean that smaller objects can be detected, even down to micron-sized particles. Laser devices are the only practical energy-source.

^a A modification of the old Chemical Corps LOPAIR chemical alarm, using a laser instead of the original incoherent emitter.

and the stockpiling of vaccines (and antisera) is in any case a complicated and costly business. Furthermore, since there are so many diseases against which immunization is not possible, it is a comparatively simple matter for an attacker to select a BW agent against which the target population has no immunity. It might be argued, on the other hand, that an attacker would be unlikely to use a BW agent against which he could not protect his own troops.

Most CW agents do not elicit immune responses from the body,³² and the sort of immunization that is possible against some BW agents is not possible against them. There is, however, some hope for a rather different type of prophylaxis against nerve gases. Nerve gas poisoning can be explained rather well in terms of inhibition of the enzyme acetylcholinesterase, which plays a crucial role in the transmission of nerve signals; if a drug could be found that protected the enzyme from nerve gas attack without interfering with its function, then a good many of the toxic effects of nerve gas might be prevented. Drugs which come some way towards fulfilling this role were discovered in the early 1950's-oximes and hydroxamic acids of various types. For the less toxic of these, it has been shown in laboratory animals, and in cases of insecticide poisoning in man, that they can counteract many of the toxic effects of organophosphates.³³ They are not perfect yet by any means: they can protect cholinesterase in a few parts of the body only, and there are some nerve gases against which they have barely any effect. They nonetheless offer considerable possibilities for the future, and for the present they can serve to extend the period within which conventional atropine therapy³⁴ must be initiated, and thereafter to shorten the treatment time. Some countries regard them as sufficiently promising to supply to their field armies. The British, for instance, have recenty made oxime pills, as well as atropine, available to their forces in Germany. The pills are to be taken prophylactically as soon as the gas alarm is sounded. In other countries, oximes are less highly regarded; the US doctrine is that they should be used only in support of atropine/artificial respiration therapy in severe cases of nerve gas poisoning.

³² The exceptions are the toxic proteins, such as ricin and the bacterial toxins; but it is unlikely that these substances have yet been adequately developed into CW agents. ³³ They appear to work both by acting as more accessible substrates for the invading organophosphate and by reactivating the inhibited enzyme.

³⁴ Many of the effects of nerve gas poisoning can be blocked by the swift administration of certain anticholinergic drugs as soon as the first symptoms appear. To this end, the soldiers of most of the major field armies are provided with auto-injectors containing atropine formulations, and are taught how to inject themselves with them.

Part IV. Helicopters

Introduction

The helicopter has existed for more than 30 years. It was, however, first during the Korean War—a war in a country with relatively few roads—that it was used by the military to any great extent. At first it was used for fast transport of the wounded; later for transport of other things such as ammunition, and small troop units with their weapons.

There have been no radical changes in helicopter technology. It is rather that the development of a wide range of new tactical uses has led to a big increase in numbers of military helicopters, particularly in the United states (table 2.6), and to a growing range of specialized types. While the numbers of other aircraft in the active aircraft inventory of the US Armed Forces have been falling, the number of helicopters has been rising (table 2.7).

One reason for the changed attitude toward the use of helicopters in war has been a reassessment of its vulnerability. It seems that relatively slow lowflying aircraft are less vulnerable to visually sighted weapons than had earlier been supposed. Statistics from US combat experience in Viet-Nam show that only one helicopter is shot down for every 6,300 combat sorties flown; and only one helicopter for 23,000 combat sorties is unrecoverable.³⁵ Further, in the Arab-Israeli War of June 1967, where both sides were equipped with sophisticated weapons, helicopters did not prove to be particularly vulnerable. The Israelis did not have a single helicopter shot down during the Sinai campaign. The helicopter's ability to fly low, to change course rapidly and to conceal itself quickly seems to offer it considerable protection.

Since it is the tactical demands which have led to technological development in helicopters, the following section begins by discussing briefly the increasing number of tactical helicopter missions. Where specialized helicopters have been developed to fulfill these missions, these are described. The main types of helicopter—classified in line with military operational requirements—are set out in table 2.8. New helicopters of each type, together with pertinent specifications, are listed in the reference section, page 276.

Current tactical missions

Intelligence and command

The helicopter can provide rapid coverage of large areas for reconnaissance, observation and surveillance. It can direct artillery fire, and has the advan-

³⁵ Authorization for Military Procurement, Research and Development, Fiscal Year 1969, and Reserve Strength: Hearings before the Committee on Armed Services, U.S. Senate, 90th Cong., 2nd Sess. (27 Feb. 1968), p. 806.

							Trumber
1959	1961	1963	1964	1965	1966	1967	1968
444	366	672	1 014	1 471	2 170	2 805	2 872

N7 I

Table 2.6. Procurement of helicopters for the US Armed Forces

Source: Space/Aeronautics, October 1968, p. 61. Figures for 1966, 1967, 1968 are estimates. Part of the production is to replace Viet-Nam losses. 2 492 helicopters have been lost from the beginning of the War up to the end of March 1969.

tage of getting the information about the target's location back immediately. There are specialized observation helicopters, in the light helicopter class for example, the US Hughes OH-6A Cayuse. The main trend in development is toward increased speed.

Light helicopters also provide a local commander with a means of direct command and control over large areas, by quick personal visits. In Viet-Nam the helicopter is used by United States forces as an aerial command post, coordinating air forces, ground forces and support fire.

Anti-submarine warfare

In anti-submarine warfare (ASW), the helicopter is one component of a detection/attack weapons system. It can move at relatively high speeds, can hover at will, and is comparatively immune to counter-attack from the submarine. On the other hand, its noise and vibration interfere to some extent with sonar operation, and its range and weapon-carrying ability are limited; and it is therefore important that it be closely linked with its parent platform. ASW helicopters are usually equipped with extensive electronic apparatus—for example, an automatic flight control system which provides for a prescribed pattern of cruising and hovering, a navigation system, search radar, sonar, and a computer which provides the specifications for flying to the point of attack. The weapons are usually two or four homing torpedoes or depth charges. ASW helicopters have also been used for mine-sweeping: they have a higher sweeping rate than surface ships and are

	· · · · · · · · · · · · · · · · · · ·			Number
······································	1961	1968	1969 ^a	1970 ^a
Helicopters	4 047	10 188	11 468	12 014
Other aircraft	27 215	24 095	23 806	23 449

Table 2.7.	Active aircraft	inventory o	f the	US	Armed	Forces
------------	-----------------	-------------	-------	----	-------	--------

Source: The Budget for Fiscal Year 1970, United States Government, p. 75. ^a Estimate.

Class	Military use	Civilian use	
Light	Reconnaissance, observa- tion, command, liaison.	Business travel, police patrol, etc.	
Utility (general purpose)	Command, liaison, eva- cuation of wounded, light troop lift, supply support, ASW, ^a etc.	Light construction work in inaccessible areas, business travel.	
Cargo light medium heavy	Transport and artillery lift, supply support, ASW, rescue, plane guard, etc.	Feeder traffic, construction work.	
Crane	Heavy lift (bridges, vehicles, crashed aircraft, etc.).	Heavy construction work.	
Armed	Armed support (suppressing fire, anti-tank fire, "aerial artillery", etc.).		

Table 2.8. Classification of helicopters

^a Anti-submarine Warfare.

invulnerable to mine damage. Adapted utility or cargo helicopters are usually used for the ASW mission.

Transport missions

The main use to which the US Army has put its increased fleet of helicopters is the transport of troops and supplies in the combat zone. These "air mobile operations" have brought about a great increase in tactical mobility. An American general has commented that "the helicopter has made possible the greatest breakthrough in tactical mobility since the first time a doughboy went into battle aboard an armed vehicle."³⁶ With the helicopter, the infantry unit has obtained an increase in its mobility which is comparable with the increase in its firepower during the last decades. The ability to move in any direction, quickly, means that it is possible to do more with fewer troops. Furthermore helicopter-borne troops are rested, not fatigued by ground transport or by miles of difficult ground advance.

Helicopters can be used not only to carry the infantry's own missiles, guns and rockets, but also to relocate artillery batteries and their crews, and to transport heavier weapons, such as artillery rockets and ground-to-ground and ground-to-air missiles. Helicopter evacuation of the wounded reduces death-rates.

Medium-transport helicopters seem likely to remain at about their present size, with a payload of 10-12 tons. There seems to be no tactical require-

³⁸ General W. C. Westmoreland, in Armed Forces Management, Dec. 1968.

ment for greater speed in the battle zone. It is more important that the helicopter retain its low flying, blind flying and all-weather characteristics and be simple to maintain.

Heavy-lift helicopters have also shown themselves to be tactically valuable. When specially equipped they can be used, for example, to recover aircraft downed at sea. One may expect them to develop towards the ability to lift loads of 30-50 tons.

Fire support

Armed helicopters were pioneered by the French, who begun to use them in Indochina and then in Algeria. The Amerians began to use them at the end of the 1950's. Soviet films of military excercises, released in 1968, have shown a close support version of the Mi-4, with a gun turret, air-to-surface rockets and wire-guided anti-tank missiles.

Helicopters are armed to provide escort for troops transported in other helicopters and to deliver direct fire support to cover their landing. Current armaments include fixed flexibly-mounted and turret-installed automatic weapons.³⁷ Attack helicopters like the Cheyenne are equipped with a computerized fire-control system.

In providing fire support the operation of helicopters is rather different from that of fixed-wing attack aircraft. Since helicopters operate closer to the ground, targets can be better identified and ordnance can be laid down closer to friendly lines. On the other hand, anti-aircraft fire may attack them more effectively.

The first attack helicopters were utility helicopters equipped with weapon kits. An example is the American UH-1-Iroquois. One difficulty of this adaptation was that with weapons installed, the speed of the UH-1 dropped below the cruising speed of the helicopter it was escorting. Consequently the United States developed, as an interim solution, a new version of the UH-1, designed for greater speed and a bigger payload of armaments—the AH-IG/J Huey Cobra. It also put out a contract for a new armed helicopter, the AH-56A Cheyenne. The Cheyenne was designed specifically to provide the US Army with a high speed, heavily armed helicopter for escort of air mobile forces and for direct fire support. It represented a significant advance in helicopter technology. It had a rigid rotor, small low-set fixed wings, retractable landing gear and a pusher propeller to give it greater speed and stability. It was claimed that it would be much more stable than an armed utility helicopter, and so it would be possible for its armaments to aim more precisely. It had a computerized sighting system and fire direction system

³⁷ Examples of armament are included in the table in the reference section, page 276.

which permitted either pilot or co-pilot to fire all weapons. In all, the Army claimed that it would be some eight times more efficient than the Huey Cobra. It also seemed likely that it would be six to seven times more expensive. The Huey Cobra costs some \$500,000. The cost of the Cheyenne in the early months of this year was said to be some \$3-3.5 million.

However, it appeared that the design problems of this helicopter had not been fully solved, and at the end of May 1969 the US Army announced the termination of the contract to build the Cheyenne because of default of the contractor.

Ancillary equipment

As with fixed-wing aircraft, so with helicopters, aviation electronics—"avionics"—are a growing part of the total cost. With the combination sight, search and navigation equipment, the electronic equipment in the more advanced helicopters probably accounts for 40 per cent of their cost. The comprehensive equipment for all-weather flight of the Cheyenne, for example, included automatic terrain-following radar, an automatic flight control system and a doppler radar and inertial navigation system. Two interesting developments specific to helicopters are the installation of a radar system which gives warning of attack from the rear and the attempt to make use of the rotors as an antenna for radar.

Technical development

The helicopters which are in service at present have a limited maximum speed around 300 km/hr and are limited in their maneuverability and load capacity. The limitations are due mainly to the rotor system; and intensive research is under way on the aerodynamics of rotors. One of the difficulties is that when the rotor reaches a certain speed, the retreating rotor blade stalls and its lifting power disappears. A similar problem arises when the tip of a forward-turning blade reaches the speed of sound. The approaches to these problems have been to improve the design of the rotor blades and to introduce semi-rigid rotors and completely rigid rotors. The rigid rotor has no joint. The blades cannot flap or swing; they can only turn on their own axle. In addition to making possible increases in speed, the rigid rotor appears to provide such important advantages as good stability, relatively small vibrations and simplicity of construction; it seems likely that it will be used extensively in future.

The drive system can also be improved to increase speed. The most common drive system is shaft drive; shaft piston engines are in general being

replaced by shaft turbine engines. Several attempts have been made to design a drive which operates directly from the rotor blade. One such construction is the hot gas rotor developed for the German DO-132. The gas is led from the power sources via the rotor head through the blades and out through nozzles in the blade tips, where the gas expands and drives the rotor round in accordance with the jet principle. The problems with these systems have been of two kinds: leaks in the transmission and inadequacies in material. The difficulty here is to lead gas at a temperature of 750°C through tubes contained in the rotor blades, providing tubes with as large a diameter as possible and rotor blades as thin as possible and putting the best possible insulation between them.

New insulation material has made it possible to use light metal-covered blades which reduce the weight of the system. Compared with the conventional mechanical drive, the hot cycle rotor eliminates the need for any mechanical transmission such as reduction gears, shaftings, and couplings. As the jet driven rotor is virtually torque free, there is no need for an antitorque rotor in the tail. All this makes possible a robust construction with high reliability.

However, the rotor system appears to set a maximum speed for the conventional helicopter of around 400 km/hr. To achieve higher speeds, the helicopter has to be made in some way independent of the rotor, once it has been lifted into the air and has reached a certain speed. This is the solution provided by the so-called compound helicopter.

In the compound helicopter the construction includes a wing for taking over the load from the rotor at high speeds, and also an additional system for forward drive. The combination of the two can increase the speed range to around 550 km/hr. An example of this type of helicopter is the Cheyenne.

Stowed and stopped rotors

A further speed increase in rotor aircraft is possible only if there is a further move away from the conventional helicopter. There are a large number of technically different solutions in different stages of development, from sketches on the drawing board to flying prototypes.

One such solution is the stowed rotor. When the wing takes over the lift power, the rotor is stopped and may be folded into the upper fuselage or drawn in by having telescoping blades. There is an important decrease in air resistance by bringing in the rotor, so that the speed can be increased to at least 750 km/hr. The disadvantage is that the rotor is a dead weight; and when folded it takes up a rather large part of the aircraft's space. One example of the stopped rotor principle is a helicopter with a rotor in the form of a large triangular hub. When the helicopter reaches a certain speed the rotor is stopped in such a position that the hub serves as a wing, so eliminating the requirements for stowing the rotor. The motor's exhaust is shifted to rear-facing nozzles. A helicopter of this type might have a maximum speed around 900 km/hr with a larger transport version which would cruise at around 650 km/hr. The aim of all these projects is to breed a helicopter-with-fixed-wing aircraft, extracting the vertical performance of the helicopter and the cruise performance of the fixed-wing aircraft without too much loss in payload. This means that it will become more and more difficult to draw a line between helicopters and other aircraft.

Other areas of development

There are various other ways in which helicopter performance is being improved. There are improvements designed to increase reliability and safety; there is the use of new materials and new fuels. The United States Army has a "quiet helicopter program": it is claimed that if the noise could be reduced there would be a considerable increase in combat survival.

The helicopter is at present relatively expensive in operating costs and maintenance. In this respect Soviet helicopters appear to have a considerable advantage over those of other nations; and increased reliability will probably become one of the important objectives of further Western development. Safety can be increased by duplicating systems; this can be done for the engines and for other systems as well.

New materials are important. Dual hardness steels, which have 50 per cent more penetration resistance than conventional steels, are increasingly being used to protect critical areas such as gear boxes, fuel tanks, and pilot seats. Reinforced plastics, which are expensive now but which will no doubt become cheaper, will be more widely used both to reduce weight and to reduce radar reflectivity. Attempts are being made to reduce fire hazards by such developments as that of semi-solid emulsified fuels.

Part V. Image intensifiers

Introduction

During World War II night-fighting devices were confined to illumination equipment, such as searchlights and flares, and infra-red sights, like the Sniperscope. After the War, research and development of night-combat devices was expanded. More sophisticated infra-red equipment was manufactured. Small radars were developed to permit surveillance of the battlefield in darkness as well as by daylight. The research was directed towards a

broad register of devices—equipment employing sensors in all portions of the electromagnetic spectrum, from ultraviolet through visible light, infrared, and the micro-wave spectra to the very low frequencies.

In the United States interest in night-fighting devices has grown sharply during the 1960's, as a result of the Viet-Nam War. There is a natural tendency for poorly armed troops and insurgency forces to fight at night in order to neutralize or diminish the effectiveness of firepower from enemy artillery pieces and aircraft. The US Army has had an urgent need to get better night vision equipment; and it is said that the development of the technology of night vision is one of the fastest growing of all the US Army's tactical applications of electronics.³⁸

The ultimate objective of the development of night-vision devices is to be able to fight at night with the same effectiveness as in clear daylight. Darkness will, for a long time to come, impose limitations on fighting forces; but it seems likely that a defender equipped with modern night-combat devices no longer risks being surprised by a night attack and that night-time infiltration can be more easily detected and countered.

Even in the field of night-fighting equipment, a new device leads to the conception of its counter-device. Radar and infra-red devices are "active" equipment, that is, they radiate electromagnetic energy. Their location can therefore be detected as readily as that of a searchlight if the enemy is properly equipped; and they are then potentially subject to counter-measures. In the case of infra-red beams, a simple, cheap infra-red sensitive device will tell troops that they are under infra-red source can, furthermore, be detected from distances greater than its viewing range. The introduction of warning devices has led to the development of "passive" viewers. These do not emit energy and cannot be detected. The most important of these devices is the image intensifier, which amplifies available light.

Research and development expenditure for image intensification equipment in the USA during the period 1961–64 was around \$20 million.³⁹ The first contracts were let in FY 1967, when \$31.4 million was obligated. In FY 1968 the figure rose to \$54.6 million, and it will approach \$100 million in 1969. The outlook for the 1970 budget is said to be "substantially more."⁴⁰

⁸⁸ "ECOM Labs Develop New Generation of Night-Vision Devices", Army Research and Development Newsmagazine, Vol. 9, no. 7 (July-Aug. 1968), 7.

³⁹ "US Army Tactical Night Vision Devices", International Defense Review, no. 3, 1968, p. 208.

⁴⁰ "\$100 million for Night Vision in FY 70", Armed Forces Management, Vol. 14, no. 12 (Dec. 1968), 19.


Chart 2,2. The amplification tube of an image intensification device

Three image intensifiers

Three image-intensification devices have been manufactured: a small starlight scope, a crew-served weapons sight and a medium-range night-observation device. The "technological breakthrough" leading to the production of these devices is described as the "development of a unique tube for amplification of light along with the design and development of fiber optic plates through which light is transmitted. An image of light rays is conducted into the tube by a fiber optic plate. An electron image is emitted in the tube when the light impinges upon chemical film, which is deposited on the fiber optic plate. These electrons pass through an electric field of 15,000 volts, causing acceleration that gives energy ... and focuses the image on a phosphorus screen that emits a light brighter than the input stage. The light image is further amplified by passing through two additional electron image tube stages coupled together by means of fiber optics, and the result is that the output light image is over 40,000 times the original input level."⁴¹ The basic elements of the amplification tube are shown in chart 2.2.

The smallest of the three American image-intensifiers, the AN/PVS-2 Starlight Scope, has a weight of 2.6 kg. The three-stage cascade image intensifier unit is 25 mm in diameter. The device has four to one magnification and range of 300-400 meters. It is used either separately, held by hand or, when needed, it can be clipped to a number of weapons, from rifles to rocket and grenade launchers.

The larger AN/TVS-2 crew-served weapon sight has a weight of 7.2 kg. This device also uses the three-stage 25 mm cascade image intensifier tube. It has seven to one magnification and a range of maximum 1000 meters. It

⁴¹ Excerpt from a recommendation by the US Army Electronics Command for Dr. Robert S. Wiseman, Director of Combat Surveillance, Night Vision and Target Acquisition Laboratories, to receive the Army Exceptional Civilian Service Award, cited in "\$5,000 award recognizes night-vision progress", Army Research and Development Newsmagazine, Vol. 10, no. 1 (Jan. 1969), 3.

is used on a variety of weapons including a recoiless rifle and a machine gun.

The largest of these night-vision units is the Night Observation Device (NOD) Medium Range, designation AN/TVS-4. The total weight is 18.1 kg. The three-stage intensifier tube has a diameter of 40 mm. The device has seven to one magnification and a range of 1200 meters. It is normally mounted on a tripod or on a vehicle.

All the three devices use a 6.75V mercury battery giving a high-voltage power supply.

The range of the image intensifiers is naturally to a certain degree dependent on the available light. Although a faint skyglow is sometimes enough, a slight artificial increase in the ambient light, by indirect use of flares or searchlight—even laser is mentioned—will enable the devices to be used to their full effect. On the other hand too much white light will blind them; so the control of white light on the battlefield is of great importance.

The main limitation of image intensifiers is that they are very tiring to operate for any length of time (unless the output is displayed on a televisiontype screen—low light television). This may be taken care of by the second generation of image intensifiers now under development. Improvement in efficiency is also likely, and there may be reductions in size and weight. Some sort of auxiliary illumination may be developed to stretch out the ranges of some devices. It seems probable that image intensification techniques will compete with other "passive" equipment, such as thermal devices which make use of heat emissions.

An example of the combined use of image intensifiers with other nightvision devices is provided by a new system now being developed for helicopters. It is called the INFANT (Iroquois Night Fighter and Night Tracker) system. Forty of these are being developed for the US Army, at a cost of \$15 million. INFANT uses two sensors connected with the front of the aircraft: one gives a direct view, using an image intensifier; the other, a remote system using low-level TV, projects an image on the cockpit displays for the crew. When ambient lighting is less than starlight, the helicopters can use infra-red light from searchlights to illuminate the target.

VI. References and sources

Part II. Submarine-launched missiles

- 1. La Fond, C. D. "Phase two Poseidon contracts let", Missiles & Rockets, Vol. 18, no. 15 (11 April 1956), 28-29.
- 2. Wilson, G. C. "ICBM for sub fleet: Navy Poseidon missile gets 3000-mile test tomorrow", International Herald Tribune, 12 Nov. 1968.

- 3. Enthoven, Alain C., Assistant Secretary of Defense for Systems Analysis. Status of U.S. Strategic Power: Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services, U.S. Senate, 90th Cong., 2nd Sess., part I (23, 24 and 26 April 1968), p. 121.
- 4. Effective Use of the Sea (Report of the Panel on Oceanography, President's Science Advisory Committee), June 1966 (Washington, D.C.: G.P.O.), pp. 32-34.
- Smith, Adm. Levering R. "Polaris an element of strategic deterrence", Annals, New York Academy of Sciences, Civilian and Military Uses of Aerospace: Vol. 134, Art. 1 (22 Nov. 1965), 114-118.
- 6. Perry, L. R. The Ballistic Missile Decisions (RAND Memorandum P-3686). Santa Monica, Calif.: RAND Corporation, Oct. 1967.
- 7. Wilson, L. H. "The Polaris fleet ballistic missile", Interavia, Vol. 20, no. 1, 1965.
- 8. "Longer range is goal of Polaris B3", Aviation Week & Space Technology, Vol. 78, no. 10 (11 March 1963).
- 9. "Polaris B3 program moving ahead", Missiles & Rockets, Vol. 16, no. 2 (11 Jan. 1965).
- 10. "Missile and rockets astrolog", Missiles & Rockets, Vol. 6, no. 10 (7 March 1960), 18.
- "Advanced Polaris is success", U.S. Naval Institute Proceedings, Vol. 90, no. 11 (Jan. 1964), reprinted from Baltimore Sun, 27 Oct. 1963.
- 12. Aviation Week & Space Technology, Vol. 91, no. 2 (14 July 1969).
- 13. "Polaris under a new name may not be the same", Space/Aeronautics, Vol. 43, no. 4 (April 1965), 17–18.
- Lindsey, R. "DOD studying concept: proposed fourth-generation Polaris would use state-of-art technology", *Missiles & Rockets*, Vol. 14, no. 2 (13 Jan. 1964), 18-19.
- 15. Wilson, G. C. "2000 sub warheads is aim in U.S. strategy", *Washington* Post, 2 Feb. 1967.
- 16. Jane's Fighting Ships (annual) 1968/69, p. 344.
- 17. Harod, D. "Russian system to drop 10 H-bombs at a time", Daily Telegraph, 14 Jan. 1969.
- Beecher, W. "Soviet reported to achieve gain in MIRV program", New York Times, 9 June 1969.
- 19. Saxbe, W. B., U.S. Senator. "The Proposed Safeguard ABM System", Congressional Record-Senate, 8 May 1969, pp. S4697-S4701.
- Schultz, C. (in) Conference on The Military Budget and National Priorities, 28-29 March 1969, printed in *The Progressive*, Vol. 33, no. 6 (June 1969), 38.
- Robinson, Comm. R. B. "Polaris navigation and the gyroscope", U.S. Naval Institute Proceedings, Vol. 91, no. 12 (Dec. 1965), 148-152.
- 22. U.S. Naval Institute Proceedings, Vol. 90, no. 6, June 1964.
- "Naval satellite to set time standard", U.S. Naval Institute Proceedings, Vol. 94, no. 10 (Oct. 1968), 158–159, reprinted from Naval Research Reviews, Vol. 21, no. 7 (July 1968).
- Hastings, H. F. "Precision frequency control and milisecond timing", Naval Research Reviews, Vol. 13, no. 9 (Sept. 1960), 6-12.

10-693310 SIPRI Yearbook

- 25. "More accurate time signals", Naval Research Reviews, Vol. 14, no. 4 (April 1961), 10.
- 26. "Navy gets new atomic clocks", Naval Research Reviews, Vol. 14, no. 7 (July 1961), 23.
- 27. Kershner, R. B. "Progress report on Transit", Marine Sciences Instrumentation, Vol. 1, 91-118.
- Ehrlich, E. "Navigation by satellite", TRW Space Log, Vol. 7, no. 2 (Summer 1967), 2-16.
- 29. Freitag, R. F. "Navigational satellites", Science Journal, Vol. 1, no. 12 (Dec. 1965), 72-76.
- Kershner, R. B. "Transit program results", Astronautics, Vol. 6, no. 5 (May 1961), 30-31, 106-110.
- Baar, J. "Transit system is due by early '61", Missiles & Rockets, Vol. 5, no. 42 (12 Oct. 1959), 16-17.
- "Ships to use navigation satellite", U.S. Naval Institute Proceedings, Vol. 93, no. 4 (1967), 147, reprinted from Wilford, J. N., New York Times, 30 July 1967.
- Winters, P. B. "A navigation-geodetic system by satellite", U.S. Naval Institute Proceedings, Vol. 93, no. 6 (June 1967), 131-134.
- 34. McGuire, F. G. "Polaris guidance needs are critical", *Missiles & Rockets*, Vol. 7, no. 1 (4 July 1960), 17.
- 35. Aviation Week & Space Technology, Vol. 80, no. 11 (16 March 1964), 145.
- 36. Baldwin, H. W. "Polaris: its record gets high marks", New York Times, 13 Aug. 1967.
- 37. Undersea Technology, Vol. 6, no. 11 (Nov. 1963).
- "Polaris invulnerability upgraded", Missiles & Rockets, Vol. 14, no. 22 (1 June 1964), 9.
- Laird, Melvin R., Secretary of Defense. Defense Report: Statement before the Senate Armed Services Committee, 19 March 1969 (Department of Defense mimeograph), p. 32.
- Foster, J. S., Jr. Status of U.S. Strategic Power: Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services, U.S. Senate, 90th Cong., 2nd Sess. part I (23, 24 and 26 April 1968), pp. 60-61.
- "Polaris to get a royal launching", Aerospace Technology, Vol. 21 no, 17 (12 Feb. 1968).
- 42. "First British SSBN test fires Polaris", U.S. Naval Institute Proceedings, Vol. 94, no. 5 (May 1968), reprinted from Baltimore Sun, 16 Feb. 1968.
- 43. Douglas-Home, C. "More punch for UK Polaris", The Times, 3 Aug. 1967.
- 44. "Polaris takes place of Poseidon", Guardian, 2 July 1969.
- 45. Defense Market Survey Intelligence Report: Advanced Sea-Based Deterrent.
- 46. Bulban, E. J. "Navy studies deterrent force for 1980's", Aviation Week & Space Technology, Vol. 80, no. 23 (June 1964), 91-94.
- 47. Clifford, Clark M., Secretary of Defense. The 1970 Defense Budget and Defense Program for the Fiscal Years 1970-74 (Department of Defense mimeograph), p. 62.
- 48. Status of U.S. Strategic Power: Hearings before the Preparedness Investigating

Subcommittee of the Committee on Armed Services, U.S. Senate, 90th Cong., 2nd Sess., part I (23, 24 and 26 April 1968), p. 53.

- 49. "A supersub for supermissiles", Newsweek, 24 June 1968.
- 50. "Advanced FBM studies: Poseidon tests start", Armed Forces Management, Vol. 14, no. 12 (Dec. 1967).
- 51. Gettler, M. "Navy eyes new sea-based deterrent", *Technology Week*, Vol. 19, no. 1 (4 July 1966), 14-15.
- 52. "Plans for new type missile silo and nuclear subs are reported", Washington Post, 5 Jan. 1968.
- 53. "U.S. weighs sub missile net", Christian Science Monitor, 4 Feb. 1969.
- 54. Undersea Technology, Vol. 4, no. 10 (Oct. 1963).
- 55. Stone, I. "New missile concepts stress environment", Aviation Week & Space Technology, Vol. 78, no. 10 (11 March 1963), 142.
- 56. "Special Report: Electro-Optical Systems: Billion dollar annual market is due to double by the end of the decade", *Missiles & Rockets*, Vol. 14, no. 22, (1 June 1964).
- Boling, G. R. "Dolphin joins the fleet; new breed of deep-diving sub is expected to unravel many mysteries of ocean depths", *Our Navy*, Vol 63, no. 10 (Oct. 1968), 41-42.
- 58. Devline, J. C. "7-man sub uses nuclear power: \$67.5 million research ship can crawl oceans floor", New York Times, 26 Jan. 1969.
- 59. "Nuclear research sub", U.S. Naval Institute Proceedings, Vol. 95, no. 4 (April 1969).
- 60. "Deeper diving subs proposed", Undersea Technology, Vol. 4, no. 6 (June 1963).
- 61. Annual Report to Congress of the Atomic Energy Commission for 1968. Washington, D.C.: G.P.O. 1969.
- 62. Watson, M. S. "Sub-rescue plan submitted", Baltimore Sun, 29 April 1964, reprinted in U.S. Naval Institute Proceedings, Vol. 90, no. 7 (July 1964).
- 63. "Defense projects may begin to get the ax", Product Engineering, 10 March 1969.
- 64. Tape, G. F. "Atoms for war and peace", Ordnance, Vol. 53, no. 294 (May-June 1969), 579.
- 65. "Anglo U.S. nuclear pact runs till 1974", Times, 21 Feb. 1969.

Part IV. Helicopters

General articles

- Guthrie, Brig. Gen. John R. "The challenge of Army requirements to aerospace technology in the 1970's", *Defense Industry Bulletin*, Vol. 3, no. 6 (1967), 7-11.
- Ord-Hume, A. "World of rotors", Flying Review International, Vol. 24, no. 4 (1968), 34-43.
- Seneff, Brig. Gen. G. P., Jr. "Jungle warfare—helicopter's role", Sperryscope, first quarter (1966), pp. 1-5.
- Sikorsky, Sergei. "Der Hubschrauber heute und morgen", Soldat und Technik, Vol. 12, no. 3 (1969), 128.

Witze, Claude. "The U.S. Army flies to fight and win", Aerospace International, Vol. 3, no. 4 (1967), 13-17.

Data on helicopters

- "The Bell AH-1G Huey Cobra", Interavia, Vol. 22, no. 10 (1967), 1560-61. "The Dornier Do-132", Interavia, Vol. 22, no. 10 (1967), 1566-67.
- Jane's All the World's Aircraft (annual) 1968/69.
- "Kampfhubschrauber AH-IG 'Huey-Cobra", Soldat und Technik, Vol. 11, no. 7 (1968), 384-5.
- "The Lockheed AH-56A Cheyenne", Interavia, Vol. 22, no. 10 (1967), 1562-63.
- "Luftfahrttechnik von heute und morgen", Soldat und Technik, Vol. 11, no. 7 (1968), 378-82.
- Martin, Norman W. "Armament for the Cheyenne", Ordnance, Vol. 53, no. 293 (1969), 502-5.

Technical development

- Beller, Willam S. "Next generation of military aircraft studied by DOD", *Technology Week*, Vol. 20, no. 13 (1967), 54-60.
- Beller, William S. "Subsonic aeronautics enters 'Renaissance'", Technology Week, Vol. 20, no. 15 (1967), 38-9.
- "The development of the rigid rotor", Interavia, Vol. 22, no. 10 (1967), 1564-65.
- Fischer, C. "High-speed helicopters", Interavia, Vol. 22, no. 10 (1967), 1551-59.
- "Kampfzonentransporter der Zukunft", Soldat und Technik, Vol. 12, no. 5 (1969), 242-9.

New missions

- "The ASW version of the Super Frelon", Interavia, Vol. 24, no. 1 (1969), 68-72.
- "Decca-Navigation bewährt sich in Vietnam", Soldat und Technik, Vol. 11, no. 4 (1968), 192-3.
- Picou, Col. Lloyd J. "Artillery support for the airmobile division", *Military Review*, Vol. 48, no. 10 (1968), 3-12.
- Polmar, Norman. "Target: downed pilot", Aerospace International, Vol. 2, no. 11 (1966), 37-40.
- "The Sea King anti-submarine helicopter", Interavia, Vol. 24, no. 1 (1969), 52-4.
- "U.S. Army weapons in Vietnam", International Defense Review, no. 3 (1967), 256-61.

Part V. Image intensifiers

- "Combat surveillance in the British Army", International Defense Review, no. 3, 1967.
- Cornford, E. C. Technology and the battlefield (Adelphi Papers No. 46). London: Institute for Strategic Studies, 1968.
- Dulberger, Leon. "Targeting for air attack", Space/Aeronautics, Vol. 44, no. 6 (Nov. 1965).

"Electronics in the French Army", Interavia, Vol. 22, no. 8 (Aug. 1967).

- Judge, John F. "Surveillance needs systems approach", Missiles & Rockets, Vol. 18, no. 13 (28 March 1966).
- "Lichtvermstärkungsgeräte im Truppenversuch", Soldat und Technik, Vol. 11, no. 11 (Nov. 1968).
- Thorp-Tracey, "Night fighting equipment and tactics", International Defense Review, no. 2, 1968.
- "US Army tactical night vision devices", International Defense Review, no. 3, 1968.

Chapter 3. Disarmament efforts

This chapter is divided into eight parts. The first gives a skeleton description of the history of disarmament efforts, 1945–67—an outline of "the story so far". (A chronology in the reference section on page 280 sets this out more fully.) The second covers the first half of 1968—the meeting of the ENDC¹ and the General Assembly and Security Council discussions. The third gives an account of the Non-Proliferation Treaty—the main development of 1968. The fourth describes what happened in the ENDC in July and August 1968. The fifth covers the Conference on Non-Nuclear-Weapon States, and the sixth, the 23rd General Assembly. The seventh covers the ENDC in the period up to May 1969. The eighth summarizes the position, at the time of going to the printer, on the strategic arms limitation talks (SALT) between the United States and the Soviet Union.

Part I. Historical background²

Phase 1. Initial efforts, 1945-50

On 26 June 1945 the United Nations Charter was signed in San Francisco. The new world organization proclaimed as one of its main purposes and principles the maintenance of international peace and security. In order to promote this purpose the founding members entrusted specific responsibilities for disarmament and the regulation of armaments to the Security Council and the General Assembly, thus providing the legal basis for all further activities in this field.

The Security Council was made responsible for formulating, with the assistance of the Military Staff Committee (art. 47), plans to be submitted the members of the United Nations for the establishment of a system for the regulation of armaments (art. 26). The General Assembly was empowered to consider the principles governing disarmament and the regulation of armaments and to make recommendations about them (art. 11).

¹ Throughout this chapter, the abbreviation ENDC is used for the Conference of the Eighteen-Nation Committee on Disarmament. During the July-September 1969 session eight new members were added to the Committee, which is now called the Committee on Disarmament (see page 187).

² See the chronology of disarmaments efforts, page 280, for more details.

When the Charter came into force (24 October 1945), disarmament had already become a serious problem. The dropping of the first atomic bombs (August 1945) confronted the United Nations with the urgent task of establishing control over atomic energy and outlawing the use and production of atomic weapons. Thus the very first resolution passed by the General Assembly (24 January 1946) unanimously established the UN Atomic Energy Commission, consisting of the members of the Security Council, plus Canada (when not a member of the Council). The Commission was asked to draw up plans for the control of atomic energy and for the elimination of atomic weapons and of all other major weapons of mass destruction. In the immediate post-war period disarmament negotiations were almost entirely concerned with these questions.

The United States plan for nuclear disarmament (Baruch Plan) was put forward in the Atomic Energy Commission in June 1946. It envisaged the creation of a system for control of atomic energy, with punishment for violation of the rules of operation. This would then be followed by the stopping of the manufacture of bombs and the destruction of all existing bombs. The plan provided that control must precede prohibition: and the administration of the control would be free of the veto of permanent members of the Security Council. The suggested degree of inspection and control-probably to be exercised by a body in which Western powers would have the major influence-was unacceptable to the Soviet Union. Furthermore, if at any time the treaty broke down, the United States would have a monopoly of atomic weapons. The Soviet Union's counter-proposal of June 1946 (Gromyko Plan) required signatories to agree not to use atomic weapons, to prohibit the production of them and to destroy all existing stocks. In this plan, prohibition and destruction would precede control: consequently, the United States advantage in atomic weapons would be nullified. The Soviet Union modified this position in October 1948, suggesting that the conventions on the prohibition of atomic weapons and on the establishment of international control over atomic energy be brought into operation simultaneously.

It was some time before discussion on conventional armaments began. The Commission for Conventional Armaments, established by the Security Council in 1947 and consisting of its members, did not begin serious work until 1948, after the rejection of the Soviet proposal that conventional and nuclear disarmament be considered together. The Soviet proposal, which then called for reductions in existing forces by a third, was not accepted because in the Western opinion such reduction would preserve the Soviet Union's conventional military superiority. The Western countries were concerned with the relative level of conventional arms, and most immediately with establishing what the existing ratio in fact was.

In this period, then, when the United States had a nuclear monopoly and the Soviet Union was presumed to be superior in conventional weapons, each side was making proposals which preserved its own position while neutralising the other side's superiority. The two Commissions, failing to agree, adjourned indefinitely in 1950.

Phase 2. Regulation of armed forces and armaments, 1952–58

After two years of deadlock, negotiations began again in 1952. By this time the Soviet Union had exploded an atomic device (1949); and the Western powers agreed to merge the discussions of nuclear and conventional disarmament. A new Disarmament Commission was established (1952), with the same membership as the earlier Commissions-the Security Council plus Canada. Its task was to prepare proposals for the "regulation, limitation and balanced reduction of all armed forces and all armaments, for the elimination of all major weapons adaptable to mass destruction, and for effective international control of atomic energy to ensure the prohibition of atomic weapons and the use of atomic energy for peaceful purposes only." In 1954 the discussions were moved to a subcommittee, consisting of Canada, France, the United Kingdom, the Soviet Union and the United States, where they continued in private until September 1957. A series of disarmament plans consisting of different stages was put forward by each side. By 1955 there appeared to be a considerable degree of convergence. There was agreement, for example, on the eventual force levels, on the total prohibition of nuclear weapons, to be effected after 75 per cent of the reduction of armed forces had been carried out, and on the principle of permanent ground control posts to supervise inspection. However, there was little progress after 1955. In September 1955, the United States representative put a "reservation" on all earlier disarmament proposals.

Attention shifted to proposals for limited measures such as arrangements for ground and air inspection, the establishment of nuclear-free zone in Europe, measures against surprise attack; and negotiations for the discontinuance of nuclear weapons tests were initiated.

Phase 3. General and complete disarmament, 1959-67

A programme for general and complete disarmament was first put forward by the Soviet Union on 18 September 1959. By 1960 both sides had agreed that general and complete disarmament was the objective of negotiations. The Disarmament Commission was not dissolved but beginning in March

1960 the negotiations were conducted in a new Ten-Nation Disarmament Committee, with five members from NATO countries and five from Warsaw Pact countries. In March 1962 eight non-aligned countries were added to this Committee, thereafter called the Eighteen-Nation Disarmament Committee. To the ENDC the Soviet Union submitted a "draft treaty on general and complete disarmament under strict international control", and the United States submitted an "outline of basic provisions of a treaty on general and complete disarmament in a peaceful world". The Soviet draft treaty provided for the completion of the disarmament process within a fixed, short period of time: nuclear delivery vehicles were to be completely abolished by the end of the first stage of disarmament. The United States outline, on the other hand, provided for gradual disarmament, beginning with a freeze, and keeping the relative military positions throughout the disarmament process similar to what they were at the beginning of the process. The Soviet Union subsequently amended its proposal to permit the United States and Soviet Union to retain, on their territories, a limited number of inter-continental, anti-missile and anti-aircraft missiles until the last stage of disarmament. Little progress was made in these negotiations; and there has not been much discussion of general and complete disarmament since 1965.

Limited measures, 1959–67

More progress was made with some limited measures. On 1 December 1959 twelve nations, including the Soviet Union, the United States, France and the United Kingdom, signed the Antartic Treaty, prohibiting "any measures of a military nature, such as the establishment of military bases, as well as the testing of any kind of weapon" in the area; it envisaged inspection by observers designated by the contracting parties. After discussion in the ENDC and, in the final stage, between the Soviet Union, United Kingdom and United States, the Moscow Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water was signed on 5 August 1963. Thereafter, discussions on a comprehensive test ban were not intensively pursued by the two great powers, although at various times in the negotiations the differences between them-on the number of on-site inspectionshad been very small. In 1967 negotiations were successfully ended on two other collateral measures. On 27 January the Outer Space Treaty was signed, it requires signatories to refrain from placing in orbit any objects carrying nuclear weapons or other weapons of mass destruction. On 14 February a treaty was signed for the prohibition of nuclear weapons in Latin America (Treaty of Tlatelolco). By the end of 1967 the negotiations on the Non-Proliferation Treaty were nearing completion.

This, briefly, is the background to developments in 1968.

Part II. The start to 1968

1968 was a year of ups and downs in disarmament. In the autumn of 1967, the ENDC had taken the unusual course of staying in session, meeting in parallel with the General Assembly, in an attempt to reach agreement on the Non-Proliferation Treaty (NPT). The main point of disagreement was article III, dealing with controls. This had been left blank in earlier drafts tabled by the Soviet Union and the United States. Agreement had not been reached by the end of the year and the General Assembly had been obliged to postpone consideration of the NPT until the spring of 1968. Then, unexpectedly, on 18 January at the opening of the new session of the ENDC, the Co-Chairmen (United States and Soviet Union) presented a complete draft text of the NPT, including an agreed version of article III. They had managed to solve the conflict of competence between the safeguards systems of the International Atomic Energy Agency (IAEA) and the European Atomic Community (Euratom): the substance of the agreement was that the IAEA would be the agency with overall responsibility for the application of the verification provisions, while other systems would work on a subordinate level.

The 18 January-14 March session of the ENDC

When the ENDC reconvened on 18 January 1968, it had before it a resolution of the General Assembly (2346 A (XXII)) in which there was a request that it should submit to the General Assembly, not later than 15 March, a report on "the negotiations regarding a draft treaty on the non-proliferation of nuclear weapons". Between 18 January and 14 March, the ENDC met formally 24 times. There were also a number of additional informal contacts, and the session was a relatively lively one. With the prospect of final agreement ahead, and the need to hurry in order to report to the Assembly, discussion was almost wholly devoted to the Non-Proliferation Treaty.

The text tabled by the United States and the Soviet Union was the result of long and elaborate negotiations. Every word of articles I and II has its own history. The control article (article III) had been worked out in a dialogue between the Co-Chairmen of the ENDC, in consultation with members of the Committee and with other interested parties. There had been extensive negotiations in particular between the United States and the members of Euratom. At this stage there was no real possibility for the ENDC to change the main articles of the treaty without risking the whole effort and causing at least a year's setback to the work of the Committee. Although some delegations suggested amendments to these articles, a few of them rather farreaching, the Co-Chairmen and the Committee were unwilling seriously to consider their acceptance.

A number of amendments were proposed by various delegations on other parts of the text, for example those concerning the peaceful applications of atomic energy, nuclear explosions for peaceful purposes, further disarmament measures, and the treaty's amendment, entry into force, and termination. Only four of these proposals were adopted by the Co-Chairmen.

On 7 March the three nuclear powers represented at the ENDC—the Soviet Union, United States and United Kingdom—tabled jointly a draft Security Council resolution on security assurances to non-nuclear-weapon states against "aggression with nuclear weapons or the threat of such aggression." Instead of including an article to this effect in the NPT itself, the nuclear powers chose this way of meeting the desire expressed by many nonnuclear-weapon states for security guarantees compensating them for their abstention from a nuclear defence of their own. The draft resolution:

1. Recognizes that aggression with nuclear weapons or the threat of such aggression against a non-nuclear-weapon State would create a situation in which the Security Council, and above all its nuclear-weapon State permanent members, would have to act immediately in accordance with their obligations under the United Nations Charter;

2. Welcomes the intention expressed by certain states that they will provide or support immediate assistance, in accordance with the Charter, to any nonnuclear-weapon State Party to the Treaty on the Non-Proliferation of Nuclear Weapons that is a victim of an act or an object of a threat of aggression in which nuclear weapons are used;

3. Reaffirms in particular the inherent right, recognized under Article 51 of the Charter, of individual and collective self-defence if an armed attack occurs against a member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security.

In addition to tabling the draft resolution, the nuclear powers expressed the intention of making separate though similar declarations promising immediate assistance through the Security Council to any signatory of the NPT subjected to nuclear aggression or blackmail.

Since these proposals on assurances were made very late in the session, none of the non-aligned delegations to whom they were addressed had time to prepare a response before the session ended on 14 March.

On 14 March, the ENDC submitted to the General Assembly a report on its progress in negotiating a draft NPT. The report itself is rather short and contains only facts about the formal conduct of the deliberations. To it was annexed the Co-Chairmen's draft NPT text, the draft Security Council resolution, and a list of all relevant proposals made by the 17 participating delegations in the two sessions of 1967 and the first session of 1968. In this

way the report indicated that the submitted draft NPT text was the proposal of the Co-Chairmen and was not necessarily supported by the other participating delegations.

It was the first time an NPT draft text had been jointly sponsored by the delegations of the United States and the Soviet Union, indicating closer cooperation between them than before. On the two previous occasions when they had put forward agreed drafts, they had tabled separate but identical texts.

The 24 April–12 June session of the General Assembly and the 17–19 June session of the Security Council

When it received the ENDC report, the General Assembly reconvened its 22nd session, suspended since December 1967, to discuss the question of non-proliferation. Other issues on the agenda were the Middle East and South-West Africa. The issues of the NPT which had not been resolved in the ENDC were now raised at a gathering where there were 122 nonnuclear-weapon states rather than 14. Criticism was concentrated on the imbalance of obligations between nuclear and non-nuclear-weapon states and on the proposed security guarantees. The debate was lively and sometimes bitter, although most delegates warmly supported the idea of non-proliferation as such. Apparently the nuclear powers had hoped that the respect of other nations for the ultimate aims of the Treaty and for the work already done on preparing the draft would ensure a majority vote for a resolution endorsing the draft as it stood. In the event, the integrity of the three first articles was widely accepted, but only with reluctance. A number of important delegations called for amendments to most parts of the text. In a situation where probably only 80 of the 124 UN members would vote for the text, the Soviet Union and the United States on 31 May tabled a slightly revised draft, in order to meet the wishes of a number of non-aligned states who were pushing their points to the brink of impasse, and in order to keep the initiative and discourage other states from tabling draft texts of their own. The amended text granted non-nuclear-weapon states a stronger guarantee of access to the peaceful use of atomic power, particularly in the developing areas of the world. The superpowers also introduced a new full paragraph in the preamble, related to the general security of signatories:

Recalling that, in accordance with the Charter of the United Nations, States must refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations, and that the establishment and maintenance of international peace and security are to be promoted with the least diversion for armaments of the world's human and economic resources.

The inclusion of this new paragraph in the preamble was significant. It extended the scope of the intention of the security guarantees from nuclear aggression only to aggression in general.

At this stage the African and Asian group of member states tried—successfully—to delay the vote on the NPT a few days in order to push for strong UN measures on the dispute with South Africa over ending its control of South-West Africa. Finally, on 10 June, a resolution "commending" the 31 May version of the NPT was passed by the Political Committee and on 12 June the resolution was passed by the General Assembly. The vote in the Assembly was 95 countries for, four countries against (Albania, Cuba, Tanzania and Zambia), and 21 abstentions (France, Portugal, Spain, Argentina, Brazil, Burma, India, Saudi Arabia and 13 African states).³

Many countries gave explanations of their votes. The United States supported the text of the accession article (IX)—"open to all states for signature" (italics added)—in order to allow for the widest possible geographical application of this particular treaty; but it stated that this support does not "affect the recognition or status of an unrecognised régime or entity, which may elect to file an instrument of accession to the Treaty. The United States reserves its right to object if later an unrecognized entity should seek to assert privileges such as the participating in a conference called under articles VIII and X of the Treaty." The United Kingdom issued a similar statement. These statements have significance in relation to the accession to the NPT of some countries, for example, the German Democratic Republic.

The French delegate declared that "France, for its part, which will not sign the Treaty, will behave in the future in this field exactly as the States adhering to the Treaty. There is certainly no doubt in that respect in the mind of anyone." The decision of France not to sign the NPT is related to her long absence from the disarmament negotiations in general. The main difference between signing and making this declaration concerns the possibility of withdrawal. Formal withdrawal from the Treaty requires three months notice and "a statement of the extraordinary events [the signatory] regards as having jeopardized its supreme interests".

The large majority in favour of the NPT was partly achieved because the resolution "commended" rather than "endorsed" the Treaty. A number of non-nuclear-weapon states cast their vote with the expressed reservation that they expected the nuclear-weapon states to fulfill their obligation to

³ Two states were not present (Gambia and Cambodia). Two were not allowed to vote according to article 19 of the UN Charter, concerning arrears in the payment of financial contributions (the Dominican Republic and Haiti).

take steps to disarm. Several countries declared that their positive vote did not commit them to signature or ratification.

A few hours after the non-proliferation resolution was passed in the General Assembly, the United States, the Soviet Union and the United Kingdom, in a joint letter to the Chairman of the Security Council, requested a meeting of the Council to consider their draft resolution on security guarantees. At the meeting of the Security Council, from 17 to 19 June, the three countries made the promised declarations concerning the security of non-nuclear-weapon states. The core content of the identical statements was that:

Aggression with nuclear weapons, or the threat of such aggression, against a non-nuclear-weapon State would create a qualitatively new situation in which the nuclear-weapon States which are permanent members of the United Nations Security Council would have to act immediately through the Security Council to take measures necessary to counter such aggression or to remove the threat of aggression in accordance with the United Nations Charter, which calls for taking "effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace." Therefore, any State which commits aggression must be aware that its actions are to be countered effectively by measures to be taken in accordance with the United Nations Charter to suppress the aggression or remove the threat of aggression.

The [USSR, United Kingdom, United States] affirms its intention, as a permanent member of the United Nations Security Council, to seek immediate Security Council action to provide assistance, in accordance with the Charter, to any non-nuclear-weapon State, Party to the Treaty on the Non-Proliferation of Nuclear Weapons, that is a victim of an act of aggression in which nuclear weapons are used.

In the debate, France declared that in line with its general attitude to the NPT, it would not vote for the resolution. Most other countries welcomed the resolution.

Denmark emphasized that "the political significance of this agreement goes far beyond the text of the guarantee formula embodied in it". Others called its tabling "an historic event". Brazil concluded that "the draft resolution falls short of assuring the guarantees against all kinds of aggression already contemplated in the Charter." The most critical was the representative of Algeria, who in an elaborate analysis said that:

The draft resolution gives the Treaty the nature of a collective security covenant from which only the signatories would benefit. It is unprecedented for the Council to act as guarantor for any covenant. Moreover, while the United Nations Charter places the responsibility for safeguarding and maintaining peace on the five permanent Members of the Security Council, the draft resolution requires the agreement of only three permanent Members, thus calling into question a balance worked out when the Council was created. This is a biased approach and implies an indirect alteration of the Charter. The draft resolution seems to be directed against the People's Republic of China. The restoration of its rights in the United Nations would be the decisive test of the effectiveness of the resolution. China has repeatedly declared that it would under no circumstances be the first to use nuclear weapons and France does not envisage offensive uses of its nuclear arsenal. However, these two nuclear Powers are not ready to enter into commitments similar to those assumed by the other three nuclear Powers. Consequently the assurances are either inadequate or unnecessary.

The resolution was adopted by a vote of 10 in favour, none against, with five abstentions (Algeria, Brazil, France, India, Pakistan). The People's Republic of China was strongly opposed to the NPT and the security guarantees. At a reception for President Julius Nyerere of Tanzania on 18 June, Prime Minister Chou En-Lai paid tribute to Tanzania for voting aginst the NPT. To describe China's attitude to the treaty, which is quite different from that of the other countries mentioned so far, he used the following words:

Recently, the United States and the Soviet Union, working in collusion with each other, railroaded the so-called "treaty on non-proliferation of nuclear weapons" through the UN General Assembly under their manipulation. This is another big conspiracy and swindle they have engineered against the people of all countries. In so doing, they vainly attempt to consolidate their nuclear monopoly, turn the non-nuclear countries into their "protectorates" and press forward with a new type of colonialism, "nuclear colonialism".

Part III. The Non-Proliferation Treaty

This section gives an account of what the Treaty says and includes remarks on the background to its main clauses, and on the problems to which they give rise. The text of the Treaty is given in full in the reference section, page 349.

The Treaty rests on a distinction between nuclear-weapon states and nonnuclear-weapon states. Article IX: 3 defines nuclear-weapon states as those which had "manufactured and exploded" a nuclear weapon or other nuclear explosive device before 1 January 1967, that is, China, France, the United States, Soviet Union and the United Kingdom. Other states are non-nuclearweapon states.

Strict as it looks, the adopted definition of a nuclear-weapon state does allow—and this is no accident—for different interpretations if a new state emerges through the integration of several states, at least one of which is a

nuclear-weapon state. The possibility of the creation of a federation of Western Europe, including France and perhaps the United Kingdom, makes this uncertainty a matter of importance. Such a federation might have both the necessary resources and the ambition to become a superpower. The final interpretation, like any issue involving German access to nuclear weapons, is of great concern to the Soviet Union. There are now two interpretations on the issue: a Soviet interpretation which would define a Western European federation as a non-nuclear-weapon state because it would be established after 1 January 1967; and a Western interpretation which would define it as a nuclear-weapon state because it would "inherit" nuclear power status from at least France. The latter interpretation has been called the "European option".

Article I

This article embodies the compromise between the Soviet Union and the United States that made the Treaty possible. It deals with the obligations of the nuclear-weapon states. It says that no nuclear weapons or other nuclear explosive devices are to be transferred by a nuclear-weapon country to *any* country, whether a signatory or not, whether a nuclear-weapon state or not, whether directly or indirectly through an alliance. This means that when nuclear weapons are stationed abroad, the nuclear-weapon state providing them must keep possession of them: the host state cannot order them to be fired. The article does not, on the other hand, prevent the host state from having a say in the targeting of nuclear weapons.

The ban covers all transfers of operational nuclear weapons between any countries. It includes devices for peaceful explosions as well as weapons, the two being effectively the same.

The second part of the article forbids nuclear-weapon states to assist, encourage or induce non-nuclear-weapon states to acquire nuclear weapons or devices. Here the ban does not apply to relations between nuclear-weapon states.⁴

The formula agreed by the two superpowers for article I is significant in that it precludes "nuclear sharing" in Europe, that is, non-nuclear-weapon European allies gaining control of American nuclear weapons. The idea of nuclear sharing has a long history running through the European Defence Community, the NATO nuclear-strike force of the 1950's and the Multilateral Force (MLF). The formula accomodates the Defence Planning Com-

⁴ It follows that co-operation in bomb technology between the United States and the United Kingdom is allowed to continue.

mittee set up in 1966, since that involves only joint planning, not joint control.

Even under the Western interpretation of the "European option" (inherited nuclear status), an eventual Western European federation would not, any more than any existing European state, be able to import operational nuclear weapons from the United States. In order to become a superpower such a federation would have to develop and manufacture its own arsenal. It would, on the other hand, under the "European option", be able to receive technological assistance from the United States.

Article II

This article sets out the main obligations of the non-nuclear-weapon states. These are obligations to abstain from the pursuit of nuclear weapons, and they are mostly the corollary of the obligations in nuclear-weapon states not to provide them. The main points are:

(a) The article forbids a non-nuclear-weapon state which signs the Treaty to manufacture or otherwise acquire nuclear weapons or devices including devices for peaceful uses; it does not explicitly forbid research or other preparations for making nuclear weapons up to the stage of testing.

(b) The article does not mention possible assistance in the manufacture of atomic weapons provided by one non-nuclear country to another which is not a signatory to the NPT. Such assistance is thus not expressly forbidden. On 26 September 1967, the United Arab Republic suggested in the ENDC that in order to close this loophole, a special sentence should be added to Article II saying that non-nuclear-weapon states "should not in any way assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices." But agreement was not reached on this provision, mainly because nobody would run the risk of trying to change articles I and II after they had been so lengthily negotiated between the United States and the Soviet Union. The Soviet Union argued that such an extra provision was unnecessary because it was already covered by "the meaning of Article II and the preamble to the Treaty. If a nonnuclear-weapon State Party to the Treaty were to assist another non-nuclearweapon State to manufacture and acquire nuclear weapons, such a case would be regarded as a violation of the Treaty." The United States, on the same occasion, argued that "it seems clear that a non-nuclear-weapon State which accepts the Treaty's restrictions on itself would have no reason to assist another country not accepting the same restrictions to gain advantage from this fact in the field of nuclear weapon development. If a non-nuclear-

weapon Party did nevertheless attempt to provide such assistance in the territory of a non-party, the presumption would immediately arise that these acts had the purpose of developing nuclear weapons for itself, in violation of the Treaty."

Article III

This is the main article dealing with control, the most complex and controversial issue of the negotiations.

The obligation to accept control and inspection, or "safeguards", applies only to non-nuclear-weapon states. There is no verification of the obligations falling on nuclear-weapon states about nuclear weapons or other nuclear explosive devices. The preservation of secrets is one reason for this. Another is that there was no acceptable system for verifying whether nuclear forces are reassigned from one country to another. What may be more important is that no-one can verify how effectively nuclear-weapon states maintain control of weapons which are stationed on the territory of allies and, in many cases, used in delivery systems operated by those allies. But ordinary intelligence must provide a good deal of information on such issues.

The safeguards system will be that of the IAEA. Non-nuclear-weapon states signing the Treaty are obliged to make an agreement with the IAEA, singly or together with other states, accepting verification. The safeguards system involves keeping track of fissile material and ensuring that it is not diverted to forbidden uses.

The only nuclear activities to which the safeguards apply are peaceful ones: they are to be inspected to ensure that no material is diverted from them (article III: 1). On the other hand, it is only the manufacture of nuclear weapons and other nuclear explosive devices which is forbidden by article II: non-explosive military applications, such as the nuclear propulsion of submarines, are permitted. There is a loophole here, in that fissile material for the permitted military purposes need not be submitted to control. This loophole is no oversight. Some non-nuclear-weapon states wanted the option of having nuclear submarines without admitting IAEA inspectors to the engine rooms. Similarly there is no obligatory surveillance over material declared to be intended for export to nuclear-weapon countries for non-peaceful purposes. Altogether the limitation of the safeguards to peaceful uses only seems unfortunate, since transfers to uninspected uses will be legitimate yet bound to arouse uncertainty and suspicion. The Treaty for Prohibition of Nuclear Weapons in Latin America applies safeguards to signatories' nuclear activities without any such limitation.

According to article III: 2 all signatories will deny supplies of fissile ma-

terial to non-signatories unless they accept the safeguards provided for in the Treaty. While subject to the loophole mentioned above, this paragraph means that non-signatories are forced to conform if they do not have independent supplies and technology. The clause helps to make the surveillance of transfers of material more complete.

The third paragraph of article III and the sixth preambular paragraph are intended to meet the concern expressed by non-nuclear-weapon countries during the negotiations that safeguards might hamper their development of peaceful atomic power. The risk of industrial espionage was put forward as an argument against the safeguards; and the paragraphs provide that the safeguards should be conducted so as not to hamper technological development.

A major problem was how to deal with Euratom, which already has its own safeguards system and includes both nuclear and non-nuclear states (France and the Federal Republic of Germany). This problem was met by article III: 4, which provides for countries so desiring to negotiate safeguards with IAEA in groups. In negotiations within the NATO alliance the formula of article III: 4 was accepted by the Euratom countries subject to several conditions, of which the two most important were: (a) The details of the safeguards procedure shall be settled in an agreement between IAEA and Euratom. (b) There shall be no guillotine clause enforcing exclusive IAEA safeguards if agreement between Euratom and the Agency has not been reached within a certain time limit. The position over time limits is confused, since article III: 4 does contain a time limit. The Euratom countries themselves can avoid this by refraining from ratifying the Treaty until an agreement with IAEA is reached.

The fact that safeguards apply to non-nuclear-weapon states and not to nuclear-weapon states was criticized on the grounds of imbalance and discrimination, including commercial discrimination. The force of these arguments was reduced when President Johnson on 2 December 1967 offered to apply IAEA safeguards "to all nuclear activities in the United States—excluding only those with direct national security significance" as soon as such safeguards are applied under the NPT. The British Minister of Disarmament announced a similar offer on the part of the United Kingdom two days later. The Soviet Union has not made an offer of this kind; China rejects the NPT; France is subject to the Euratom safeguards for non-military nuclear activities.

If the NPT comes to fruition, the introduction of its safeguards will standardize and simplify the complicated controls now applied by the countries which export fuel, facilities and equipment for nuclear power production. On the other hand, the extent of control demanded by the NPT is less

than that now demanded by many suppliers in two respects. First, some kinds of transfer are not covered by the NPT—for example, the transfer of material to a nuclear-weapon state, or the transfer of material to a nonsignatory non-nuclear-weapon state through a non-signatory nuclear-weapon state. Second, suppliers sometimes make additional conditions of sale, such as the right to buy back plutonium produced from the fuel they have supplied, if it is not needed by the consumers for peaceful purposes. Such measures were not considered in the debate on the Treaty. It is likely that most suppliers will continue to apply measures of this kind, whether or not the NPT comes into effect.

Article IV

Article IV affirms that the non-nuclear-weapon states have the right to undertake research, production and exploitation of nuclear energy for peaceful purposes; and it puts on all states in a position to do so an obligation to help other countries, especially those in the developing world. It was argued that a military nuclear programme helps a peaceful one, and that the benefits so enjoyed by the nuclear powers should be shared with those who renounce military programmes.

This article in fact complements Articles I and II. Those articles outlaw assistance related to explosions. This one endorses co-operation for peaceful atomic power production. An amplification of this kind is not out of place, since production of fuel for military and for peaceful uses relies on many of the same processes.

Article V

The possession of the necessary explosive devices for peaceful explosions is forbidden to non-nuclear-weapon states under Article II. Yet there was unanimous agreement that the benefits of peaceful nuclear explosions should be available to all states. This was met by an obligation for nuclear-weapon states to provide peaceful explosions to non-nuclear-weapon states under appropriate international observation and procedure.

It is also stated that such services should be subject to minimum charges which exclude any charges for research and development. The object here was to discourage non-nuclear-weapon states from claiming that they need to develop their own peaceful explosives for economic reasons. The international procedure for handling peaceful explosions was not established; article V states that negotiations concerning this matter should start as soon as possible after the Treaty enters into force.

Article VI and preambular paragraph 9

The non-nuclear-weapon states argued fiercely that if they were to renounce nuclear weapons, the nuclear powers should take steps to stop their arms race and disarm: measures to stop horizontal proliferation should be matched by measures to stop vertical proliferation.

The nuclear powers rejected all proposals that they should commit themselves to any specific measures: they praised disarmament but argued that it should not be traded against the NPT, since that was good for everyone anyway and further measures would be politically more practicable once the NPT was introduced. The outcome of this argument was reflected in article VI which contains a promise to pursue further disarmament negotiations. The preamble also deals with the question and refers specifically to a comprehensive test ban as well as to steps to achieve general and complete disarmament.

Other articles

It is provided that a conference to review the Treaty shall be held five years after it enters into force and that further reviews may be held every five years thereafter, if a majority of the signatories so wish (article VIII).

Twenty-five years after the entry into force of the NPT, a conference shall be held to decide, by majority vote, whether it shall continue in force indefinitely, or shall be extended for an additional fixed period of time (article X: 1,2).

The treaty may be amended according to an intricate procedure as prescribed in article VIII: 2 requiring a majority approval of all the parties to the treaty but subject to the veto of the Soviet Union, United Kingdom or United States or any party which is a member of the Board of Governors of the IAEA on the date of circulation of the amendment. Amendments need not be observed by countries which do not ratify them.

The Treaty enters into force upon the deposit of instruments of ratification by the Soviet Union, United Kingdom and United States and 40 other states (article IX).

Progress towards ratification

On 1 July, the NPT was opened for signature at ceremonies in Moscow, Washington and London, capitals of the three depositary Governments. Fifty-seven countries signed it on the first day. Ireland, which sponsored the Irish resolution on non-proliferation passed by the General Assembly on 4

December 1961, was the first country to ratify the Treaty, doing so on the day it was opened for signature.

The United States immediately started its process of ratification. The NPT was referred to the US Senate on 9 July 1968 and hearings were held on the matter on 10–17 July. These hearings were studied with great attention by the United States' European allies, particularly by West Germany, which was seeking favourable interpretations of the "European option" and the security guarantees before signing the Treaty. During the hearings, the United States' Secretary of State made it clear that the security guarantee embodied in the Security Council resolution and the subsequent declaration of intent "does not in any way extend the unilateral obligations of the United States". The United States' mutual bilateral and multilateral security treaties would however remain in effect.

The ratification of the NPT by the United States and many other states was expected to be a matter of routine. However, after the entry of troops from five Warsaw Pact countries into Czechoslovakia in August the ratification was delayed in many countries while Governments reviewed the situation.

The reaction was particularly pronounced in the United States, where new Senate hearings were not started until 18 February 1969; the NPT was, however, passed with an overwhelming majority by the Senate on 13 March. Meanwhile, the United Kingdom ratified the Treaty on 11 November 1968. The Soviet and United States Governments have not ratified as yet. They are said to be seeking agreement on a suitable moment for simultaneous deposit of their instruments of ratification. A list of countries that have signed and/or ratified is given in the reference section, page 320.

Part IV. The disarmament agenda following the NPT

The argument raised against the non-proliferation treaty, that it is "unbalanced" in favour of the nuclear-weapon states, was frequently countered with the argument that once the NPT was concluded, the political climate would be so improved that more far-reaching disarmament measures would follow.

Immediate developments were promising. Both the United States and the Soviet Union, at the ceremonies for the signing of the NPT, declared that they were ready for talks on the limitation of strategic arms (SALT). (There is a fuller account in part VIII, page 188, which discusses the background to these talks.) On 1 July the Soviet Government issued a memorandum

suggesting a nine-point programme for further disarmament measures. The nine points were:

(1) Prohibition of the use of nuclear weapons.

(2) Measures for stopping the manufacture of nuclear weapons and for reducing and destroying stockpiles.

(3) Limitation and subsequent reduction of means of delivery of strategic weapons.

(4) Prohibition of flights beyond national borders of bombers carrying nuclear weapons. Limitation of navigation zones for rocket-carrying submarines.

- (5) Ban on underground nuclear weapon tests.
- (6) Prohibition of the use of chemical and bacteriological weapons.
- (7) Elimination of foreign military bases.
- (8) Measures for regional disarmament.
- (9) Peaceful uses of the sea-bed and ocean floor.

The Soviet Government in its memorandum proposed that points two and three be dealt with by negotiations with the states concerned and that points one, six, seven and nine be considered by the ENDC.

The second half of the year, however, saw no progress with SALT (see page 188). Partly because of this, the climate at the ENDC, which had been particularly hopeful immediately after the signing of the NPT, became less so as the year went on.

The 16 July-28 August session of the ENDC

The ENDC had before it the Soviet memorandum of 1 July cited above and a message from President Johnson which gave prime attention to the arms limitation talks with the Soviet Union but also expressed the hope that significant progress would be made with measures which they had already thrashed over in the past. The message proposed that the ENDC should pursue arms limitation on the sea-bed, an agreement to share the potential benefits from any peaceful applications of nuclear explosions and measures for regional limitation of armaments.

The session included 14 formal plenary meetings, and one informal meeting devoted to procedural matters. In addition the eight non-aligned members of the Committee met, as usual, informally every Wednesday.

On 15 August the ENDC unanimously adopted a four-point agenda for its future work:

(1) Further effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament.

Under this heading members may wish to discuss measures dealing with the cessation of testing, the non-use of nuclear weapons, the cessation of production of fissionable materials for weapons use, the cessation of manufacture of weapons, and reduction and subsequent elimination of nuclear stockpiles, nuclear-free zones, etc.

(2) Non-nuclear measures.

Under this heading, members may wish to discuss chemical and bacteriological warfare, regional arms limitations, etc.

(3) Other collateral measures.

Under this heading, members may wish to discuss prevention of an arms race on the sea-bed, etc.

(4) General and complete disarmament under strict and effective international control.

However, the right of any delegation to raise and discuss any disarmament subject at any time was also recognized.

On the subject of a comprehensive test ban, several contributions were made. On 29 July the delegation of Sweden circulated a letter, attached to which was a summary of a meeting of a group of experts on seismic methods for monitoring underground explosions convened by SIPRI.

The main conclusions of the report were that it is now possible, with existing installations, to distinguish large and medium sized (20-60 kilotons in granite) nuclear explosions from earthquakes; that research indicates that, with improved installations, separation of explosions and earthquakes should be possible down to 10 kilotons, and that further research in order to lower the threshold to a few kilotons is now worthwhile. Additional improvements would result from the use of more modern instrumentation, the implementation of more seismic-array stations and the merging of existing networks into one world-wide data exchange.

On 20 August, the United Kingdom tabled a working paper containing a proposal for verification which was a compromise between the Western insistence on on-site inspection and the Soviet view that national means of detection are fully sufficient. The British proposal, which had been described briefly at two earlier meetings, was that a committee be established whose function would be to consider evidence of possible infringements of a treaty, and which would have the right to carry out on-site inspections, if a majority of its members felt this was needed. The committee would be composed of representatives of the three nuclear-weapon states parties to the treaty, representatives of three non-aligned countries, and a nominee of the UN Secretary-General or the IAEA Director-General. The proposal further included a quite new idea of a "phased" implementation:

While the United Kingdom delegation are in favour of the conclusion of an effective test ban treaty at the earliest possible moment they have also been considering the possibility that the implementation of the comprehensive test ban might be made a phased operation by starting with an agreed annual quota of underground test explosions. This proposal is based on recognition of the fact that it may not be possible to get agreement now to stop all nuclear weapons testing overnight in isolation from other measures of disarmament. The object of the quota proposal is to put an increasingly powerful brake on the development of new nuclear weapon systems with a view to bringing this dangerous process to a complete halt within a fixed period. The treaty might provide for quotas on a descending scale over a period of four or five years ending with a nil quota after which further tests would be banned absolutely. Alternatively, the quotas might not be written into the treaty but fixed annually, possibly by a committee of the kind which has been suggested above. Supervision of the quota arrangements would be exercised by the same mechanism as proposed above for the treaty itself.

Later, on 26 August, the eight non-aligned members of the ENDC submitted a strongly-worded memorandum on a comprehensive test ban:

The eight delegations are gravely concerned by the fact that all countries have not yet adhered to the Partial Test Ban Treaty. Tests in the atmosphere are in fact taking place at an increasing rate and the yields of such tests have reached the megaton range, resulting once again in widespread radioactive contamination, which had started diminishing since the conclusion of the Partial Test Ban Treaty.

Nuclear weapon testing underground is also continuing at a high frequency and with increasing yields, thus substantiating the fears expressed in the Memorandum of the eight delegations of 17 August 1966 that continued testing would impart "a renewed impetus to the arms race, bringing about unforeseeable consequences in regard to unbalance and mistrust in the relationship between States and causing immense and increasing diversion of human and material resources for purposes of war."

There have also been reports that large underground tests have led to leakages of radioactivity outside the territorial limits of testing States, thus causing infringements of the Partial Test Ban Treaty. Even if these incidents have not been deliberate, they may eventually lead to a weakening of the Partial Test Ban Treaty and even endanger its very existence.

In the memorandum the eight delegations strongly urged that renewed and urgent efforts should be made to conclude a comprehensive test ban treaty and that pending the conclusion of such a treaty the nuclear-weapon states should take immediate steps to stop all nuclear weapon tests.

On the question of chemical and biological weapons the ENDC agreed to recommend to the UN General Assembly that the Secretary-General be asked to appoint a group of experts to study the effects of the possible use of chemical and bacteriological means of warfare. The possibility of a study

of this kind, similar to that already made on the effects of the possible use of nuclear weapons, had been floated in the General Assembly in the autumn of 1967. The Soviet Union in its 1 July memorandum proposed "that the ENDC consider ways and means of securing the observance by all States of the Geneva Protocol of 1925. Having achieved this one could pass on to the next measure—cessation of the manufacture of chemical and biological weapons and their destruction." On 6 August the United Kingdom tabled a working document, including a proposal for a convention for the prohibition of biological methods of warfare.

This envisaged that, in addition to renouncing the use of biological weapons, governments would also accept a ban on possession and production of these weapons and a ban on research into them. A proposal for safeguards of a somewhat informal kind was included.

The United States delegate recommended that, should the British proposal gain wide support, "a working group be formed under the auspices of the ENDC to study the problem [of verification] as well as other problems relating to the proposal". The Soviet delegate held that the British proposal was premature.

As regards the sea-bed, the ENDC had before it two proposals. The Soviet Union proposed that the sea-bed beyond the limits of the present territorial waters be used exclusively for peaceful purposes, along the lines already embodied in the Antarctic and the Outer Space treaties. The United States proposed that only nuclear weapons or other weapons of mass destruction be outlawed on the ocean bed, thus permitting continued emplacement of conventional weapons and apparatus for submarine detection, navigation or communication. No agreement was reached.

These were the issues which were seriously discussed. Other subjects were mentioned. General and complete disarmament, the most important issue before ENDC, was brought up, as it always is: but it cannot be said that it was taken seriously, at least by the majority. A development of some significance to this subject was the inspection exercise "First Look", which the United Kingdom invited the other delegations to attend in Britain on 14–15 August. This was a joint United States–United Kingdom exercise in the "inspection and observation of retained levels of ground and general purpose air forces in a specified area." Four such exercises were earlier performed in the United States. The main purposes were to compare the effectiveness of several types of ground inspection, to determine whether ground inspection should include all military installations in the area or could be limited to part of them, and to determine to what extent aerial surveillance and unmanned instrumentation alone or together could be used so as to limit ground inspection. First Look operated over an inland area some 120 km by 85 km which contained 30,000 British ground and air force troops. Preliminary results were published in January 1969. They indicated that under favourable conditions two inspectors for every 2500 square km could give a reasonable certainty that agreed troop levels and troop movements were complied with, if the inspectors were allowed access to military installations. The exercise was observed by 19 visitors, none from the Warsaw Pact countries.

Part V. The Conference of Non-Nuclear-Weapon States, 29 August – 28 September

This Conference was a result of the feeling among non-nuclear countries that they had not had an adequate opportunity to be heard on the issue of non-proliferation and on other aspects of disarmament. A majority of the members of ENDC were against holding a conference of this kind, whereas some of its sponsors thought of it as possibly taking over the role of ENDC.

The decision to hold the Conference was taken at the 1966 General Assembly when it voted in favour of a Pakistani draft resolution (Res 2153B (XXI) to convene by July 1968 a conference of non-nuclear-weapon states to consider "How can the security of the non-nuclear states best be assured? How may non-nuclear powers co-operate among themselves in preventing the proliferation of nuclear weapons? How can nuclear devices be used for exclusive peaceful purposes?" and other questions. A committe of eleven countries prepared the Conference, which was eventually convened in Geneva on 29 August 1968.

During the preparatory period the nature of the Conference was to some extent altered by events: the draft NPT was agreed and passed by the General Assembly two months before the Conference began. Hence the issues of non-proliferation had to be discussed with reference to a concrete set of provisions rather than in general terms.

Ninety-six countries participated in the Conference, including four nuclear-weapon states attending as observers without votes. France, which has been absent from the ENDC since it began in March 1962, came to the Conference. None of the representatives of the nuclear-weapon states spoke. The fifth nuclear-weapon state, the People's Republic of China, was invited, but on 29 June the Peking telegraph office declared: "The People's Republic of China has no relations whatsoever with the United Nations. We therefore refuse to accept the June 25 telegram of U. Thant" (containing the invitation).

The matters of substance on the agenda of the Conference were:

(1) Measures to assure the security of non-nuclear states.

(2) Establishment of nuclear-weapon-free zones.

(3) Effective measures for the prevention of the further proliferation of nuclear weapons, the cessation of the nuclear arms race at an early date and nuclear disarmament:

(a) Safeguards against the diversion of fissionable material from peaceful to military uses, and safeguards against industrial espionage.

(b) Submission of periodic reports by countries, to an international agency, on the nature of nuclear technical assistance and the nature and extent of special fissionable material supplied by them to non-nuclear weapon states for peaceful purposes.

(c) Conclusion of a comprehensive test ban.

(d) Freeze on production of fissile materials for weapons purposes and the cessation of the manufacture of nuclear weapons.

(4) Programmes for cooperation in the field of peaceful uses of nuclear energy.

(a) Access to and exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy among non-nuclear-weapon states and nuclear-weapon states.

(b) Assistance and co-operation in development of the application of nuclear energy for peaceful purposes, in the territories of non-nuclear-weapon states, with due consideration of the needs of the developing areas of the world.

(c) The question of nuclear explosions for peaceful purposes.

(d) Benefits from peaceful applications of nuclear explosions to nonnuclear-weapon states which have renounced the production, acquisition and use of nuclear weapons pursuant to special international agreement and agreements through an appropriate international body or through bilateral arrangements.

(5) Adoption of final document and implementation of Conference decisions.

Scores of proposals and suggested recommendations were advanced in the course of the opening 10 days of general debate and later in the proceedings of the two main committees, the first on questions of security and disarmament, the second on the peaceful uses of nuclear energy and nuclear explosives.

The Conference, acting on the recommendations of its committees, ultimately adopted 14 resolutions and a declaration. These aimed at stronger measures of security for the non-nuclear states, the prevention of further proliferation of nuclear armaments, encouragement of progress towards disarmament, and the development of programmes for co-operation in the field of peaceful uses of nuclear energy, particularly in developing countries.

On every agenda item one or several resolutions and recommendations were adopted. The official texts of the more important resolutions are given in the reference section, page 355.

Security was a dominant topic at the Conference, which was held a week after the Czechoslovak crisis. It was the main subject of the speech of the Foreign Minister of the Federal Republic of Germany on 3 September. This was the first time West Germany had an opportunity to address a UN forum at this level on the important political problems of the world. The Foreign Minister proposed a convention to prohibit "any aggression with nuclear, biological, chemical and conventional weapons"; and he observed that "the threat of force and fear of force are not abstract matters" and that "there is no doubt that a nuclear state can endanger the security and independence of a non-nuclear state by using conventional weapons." The delegates from Romania and Yugoslavia also concentrated on the question of security. There was no consensus, however, in favour of demanding additional security measures as a condition for adherence to the NPT. In this context, it was deemed that it was "obviously not enough to ban nuclear aggression or the threat of it".

The last week of the Conference overlapped with the IAEA General Conference in Vienna and covered some of the same ground. In Geneva there were many references to the future role of the IAEA and to the possibility of establishing more international organizations to deal with peaceful nuclear energy and its development. It was noticeable that representatives of the same country advanced different and sometimes contradictory positions in Geneva and Vienna. In his statement to the General Conference, IAEA Director-General Sigvard Eklund remarked on this in the following words:

I have attended some sessions of the Non-Nuclear-Weapon States Conference, and have been surprised to hear such proposals as that the Secretary-General of the UN should be requested to "appoint a group of experts, chosen on a personal basis, to prepare a full report on all possible contributions of nuclear technology to the economic and scientific advancement of the developing countries." I do not think that the experts could add anything to the knowledge which is already available in this organization. I would prefer to see such experts being appointed who could advise on where the means can be found to implement already existing programmes.

... The Conference at Geneva has demonstrated an appalling ignorance about the activities of the Agency and an apparent serious lack of coordination between the political and scientific organs in some of the countries represented. There appears to be a lack of consistency between the instructions issued by countries to their representatives at the Geneva Conference and their delegates to the

Agency General Conference. This was demonstrated by statements at the Conference which appeared to be based on a complete lack of knowledge of what the Agency is doing or is capable of doing, particularly in such matters as the dissemination of scientific information, work on nuclear explosives and the provision of technical assistance. I would urge the delegates to this Conference to use their good offices to avoid their countries' appearing to speak with two voices on important issues, particularly those related to atomic energy and the nonproliferation of nuclear weapons. As I have said before, the main problem facing the Agency in fulfilling these objectives is the classical one of where and how to get the means necessary to implement already existing programmes.

One result of NPT and of the Non-Nuclear-Weapon States Conference will be an increase in the tasks given to the IAEA in the field of safeguards and that of peaceful uses of atomic energy. In order to carry out these new duties, which affect different groups of countries from those affected by the IAEA's original duties, the organization of the Agency may need to be reshaped and its statutes amended.

At the start of the Conference, the UN Secretariat circulated ten papers by experts on problems related to the NPT. Since many delegations have limited possibilities of getting expert advice, this was very valuable. At the ENDC and General Assembly, papers of this kind on disarmament are not provided.

Part VI. The 23rd General Assembly of the United Nations, 24 September – 21 December 1968

The discussion on disarmament in the 23rd General Assembly was to a great extent a continuation of the ENDC and the Conference of Non-Nuclear-Weapon States, from both of which it received reports and recommendations.

During the debate on general and complete disarmament the Assembly passed two resolutions.⁵ The first called for an expert report on the effects of biological and chemical weapons. This proposal received general support. The only significant qualification was the stress laid by several countries, primarily the Soviet Union and other socialist countries, on the need to ensure that the report of the experts served to uphold the 1925 Geneva Protocol outlawing the use of these weapons. A study group of 14 experts was later appointed by the Secretary-General, and his report to the General Assembly was made on 1 July 1969.

⁵ Resolution 2454 (XXIII) A and B. They are summarized in the reference section, page 355.

The second resolution, asking the ENDC to continue its efforts, is an annual routine. In the debate several speakers stressed that general and complete disarmament was the ultimate goal of the ENDC and that it was now time to treat this issue seriously.

The subject of international trade in arms was brought up. Denmark, Iceland, Malta and Norway sponsored a draft resolution suggesting that the Secretary-General consult member governments to see what they thought about the idea of establishing a public register of transfers of arms from one country to another. The proposal was criticized by many countries, primarily Arab states and East European states. They argued that such a measure would handicap small and weak states and people fighting for their freedom. It was also said to be unrealistic. The sponsors withdrew the proposal.

In a test ban debate the Assembly passed a resolution requesting the ENDC to take up the elaboration of a comprehensive test ban as a matter of urgency, and calling on all nuclear-weapon states to suspend nuclear tests in all environments.⁶

The US delegate made a new proposal, namely, that some underground nuclear explosions be conducted with the object of serving as the basis for world-wide seismic investigations. He expounded the proposal in the following words:

Sufficiently in advance of an explosion with the collateral seismic purpose, seismic stations throughout the world would be alerted so as to be fully prepared to record the explosions. Data on scheduled time, location, depth, geological medium and predicted explosion yield would also be provided in advance. Following the explosion, the actual time of explosion, yield and other pertinent data from national seismic systems would be furnished. Seismic data would then be exchanged throughout the world. The results of the seismic analysis would be published and distributed and could then be discussed in the relevant forums. The success of the proposal would depend greatly on the extent of world-wide participation in collecting and evaluating the seismic data.

The General Assembly devoted a great deal of time to the report of the Conference of Non-Nuclear-Weapon States and passed four resolutions⁷ endorsing and implementing the decisions and recommendations introduced by it. These four resolutions concerned a report on the contribution of nuclear technology and development; nuclear-free zones; nuclear explosions for peaceful purposes; and talks between the two superpowers on strategic delivery systems.

In another resolution,8 the General Assembly invited the Secretary-Gen-

^e Resolution 2455 (XXIII).

⁷ Resolutions 2456 (XXIII) A, B, C, and D.

⁸ Resolution 2444 (XXIII).

eral to appoint a group of experts on "Prospect for human rights in armed conflicts". It was proposed that the experts should study the existing rules and humanitarian conventions of war, and consider their better implementation and extension.

Part VII. The session of the ENDC, 18 March-23 May 1969

The main subjects taken up at this session were the cessation of underground nuclear tests and the prevention of an arms race on the sea-bed and the ocean floor. On these two items draft treaties were submitted and examined.

In the following paragraphs the proceedings of the Committee are dealt with by subject. In the proceedings themselves, as a result of the lack of the normal rules of procedure, each delegate may talk at any time on any and as many subjects as he chooses.

Treaty banning underground nuclear weapon tests

On 1 April 1969 Sweden put forward a working paper containing a draft underground test ban treaty.⁹ It was an unprecedented step. In the past, such initiatives had always been left to the Co-Chairmen¹⁰ of the Committee.

According to the draft, the states parties to the treaty would undertake to prohibit, prevent and not carry out any underground nuclear weapon test explosion, or any other underground nuclear explosion, at any place under their jurisdiction or control; and to refrain from causing, encouraging or in any way participating in the carrying out of such explosions.

These provisions would not apply to explosions carried out for construction or other peaceful purposes, which would take place in conformity with an international agreement to be negotiated separately.

The parties would undertake to co-operate in good faith in an effective international exchange of seismological data in order to facilitate the detection, identification and location of underground events, and in the clarification of all events pertaining to the subject matter of the treaty. Each party would be entitled:

(a) to make inquiries and to receive information as a result of such inquiries;

(b) to invite inspection on its territory or territory under its jurisdiction;

^o Document ENDC/242.

¹⁰ Soviet Union and United States.

such inspection would be carried out in the manner prescribed by the inviting party;

(c) to make proposals, if it considered the information available or made available to it under all or any of the preceding provisions inadequate, as to suitable methods of clarification.

Each party, moreover, might bring to the attention of the Security Council and of the other parties to the treaty that it deemed that another party had failed to co-operate to the fullest extent for the clarification of a particular event.

The proposed preamble affirmed the following principles, among others: the benefits of peaceful applications of nuclear technology, including any technological by-products derived by nuclear-weapon states from the development of nuclear explosive devices, should be available for peaceful purposes to all parties to the treaty; resources, freed by measures of arms control and disarmament, should be channelled, to the greatest extent possible, to social and economic development, particularly that of developing countries.

The treaty would be of unlimited duration. The articles concerning withdrawal from the treaty, amendments, signature, ratification, entry into force and registration were in essence the same as those included in the Partial Test Ban Treaty or the Treaty on the Non-Proliferation of Nuclear Weapons.

With regard to the provisions about verification, Sweden explained that the first two—(a) and (b) above—were intended to lead to clarification of uncertain underground events and to enable a suspected government to free itself of suspicions. The third one, (c) above, left open other possibilities of action, if a party considered that the earlier measures had not been sufficient. Sweden further added that a demand for an *ad hoc* inspection in the territory of a suspected party was not excluded, but expressed doubt about the effectiveness of such inspection.

The whole procedure, in conjunction with the withdrawal clause, constituted a set of rules which were meant to deter a prospective violator by confronting him with a sufficient probability of being exposed.

The debate that followed centered mainly on the issue of control.

The United States said that a clear separation between earthquakes and nuclear explosions could not be made by teleseismic means for underground nuclear tests up to tens of kilotons of explosive yield. In the view of the United States, tests below that level could have very important military value. Adequate verification of a comprehensive test ban would therefore require a certain number of on-site inspections in addition to seismic detec-

tion and identification techniques. An agreement not providing for obligatory inspections would be inherently unstable.

The United States recalled its proposal (1968) to undertake some underground nuclear explosions for which advance notice would be provided so that other countries could study them as an experiment in seismic detection; and it announced that the first such explosion, with the code name Project Rulinson, would be carried out in September 1969.¹¹

The United Kingdom also held that the verification procedure proposed by Sweden was unsatisfactory. No adequate international machinery was in existence to enable states to assure themselves that the best possible use could be speedily made of seismic data obtained from stations throughout the world. There was need for a committee to supervise the operation of a treaty—to assess the large amount of information put forward and to clarify doubtful phenomena. But even with the best use of seismic data, the right to proceed to on-site inspection should exist, although it might not necessarily be automatic.

The United Kingdom renewed its suggestion for an agreed annual quota of underground explosions, which would be reduced within a few years to zero. (This phased approach to the cessation of tests was considered by Sweden unobjectionable, provided it was not embodied in the treaty itself, but in some annex or protocol.)

Canada thought it advisable that a group of experts meet to consider and report upon the organization of an effective international exchange of seismic data. The existing arrangements in this field could be extended and strengthened by governmental guarantees. As a first move, all countries would be asked to send a list of seismographic stations, with necessary technical characteristics, from which they would be ready to supply records in the framework of a world-wide exchange of data. The proposed text of such a request was included in a working paper submitted by Canada.¹²

A suggestion along similar lines was made by Ethiopia: the United Nations Secretary-General should be requested to examine the possibility of creating an international research agency, using as a nucleus, in so far as is possible, existing bodies, such as SIPRI, for the advancement of seismological means of verification of underground explosions. It could also be attached to the World Meteorological Organization and serve as a verification agency for a treaty banning underground nuclear tests.

The Soviet Union maintained the position that verification of compliance with an underground test ban treaty should be carried out on the basis of

¹² Document ENDC/251.

¹¹ Detailed information about the explosion was provided in Document ENDC/252. The explosion was conducted on 10 September 1969.
national means of detection. While favouring the idea of setting up a "detection club" of countries co-operating in the exchange of seismological data, it stressed that evaluation of the data collected should be made not by an international body, but by each state for itself. It opposed international onsite inspection and objected to the control clause proposed by Sweden on the ground that it provided for inspection in the guise of being "by invitation only". It also claimed that in the Swedish paper the question of nuclear explosions for peaceful purposes was dealt with in a way contrary to the provisions of the Non-Proliferation Treaty.

The Soviet Union reaffirmed its support for a former United Arab Republic proposal to prohibit underground nuclear weapon tests above a seismic magnitude of 4.75 and declare a moratorium on tests below that threshold.

Nigeria believed that as long as there was no fool-proof seismological verification system there was need for some on-site inspections as a temporary measure. An inspection would be ordered only if there was strong evidence of a violation of the test ban treaty which could not be conclusively proved by the long-range seismic detection system. Such inspections could be conducted by a group of non-aligned countries which had signed the Non-Proliferation Treaty and which possessed the necessary know-how to cope with them.

The United Arab Republic doubted whether control provisions could work satisfactorily in cases where co-operation in good faith would be difficult or impossible to achieve.

Burma called for a moratorium on all nuclear weapon tests and suggested that if a treaty had to be signed, a provision might be included in it enabling the parties to review the verification clauses in the light of experience gained, after a specified period of time.

Brazil asked for a moratorium on tests above the ten kiloton range.

India's stand was that the conclusion of a treaty should not await the perfecting of seismic detection and identification techniques.

All the Committee members acknowledged the importance of the cessation of tests for the termination of the qualitative nuclear arms race. References were made to United Nations resolution 2455 (XXIII)¹³ which requested the ENDC to take up the elaboration of a treaty banning underground nuclear weapon tests as a matter of urgency and to report on this matter.

Sweden and India added that radioactive material from underground tests had drifted across borders. This constituted a violation of the Moscow Partial Test Ban Treaty.

¹³ See the reference section, page 339.

Disarmament efforts

The non-aligned countries welcomed the submission of the Swedish draft treaty as a basis for discussion. The United States' and the United Kingdom's attitude towards the Swedish draft was negative. The Soviet Union, though apparently more receptive to the proposal, also raised serious objections to it. The Committee thus remained stalemated, ostensibly on the issue of verification.

Prevention of an arms race on the sea-bed and ocean floor

On 18 March 1969 the Soviet Union submitted a draft treaty¹⁴ providing for prohibition of the placement on the sea-bed and the ocean floor and the subsoil thereof of objects with nuclear weapons or any other weapons of mass destruction, and the setting up of military bases, structures, installations, fortifications and other objects of military nature—beyond the twelvemile maritime zone of coastal states. The outer limit of the twelve-mile zone established for the purposes of the treaty would be measured from the same base-lines as were used in defining the limits of the territorial waters of coastal states.

All installations and structures on the sea-bed and the ocean floor and the subsoil thereof would be open on the basis of reciprocity to inspection by representatives of other states parties to the treaty.

In presenting the idea of total demilitarization of the sea-bed, the Soviet Union expressed the view that if weapons of mass destruction only were prohibited—as proposed by some—a conventional arms race might develop on the sea bottom. Moreover, an unconditional ban on military activities would facilitate the problem of verification because states would not fear that control would reveal military secrets.

The Soviet Union also explained that demilitarization did not imply destruction or prohibition of the emplacement and use of means of communication, beacons and other installations having no direct military purpose. In the twelve-mile coastal zone states would retain freedom of action, including the freedom to place submarine tracing stations to safeguard the security of their territory. The twelve-mile zone would be established exclusively for the purposes of the treaty without involving the question of the limits of territorial waters, national jurisdiction, etc. Military personnel or military equipment could, furthermore, be used on the sea-bed and ocean floor for peaceful scientific research.

The United States stated that as a major naval power it was not prepared to accept a ban on all military activities on the sea-bed. In its opinion,

¹⁴ Document ENDC/240.

complete demilitarization would be a threat to the security of states; the existence of submarine forces required action in self-defence. Complete demilitarization would, moreover, raise insuperable problems of verification since it would be necessary to decide whether each object or installation emplaced on the sea-bed was of a military nature.

On 22 May the United States submitted a draft treaty¹⁵ providing for an undertaking by states not to emplant or emplace fixed nuclear weapons or other weapons of mass destruction or associated fixed launching platforms on, within or beneath the sea-bed and ocean floor beyond a narrow band adjacent to the coast of any state, the width of which should be three miles; and to refrain from causing, encouraging, facilitating or in any way participating in the prohibited activities.

For the purpose of the treaty, the United States was prepared to accept base-lines drawn in a manner specified in the 1958 Geneva Convention on the Territorial Sea and Contiguous Zone if agreement could be reached on the appropriate interpretations.

To ensure the observance of the treaty the powers would remain free to observe activities of other states on the sea-bed and ocean floor, without interfering with such activities or otherwise infringing on rights recognised under international law, including the freedom of the high seas. If such observation did not in any particular case suffice to eliminate questions regarding fulfillment of the provisions of the treaty, parties would undertake to consult and to co-operate in an attempt to settle the point at issue.

Five years after the entry into force of the treaty, a conference of parties to the treaty would be held in order to review its operation.

The United States explained that the prohibition would apply to fixed launching platforms, whether or not a missile or a warhead containing a nuclear weapon or other weapon of mass destruction was actually in place.

The procedure for verification involving observation and consultation would be available to all parties to the treaty. If technological and other developments warranted revision of the verification provisions, they would be considered at the review conference.

Comments were made mostly on the Soviet draft, as the United States draft was tabled only at the end of the session. The discussion concerned (a) the scope of the prohibition, (b) the extent of the area to be covered by the prohibition, and (c) the nature of the verification system. The positions taken on these three points were as follows:

(a) The United Kingdom considered that the Soviet proposal went too far. Italy thought it was not a realistic basis for an agreement. Canada inter-

¹⁵ Document ENDC/249.

Disarmament efforts

preted the phrase "peaceful purposes", contained in the General Assembly resolution recommending the issue for negotiation,¹⁶ as not prohibiting all military uses. It could not accept a proposal which meant that the placing of surveillance devices for detecting the approach of ships, submarines and weapons to its shores would be forbidden in coastal waterways, straits and ocean depths at distances greater than twelve miles. It suggested the prohibition, beyond an established zone, of weapons of mass destruction, as well as all other weapons, military activities, under-sea bases or fortifications from which military action could be undertaken against the territory, territorial sea or air space of another state.

India thought that agreement should be reached as to what activities of a military nature should be prohibited, without interfering with the legitimate rights of maritime nations in respect of communication links, navigational aids and other such requirements.

Brazil, while favouring an agreement that would fully exclude the seabed from the arms race, believed that a ban on weapons of mass destruction could be a preliminary measure to be adopted before a total ban on military uses of the sea-bed was concluded.

Sweden was of the opinion that the prohibition must encompass all military installations. Nigeria agreed with this view, but saw no harm in exempting defensive detection installations from such a prohibition.

The other non-aligned countries—Burma, the United Arab Republic, Mexico and Ethiopia—reiterated their support for the idea that the sea-bed should be used for peaceful purposes only.

(b) As to the extent of the area to be covered by the treaty, Canada suggested that a defensive zone adjacent to a twelve-mile security band be established, extending 200 or more miles from the outer limits of that band. The prohibitions of the treaty could apply within this zone, with the exception, however, that the coastal state would be allowed to undertake there whatever limited defensive activities were permitted under the treaty; no other state could carry out such activities in the area in question except with the explicit consent of the coastal state.

Italy was against the excessive restriction of the use of the continental shelf for defensive purposes. It proposed that the prohibitions apply beyond a bathymetric curve corresponding to a depth of 200 metres, with the understanding that the line should in no case be closer than twelve miles from the coast.

The non-aligned countries were agreed that as large an area of the sea-bed as possible should be reserved for peaceful uses. Sweden considered the pro-

¹⁶ Resolution 2467A (XXIII).

posal in the Soviet draft acceptable. Nigeria suggested adding to the Soviet text a proviso: where the twelve-mile maritime zone overlapped a similar zone in respect of another state, signatory to the treaty, both states should waive their rights in regard to the use of the zone for military purposes and should accept verification obligations within the zone without prejudice to their rights under the Continental Shelf Convention of 1958. India, on the other hand, pointed out that the question of sovereignty in respect of territorial waters and sovereign rights in regard to the continental shelf, and their importance from the defence and economic points of view, needed to be taken into consideration.

(c) On the verification issue, Brazil suggested that in the area beyond the mileage adopted by the treaty, but still within the limits of national jurisdiction over the sea-bed, the right of verification should be exercised with the participation of the state having sovereign rights for the exploitation of the area concerned.

Canada interpreted the Soviet proposed control clause as suggesting that only states which had placed objects on the sea-bed or ocean floor would acquire the right to inspect submarine installations emplaced by another state, and found this unsatisfactory. The verification procedures would have to accommodate states which might feel threatened, and should allow them, in some way, to participate in the inspection.

Sweden, too, questioned the concept of reciprocity introduced in the Soviet draft. All installations should be open on a non-discriminatory basis for inspection by all parties, and the carrying out of inspection through an international undertaking might be considered. The desirability of applying the principle of international verification was also indicated by Italy, India and Nigeria.

In its reply to these remarks, the Soviet Union stated that it saw no need for international control, and pointed out that control based on the principle of free access had proved effective in verifying compliance with the Treaty on Antarctica. The United States saw no need, either, for a special international verification organization which—in its view—would be both premature and wasteful of resources.

The consensus of the Committee was that the sea-bed should not become the site of an arms race. The divergences concerned mainly the extent to which it should be demilitarized.

The Soviet comprehensive approach, similar to that applied to Antarctica under the Treaty of 1959, and the moon and other celestial bodies under the Treaty of 1967, though found desirable by the non-aligned Committee members, proved unacceptable to the NATO powers. The United States saw the analogy rather with the part of the Treaty on Outer Space which prohibits the placing in orbit of nuclear and other weapons of mass destruction. The Co-Chairmen indicated, however, that their texts were negotiable; and it was agreed that efforts should be made to bring the positions closer together.

The Non-Proliferation Treaty

Although nearly ninety states had signed the Treaty, only nine had ratified it by the date of the opening of the Committee's session. Expressing concern at the slow progress of ratification, some Committee members also pointed out that the Treaty had not even been signed by some states which, because of the level of their industrial and scientific development, were approaching the stage when they would be able to manufacture nuclear weapons. Specific criticism was directed by the Warsaw Pact countries at the Federal Republic of Germany, and by the United Arab Republic at Israel. India, however, voiced the opinion that the delay in bringing the Treaty into effect should not be a reason for not proceeding with nuclear disarmament.

Nigeria considered it essential that the provision of fissionable materials for peaceful uses to non-nuclear powers be restricted to those who accepted Treaty obligations, particularly in regard to the international inspection of their atomic activities.

Romania asked for effective security guarantees for states which under the Non-Proliferation Treaty renounced nuclear weapons, and called for a commitment to be given by the nuclear-weapon powers not to attack or threaten the non-nuclear-weapon states with the use of nuclear weapons.

The problem of the peaceful uses of the atom was also raised. In this context the Co-Chairmen informed the Committee that Soviet-United States technical discussions on peaceful uses of nuclear explosions had taken place in Vienna from 14 to 16 April 1969. The two countries were of the view that underground nuclear explosions might be successfully used in the not too distant future to stimulate oil and gas production and to create underground cavities. It might also be technically feasible to use them in earthmoving work for the construction of water reservoirs in arid areas, in digging canals and in removing the upper earth layer for surface mining, etc. Although the economics would vary from project to project, the use of nuclear explosions for those purposes was promising and would permit operations under conditions where conventional methods were either impossible or impracticable. Provided that certain requirements were met, the present state of technology would make it possible to carry out underground explosions fully meeting national or generally accepted international safety standards for the protection of the public from radiation.

Cessation of the production of fissionable materials for weapons purposes

On 8 April, the United States proposed some essential elements of a socalled cut-off agreement.

According to the proposal, nuclear-weapon states would halt all production of fissionable material for use in nuclear weapons—that is, enriched uranium (U-235) and plutonium; and the production of fissionable material would be permitted to continue for purposes other than use in nuclear weapons, such as power and propulsion reactors and nuclear explosives for peaceful purposes. In order to provide for compliance with the agreement, the International Atomic Energy Agency (IAEA) would be asked to safeguard the nuclear materials in each state's peaceful nuclear activities and to verify the continued shut-down of any facilities for production of fissionable materials that had been closed.

The last element—the provision for IAEA safeguards—represented a change in the position of the United States. Previously the United States had proposed a system of "adversary inspection", to be carried out by the challenging party. The new approach was similar to that contained in the inspection clause in the Non-Proliferation Treaty with regard to non-nuclear-weapon states.

The United States also reiterated its offer to transfer 60,000 kilograms of U-235 to peaceful purposes, provided the Soviet Union transferred 40,000 kilograms of the same material, but added that now it might be thought appropriate that equal quantities should be transferred by the United States and the Soviet Union.

The United Kingdom was willing to accept IAEA safeguards for the purpose of a cut-off agreement if the other nuclear powers were prepared to do likewise. Ethiopia reminded the Committee of the formal pledges made in 1954 by the United States, the Soviet Union and the United Kingdom to reduce the production of fissionable material for weapons purposes, and it asked that the ENDC be informed of the practical steps taken to fulfill these unilateral declarations.

Brazil recalled the resolution of the 1968 Conference of Non-Nuclear-Weapon States requesting the nuclear-weapon states to channel to a fund for the benefit of non-nuclear-weapon countries the fissionable materials released as a result of adoption of nuclear disarmament measures.

Sweden assumed that fissionable materials made available for peaceful purposes under the United States proposal would be put at the disposal of other states, signatories to a cut-off treaty, particularly less developed states.

The Soviet Union reiterated the stand that the cessation of the production of fissionable materials would not lead to the reduction of existing arsenals

Disarmament efforts

of nuclear weapons and would not diminish the possibility of further production of such weapons. It would not solve the problem of eliminating or reducing the threat of a nuclear war, even if all the nuclear powers agreed to carry out the measure. The Soviet Union did not comment directly on the United States proposal concerning IAEA safeguards system to be employed for the verification of a cut-off agreement.

The Western proposal for the cessation of the production of fissionable materials for weapons purposes continued to enjoy considerable support from the non-aligned countries. The proposal was made more attractive than before by, in particular, the United States suggestion that the nuclearweapon powers accept the same safeguards on their production facilities as were provided for verification of non-proliferation in the non-nuclearweapon states. Although the debate remained inconclusive, it was believed that the matter was worth pursuing. Some Committee members even felt that a cut-off agreement might be easier to achieve than a comprehensive test ban.

Prohibition of chemical and biological weapons

The United Kingdom enlarged on the proposal (1968) that possession and production of biological weapons and research into them should be outlawed. It made some new suggestions for safeguards and said that it would later table a draft convention.

The Soviet Union favoured complete prohibition of both chemical and biological weapons. It criticized the United Kingdom proposal as undermining the Geneva Protocol, stressed the need to reaffirm the validity of the Protocol and to strengthen it by securing the accession of those states which had not yet done so.

The United States supported the principles of the Geneva Protocol and noted a comitment to respect them. (The United States is not a party to the Protocol.)

Sweden proposed that governments should subscribe to a standard interpretation of the Geneva Protocol. The object of the proposal was to confirm that the use of "non-lethal gases", as well as lethal ones, is outlawed.

Most members of the Committee preferred to defer action on the prohibition of chemical and biological weapons until the Secretary-General's report on the effects of the possible use of such weapons had been prepared.

There was a feeling that the problem of controlling the ban would make the conclusion of a convention on the subject very difficult. The desired result, it was thought, could be obtained by working for universal and unconditional adherence to the Geneva Protocol.

Other measures

The Soviet Union continued pressing for total prohibition of the use of nuclear weapons. It indicated a new approach in asking the Western Powers whether their own proposals of 1957 and 1962 regarding the use of nuclear weapons only for purposes of self-defence were still valid.

Some countries called for the resumption of the discussion on general and complete disarmament which was described as the principal task of the Committee and the very purpose for which it was formed. They asked the United States and the Soviet Union to revise their draft treaties on general and complete disarmament, submitted in 1962, in the light of developments which had since taken place.

Virtually all Committee members underlined the importance of the forthcoming bilateral talks between the United States and Soviet Union on the limitation of offensive and defensive strategic nuclear weapons (SALT).

Requests were voiced that ENDC should be informed about the progress of those talks and that at some stage it should be asked to express its views on the problems discussed.

A number of states were of the opinion that the Committee's progress was slow and its achievements meagre. They called for intensification of negotiations and for the adoption of a co-ordinated programme of work. Italy submitted a paper with specific suggestions to that effect.¹⁷

The Co-Chairmen invited Japan and Mongolia to join the Committee as additional members and to participate in the summer session scheduled to start in July 1969. It had earlier been debated whether six countries should not be added. The addition of the two was discussed at a closed meeting of which there is no official record, but it was widely reported in the press that many countries, including all the non-aligned members, were dissatisfied at the lack of opportunity to have their views on this proposal taken into account.

The summer session

The spring session of the ENDC adjourned on 23 May, and the summer session opened on 3 July. This summer session was still in progress in mid-September, and will be more fully reported in next year's Yearbook. In this session, the ENDC was further enlarged, and changed its name. The Co-Chairmen agreed to add Argentina, Hungary, Morocco, the Netherlands, Pakistan and Yugoslavia. All six countries took part in the work of the Committee from 7 August onwards. The committee agreed to change

¹⁷ Document ENDC/245.

Disarmament efforts

its name to the Committee on Disarmament, and the name of the Conference to the Conference of the Committee on Disarmament.

In the new session, discussion continued to be mainly about chemical and biological warfare, a comprehensive test ban, and the demilitarization of the sea-bed. It was only on the third of these subjects that any kind of agreement appeared in prospect. Various states made suggestions which might bring the positions of the two great powers closer together. By mid-September, neither the United States nor the Soviet Union had officially changed its position (see page 180). However, the fact that the Co-Chairmen did not agree to adjourn in time for the autumn session of the General Assembly suggested that the USA and USSR might be negotiating a treaty behind the scenes, possibly accepting the United States limitation of the ban to nuclear weapons and weapons of mass destruction, and accepting the Soviet proposal of a 12-mile rather than a 3-mile limit.

This proved to be the case. On 7 October a joint draft treaty on these lines was submitted by the USA and USSR. The key paragraph would forbid the placing of nuclear weapons and other weapons of mass destruction, "as well as structures, launching installations or any other facilities specifically designed for storing, testing or using such weapons," either on the sea-bed, the ocean floor, or the subsoil thereof. The treaty would prohibit nuclear mines that were anchored to the sea-bed, but not submarines if they were either anchored to or resting on the sea-bed.

Part VIII. Towards Strategic Arms Limitation Talks

These long-heralded talks are due to begin in Helsinki on November 17.

As far back as 1964, official proposals had been made for a "freeze" of strategic nuclear weapons. The proposal was picked out—for separate consideration as a collateral measure—from the discussion of general and complete disarmament. In a message to the ENDC at the beginning of the year, President Johnson suggested "The United States, the Soviet Union and their respective allies should agree to explore a verified freeze of the number and characteristics of strategic nuclear offensive and defensive missiles." The proposal was elaborated later by the United States delegate to the ENDC, who in April of that year formally proposed the freeze of:

(a) Ground-based surface-to-surface missiles having a range above 1000 km and sea-based surface-to-surface missiles having a range of 100 km or greater, together with their associated launchers.

(b) Strategic anti-missile systems, together with their associated launchers.

(c) Strategic bombers having an empty weight of 25,000 kg and upwards, with associated missiles having a range of 100 km or greater.

These proposals were made at a time when the United States had a considerable margin of strategic superiority: it was intended that there should be some system of on-site inspection. The proposals were rejected by the Soviet Union: Foreign Minister Gromyko said, "The latest United States proposal is really not a disarmament proposal at all. It is a plan for maintaining a full complement of all nuclear weapon vehicles now available to States. In fact it consolidates, so to speak, the present level of nuclear weapon vehicles, and indeed that of all kinds of armaments." The United States later developed its proposal and suggested, in 1965, that a freeze of strategic weapons could then be followed by a reduction. This, however, did not make the proposal any more palatable to the Soviet Union.

The next stage in the long road to the talks began in 1967. At the end of 1966 Mr. McNamara told a news conference that the Soviet Union was beginning to deploy anti-ballistic missiles. In his Budget message to Congress at the beginning of the year President Johnson said that the United States would "take no action now" to deploy anti-ballistic missiles, but would initiate discussions with the Soviet Union and reconsider the deployment decision if discussions were unsuccessful. On 27 January 1967 he wrote President Kosygin a letter in which he proposed bilateral discussions of nuclear missiles; and on 2 March he announced that President Kosygin had agreed to bilateral discussions on "means of limiting the arms race in offensive and defensive nuclear missiles". No talks in fact took place that year. In September Mr. McNamara announced that the United States would deploy a limited ABM system against China. In October, a US Government spokesman said that the United States still hoped for some parallel action or formal agreement to limit strategic forces: that the United States hoped to avoid getting "bogged down" in the inspection issue. He said that some parallel action or agreement might be verified by "our own unilateral capability" but that any agreements involving substantial reductions would require international inspection.

On 27 June 1968, Foreign Minister Gromyko told the Supreme Soviet that the Soviet Union was ready to begin discussions with the Western nuclear powers on "mutual restriction and subsequent reduction" of offensive and defensive strategic weapons. On 1 July, at ceremonies for signing the NPT, Prime Minister Kosygin in Moscow and President Johnson in Washington announced that agreement had been reached between the two powers "to enter in the nearest future into discussions on the limitation and the reduction of both offensive strategic nuclear weapons delivery systems and systems of defence against ballistic missiles."

Then, after the armed forces of the Soviet Union and other Warsaw Pact countries moved into Czechoslovakia in August 1968, the United States

Disarmament efforts

Administration said that talks would be inopportune. In November, at the General Assembly, and also at a news conference in January 1969, the Soviet Union indicated that it was "ready to start a serious exchange of views" on the subject. However, by this time there was a new United States Administration. At first, the new President suggested some kind of linkage between the initiation of the talks and the progress in such political areas as the Middle East: he declared that the interests of the United States and the Soviet Union would not be served "by simply going down the road on strategic arms talks without, at the same time, making progress on resolving these political differences that could explode". Finally, in mid-June, President Nixon said that their strategic review was nearly complete: and that the Soviet ambassador had been informed that 31 July had been set as the target date for the beginning of the talks. In mid-July, Foreign Minister Gromyko, in an address to the Supreme Soviet, said that the Soviet Union was prepared for the talks. Eventually agreement was reached to start talks in Helsinki on November 17.

In the two-and-a half years which have elapsed since the first agreement to have talks was reached, the strategic arms race has not stood still. Indeed there is a widespread fear along experts that it may already have passed one more point of no return.

The problem of MIRVs

One particular problem is to obtain an agreement before multiple individually targetable reentry vehicles (MIRVs) are ready to be deployed, in the missile forces of either side. (There is an account of the state of the development of these warheads in chapter 1, page 40.) First of all, once these warheads are operational, a simple ban on their production or deployment would be extremely difficult if not impossible to verify. Multiple warheads could be fitted to existing missiles without changing their appearance; and it would be impossible, by satellite reconnaissance or indeed by simple visual inspection from the ground, to determine how many warheads a missile contained. Any arms control agreement banning deployment of multiple warheads would probably require inspection of the inside of the missile. It is unlikely that either the United States or the Soviet Union would agree to this.

Once, therefore, MIRVs are operational, it appears that any agreement would have to assume that they were in fact likely to be deployed on both sides. However, such an agreement would probably be more difficult to reach in the first place, and, in the view of many strategists, less "stable" when reached. This is because, with MIRVs of sufficient accuracy, a single missile shot from one side could have the capability of destroying not just one but a number of missiles on the other side. Strategists envisage a situation in which both sides have MIRVs; in which the anti-ballistic missile systems on both sides are extended to the defence of the major cities; and in which these ABM systems have the capacity for dealing with sea-based missiles. If the missile forces on either side developed in this way, then a position might be reached in which each side might fear a possible first strike from the other side against its land-based missiles. (Indeed this kind of fear is already being expressed in the United States—see page 34.) It is argued that it would be very difficult in this situation to reach a secure agreement.

This is the background to the extensive discussion there has been in the United States on the possibility of a moratorium on the testing of MIRVs. In early July, 41 Senators and 102 Representatives asked the President to seek urgently for such a moratorium with the Soviet Union: and there have been other proposals in the House of Representatives that the United States should announce a suspension of MIRV tests, together with a statement that the suspension would continue as long as the Soviet Union also suspends its testing programme. The Administration's position is that it is considering a moratorium on MIRV tests as part of an arms-control agreement but that it would not be in the United States interests to stop tests unilaterally.

The Congressional debate on this question illustrates some of the problems of the proposal. First, has testing gone so far, on either side, that multiple individually targeted warheads could be deployed without further testing? The stage reached in the United States has been described on page 40: and to date United States sources have referred to three Soviet tests only, which seem more probably to have been tests of MRVs-triple warheads without the possibility of individual targeting. It seems most unlikely that the United States would have sufficient confidence in the system to install it without further testing-particularly as it would in fact be replacing a thoroughly tested system. One of the expert witnesses before a Congressional Committee, Dr. Ruina, commented: "The truth of the matter is that before a system can be considered operationally reliable (and I would like to point out parenthetically that for first strike the reliability has to be superb, far better than is necessary for a deterrent force) operational utility requires testing far more than just R & D testing. We have got to include testing from operational sites, and operational conditions and we have to test constantly." So long as testing was suspended, therefore, it is unlikely that MIRVs would be deployed.

Secondly, could tests be detected without the need for an on-site in-

Disarmament efforts

spection system? Some witnesses before Congressional committees have suggested complex procedures by which tests might be concealed, or disguised as tests of an ordinary intercontinental ballistic missile. However, most expert witnesses doubted whether partial testing of this kind could give the necessary confidence in the new system. It seemed generally agreed, however, that a moratorium would have to apply to tests of multiple warheads which were not individually targeted as well as to those which were, since these two kinds of tests would be difficult to distinguish. There was a difficulty here, in that the United States has already deployed a triple warhead on one of its missiles—the missile now carried by most of the Polaris fleet—whereas the Soviet Union does not appear to have deployed such a missile yet, and may be still in the process of testing one.

The record of the Congressional debate on the subject suggests that a moratorium on further testing, if agreed upon within the next three months, could be effective in preventing the deployment of MIRVs. However, the time is short. Within the next three to six months the point of no return will be reached, assuming that the United States testing programme proceeds as planned. A further step in the arms race will have been taken which will then be extremely difficult to reverse.

Part II. Reference Material

Section 1. Military expenditure and the trade in arms

1A. World military expenditure, 1948–1968

SOURCES AND METHODS

Introduction

The main purpose of the collection of military expenditure material is to answer questions about long- and short-term trends in military expenditure, in individual countries, regions and the world as a whole. Because of differences in coverage, and the difficulty of finding appropriate exchangerates, expenditure figures are often unsuitable for cross-country comparisons, that is, for comparing the military efforts of two countries at a particular point in time. The expenditure figures of, for example, the USA and USSR do not provide a good basis for comparing the military efforts of the two countries. They do, however, provide a good basis for commenting on the rate at which military expenditure is rising.

Definitions

The aim is to present expenditure figures: series showing the amount of work actually done (or likely to be done, for 1969) for military purposes. In many countries there are other series—such as those for obligations or appropriations in the USA—which may be at a different level and show a different movement from the expenditure series. For a good deal of defence procurement, there is usually a long lag between the decision to spend the money and the actual use of resources in producing the items. It is the actual use of resources which we are attempting to measure.

Even in countries with highly developed accounting systems, the expenditure figures for any particular year are likely to have a margin of error of 1-2 per cent: when a major procurement contract has been spread over a number of years, the accounting authority may well find it difficult to state precisely the value of work done in any particular year. Small movements in the figures from one year to the next are not usually significant.

Expenditure is defined to include research and development, to include military aid in the budget of the donor country and to exclude it from the budget of the recipient country, and to exclude war pensions. Where possible, adjustments were made to bring the figures closer to this definition. For example when expenditure for research and development of nuclear weapons is separate from the regular budget, figures or estimates were included for this expenditure. For many countries, however, it was not possible to get a precise definition of the coverage of the figures, and no adjustments were made.

All figures were adjusted to the calendar years. The figures for 1969 were based on Budget figures. Where the Budget series differs from the expenditure series chosen, then the percentage change shown by the Budget series was applied to the expenditure series.

The countries covered by each region in the world summary table are shown in the subsequent tables. Albania is included as a member of the Warsaw Pact, since it was a member during most of the period covered by the series.¹

For colonial territories no figures are shown before the date of independence, except where it is known that the territory concerned financed some military expenditure out of its own Budget.

Wherever possible, the series of figures was carried back to 1948.

Sources

The published sources, covering figures for more than one country, used for military expenditure figures were as follows:

- 1. United Nations Statistical Yearbook, 1948-1967.
- Nato Letter, Vol. 11:1 (Jan. 1963). NATO press release: M4(67)2, 13 Dec. 1967; M1(69)1, 16 Jan. 1969.
- 3. Loftus, Joseph E. Latin American Defense Expenditures, 1930-1965, (Rand Memorandum RM-5310-PR/15A), Jan. 1968.
- 4. United States Arms Control and Disarmament Agency: World-wide Defense Expenditures and Selected Economic Data, Calendar Year 1964, (Research Report 66-1). World-wide Military Expenditures and Related Data, Calendar Year 1965, (Research Report 67-6). World Military Expenditures 1966-67, (Research Report 68-52).
- 5. Institute for Strategic Studies. The Military Balance (annual) 1959/60-1968/69.
- 6. Coward, H. Roberts. *Military Technology in Developing Countries*. Cambridge, Mass.: Center for International Studies, Massachusetts Institute of Technology, 1964.
- 7. Economic and Social Consequences of Disarmament: Replies of Govern-

^a Albania announced her formal withdrawal from membership of the Warsaw Pact in a unilateral declaration on 12 September 1968.

ments and Communications from International Organizations UN Doc. E/3593/Rev. 1, 1962.

- 8. United Nations Yearbook of National Accounts Statistics, 1957, 1958, 1959, 1961, 1964, 1966.
- 9. Statistics of National Accounts, 1950-61, 1955-62, 1956-65, 1957-66 OECD, Paris.
- Agency for International Development, Washington, D.C.: *AID Economic Data Book: Latin America*, Dec. 1967. *AID Economic Data Book: Africa*, Dec. 1967. *AID Economic Data Book: Far East*, Dec. 1967. *AID Economic Data Book: Near East and South Asia*, Dec. 1967.
- 11. Statesman's Yearbook, 1963/64-1968/69, New York.

 Institute for Strategic Studies (London), Adelphi Papers: Nr. 12. Brown, N., and Gutteridge, W. F., The African Military Balance, Aug. 1964. Nr. 20. Wood, D., The Middle East and the Arab World: the Military Context, July 1965. Nr. 27. Wood, D., The Armed Forces of African States, April 1966. Nr. 34. Wood, D., Armed Forces in Central and South America, April 1967.

- 13. Regional Arms Control Arrangements for Developing Areas. Cambridge, Mass.: Center for International Studies, Massachusetts Institute of Technology, Sept. 1964.
- Benoit, E., and Lubell, H.: "The World Burden of National Defence", in Disarmament and World Economic Interdependence, ed. E. Benoit. Oslo, 1967.
- 15. Schoor, Stuart H. The Arms Race and Defense Strategy in North Africa. (American University Field Staff Report SH S-3-67) (North Africa Series, Vol. 8: 9), Dec. 1967.
- 16. Great Soviet Encyclopedia.

In addition, the budget statements or defence statements for individual countries were consulted wherever possible. Copies of the series which we proposed to use were sent to all Governments concerned, with a request for any comments or corrections, which were included where provided. Requests for figures were also sent to a large number of academic institutions in countries for which figures were not available in international sources. Some recent figures were taken from press reports.

Methods

A. Selection of sources

A working sheet was prepared for each country, on which all figures from all sources were entered. A single continuous series was then prepared for as long a period as possible. For NATO countries, the series used were those corresponding to NATO definitions (source [2]). For Warsaw Pact countries, official national series were used. The coverage of USSR military expenditure figures is probably not the same as that of the US figures, for example; but attempts made to produce a more comparable series are highly speculative². For countries outside NATO and the Warsaw Pact, the source usually preferred, when figures were available, was the United Nations *Statistical Yearbook*. For a number of countries only rough estimates were available: thus no official figure has been published for China since 1960. The more conjectural estimates are shown in square brackets.

For Latin American countries for the years up to 1964 the figures were taken from Loftus (source [3]), who also used U.N. *Statistical Yearbook* figures, price-corrected by consumer price indices and constructed at 1960 official exchange-rates.

B. Price correction

Since the main purpose of the series is to show whether the quantity of resources absorbed by military expenditure—the "real cost" of this expenditure—is rising or falling, and how fast, the series needed to be corrected for price changes. There is no price index that is self-evidently right for this. Some countries have a defence price index: but the use of this index leads to an understatement of the rise in the real cost of defence.³ We have used

² For example, A. S. Becker, Soviet military expenditure outlays 1955 (Rand Memorandum RM-3886-PR), July 1964.

³ These considerations are relevant to the choice of a price index:

(a) It is not at all easy to say what the "real output" of the military sector of an economy is: there is no measurable end-product, as there is, for example, with the steel industry. One possible theoretical approach would be to attempt to measure the increase in the potential output of lethal power, since this is what military expenditure is about. This is not a very practical approach. It would give an astronomical rate of increase over this period. Also, any such measure would omit, for example, the increase in resources devoted to a wide range of ancillary equipment. If, for example, one measured the output of a bomber by the megatonnage of the bombs it could carry, this output would not be increased if the bomber were subsequently equipped with elaborate electronic counter-measures.

(b) The "real output" indices for military expenditure which are included in some countries' national accounts incorporate price indices for procurement and for research and development. For the armed forces themselves, the whole of the increase in armed forces' pay-per-head is usually assumed to be a price increase: that is, it is assumed that there is no increase in the productivity of any member of the armed forces.

(c) If, instead of thinking of the "real output" of the military sector we think of the "real cost", in terms of the real quantity of civil output foregone, then some allowance has to be made for the general increase in output-per-head in the civil sector of the economy. A member of the armed forces who is transferred to the civil sector now will have a higher real output than one who was transferred ten years ago. It follows that for measuring the increase in this real cost, a defence price index is unsuitable: it rises too fast. It postulates no increase in the real output-per-head of the armed forces,

Part II. Military expenditure

a consumer price index. For a fairly large number of countries this is the only price index available. If we had used a general price index, instead, for those countries which possess one—that is, a price index for the output of all goods and services, not just consumer goods and services—the general trends shown by the constant price figures here would not have been significantly different.

All consumer price indices were rebased on the year 1960.

C. Comparability between countries: the exchange-rate problem

If we wish to make any statements about world or regional trends in military expenditure, the series for individual countries have to be summed—and, consequently, converted into a common currency. The exact exchange-rate chosen is important if the object is to compare the military efforts of two countries. It is less crucial, however, if the need is simply for a weighting system to add together the various countries in a region. Small changes in the weighting are not likely to lead to significant differences in the movement of total military expenditure for a region.⁴ The official exchange-rates for 1960—the base year used for the consumer price indices—were therefore generally used.

The Warsaw Pact countries presented something of a special problem. For all of them except the USSR there were two official rates in 1960—a basic rate and a non-commercial rate. The two rates differed considerably. In tables 1A.1 and 1A.4a the series are shown converted at the basic official rates. The relationships suggested by using these rates are rather surprising: they imply, for example, that Poland's defence expenditure in 1968 was equivalent to 40 per cent of that of the USSR. They also imply that USSR military expenditure in 1968 was less than a quarter that of the USA. This does not seem to match other knowledge about the relative size of the resources devoted to military purposes by the countries concerned.

An alternative series is therefore presented in tables 1A.1 and 1A.4b, using exchange-rates estimated by E. Benoit and H. Lubell,⁵ who attempted

whereas the real cost of foregoing their potential contribution to civil output rises through time.

⁽d) It is worth noting here that in any country with conscription, where the conscript is paid less than he could earn in civil life, the real cost of military expenditure and its share in the gross national product is understated, since the valuation put on the services of the armed forces in the military budget is too low.

⁴ An experiment was made using estimated defence-purchasing-power-parity exchangerates for European NATO countries. These rates were derived from E. Benoit and H. Lubell, "The world burden of national defence," in *Disarmament and World Economic Interdependence*, ed. E. Benoit (source [14]). The series derived for total European NATO from using these exchange-rates was not significantly different from the series derived from the use of official exchange-rates. ⁵ Source [14].

		Value of US \$ in natio	onal currency
	Currency	Official basic rate end-1960	Benoit-Lubell exchange-rate
Albania	leks	50.00	39.67
Bulgaria	levs	6.80	1.16
Czechoslovakia	crowns	7.20	8.50
Germany, East	marks	2.22	3.39
Hungary	forintas	11.74	17.36
Poland	zlotys	4.00	15.92
Romania	lei	6.00	9.43
USSR	roubles	0.90	0.42

Table A.	Official and	Benoit-Lubell	exchange-rates	for	Warsaw	Pact	countries
----------	--------------	----------------------	----------------	-----	--------	------	-----------

to calculate defence-purchasing-power-parity exchange-rates for these countries. The differences between these exchange-rates and the basic official rates are shown in table A above.

Conventions

- []=Rough estimate
- () = Budget estimate, adjusted to the expenditure figures
- \blacksquare = Date of independence.

Figures for all countries are given (a) at current prices, in local currency, (b) at constant (1960) prices, converted into US dollars at 1960 exchangerates, and (c) for the year 1968, at current prices, converted into US dollars at current exchange-rates. When 1968 figures were not available for this final column, 1967 or 1966 figures were given instead.

Tables 1A.3, 5, 7, 9, 11, 13, 15, 17, 19 and 21 give current price figures in local currency.

Tables 1A.1, 2, 4 a, 4 b, 6, 8, 10, 12, 14, 16, 18, 20 give constant price figures converted into dollars at 1960 exchange-rates, and also give a column for 1968 expenditure, *1968 X*, at current prices converted into dollars at current exchange-rates.

Part II. Military expenditure

Table 1 A. 1.	World	summary:	constant	price	figures
---------------	-------	----------	----------	-------	---------

1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
	16 629	17 733	37 781	52 992 15 495	54 409 15 878	46 915	44 428	45 307	46 843
	23 905	26 692	50 231	68 48 7	70 287	61 711	58 985	60 682	62 382
677 210 610 470 [2 000] 369 50	723 270 620 650 [2 500] 281 50	726 300 650 1 120 [2 750] 342 50	828 330 680 1 400 [3 500] 496 90	1 280 320 740 1 420 [3 000] 595 90	1 260 350 680 1 650 [2 500] 596 80	1 243 390 690 1 670 [2 500] 536 80	1 243 500 740 1 580 [2 500] 547 90	1 240 640 830 1 590 [2 500] 535 130	1 335 670 750 1 790 [2 750] 496 150
270 850	270 790	270 710	270 760	270 760	280 830	260 810	270 870	280	300
	30 059	33 610	58 585	76 962	78 513	69 890	67 325	69 457	71 613
7 366	8 800 [4 800]	9 208 [4 800]	10 709 [4 800]	12 111 [4 800]	11 978 [4 800]	11 144 [4 800]	11 888 [4 800]	10 811 [5 250]	10 747 5 488
	13 600 43 659	14 008 47 618	15 509 74 094	16 911 93 873	16 778 95 291	15 944 85 834	16 688 84 013	16 061 85 518	16 235 87 848
15 783	18 857 [2 500]	19 731 [2 500]	22 948 [2 500]	25 952 [2 500]	25 666 [2 500]	23 881 [2 500]	25 476 [2 500]	23 167 [2 750]	23 029 2 827
	21 357 51 416	22 231 55 841	25 448 84 033	28 452 105 414	28 166 106 679	26 381 96 271	27 976 95 301	25 917 95 374	25 856 97 469
	1948 677 210 610 470 [2000] 369 50 270 850 7 366 15 783	1948 1949 16 629 7 276 23 905 677 723 210 270 610 620 470 650 [2 000] [2 500] 369 281 50 50 270 270 850 790 30 059 7 7 366 8 800 [4 800] 13 600 43 659 15 783 15 783 18 857 [2 500] 21 357 51 416	1948 1949 1950 16 629 7 276 17 733 8 959 23 905 26 692 677 723 23 905 26 692 270 300 300 610 620 650 1 120 12 70 300 10 620 650 1 120 12 700 300 12 000] [2 500] [2 750] 369 50 50 270 270 270 270 850 790 710 30 059 33 610 14 008 43 659 47 618 15 783 18 857 19 731 [2 500] [2 500] 21 357 22 231 51 416 55 841 55 541 55 50	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	19481949195019511952195319541955 $16\ 629$ 17 73337 78152 99254 40946 91544 4287 2768 95912 45015 49515 87814 79614 55723 90526 69250 23168 48770 28761 71158 9856777237268281 2801 2601 2431 2432102703003303203503905006106206506807406806907404706501 1201 4001 4201 6501 6701 580[2 000][2 500][2 750][3 500][3 000][2 500][2 500][2 500]3692813424965955965365475050505090908080902702702702702702802602708507907107607608308108707 3668 8009 20810 70912 11111 97811 14411 88843 65947 61874 09493 87395 29185 83484 01315 78318 85719 73122 94825 95225 66623 88125 476[2 500][2 500][2 500][2 500][2 500][2 500][2 500][2 500]15 78318 85719 73122 94825 952<	1948 1949 1950 1951 1952 1953 1954 1955 1956 16 629 17 733 37 781 52 992 54 409 46 915 44 428 45 307 7 276 8 959 12 450 15 495 15 878 14 796 14 557 15 375 23 905 26 692 50 231 68 487 70 287 61 711 58 985 60 682 677 723 726 828 1 280 1 260 1 243 1 243 1 240 210 270 300 330 320 350 390 500 640 610 620 650 680 740 680 690 740 830 12 0001 [2 500] [2 750] [3 500] [3 000] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500] [2 500]

(A)=At official exchange-rates (B)=At Benoit-Lubell exchange-rates

Table 1 A. 2. NATO: constant price figures

	1949	1950	1951	1 952	195 3	1954	1955	1956	1957
North America:									-
United States	16 629	17 733	37 781	52 992	54 409	46 915	44 428	45 307	46 843
Canada	476	61 9	1 38 6	2 066	2 193	1 950	2 008	2 055	1 931
Europe:									
Belgium	186	202	301	446	442	435	376	365	380
Denmark	77	72	86	118	155	153	150	145	152
France	1 870	1 987	2 651	3 394	3 796	3 206	2 977	3 876	4 028
Germany, West	12	1 000	1 887	2 059	1 646	1 671	1 920	1 837	2 236
Greece	103	115	137	13 2	126	135	138	178	157
Italy	646	767	908	994	897	981	974	1 000	1 036
Luxembourg	3	4	6	10	11	12	13	9	9
Netherlands	266	325	344	402	428	486	511	551	514
Norway	84	78	107	142	179	183	152	148	158
Portugal	53	57	60	65	76	81	85	86	88
Turkey	146	165	183	191	211	217	228	215	211
United Kingdom	3 354	3 568	4 394	5 476	5 718	5 286	5 031	4 910	4 639
Total NATO	23 905	26 692	50 231	68 487	70 287	61 711	58 985	60 682	62 382
Total NATO excl. USA	7 276	8 959	12 450	15 495	15 878	14 796	14 557	15 375	15 539
Total NATO Europe	6 800	8 340	11 064	13 429	13 685	12 846	12 555	13 320	13 608

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1 95 8	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1968X
46 432	47 085	45 380	47 335	51 203	50 527	48 821	48 618	57 951	66 889	68 213	(67 770)	79 605
14 379	15 342	15 955	16 354	1 7 898	18 408	18 752	18 662	18 825	19 719	19 542	(19 673)	24 365
60 811	62 427	61 335	6 3 68 9	69 101	68 935	67 573	67 28 0	76 77 6	86 608	87 755	(87 443)	103 970
1 368	1 41 2	1 397	1 510	1 637	1 677	1 772	1 785	1 840	1 834	1 892	(1 897)	2 5 2 7
790	870	890	950	1 060	1 180	1 390	1 565	1 695	2 250	2 699	•••	2 748
810	800	812	854	1 080	1 640	1 638	1 735	1 769	1 563	1 610	•••	1 860
2 050	2 180	2 290	2 440	2 525	2 315	2 535	2 800	2 820	3 110	3 570	•••	3 970
[2 500]	[2 800]	[2 800]	[3 300]	[3 800]	[4 300]	[4 800]	[5 500]	[6 000]	[6 000]	[6 000]	•••	[7 000
491	498	496	498	512	536	605	735	874	1 033	1 199	•••	1 401
170	210	320	390	555	610	750	880	985	[1 000]	[1 100]	•••	[1 220]
300	310	330	340	380	380	395	415	455	475	[480]	•••	515
1 100	960	970	940	1 010	1 030	1 080	1 250	1 130	1 280	1 390	•••	2 1 2 0
70 390	72 467	71 640	74 911	81 660	82 603	82 538	83 945	94 344	1 05 153	107 695	•••	127 331
10 400	10 41 1	10 333	12 889	14 111	15 444	14 778	14 222	14 889	16 111	18 556	(19 667)	18 556
5 773	6 665	6 991	7 823	8 540	9 231	9 386	9 616	10 259	10 871	12 600	(14 224)	13 394
16 173	17 076	17 324	20 712	22 651	24 675	24 164	23 838	25 148	26 892	31 156	(33 891)	31 950
86 563	89 543	88 964	95 623	104 311	107 278	106 7 02	107 783	119 492	132 045	138 851	•••	159 281
22 286	22 310	22 143	27 619	30 238	33 095	31 667	30 476	31 905	34 450	39 780	(42, 143)	39 780
2 918	3 198	3 379	3 752	4 186	4 445	4 4 3 9	4 4 1 6	4 733	5 082	6 023	(6 795)	6 294
25 204	25 508	25 522	31 371	34 424	37 540	36 106	34 892	36 638	39 532	45 803	(48 938)	46 074
95 59 4	97 975	9 7 162	106 282	116 084	1 2 0 143	118 644	118 837	130 982	145 045	153 498		173 405

^a India, Pakistan, Afganistan, Ceylon

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1968X
46 432	47 085	45 380	47 335	51 203	50 527	48 618	48 618	57 95 1	66 889	68 2 13	(67 770)	79 605
1 783	1 665	1 660	1 708	1 778	1 653	1 720	1 536	1 576	1 695	1 612	(1 572)	1 802
377	380	386	391	415	427	459	444	448	471	498	•••	616
140	144	161	164	200	203	209	220	217	218	230	(255)	339
3 718	3 793	3 908	3 876	4 182	4 1 1 0	4 225	4 293	4 415	4 615	4 698	(4 745)	6 076
1 677	2 685	2 905	3 082	3 894	4 371	4 193	4 1 3 1	4 057	4 225	3 968	(4 050)	5 107
155	161	170	165	168	172	179	193	210	270	317	(354)	367
1 064	1 097	1 144	1 182	1 298	1 447	1 482	1 537	1 662	1 623	1 647	•••	2 2 3 9
9	8	5	6	7	7	9	9	9	7	6	• • •	8
452	403	458	534	569	575	626	610	594	660	660	(682)	<i>902</i>
146	155	148	161	178	185	188	217	216	223	244	(257)	330
89	101	105	168	191	187	204	204	214	263	271	(272)	360
218	251	266	289	306	303	323	343	332	333	363	•••	577
4 551	4 499	4 639	4 628	4 712	4 768	4 935	4 925	4 875	5 080	5 028	(4 871)	5 642
60 811	62 427	61 335	63 689	69 101	68 935	67 573	67 280	76 776	86 608	87 755	(87 393)	103 970
14 379	15 342	15 955	16 354	17 898	18 408	1 8 752	18 662	18 825	19 719	19 542	(19 623)	24 365
12 596	13 677	14 295	14 646	16 120	16 755	17 032	17 126	17 249	18 024	17 930	[18 051]	22 563

Part II. Military expenditure

	Currency	1949	1950	1951	1952	1953	1954	1955	1956
North America:									
United States	mn. dollars	13 503	14 559	33 398	47 852	49 621	42 786	40 518	41 773
Canada	mn. dollars	372	495	1 220	1 875	1 970	1 771	1 819	1 888
Europe:									
Belgium	mn. francs	7 653	8 256	13 387	19 965	19 815	19 925	17 067	17 065
Denmark	mn. kroner	360	359	475	676	889	885	920	936
France	mn. francs	4 787	5 591	8 811	12 531	13 865	11 710	11 020	14 690
Germany, West	mn. marks	45	3 498	7 098	7 898	6 195	6 287	7 383	7 211
Greece	mn. drachmas	1 630	1 971	2 615	2 655	2 767	3 428	3 688	4 9 3 9
Italy	bn. lire	301	353	457	521	480	543	551	584
Luxembourg	mn. francs	112	170	264	436	488	566	614	395
Netherlands	mn. guilders	680	901	1 060	1 253	1 330	1 583	1 699	1 854
Norway	mn. kroner	370	357	572	831	1 067	1 141	953	967
Portugal	mn. escudos	1 419	1 516	1 553	1 691	1 975	2 100	2 224	2 297
Turkey	mn. lire	556	599	652	725	827	936	1 077	1 1 5 9
United Kingdom	mn. pounds	779	849	1 149	1 561	1 681	1 571	1 567	1 615

Table 1 A. 3. NATO: current price figures

Table 1A. 4a. Warsaw Pact: constant price figures

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
A 11								· · · · · · ·		1601
Albania	•••		••	••	100	••	••	••	••	[50]
Bulgaria	••	••	••	••	138	••	••	••	••	129
Czechoslovakia	897	1 032	1 181	1 297	••	1 037	963	••	1 189	1 240
Germany, East	••	••	••	••	••	••	••	••	••	[592]
Hungary	••	••	••	••	••	••	••	••	••	161
Poland	••	••	••	••	••	2 601	••	3 488	••	2 680
Romania	••	••	••	••	••	••	••	••	••	636
USSR	7 366	8 800	9 208	10 709	12 111	11 978	11 144	11 888	10 811	10 747
Total Warsaw Pact	••	13 600	14 008	15 509	16 911	16 778	15 944	16 688	16 061	16 235
Total excl. USSR	••	[4 800]	[4 800]	[4 800]	[4 800]	[4 800]	[4 800]	[4 800]	[5 250]	5 488

Table I A. 4 D. Warsaw Pact: constant price lig

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Albania	•••	•••	•••	•••		•••	•••	•••		[70]
Bulgaria	•••	•••	•••	•••	130	•••			•••	130
Czechoslovakia	760	874	1 000	1 099		878	816	•••	1 008	1 050
Germany, East	•••			•••		•••		•••		[390]
Hungary	•••	•••	•••	• • •	•••	•••	•••	•••	•••	109
Poland	•••	•••		•••	•••	654	•••	877	•••	673
Romania	•••	•••	•••	•••	•••		•••		•••	405
USSR	15 783	18 857	19 72 1	22 948	25 952	26 238	23 881	26 691	23 167	23 029
Total Warsaw Pact Total Warsaw Pact		21 357	22 231	25 448	28 452	28 738	26 381	29 191	25 917	25 856
excl. USSR		[2 500]	[2 500]	[2 500]	[2 500]	[2 500]	[2 500]	[2 500]	[2 750]	2 827

Tables of values

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
44 548	45 503	46 614	45 380	47 808	52 381	52 295	51 213	51 827	63 572	75 451	79 605	(81 460)
1 829	1 740	1 642	1 654	1 716	1 810	1 712	1 813	1 659	1 766	1 965	1 934	(1 934)
18 356	18 312	18 686	19 161	19 561	21 111	22 230	24 853	25 036	26 313	28 432	30 791	
1 012	938	986	1 113	1 180	1 551	1 651	1 764	1 974	2 080	2 249	2 545	(2 952)
15 600	16 569	17 926	19 162	20 395	22 184	22 849	24 280	25 300	26 732	28 912	30 200	(31 408)
8 962	6 853	11 087	12 115	13 175	17 233	19 924	19 553	19 915	20 254	21 394	20 324	(21 117)
4 477	4 469	4 735	5 1 1 0	5 034	5 102	5 385	5 647	6 290	7 168	9 390	11 022	(12 543)
611	647	667	710	749	861	1 031	1 118	1 212	1 342	1 359	1 395	(1 493)
439	429	402	263	290	355	348	462	477	497	413	376	•••
1 845	1 656	1 505	1 728	2 013	2 186	2 307	2 661	2 714	2 790	3 200	3 265	(3 471)
1 049	1 024	1 107	1 058	1 179	1 371	1 465	1 570	1 897	1 947	2 097	2 357	(2 562)
2 391	2 485	2 820	3 023	4 922	5 744	5 724	6 451	6 680	7 393	9 575	10 370	(10 753)
1 266	1 470	2 153	2 405	2 718	2 980	3 157	3 443	3 821	3 996	4 596	5 235	••••
1 574	1 591	1 589	1 655	1 709	1 814	1 871	2 000	2 091	2 1 5 3	2 299	2 364	(2 346)

US \$ mn, at 1960 prices and 1960 official exchange-rates (Final column, X, at current prices and exchange-rates)

[50]	[55]										
120		[55]	[55]	[55]	56	58	54	54	61	(84)	61
139	153	184	213	217	208	186	193	213	213	(244)	226
197	1 222	1 327	1 507	1 552	1 490	1 393	1 468	1 643	1 740	(1 866)	1806
[848]	[976]	[1 104]	1 233	1 234	1 236	1 252	1 477	1 611	2 595	(2 840)	2 6 1 3
213	[260]	303	420	514	507	409	407	434	512	(657)	548
644	3 725	4 225	4 462	4 976	5 204	5 561	5 860	6 083	6 614	(7 466)	7 275
574	[600]	[625]	650	683	685	757	800	833	865	(1 067)	865
411	10 333	12 889	14 111	15 444	14 778	14 222	14 889	16 111	18 556	(19 667)	18 556
076	17 324	20 712	22 651	24 675	24 164	23 838	25 148	26 982	31 156	(33 891)	31 950
665	6 991	7 823	8 540	9 231	9 386	9 616	10 259	10 871	12 600	(14 224)	13 394
	135 197 348] 213 544 574 411 076 665	139 133 197 1 222 348] [976] 213 [260] 544 3 725 574 [600] 411 10 333 076 17 324 665 6 991	135 135 164 197 1 222 1 327 348] [976] [1 104] 213 [260] 303 544 3 725 4 225 574 [600] [625] 411 10 333 12 889 076 17 324 20 712 665 6 991 7 823	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	139 133 164 213 217 206 160 193 213 197 1222 1327 1507 1552 1490 1393 1468 1643 197 1222 1327 1507 1552 1490 1393 1468 1643 213 [260] 303 420 514 507 409 407 434 544 3725 4225 4462 4976 5204 5561 5860 6083 574 [600] [625] 650 683 685 757 800 833 411 10333 12 889 14 111 15 444 14 778 14 222 14 889 16 111 076 17 324 20 712 22 651 24 675 24 164 23 838 25 148 26 982 665 6 991 7 823 8 540 9 231 9 386 9 616 10 259 10 871	$ \begin{bmatrix} 137 & 137 & 134 & 213 & 217 & 206 & 166 & 193 & 213 & 213 \\ 197 & 1222 & 1327 & 1507 & 1552 & 1490 & 1393 & 1468 & 1643 & 1740 \\ 348] & [976] & [1104] & 1233 & 1234 & 1236 & 1252 & 1477 & 1611 & 2595 \\ 213 & [260] & 303 & 420 & 514 & 507 & 409 & 407 & 434 & 512 \\ 544 & 3725 & 4225 & 4462 & 4976 & 5204 & 5561 & 5860 & 6083 & 6614 \\ 574 & [600] & [625] & 650 & 683 & 685 & 757 & 800 & 833 & 865 \\ 411 & 10333 & 12889 & 14111 & 15444 & 14778 & 14222 & 14889 & 16111 & 18556 \\ 076 & 17324 & 20712 & 22651 & 24675 & 24164 & 23838 & 25148 & 26982 & 31156 \\ 665 & 6991 & 7823 & 8540 & 9231 & 9386 & 9616 & 10259 & 10871 & 12600 \\ \end{bmatrix} $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				

US \$ mn, at constant 1960 prices and Benoit-Lubell exchange-rates (Final column, X, at current prices and Benoit-Lubell exchange-rates)

1958	1959	1960	1961	1962	1963	1964	196 5	1966	1967	1968	1969	1968 X
[70]	[20]	[70]	[70]	1701	[70]	71		(0	(0		(106)	
[/0]	[/0]	[/0]	[/0]	[/0]	[/0]	/1	13	69	69		(100)	
146	140	154	186	214	219	210	188	195	215	215	(246)	228
1 005	1 014	1 035	1 125	1 276	1 315	1 262	1 180	1 244	1 392	1 473	(1 584)	1 529
471	[550]	[630]	[710]	807	808	809	820	967	1 055	1 699	(1 860)	1 711
[120]	144	[174]	204	284	348	343	277	276	293	347	(444)	371
725	915	936	1 062	1 121	1 250	1 308	1 397	1 473	1 528	1 662	(1 876)	1828
381	365	[380]	[395]	414	435	436	481	509	530	550	(679)	550
22 381	22 310	22 143	27 619	30 238	33 095	31 667	30 476	31 905	34 4 50	39 780	(42 143)	39 780
25 299	25 508	25 522	31 371	34 424	37 540	36 106	34 892	36 638	39 532	45 803	(48 938)	46 074
2 918	3 198	3 379	3 752	4 186	4 445	4 439	4 416	4 733	5 082	6 023	(6 795)	6 294

Part II. Military expenditure

Table	1 A.	5.	Warsaw	Pact:	current	price	figures

	Currency	1948	1 949	1950	1951	1952	1953	19 5 4	1955	19 5 6
Albania	mn. new leks			••••				•••	•••	••••
Bulgaria	mn. new levs	•••	• • •	• • •	•••	161	• • •	•••	•••	• • •
Czechoslovakia	mn. korunas	7 267	8 359	9 565	10 506	• • •	8 400	7 800	•••	9 100
Germany, East	mn. marks	• • •		•••		• • •			• • •	•••
Hungary	mn. forintas	•••	•••	• • •	•••	• • •	• • •		•••	• • •
Poland	mn. zlotvs	•••	•••	•••	•••	•••	10 300	• • •	12 600	•••
Romania	mn. leui		•••	•••	• • •	•••	• • •		•••	• • •
USSR	mn. roubles	6 629	7 920	8 287	9 638	10 900	11 020	10 030	11 210	9 730

Table 1 A. 6. Other European: constant price figures

	1948	1949	1950	1951	1952	1953	1954	1955	1956	19 5 7
Austria	33	38	25	32	21	20	2	8	41	69
Finland	112	91	54	67	45	51	53	70	6 6	64
Ireland	19	19	20	22	26	29	27	26	24	24
Spain	86	81	79	78	98	95	103	99	106	112
Sweden	268	298	340	378	436	489	512	527	532	546
Switzerland	109	127	135	172	219	195	172	185	166	223
Yugoslavia	50	69	73	79	435	381	374	328	305	297
Total	677	723	7 26	828	1 280	1 260	1 243	1 243	1 240	1 335

Table 1 A. 7. Other European: current price figures

	Currency	1948	1949	1950	1951	1 952	1953	1954	1955	1956
Austria	mn. shillings	354	525	383	623	476	443	47	188	1 001
Finland	mn. marks	169	146	99	151	107	121	124	163	170
Ireland	mn. pounds	4.5	4.5	4.9	5.8	7.5	8.9	8.4	8.1	7.9
Spain	mn. pesetas	2 640	2 640	2 834	3 037	3 770	3 716	4 105	4 084	4 665
Sweden	mn. kronor	860	962	1 138	1 441	1 786	2 026	2 147	2 264	2 389
Switzerland	mn. francs	418	478	505	666	880	775	688	750	682
Yugoslavia	mn. new dinars	270	373	395	431	1 822	1 674	1 627	1 593	1 580

Table 1 A. 8. Middle East: constant price figures

	1948	1949	1950	1 95 1	1952	1953	1954	1955	19 5 6	1957
Cyprus		•••	•••	•••		•••	•••	•••		
Iraq	13.5	18.8	21.8	22.5	31.9	47.1	53.1	53.2	75.1	82.4
Iran	37.9	50.1	66.5	63.4	60.0	56.9	64.7	90.0	105.7	127.2
Israel	26.4	36.2	49.2	78.0	49.9	39.7	35.8	38.6	77.1	109.2
Jordan	9.6	13.3	16.6	27.9	29.2	31.2	31.8	32.3	38.5	39.3
Kuwait	•••	•••	• • •	•••	•••	•••	•••	•••	•••	
Lebanon	4.5	6.3	5.7	6.5	6.4	8.2	8.8	10.7	14.3	13.8
Saudi Arabia	•••	•••	• • •	•••	• • •	•••	• • •	• • •	•••	• • •
Syria	11.4	14.9	24.2	21.2	20.0	27.1	25.5	27.9	48.1	39.8
Yemen	• • •	•••	• • •	• • •	• • •	• • •	•••	•••	•••	• • •
United Arab Republic	89.6	106.5	92.8	88.8	95.2	108.9	142.8	216.2	249.3	222.7
Total	210	270	300	330	320	350	390	500	640	670
							·			

^a 1967.

Tables of values

Local currency, current prices

1957	1958	19 5 9	1960	1 96 1	1962	1963	1964	196 5	1966	1967	1968	1969
•••			•••	•••	•••		282	288	272	272	304	(420)
154	173	163	179	217	258	270	260	231	240	264	264	(303)
9 300	8 900	8 800	8 800	9 500	10 900	11 300	10 900	10 300	10 900	12 400	13 000	(14 000)
•••	1 650		•••		2 764	2 764	2 764	2 800	3 300	3 600	5 800	(6 350)
1 912		2 500		3 563	4 998	6 050	6 005	4 9 2 6	5 064	5 437	6 439	(8 300)
10 100	11 200	14 300	14 900	17 000	18 400	20 700	21 900	23 600	25 200	26 400	29 100	(33 300)
3 817	3 597	3 446		•••	3 900	4 100	4 110	4 540	4 800	5 000	5 187	(6 400)
9 672	9 400	9 370	9 300	11 600	12 700	13 900	13 300	12 800	13 400	14 500	16 700	(17 700)

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	19 5 9	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1968X
78	77	73	71	74	90	114	94	107	106	104	(105)	138
67	79	83	96	135	108	106	108	106	99	109	(104)	127
23	24	26	27	27	29	28	28	29	30	31	` ´	36
100	94	111	114	133	137	139	138	162	191	188	(184)	273
548	566	560	587	632	673	708	750	774	760	757	(765)	1 0 2 4
236	231	215	250	277	278	301	304	313	302	319	(304)	416
316	341	329	365	359	362	376	363	349	346	407	(407)	543
1 368	1 412	1 397	1 510	1 637	1 677	1 772	1 785	1 840	1 834	1 915	(1 900)	2 557

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	196 5	1966	1967	1968	1969
1 714	1 986	1 989	1 893	1 890	2 076	2 608	3 408	2 957	3 474	3 532	3 558	(3 719)
184	206	246	267	314	460	383	417	446	456	447	533	(535)
8.1	8.3	8.6	9.2	9.9	10.5	11.3	11.5	12.4	13.0	14.2	14.9	
5 441	5 534	5 5 57	6 688	6 968	8 586	9 609	10 460	11 736	14 704	18 368	19 026	(19 597)
2 557	2 706	2 820	2 898	3 107	3 500	3 839	4 173	4 646	5 103	5 224	5 295	(5 546)
930	1 009	972	924	1 096	1 264	1 316	1 466	1 533	1 653	1 658	1 787	(1 770)
1 590	1 785	1 956	2 077	2 477	2 701	2 862	3 321	4 305	5 070	5 387	6 786	(7 318)

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	1962	1963	1964	196 5	1966	1967	1968	1969	1968 X
•••	•••	•••	[5.0]	[6.0]	[7.0]	7.6	9.2	7.6	7.3	[7.5]	••••	7.34
88.5	103.1	118.7	123.5	132.2	153.6	181.2	223.1	232.0	210.8	230.1	•••	252.0
202.7	226.7	182.9	181.0	180.1	183.0	201.2	252.0	338.7	409.9	433.7	•••	493.1
122.5	138.8	163.1	163.1	183.7	228.1	296.9	325.3	346.7	557.4	735.5	(940.0)	596.0
45.9	57.2	53.5	52.3	55.9	56.5	55.6	45.8	54.8	58.0	68.1	•••	77.0
•••	•••	[5.0]	[5.0]	[10.0]	[20.0]	29.4	30.8	36.4	60.2	[70.0]	•••	60.2ª
15.5	14.2	15.2	17.9	25.4	21.3	23.2	26.8	32.3	36.6	38.1	(43.9)	42.9
•••	•••	[50.0]	69.9	92.4	99.7	103.0	113.0	112.0	232.5	253.4	• • •	320.9
71.3	70.1	70.1	71.6	78.8	82.3	90.6	99.2	81.2	117.4	124.8	•••	136.1
•••	•••	[7.0]	[7.0]	[7.0]	[7.0]	[7.0]	[10.0]	[10.0]	[10.0]	[10.0]	• • •	[10.0]
204.1	204.1	225.9	256.6	288.9	317.1	395.4	431.7	444.6	547.9	730.0	(854.8)	752.8
790	870	890	950	1 060	1 180	1 390	1 565	1 695	2 250	2 699	•••	2 748

Part II. Military expenditure

Table 1 A. 9. Middle East: current price figures

	Currency	1948	1949	1950	1951	1952	1953	1954	1955	1956
Cyprus	mn. pounds		•••	•••			•••			
Iraq	mn. dinars	6.0	6.6	7.0	7.7	11.8	15.2	16.7	17.2	25.8
Iran	mn. rials	1 608	2 271	2 477	2 477	2 533	2 545	3 4 3 0	4 905	6 167
Israel	mn. pounds	16	22	28	49	49	49	50	57	122
Jordan	mn. dinars	2.8	4.0	5.0	8.6	9.1	9.9	10.2	10.5	12.8
Kuwait	mn. dinars	•••	•••	• • •			•••	•••	•••	• • •
Lebanon	mn. pounds	13.3	17.3	14.6	17.9	17.6	21.2	21.7	26.7	38.0
Saudi Arabia	mn. rials	•••		•••	•••	• • •	•••	•••	•••	•••
Syria	mn. pounds	45	49	68	69	70	87	76	82	161
United Arab Rep.	mn. pounds	29	34	31	33	35	37	47	71	83

Table 1 A. 10. South Asia: constant price figures

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Afghanistan	•••	•••		•••					•	•••
Ceylon	0.7	0.8	1.2	2.2	2.9	4.0	6.5	6.0	7.2	9.8
India	443.0	443.0	452.0	452.0	475.0	470.0	503.0	524.0	624.0	567.0
Nepal	• • •		•••						• • •	•••
Pakistan	160.0	167.0	186.0	219.0	246.0	193.0	170.0	200.0	192.0	159.0
Total	600.0	600.0	650.0	680.0	730.0	680.0	690.0	740.0	830.0	750.0

a 1967.

Table 1 A. 11. South Asia: current price figures

	Currency	1948	1949	1950	1951	1952	1953	1954	1955	1956
Afghanistan	mn. afghanis	•••	•••	•••	•••	•••		•••	•••	•••
Ceylon	mn. rupees	3.1	3.5	5.4	10.6	13.8	19.0	30.2	27.4	32.8
India	mn. rupees	1 675	1 672	1 748	1 833	1 878	1 926	1 969	1 932	2 118
Nepal	mn. rupees	•••	•••	• • •	• • •	•••	•••	•••	• • •	•••
Pakistan	mn. rupees	604	621	662	812	935	817	705	787	793

Tables of values

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
•••			•••				2.7	3.3	2.7	2.6		
29.7	31.0	35.8	42.4	44.8	48.2	58.3	67.9	82.8	87.0	81.0	90.0	•••
7 898	12 589	15 629	13 857	14 137	14 170	14 469	16 523	21 098	28 267	34 780	37 352	•••
183	212	243	294	313	386	511	700	825	951	1 553	2 086	(2 755)
13.4	15.9	20.1	19.1	18.9	20.6	21.1	21.1	17.6	21.6	23.0	27.5	• • •
•••	•••	•••	• • •	•••	•••	• • •	10.5	11.0	13.0	21.5	•••	•••
39.1	45.6	43.0	47.8	56.4	80.6	68.9	76.6	90.1	114.3	128.4	136	(160)
• • •	•••	•••	•••	324	441	490	522	589	603	1 287	1 444	• • •
140	234	237	251	261	279	297	346	365	316	478	520	•••
78	71	70	78	91	100	110	143	178	200	248	327	(385)

US \$ mn, at constant 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	19 62	1963	1964	1965	1966	1967	1968	1969	1968 X
•••	•••	7.4	[8.0]	[8.0]	[8.0]	8.3	7.3	6.7	4.8	[5.0]		21.1ª
13.8	15.0	15.0	15.2	13.9	11.9	11.6	11.9	12.7	13.4	[14.0]	•••	12.1ª
621.0	577.0	582.0	625.0	862.0	1 409.0	1 380.0	1 346.0	1 307.0	1 185.0	1 213.0	(1 220.0)	1 338.0
•••	•••	2.6	[3.0]	[3.0]	3.4	3.3	3.2	3.1	4.1	[4.0]	••••	5.4ª
166.0	195.0	205.0	203.0	193.0	208.0	235.0	367.0	439.0	356.0	374.0	•••	483. <u>1</u>
810.0	800.0	812.0	854.2	1 079.9	1 640.3	1 638.2	1 735.4	1 768.5	1 563.3	1 610.0	•••	1 859.7

Local currency, current prices

1957	1958	1959	1960	1 961	1962	19 6 3	1964	1965	19 66	1967	1968	1969
•••	•••	•••	552	•••	•••	•••	855	924	1 051	948	•••	•••
45.9	66.2	71.9	71.3	73.2	67.8	59.5	59.6	61.5	65.8	71.1	•••	•••
2 665	2 797	2 699	2 774	3 046	4 336	7 306	8 084	8 651	9 279	9 582	10 035	(10 435)
•••	•••	•••	21.4	•••	•••	32.9	37.2	37.9	43.3	55.1	•••	••••
718	771	878	978	984	938	1 029	1 208	1 986	2 553	2 215	2 319	•••

Part 11. Military expenditure

Country	1948	1949	1950	1951	1952	1953	1954	1955	19 5 6	1957
Burma	14.6	18.3	25.3	32.3	49.0	70.3	87.9	76.9	76.3	76.1
Cambodia	•••		•••				•••			•••
Hong Kong	•••	• • •	•••	• • •	• • •		•••			•••
Indonesia		•••		347.5		377.7	337.4	266.3	264.2	329.5
Japan		•••		423.7	441.1	502.3	484.8	457.1	451.7	446.6
Korea, North	•••	•••					•••			•••
Korea, South	•••	41.1		• • •	66.8	154.4	185.4	150.8	145.4	187.0
Laos	•••	• • •	• • •	• • •	•••					
Malaysia	2.5	3.4	3.1	28.4	46.1	64.4	58.5	52.5	47.9	50.0
Mongolia	•••	• • •	• • •							• • •
Philippines	32.9	46.3	54.4	67.9	82.8	83.9	80.1	78.4	79.0	80.9
Thailand	16.4	21.6	22.3	31.0	52.0	53.3	52.3	45.8	41.2	74.1
Viet-Nam, North	•••	• • •	•••	• • •	•••				•••	•••
Viet-Nam, South	•••	•••	•••	•••	•••	• • •		•••	• • •	•••
Taiwan	•••	•••	•••	•••	•••	66.5	80.0	110.9	114.4	126.2
Total	[470.0]	[650.0]	[1 120.0]	[1 400.0]	[1 420.0]	[1 650.0]	[1 670.0]	[1 570.0]	[1 590.0]	[1 790.0]

Table 1 A. 12. Far East: constant price figures^a

^a Dates of independence are shown in table 13.

Table 1 A. 13. Far East: current price figures

	Currency	1948	1949	1950	1951	1952	1953	1954	1955	1956
Burma	mn. kvats	61,5	105.0	122.2	152.7	222.3	308.9	369.6	338.0	357.3
Cambodia	mn. riels	•••	• • •	•••	• • •		• • • •	•••	•••	•••
Indonesia	bn. rupiah	• • •	•••	• • •	3.3		3.9	3.6	3.9	4.4
Japan	bn. yen	• • •	•••	• • •	118.5	131.0	157.6	162.0	151.3	149.5
Korea, North	mn. won	•••	•••	•••	• • •	•••	•••	• • •	•••	• • •
Korea, South	bn. won	•••	•••	•••	• • •	0.8	2.7	4.4	6.0	7.1
Laos	mn. kips	• • •	• • • •	• • •	•••		•••	•••	• • •	• • •
Malaysia	mn. dollars	6.5	8.2	8.6	97.5	160.9	210.1	184.4	160.5	148.1
Mongolia	mn. tugrik	•••			•••	•••	•••	• • •	•••	• • •
Philippines	mn. pesos	70.8	94.0	113.6	153.6	174.6	171.9	162.3	157.2	161.6
Thailand	mn. baht	218.7	278.4	297.5	455.5	844.4	961.0	943.6	855.2	816.7
Viet-Nam, North	mn. dong	•••	•••		•••		••••	• • •	•••	• • •
Viet-Nam, South	bn. piastres	•••	•••	•••	•••	•••	· · · · i	•••	•••	• • •
Taiwan	bn. dollars	•••	•••	•••	•••	•••	1.5	•••	2.8	3.2

Table 1 A. 14. Oceania: constant price figures

	1948	1949	1950	1951	19 52	1953	1954	1955	19 56	1957
Australia New Zealand	327 42	245 36	299 43	434 62	511 84	501 95	454 82	470 77	458 77	422 74
Total	369	281	342	496	595	596	536	547	535	496

US \$ mn., at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

19	958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968 1969	1968X
8	35.1	96.6	89.2	82.9	89.5	101.0	97.6	108.3	106.7	108.7	113.1 (116.4)	113.3
	•••	• • •	[35.0]	43.0	45.1	43.2	47.1	42.6	43.1	49.1	49.3 •••	62.9
	• • •	• • •	[8.0]	[8.0]	[8.0]	[8.0]	[9.5]	[10.0]	[10.0]	[10.0]	[10.0] •••	[10.0]
41	9.4	418.8	484.8	540.7	362.2	265.4	204.8	182.5	[200.0]	230.3	184.8 •••	113.0
45	51.0	462.3	455.9	472.7	517.0	390.0	553.0	623.0	658.0	712.0	753.3	1 145.3
	• • •	•••	[200.0]	[225.0]	[250.0]	[275.0]	[300.0]	[350.0]	[300.0]	[450.0]	[600.0] •••	[629.0]
22	20.2	233.6	227.1	236.9	273.9	226.5	213.0	224.7	277.5	296.6	360.4 •••	232.3
	• • •	• • •	[20.0]	[20.0]	24.6	17.7	9.9	16.1	18.6	18.7	19.3 •••	40.0
5	52.2	46.0	42.9	36.3	36.6	49.2	68.9	97.1	119.6	110.9	112.7 •••	123.1
	• • •	• • •	[15.0]	[15.0]	[15.0]	[20.0]	[20.0]	[20.0]	[20.0]	[20.0]	[20.0] •••	[20.0]
8	34.7	87.6	87.1	89.4	87.1	87.1	83.3	93.0	111.4	124.6	149.4 •••	119.1
6	52.4	66.2	65.2	68.8	72.0	74.2	78.7	86.2	91.9	110.0	130.1 •••	156.8
	• • •	• • •	[200.0]	[225.0]	[250.0]	[275.0]	[300.0]	[350.0]	[400.0]	[450.0]	[500.0] •••	[500.0]
	• • •	• • •	157.0	162.0	248.0	231.0	283.0	313.0	227.0	186.0	331.0 (449.0)	405.9
20	07.2	219.2	203.3	214.2	245.5	249.4	267.6	285.5	236.1	232.7	237.3 ···	300.0
[2 05	50.0][2	180.0]	[2 290.0]	[2 440.0]	[2 525.0]	[2 315.0]	[2 535.0]	[2 800.0]	[2 820.0]	[3 110.0]	[3 570.0] ···	[3 970.0]
[2 05	50.0][2	180.0]	[2 290.0]	[2 440.0]	[2 525.0]	[2 315.0]	[2 535.0]	[2 800.0]	[2 820.0]	[3 110.0]	[3 570.0] ···	[3 97

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
								1705				
378.3	406.5	410.8	426.3	408.0	431.9	477.7	466.3	517.4	509.6	519.2	540.5	(556.4)
• • •	•••	•••	•••	1 610	1 736	1 764	1 964	1 845	1 855	2 100	2 204	••••
6.1	11.1	14.1	21.7	31.7	57.4	91.4	144.7	521.9	•••	20 325.0	36 070.0	•••
152.3	153.8	159.3	163.3	178.3	208.6	169.1	249.0	299.1	332.0	373.5	412.3	•••
• • •	•••	•••	• • •		•••	•••			•••	•••	1 617.0	• • •
11.3	12.8	14.0	14.8	16.7	20.5	20.5	24.9	29.9	41.1	48.7	64.1	•••
• • •	•••	•••	•••	•••	2 280	3 144	3 480	6 384	8 400	9 120	9 600	•••
160.6	166.2	142.3	131.3	110.9	112.0	154.9	217.0	303.0	380.8	366.6	379.3	• • •
• • •	• • •	•••	• • •		• • •	• • •	100	100	100	80	• • •	• • •
169.1	182.4	186.9	193.4	201.5	207.7	219.3	227.1	260.0	330.8	391.1	464.6	• • •
1 566.7	1 389.7	1 420.5	1 378.4	1 473.0	1 580.0	1 643.0	1 777.6	1 964.0	2 170.6	2 702.8	3 261.9	• • •
•••	• • •	•••	•••	• • •	•••	•••	882	1 103	882	1 323	1 470	•••
•••	•••	• • •	5.5	6.0	9.5	9.5	12.0	15.5	18.1	21.4	47.7	(78.6)
3.8	6.3	7.4	8.1	9.2	10.8	11 .2	12.0	12.8	10.2	11.0	12.0	•••

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	1962	1963	1964	1965	1966	1 967	1968	1969	1968X
417 74	423 75	419 77	425 73	441 71	465 71	521 84	641 94	774 100	936 97	1 097 102	(1 194) 	1 296 105
491	498	496	498	512	536	605	735	874	1 033	1 199	•••	1 401

	Currency	1948	1949	1950	1951	1952	1953	1954	1955	1956
Australia New Zealand	mn. dollars mn. dollars	136 18	114 16	152 20	265 32	368 47	373	342 50	362 48	372

Table 1 A. 15. Oceania: current price figures

Table 1 A. 16. Africa: constant price figures^c

	1948	1949	1950	1951	1952	19 5 3	1954	1955	19 5 6	1957	
Burundi			•••			• • •		•••		•••	
Cameroon									•••		
Central African Ren			•••					•••			
Chad			•••	•••				•••		• • •	
Congo Kinshasa	•••		•••					•••		•••	
Congo Brazzaville		•••						•••	•••	•••	
Dahomey								•••		•••	
Ethiopia						•••		•••			
Gabon				•••		•••		•••		•••	
Ghana				•••				•••		7.0	
Guinea				•••	•••					•••	
Ivory Coast				•••				•••		•••	
Kenva		•••		•••				•••	5.3	5.7	
I iberia				• • •						•••	
Libva		•••		•••				•••			
Madagascar		•••				•••	•••	•••		•••	
Malawi						•••	•••	•••			
Mali				• • •		• • •			•••	•••	
Mauritania										•••	
Mauritiue		•••		•••		•••				0.4	
Materica				• • •							
Niger				•••				•••		•••	
Nigeria	•••			•••		• • •					
S Rhodesia		• • •						• • •		•••	
Senegal	• • •	•••		•••				• • •		•••	
Sierra Leone	• • •			•••				•••		•••	
Somalia						•••				•••	
South Africa	48 5	45 4	41.5	75.7	79.6	68.0	64.0	66.5	74.3	76.9	
Sudan	3.8	29	7 1	54	4.8	5.8	7.3	8.5	8.7	11.8	
Tanzania, Un. Ren. of										•••	
Togo		•••				•••		• • • •		•••	
Tunisia						• • •		•••	4.1	5.9	
Handa		• • •						•••		••••	
Upper Volta				•••		•••		•••		•••	
Zambia				•••		•••	•••		• • •	•••	
Rhodesia and											
Nyasaland, Fed. of		•••	•••		•••	•••	•••	7.8	10.2	11.5	
Total	[50.0]	[50.0]	[50.0]	[90.01	[90.0]	[80.0]	[80.0]	[90.0]	[130.0]	[150.0]	
		I									

a=1967. b=1966. ^c Dates of independence are shown in table 17.

Tables of values

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
354	352	365	376	391	406	431	494	629	781	975	1 167	(1 312)

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	1962	1963	1964	196 5	1966	1967	1968	1969	1968X
•••	•••	•••	•••	[67.0]	77.7	97.1	100.0	110.6	117.9	157.4		172.2
•••	• • •	• • •	• • •	1.6	1.8	2.0	2.9	2.9	3.5	3.7	• • •	3.1
• • •	•••	9.7	7.9	14.3	11.9	11.4	12.0	12.3	12.2	[12.2]	•••	16.2ª
• • •	•••	• • •	0.8	0.9	0.9	1.6	2.2	2.1	[2.1]	••••	•••	3.0ª
•••	•••	• • •	•••	1.4	1.3	1.6	2.3	3.7	4.3	4.4	(5.4)	6.2
•••	•••	[40.0]	[40.0]	[40.0]	44.5	60.7	98.3	137.0	86.3	[90.0]	• • •	75.0ª
•••	•••	0.4	[2.0]	3.3	[3.6]	4.0	3.8	5.1	[6.0]	[6.5]	• • •	7.0°
• • •	•••	[0.5]	[0.8]	[1.0]	1.1	4.0	4.0	4.0	[4.0]	•••	• • •	4.0 ^b
•••	10.0	15.0	18.2	19.2	20.9	25.3	27.0	30.4	[33.0]	[37.0]	•••	40.5 ^b
•••	•••	[0.5]	[1.0]	1.4	2.2	1.7	2.5	2.4	[2.4]	•••	• • •	3.0 ^b
7.2	8.3	14.6	20.6	19.7	17.9	18.1	16.8	15.5	21.1	21.4	(23.8)	38.7
•••	•••	[3.0]	[4.0]	5.9	6.0	5.0	11.0	13.0	[15.0]	•••	•••	13.00
•••	•••	[2.0]	[5.0]	8.0	7.3	10.0	11.2	11.1	13.8	•••	•••	16.7ª
5.0	4.6	2.6	0.9	0.7	1.8	5.6	9.0	11.3	14.1	14.5	•••	17.1
• • •	1.1	[1.4]	[1.7]	[2.0]	2.4	2,6	2.8	2.7	[2.7]	[2.7]	• • •	2.80
•••	4.2	[6.0]	[8.0]	[10.0]	12.8	12.5	16.6	17.5	21.1	22.7	(28.2)	30.0
•••	•••	0.4	0.8	[2.7]	4.6	8.1	9.1	9.5	10.2	•••	•••	12.2ª
• • •	•••	•••	•••	•••	•••	0.8	1.2	1.2	1.5	1.3	• • •	1.5
•••	•••	[2.0]	[5.0]	8.7	[8.8]	9.0	10.0	5.0	[5.0]	•••	• • •	5.0 ^b
•••	•••	[1.0]	[2.0]	[3.0]	4.0	2.0	2.0	4.0	[4.0]	• • •	•••	4.0 ^b
0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.4	[0.4]	[0.4]	• • •	•••	•••
42.4	90.1	[80.0]	73.7	76.7	88.4	96.3	85.0	85.3	91.4	122.5	•••	148.2
•••	•••	[0.6]	1.2	1.5	3.4	5.0	6.0	3.0	[3.0]	•••	• • •	3.0 ^b
•••	•••	16.0	21.9	29.0	38.8	47.4	54,4	57.8	[65.0]	[75.0]	• • •	73.4 ^b
•••	• • •	•••	•••	•••	•••	12.5	15.8	14.6	17.5	20.1	•••	21.2
• • •	• • •	[1.5]	[3.0]	[6.0]	8.1	9.6	12.8	12.4	[12.4]	•••	• • •	15.00
•••	•••	• • •	[1.0]	2.1	2.0	1.9	1.8	2.2	2.2	•••	•••	2.5ª
•••		[1.5]	3.2	3.2	4.0	4.3	3.6	4.7	5.5	•••	• • •	7.5ª
58.0	41.4	61.6	97.8	157.1	160.1	223.6	277.1	302.3	301.6	296.7	•••	353.3
14.3	15.8	17.6	17.6	17.9	19.7	20.0	26.7	37.8	38.5	46.5	•••	55.3
•••	• • •	•••	[0.6]	1.4	2.5	4.7	6.5	7.4	8.6	9.2	•••	10.8
•••	•••	[0.1]	0.2	0.4	0.6	1.8	1.8	1.8	1.6	1.6	•••	2.5
10.0	15.4	17.6	19.7	15.7	16.4	19.1	15.4	17.7	16.4	20.2	(19.8)	20.0
•••	• • •	•••	•••	0.7	2.7	4.9	8.3	11.5	11.0	•••	•••	14.5ª
•••	•••	[0.7]	[1.4]	[2.1]	2.8	8.0	3.0	4.0	[4.0]	•••	•••	4.0 ^b
•••	•••	•••	•••	•••	•••	4.0	12.6	16.0	15.5	13.7	•••	19.6
12.0	17.2	15.4	22.3	24.2	[19.0]	•••	•••	•••	•••	•••	•••	•••
[170.0]	[210.0]	[320.0]	[390.0]	[55 5.0]	[610.0]	750.0	880.0	985.0	[1 000.0] [1 100.0]	•••	[1 220.0]
									······			

Part II. Military expenditure

Table 1 A. 17	Africa: current price figures	

	Currency	1948	1949	1950	1951	19 52	1953	1954	1955	1956
Algeria	mn. dinars							•••		
Burundi	mn. francs	• • •	•••	• • •	•••	•••	• • •		•••	
Cameroon	bn. francs	•••	•••		•••		•••		•••	
Central African Rep.	mn, francs	•••		•••	•••	• • •				
Chad	mn, francs	•••		• • •	•••				•••	• • •
Congo, Kinshasa	mn. francs			•••	•••	•••	•••		•••	• • •
Congo, Brazzaville	mn. francs	•••	•••	• • •	•••	• • •	•••		•••	•••
Dahomey	mn. francs	• • •	• • •	•••	•••	• • •	• • •	• • •	•••	• • •
Ethiopia	mn. dollars	•••	•••	•••	•••	•••	• • • •	• • •	•••	• • •
Gabon	mn. francs	•••	• • •	•••	•••			• • •	•••	
Ghana	mn. cedis	•••	•••	•••	•••	• • •			3.6	5.6
Guinea	mn. francs	•••	• • •	•••	•••	•••	• • •	•••		•••
Ivory Coast	mn. francs	• • •	• • •	•••	• • •	•••			• • •	• • •
Kenya	mn. pounds	• • •	• • •	•••	•••	•••	• • •	• • •	•••	1.8
Liberia	mn. dollars	• • •		•••	•••	•••	•••	• • •	• • •	• • •
Libya	mn. pounds	•••		• • •	• • • •	•••	• • •	• • •	•••	• • •
Madagascar	bn. francs	• • •	• • •		· · · •		•••		•••	•••
Malawi	mn. pounds	•••		•••	•••	•••	•••		•••	
Mali	mn. francs	•••	• • •	•••	•••	•••	• • •	• • •	•••	
Mauritania	mn. francs	•••	•••	•••	•••	•••		•••	•••	•••
Mauritius	mn. rupees	•••	•••	•••	•••	•••	•••		•••	•••
Morocco	mn. dirhams	•••	•••	•••	• • •	•••	•••	•••	• • •	• • •
Niger	mn. francs	•••	•••	•••	•••	•••	•••	•••	••••	•••
Nigeria	mn. pounds	• • •	•••	0.8	0.8	0.8	1.3	•••	1.4	1.5
S. Rhodesia	mn. pounds	•••	• • •	•••	•••	•••	• • •		•••	• • •
Senegal	mn. francs	•••	•••	•••	•••	• • •	•••	•••	•••	• • •
Sierra Leone	mn. leones	• • •	•••		•••	•••	• • •	•••	•••	•••
Somalia	mn. shillings	•••	•••	•••	•••	•••	•••	•••	•••	•••
South Africa	mn. rands	23	22	21	41	47	42	40	42	48
Sudan	mn. pounds	0.8	0.7	1.6	1.4	1.5	1.7	2.4	2.8	2.8
Tanzania, Un. Rep. of	mn. pounds	•••	•••	•••	•••	• • •	•••	• • •	•••	•••
Togo	mn. francs	• • •	•••	•••	•••	• • •	•••	•••	•••	•••
Tunisia	mn. dinars	•••	•••	•••	•••	•••	•••	•••	• • • •	1.8
Uganda	mn. pounds	• • •	•••	•••	•••	•••	•••	•••	0.7	0.8
Upper Volta	mn. francs	• • •	•••	•••	•••	• • •	•••	• • •	•••	•••
Zambia	mn. pounds	•••	•••	•••	•••	•••	•••	•••	•••	• • •
Rhodesia and Nyasa- land, Fed. of	mn. pounds		•••	•••	•••	•••	•••	•••	2.6	3.5

Table 1 A. 18. Central America: constant price figures

	1948	1949	1950	1951	1952	19 5 3	1954	1955	19 5 6	1 95 7
Costa Rica	4.3	1.8	1.4	1.9	2.0	2.0	2.2	2.2	2.2	2.5
Cuba	•••	• • •	•••	• • •				•••	•••	•••
Dominican Republic		• • •	•••	• • •	•••	•••	•••	• • •		• • •
El Salvador	4.0	4.3	5.2	5.4	6.6	6.9	6.6	6.6	7.0	8.0
Guatemala	5.1	6.4	5.5	5.4	6.3	6.2	5.8	7.2	8.2	8.6
Haiti	2.5		• • •	3.4	3.6	5.1	4.5	4.4	4.8	4.8
Honduras	4.9	3.6	3.2	3.3	3.7	3.4	3.3	3.1	4.6	4.5
Mexico	54.1	58.3	56.4	58.3	55.2	62.8	50.0	56.9	64.2	76.0
Nicaragua	•••		•••		•••		•••	•••	•••	7.4
Panama	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
Total	[270.0]	[270.0]	[270.0]	[270.0]	[270.0]	[280.0]	[260.0]	[270.0]	[280.0]	[300.0]

^a = 1967. ^b = 1965.

Local currency, current prices

1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	957
	850	613	564	539	490	392	• • • •	•••	•••	•••	•••	•••
	268.0	239.0	199.8	181.9	118.9	99.9	85.9	•••		•••	•••	•••
•••	•••	•••	3.9	3.7	3.5	3.4	3.7	2.0	2.4	• • • •	• • •	•••
•••	• • •	•••	741	741	494	247	247	203	• • •	••• -	•••	•••
(1934)	1 540	1 476	1 426	820	441	367	319	4	• • •	•••	•••	•••
•••	• • •	13 488	15 650	9 703	6 120	3 280	•••	•••	•••	••••	•••	•••
• • •	•••	•••	1 729	1 235	1 235	•••	1 070	•••	98	69	•••	•••
• • •	•••	•••	988	988	988	272	•••	•••	•••	•••	•••	•••
• • •	•••	•••	101.3	80.4	67.3	54.4	49.2	45.1	37.3	26.6	•••	•••
•••	•••	•••	741	741	494	618	371	•••	• • •	•••	•••	• • •
(44.0)	39.5	36.8	29.2	30.2	25.3	21.9	23.5	21.9	14.9	8.4	7.1	6.9
•••	•••	•••	3 211	2 717	1 235	1 482	1 457	•••	•••	•••	• • • •	•••
•••	•••	4 125	3 236	3 162	2 742	1 976	2 148	•••	• • •	•••	•••	•••
•••	6.1	5.9	4.7	3.5	2.1	0.7	0.3	0.3	0.9	1.6	1.8	2.0
•••	•••	•••	2.8	2.8	2.6	2.4	•••	•••	•••	1.0	•••	•••
(14.3)	11.0	10.0	8.0	7.0	5.0	5.0	• • •	•••	•••	1.5	•••	•••
•••	•••	3.0	2.8	2.6	2.2	1.2	•••	0.2	0.1	••••	•••	•••
•••	0.5	0.6	0.5	0.5	0.3	•••	•••	•••	•••	• • •	•••	•••
•••	•••	•••	1 235	2 470	2 223	•••	2 149	• • •	•••	•••	•••	•••
•••	• • •	•••	988	494	494	988	• • •	•••	•••	•••	•••	•••
•••	•••	••••	• • •	2	1	1	1	1	1	2	2	2
•••	750	553	520	523	574	508	415	380	•••	430	189	•••
•••	•••	•••	741	1 482	1 235	840	371	296	•••	•••	•••	•••
•••	•••	•••	26.2	22.7	19.0	15.2	11.4	8.3	5.7	5.2	4.2	1.8
•••	8.9	7.2	5.9	6.1	4.9	•••	•••	•••	•••_	•••	•••	•••
•••	•••	•••	3 705	3 705	2 717	2 223	•••	•••	• • •	•••	•••	•••
•••	•••	2.1	2.0	1.6	1.6	1.5	1.6	•••	•••	•••	•••	•••
•••	•••	53.8	46.4	36.9	38.6	32.0	25.5	24.6	•••	•••	•••	
•••	254	256	248	219	171	119	116	71	44	29	40	52
•••	19.3	17.7	15.7	10.9	8.3	7.9	6.9	6.7	6.1	5.5	5.0	3.8
•••	3.9	3.5	2.9	2.5	1.7	0.9	0.5	•••	•••	•••	•••	•••
•••	622.3	620.4	691.1	672.1	682.2	228.6	144.3	66.3	•••	••••	•••	•••
(10.5)	10.5	8.4	8.8	7.4	8.6	7.1	6.6	8.6	7.4	6.6	4.4	2.5
•••	•••	5.2	5.1	3.8	2.0	1.0	0.3	0.1	0.4	0.7	0.7	0.7
•••	•••	•••	988	741	1 976	692	•••	•••	••••	•••	•••	•••
•••	7.0	7.2	7.1	5.0	1.5	•••	•••	•••	•••	•••	•••	•••
•••	•••	•••	•••	•••	•••	•••	9.5	8.6	5.5	6.4	4.4	4.1

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1968X
												•
2.4	5.7	5.8	5.6	5.7	5.6	5.3	5.8	[5.8]	[5.8]	[5.8]	•••	2.2°
•••	• • •	[175.0]	[175.0]	[200.0]	[200.0]	200.0	213.0	230.0	250.0	[250.0]	•••	250.0"
33.5	41.7	33.4	34.4	33.4	30.8	33.3	30.8	28.4	27.3	[28.0]	• • •	31.1ª
7.5	6.2	6.1	6.3	8.9	8.6	7.9	9.0	9.2	9.6	9.4	• • •	9.8
9.2	9.6	9.6	9.3	9.0	9.3	10.9	14.1	14.5	16.1	13.9	(15.0)	14.4
6.2	6.6	5.5	5.1	6.0	5.7	6.2	6.1	5.4	5.7	[5.7]	•••	7.2ª
5.0	4.6	4.1	7.1	7.0	7.3	4.9	5.0	5.3	5.2	[5.2]	•••	6.2"
74.4	74.8	81.7	88.1	97.9	108.0	121.0	121.3	146.0	146.9	152.8	•••	182.9
5.9	6.2	6.7	6.9	6.9	7.1	6.9	7.2	7.3	8.7	[9.0]	•••	10.2ª
• • •	•••	[1.0]	[1.0]	[1.0]	[1.0]	1.0	1.0	1.0	[1.0]	[1.0]	•••	[1.0]
[300.0]	[310.0]	[330.0]	[340.0]	[380.0]	[380.0]	395.0	410.0	450.0	475.0	[480.0]	•••	515.5

Part II. Military expenditure

Table 1 A.	19.	Central	America:	current	price	figures
------------	-----	---------	----------	---------	-------	---------

	Currency	1948	1949	1950	1951	1952	1953	1954	1955	1956
Costa Rica	mn. colones	17.3	7.6	6.8	9.6	9.8	9.9	11.2	11.6	12 (
Cuba	mn. pesos									
Dominican Rep	ublic mn. pesos			• • •						•••
El Salvador	mn. colones	6.2	7.0	9.9	11.9	12.7	15.4	14.5	16.4	17.4
Guatemala	mn. quetzales	4.6	5.2	5.1	5.6	6.0	6.0	6.7	8.0	8.8
Haiti	mn. gourdes	14.1	15.6	17.7	19.8	22.9	26.3	25.7	25.9	27.2
Honduras	mn. lempiras	6.8	5.8	5.7	6.4	6.5	6.1	6.4	6.4	9.3
Mexico	mn. pesos	294	331	346	398	435	479	405	533	632
Nicaragua	mn. cordobas	•••			•••			• • •		•••
Panama	mn. balboas	•••	•••	•••	•••	•••	•••	•••	•••	•••

Table 1 A. 20. South America: constant price figures

	1948	1 949	1950	1 951	1952	1953	1954	1955	1956	1957	
Argentina	506.3	379.4	268.3	281.5	247.8	270. 1	291.7	231.4	292.6	247.0	
Bolivia			•••		•••	4.2		•••	2.4	2.5	
Brazil	172.3	220.2	219.4	246.2	238.8	241.7	235.3	268.4	323.8	359.1	
Chile	65.3	68.2	78.1	73.7	• • •	132.3	84.7	126.3	120.9	129.8	
Colombia	21.2	24.6	23.2	29.3	40.8	54.4	64.1	63.4	61.7	54.9	
Ecuador	•••			• • •	7.5	12. 1		18.2	20.1	19.3	
Paraguay	•••	• • •	•••	•••	• • •	• • •	• • •	• • •	4.8	4.8	
Peru	21.5	28.5	31.3	36.2	35.0	34.2	32.2	34.3	56.5	50.9	
Uruguay		•••	•••	• • •			•••		• • •	•••	
Venezuela	42.8	47.6	63.5	63.5	70.5	71.1	69.6	111.4	139.2	117.6	
Total	850.0	790.0	710.0	76 0.0	760.0	830.0	810.0	870.0	1 030.0	9 90.0	

^a=1967. ^b=1966.

Table 1 A. 21. South America: current price figures

	Currency	1948	1949	1950	1951	1952	1953	1 954	1955	1 956
Argentina	mn. pesos	2 135	2 071	1 952	2 747	3 320	3 775	4 246	3 809	5 420
Bolivia	mn. pesos	•••	•••	• • •	•••	•••	1.7	•••	4.7	9.'
Brazil	bn. cruzeiros	4.8	5.9	6.3	7.6	9.3	11.3	13. 0	17.8	26.2
Chile	mn. escudos	2.2	2.8	3.7	4.5	6.0	11. 7	13.2	34.3	51.
Colombia	mn. pesos	57	71	81	110	150	214	275	272	283
Ecuador	mn. sucres	• • •		•••	88	113	181	250	295	298
Paraguay	mn. guaranis	•••	•••	• • •	• • •	•••	• • •	• • •	• • •	••
Peru	mn. soles	212	319	398	508	522	562	551	618	1 066
Uruguay	mn. pesos	•••	•••	• • •	•••	• • •		• • •	•••	••
Venezuela	mn. bolivares	120	153	182	201	212	210	270	338	382
Local currency, current prices

1957	1958	1959	1960	1961	196 2	1963	1964	196 5	1966	1967	1968	1969
13.6	13.2	13.3	13.6	13.5	14.1	14.4	15.4	14.4				
				•••	•••	• • •	200	213	230	250	•••	•••
•••	34.5	42.6	33.4	31.6	33.1	34.0	37.0	35.0	32.4	31.1	•••	•••
19.2	19.0	15.6	15.3	15.5	21.7	21.3	20.0	22.6	23.0	24.1	24.5	•••
9.3	9.8	9.8	9.4	9.2	9.3	10.2	12.7	14.3	14.7	16.4	14.4	(15.7)
29.7	35.0	34.4	32.8	31.7	31.6	33.5	38.8	36.8	35.4	35.8	[35.8]	
8.9	9.1	9.3	8.2	14.4	14.5	15.4	10.8	11.4	12.4	12.4	•••	•••
792	862	883	1 021	1 111	1 258	1 388	1 589	1 651	2 073	2 148	2 284	•••
• • •	• • •	•••	•••	•••	51	55	53	57	60	72	•••	• • •
•••	•••	•••	•••	•••	•••	•••	1	1	1	•••	•••	•••

US \$ mn, at 1960 prices and 1960 exchange-rates (Final column, X, at current prices and exchange-rates)

1958	1959	1960	1961	196 2	1963	1964	1965	1966	1967	1968	1969	1968X
270 1	352 7	284.0	280 4	260.8	262.6	199.6	276.0	100.2	246 7	246 7		128 6
219.1	233.1	204.9	200.4	209.0	202.0	200.0	270.0	197.5	240.7	240.7		420.0
367.6	2.0	267.3	245 1	264.6	259.8	272.8	406.0	340.5	387 5			1 008 5
121 0	96.4	103.5	105 2	111.6	95.9	94.2	111 5	116 1	127.8	129.3	(132.2)	1000.5
50.8	42.2	47.3	56.2	88.8	97.1	94.6	101.6	101.6	104.9	106 7		135 5
18.4	16.5	22.2	21.1	20.1	17.4	19.8	22.2	24.8	19.5	19.8	(19.8)	23.54
[5.8]	[5.1]	[4.9]	4.2	4.8	5.3	5.5	5.9	7.2	8.8	[10.0]		19.64
57.7	50.8	50.1	[60.0]	[70.0]	80.7	78.7	74.6	77.1	88.2	105.7	(93.7)	153.0
•••	[9.4]	[10.8]	14.9	14.9	20.3	19.8	18.9	14.4	[15.0]	[16.0]	•••	13.10
186.2	195.1	174.6	151.9	157.8	188.3	197.6	219.1	237.9	265.8	263.1	•••	195.6
1 100.0	960.0	970.0	940.0	1 010.0	1 030.0	1 080.0	1 250.0	1 130.0	1 280.0	1 390.0	•••	2 1 2 0.0

Local currency, current prices

1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
7 115	9 831	17 686	24 027	27 367	33 608	40 188	45 158	64 703	61 656	98 933	150 000	
23.9	35.0	41.0	39.0	57.9	61.0	66.0	71.0	146.0	191.0	•••	•••	
34.6	40.8	43.9	54.8	69.6	114.5	194.5	338.5	924	1 1 57	1 430	•••	•••
73.1	82.2	91.1	109.0	119.3	144.1	178.5	256.0	369.0	472.0	614.0	774.0	(964.0)
289	306	272	317	410	664	9 65	1 072	1 218	1 467	1 628	1 761	` • • •
289	282	247	336	336	329	307	370	428	498	406	428	•••
•••	•••	•••	•••	•••		1 348	1 436	1 613	2 016	2 471	•••	•••
1 039	1 265	1 259	1 340	•••	•••	2 614	2 864	3 122	3 528	4 441	5 921	(5 766)
•••	•••	•••	•••	187	221	365	509	760	1 000		•••	` .··
496	601	607	540	533	509	613	650	734	796	881	880	•••

1 B. Armed forces of the world, 1960-1968

Thousands of men

196019611962196319641965196619671USA2 4802 4802 6802 7002 6902 6803 0903 4003Other NATO3 4003 4403 1303 1203 1603 0202 9603 0303Total NATO 5 8805 9205 8105 8205 8405 7006 0606 430 6Total Warsaw Pact4 4303 9904 5804 3504 4304 2704 2704 3104Other Europe ^a [1 100][1 000][900]800830800760[750]Middle East600600610640650700750710South Asia ^b 8408008709501 2401 2001 2301 4201Far East (incl. China)4 9405 3305 4205 3705 7705 8705 9006 3606Oceania60606060707080904Africa1302302702903103203303701Central America150160190200[220]2402402501South America18 68018 67019 31019 98019 96019 76020 30021 32021										
USA $2 480$ $2 480$ $2 680$ $2 700$ $2 690$ $2 680$ $3 090$ $3 400$ 3 Other NATO $3 400$ $3 440$ $3 130$ $3 120$ $3 160$ $3 020$ $2 960$ $3 030$ 3 Total NATO $5 880$ $5 920$ $5 810$ $5 820$ $5 840$ $5 700$ $6 060$ $6 430$ 6 Total Warsaw Pact $4 430$ $3 990$ $4 580$ $4 350$ $4 430$ $4 270$ $4 270$ $4 310$ 4 Other Europe ^a $[1 100]$ $[1 000]$ $[900]$ 800 830 800 760 $[750]$ Middle East 600 610 640 650 700 750 710 South Asia ^b 840 800 870 950 $1 240$ $1 200$ $1 230$ $1 420$ Far East (incl. China) $4 940$ $5 330$ $5 420$ $5 370$ $5 770$ $5 870$ $5 900$ $6 360$ 6 Oceania 60 60 60 60 70 70 80 90 Africa 130 230 270 290 310 320 330 370 Central America 150 160 190 200 $[220]$ 240 240 250 South America 540 570 600 590 $[600]$ 610 630 $[640]$ World total $18 680$ $18 670$ $19 310$ $19 980$ <th></th> <th>1960</th> <th>1961</th> <th>1962</th> <th>1963</th> <th>1964</th> <th>1965</th> <th>1966</th> <th>1967</th> <th>1968</th>		1960	1961	1962	1963	1964	1965	1966	1967	1968
Total NATO5 8805 9205 8105 1505 1605 0202 9005 0505Total NATO5 8805 9205 8105 8205 8405 7006 0606 4306Total Warsaw Pact4 4303 9904 5804 3504 4304 2704 2704 3104Other Europe ^a [1 100][1 000][900]800830800760[750]Middle East600600610640650700750710South Asia ^b 8408008709501 2401 2001 2301 4201Far East (incl. China)4 9405 3305 4205 3705 7705 8705 9006 3606Oceania6060606070708090Africa130230270290310320330370 Central America150160190200[220]240240250 South America540570600590[600]610630[640] World total18 68018 67019 31019 98019 96019 76020 30021 32021	USA Other NATO	2 480 3 400	2 480 3 440	2 680	2 700	2 690 3 160	2 680	3 090	3 400	3 500
Total Warsaw Pact 4430 3990 4580 4350 4430 4270 4270 4270 4310 4 Other Europe ^a $[1100]$ $[1000]$ $[900]$ 800 830 800 760 $[750]$ Middle East 600 600 610 640 650 700 750 710 South Asia ^b 840 800 870 950 1240 1200 1230 1420 1 Far East (incl. China) 4940 5330 5420 5370 5770 5870 5900 6360 6 Oceania 60 60 60 60 70 70 80 90 Africa 130 230 270 290 310 320 330 370 40 Central America 150 160 190 200 $[220]$ 240 240 250 40 South America 540 570 600 590 $[600]$ 610 630 $[640]$ World total 18680 18670 19310 19980 19760 20300 21320 21	Total NATO	5 880	5 920	5 810	5 820	5 840	5 700	6 060	6 430	6 520
Other Europe ^a [1 100] [1 000] [900] 800 830 800 760 [750] Middle East 600 600 610 640 650 700 750 710 South Asia ^b 840 800 870 950 1 240 1 200 1 230 1 420 1 Far East (incl. China) 4 940 5 330 5 420 5 370 5 770 5 870 5 900 6 360 6 Oceania 60 60 60 60 70 70 80 90 Africa 130 230 270 290 310 320 330 370 [Central America 150 160 190 200 [220] 240 250 [[570 630 [640] [[800] [[800] [[100] [20 [20 20 [[[[Total Warsaw Pact	4 430	3 990	4 580	4 350	4 430	4 270	4 270	4 310	4 310
Middle East 600 600 610 640 650 700 750 710 South Asiab8408008709501 2401 2001 2301 4201Far East (incl. China)4 9405 3305 4205 3705 7705 8705 9006 3606Oceania6060606070708090Africa130230270290310320330370Central America150160190200[220]240240250South America540570600590[600]610630[640]World total18 68018 67019 31019 08019 96019 76020 30021 32021	Other Europe ^a	[1 100]	[1 000]	[900]	800	830	800	760	[750]	740
South Asiab8408008709501 2401 2001 2301 4201Far East (incl. China)4 9405 3305 4205 3705 7705 8705 9006 3606Oceania6060606070708090Africa130230270290310320330370 Central America150160190200[220]240240250 South America540570600590[600]610630[640] World total18 68018 67019 31019 08019 96019 76020 30021 32021	Middle East	600	600	610	640	650	700	750	710	770
Far East (incl. China)4 9405 3305 4205 3705 7705 8705 9006 3606Oceania6060606070708090Africa1302302702903103203303701Central America150160190200[220]2402402501South America540570600590[600]610630[640]1World total18 68018 67019 31019 08019 96019 76020 30021 32021	South Asia ^b	840	800	870	950	1 240	1 200	1 230	1 420	1 470
Oceania 60 60 60 60 70 70 80 90 Africa 130 230 270 290 310 320 330 370 10 Central America 150 160 190 200 [220] 240 240 250 10 South America 540 570 600 590 [600] 610 630 [640] 10 World total 18 680 18 670 19 310 19 980 19 960 19 760 20 300 21 320 21	Far East (incl. China)	4 940	5 330	5 420	5 370	5 770	5 870	5 9 0 0	6 360	6 560
Africa130230270290310320330370Central America150160190200[220]240240250500South America540570600590[600]610630[640]100World total18 68018 67019 31019 08019 96019 76020 30021 32021	Oceania	60	60	60	60	70	70	80	90	100
Central America 150 160 190 200 [220] 240 250 South America 540 570 600 590 [600] 610 630 [640] World total 18 680 18 670 19 310 19 080 19 960 19 760 20 300 21 320 21	Africa	130	230	270	290	310	320	330	370	[400]
South America 540 570 600 590 [600] 610 630 [640] World total 18 680 18 670 19 310 19 080 19 960 19 760 20 300 21 320 21	Central America	150	160	190	200	[220]	240	240	250	[250]
World total 18 680 18 670 19 310 19 080 19 960 19 760 20 300 21 320 21	South America	540	570	600	590	[600]	610	630	[640]	[660]
	World total	18 680	18 670	19 310	19 080	19 960	19 760	20 300	21 320	21 78 0

Source: The list of sources, page 195.

^a Excludes NATO and Warsaw pact countries. ^b India, Pakistan, Ceylon, Afghanistan.

1C. Arms trade in major weapons, 1950-1968

SOURCES AND METHODS

Introduction

Neither the register nor the tables on the arms trade in major weapons makes any claim to be official, complete or final. They are published on our responsibility. When there were conflicting reports—and this was often the case for the number of items supplied—we have used our judgement, based on general experience of the reliability of different sources. Any corrections, additions, or deletions, from official or unofficial sources, would be welcome.

Sources of information

In collecting the basic information, three types of sources have been used. First, unofficial sources were used: technical journals, press reports, and other publications concerning defence equipment, military aid and alliances, etc. Secondly, information was gathered from official sources: parliamentary statements, hearings and debates, official publications and press releases. Thirdly, correspondents in different parts of the world interviewed officials, manufacturers, and other people connected with the arms trade, and read the relevant local publications.

Coverage

A. Weapons

Both the tables and the register cover the deliveries of major weapons: ships, aircraft, armoured fighting vehicles and missiles. The coverage of warships, combat aircraft and heavy tanks is probably reasonable. Even if it were possible, very few countries attempt to conceal deliveries of these items. The coverage of smaller items such as light aircraft, helicopters, armoured cars and missiles is not quite so good, but probably sufficient to provide a basically accurate picture of the trade in these weapons.

Information on transfers of other weapons, especially small arms, is fragmentary and unreliable. Even if the types of small arms possessed by different countries could be established, it would be extremely difficult to dis-

Part II. Trade in major weapons

cover the numbers, the dates of deliveries and the countries from which they were purchased. Small arms often have long production series, often change hands a number of times, and often take complicated routes to reach their destination. For this reason, the tables are limited to the delivery of major weapons. However, where we have come across reliable information for 1968 on the transfer of small arms or other equipment, it has been included in the register.

The tables include spares and equipment for aircraft and ground equipment (launchers) for missiles. But they do not include a whole range of equipment that may be needed to acquire a particular weapons system. For instance, a country purchasing a fighter squadron will, in addition to spares and equipment for the aircraft itself, need to acquire various kinds of munitions for the aircraft, a radar tracking and warning system, ground equipment, repair and maintenance facilities, training for its pilots and technicians, etc. Thus the figures in the tables may appear rather low when compared with, for instance, figures for US grant aid or sales.

In a number of countries, the air force is responsible for some of the country's civil transport and for training pilots for civil planes. This is particularly true for many South American countries. The Brazilian Air Force, for instance, provides transport to remote areas where civil airlines do not operate, delivers food, mail and medical supplies, and is responsible for surveying much of the vast unmapped territory of Brazil. In 1968 both Argentina and Brazil purchased heavy military transports which will probably undertake civilian duties. The recent reorganization of the Argentinian Air Force has included the expansion of the air transport brigade, which will take over duties previously performed by the Secretariats of Public Works and Agriculture and by LADE (Lineas Aéreas del Estado) which operated certain domestic services. The general principle of inclusion or exclusion in the arms trade tables has been to include all planes supplied to the armed forces of the countries concerned, except when it was known that the planes were for civil use. Often, however, it was not known: and it should be borne in mind in considering the register that transport and trainer aircraft may be used for civil purposes.

On the other hand, almost all training aircraft can be adapted for counterinsurgency action without great difficulty. The MF1-9 plane used by Swedish pilots in Biafra for strafing operations is a basic primary trainer. The Royal Laotian forces use T-28 trainers in operations against the Pathet Lao. Where it is known that a particular trainer has been purchased especially for counter-insurgency duties, this is indicated in the register in the column for comments.

Joint and licenced production of weapons has been included in both the

tables and the register. In the register both countries involved in the production are shown in the column for suppliers.

B. Countries

The countries covered by the register and the tables are the non-arms producing countries. Many of the countries under consideration do have domestic defence industries, but they are still heavily dependent on imports in meeting their defence requirements. Two of the countries—South Africa and Israel—are rapidly coming closer to self-sufficiency.

Viet-Nam—North and South—is shown separately in the tables of major weapon imports, and totals are given including and excluding Viet-Nam. In the table of major weapons exports by supplier, both North and South Viet-Nam are excluded. For the United States supply of arms to Viet-Nam, only the major weapons supplied to South Viet-Nam are entered as arms trade: the weapons supplied to US troops do not appear in the tables. Since the United States is intervening directly in this conflict, while the Soviet Union is simply supplying arms to North Viet-Nam, any comparison of the arms supplies of the two great powers to the two sides would be inappropriate. The cost of the United States intervention (see page 30), at around \$25 billion, vastly exceeds the whole of the trade in major weapons recorded in the tables.

The regions listed in the tables are as follows:

- Far East. All countries east of Pakistan, except China and Japan. Viet-Nam is shown separately.
- Middle East. Abu Dhabi, Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Muscat and Oman, Saudi Arabia, South Yemen, Syria UAR, Yemen.
- North Africa. Algeria, Libya, Morocco, Tunisia.
- Sub-Saharan Africa. The rest of Africa, except for South Africa, which is shown separately.
- Indian Sub-Continent. Afganistan, Ceylon, India, Pakistan.
- Central America. All countries from Panama northwards up to the United States.
- South America. The rest of Latin America.

Europe. Only Greece and Turkey are included in the table. In the register, Portugal is also included, because Portugal's arms procurement is relevant to the discussion of the arms trade with Africa.

Arms supplies to colonies or dependencies are included when these countries have armed forces separate from the metropolitan power—for example, Rhodesia and Malaysia during the nineteen-fifties.

The tables

There may be some slight upward bias in the figures for recent years due to extra information. This upward bias could account for approximately 10 per cent of the total. But it is unlikely to be higher than this. It concerns primarily the smaller items—helicopters, light aircraft and inexpensive military vehicles, whose values are low compared with those of heavy tanks and combat aircraft. It is unlikely that there is any upward bias in the estimates for ships and missiles. The ship estimates are based almost entirely on one source, *Jane's Fighting Ships.*¹ There were very few transfers of missiles in the earlier years.

In order to obtain aggregate statistics of the trade in major weapons, it was necessary first to reconcile conflicting data and to estimate the numbers and types of weapons and the dates of the deliveries when such information was not available, and then to value individual transactions.

A. Reconciliation and estimation

There is little difficulty in obtaining reliable and unconflicting information about the deliveries of warships, combat aircraft and heavy tanks. In value terms, these amount to around 80 per cent of total arms deliveries. The problems of reconciliation and estimation primarily concern light tanks and other vehicles, missiles, light aircraft and helicopters. When there was conflicting information, we have, if possible, made our decision on the basis of general experience of the reliability of different sources.

For tanks, other than heavy tanks, the main problem has been the lack of sources. For certain countries, whose armed forces are well publicized, such as India, Pakistan, the UAR or Israel, the information on deliveries of armoured fighting vehicles has been fairly good. These are the countries in the third world which have been the main importers of heavy tanks. For some countries (which, for the most part, imported light tanks or armoured cars) there is only information on the types the country possesses and the numbers of battalions or armoured divisions in that country. To estimate the dates and numbers of tank deliveries, we took into account the dates of production of particular types, or, in the case of second-hand equipment, the dates of replacement of the particular type in the supplier country, the dates of aid or sales agreements or other political and diplomatic ties between the supplier and the recipient countries, the dates at which the presence of these types was first reported, and the number of tanks, armoured cars, and armoured personnel carriers in an armoured battalion or division. Where we have not known the latter, we have assumed that the size of a

¹ London: Sampson Low, Marston & Co., annual.

battalion or division is the same as that of the main supplier, or in the case of ex-colonies, the same as that of the former metropolitan power.

Estimates for light aircraft—helicopters, trainers, liaison and light transport types—have followed a similar pattern. Here we have taken into account the size of squadrons and the relative requirements in an air force for combat aircraft and other types.

The problems concerning missiles are somewhat different. Once it is known that a country possesses a particular missile, it is fairly easy to pin down the date of delivery. The period between the initial date of production and the date the missile was reported is usually limited. The main problem concerns the estimation of numbers of missiles, which are small and easily concealed. For missiles launched from tanks, ships or aircraft, the estimates are based on the numbers of tanks, ships and aircraft a country possesses which are capable of delivering a particular missile. The remaining missiles are almost entirely anti-tank and anti-aircraft missiles. The deliveries of anti-aircraft missiles such as V750VK (referred to in West as Guideline), Hawk or Bloodhound have tended to attract considerable attention. There is usually, therefore, fairly good information on the numbers of missile sites, launchers, or even of the missiles themselves. As far as we know, only a few countries posses anti-tank missiles and for most of these we have reasonable information.

B. Valuation

The purpose of valuing all items in a common unit is to be able to measure changes in the total flow of weapons and its geographical pattern. Various methods of valuation are conceivable. The obvious ones are military value and monetary value. Military value is generally unmeasurable because it depends on the circumstances in which the weapons may be used. Monetary value, on the other hand, measures something that is relatively precise and is interesting in itself-the quantity of resources used. It is therefore what we have used. The monetary values chosen may not correspond to actual prices paid. Actual prices paid vary considerably according to different pricing methods, the lengths of production series and the terms involved in individual transactions. We have tried to draw up a list of comparable prices based on actual prices and on criteria such as weight and sophistication. These criteria have been different for each of the four different types of weapons-ships, aircraft, missiles and armoured fighting vehicles. One consequence of this method of valuation is that our values of Soviet weapons exports tend to be higher than their quoted prices. For this reason, our figures of the relative flows of major weapons from the United States and the Soviet Union may be much closer together than other

Part II. Trade in major weapons

statistics comparing weapon flows from these two countries. There is an additional reason for the smaller difference between the two in our figures. Soviet weapons exports to developing countries include a smaller proportion of small arms than exports from the United States; a comparison of *total* weapons exports from the two countries would look very different from a comparison of major weapons exports alone.

SHIPS

Ships were divided into eleven different categories.² For each category, we calculated a 1968 dollar price per ton, based on actual prices in 1968. We also assumed a technical improvement factor of 3.5 per cent per annum. This means that the price of a ship completed in 1967 is 3.5 per cent less than the price of a similar ship completed in 1968. This improvement factor has nothing to do with general price inflation; it is merely intended to measure the increase in the sophistication of ships. It is so to speak, "more ship".

A large proportion of the ships sold to the countries under consideration are second-hand. It was therefore necessary to take into account the depreciation of ship values. A simple exponential depreciation was taken, based on the length of life of ships in each of the eleven categories and a scrap value of 1 per cent. This yields a rather rapid depreciation in the first few years of a ship's life. For this reason, among others, the export of warships by the United Kingdom, which has exported many new ships to developing countries, is higher in value terms than the export of warships from either the United States or the Soviet Union, which have both exported large numbers of second-hand warships.

AIRCRAFT

For aircraft we derived a price for each individual type of aeroplane. This price was based on two factors. First, it was based on actual prices, taking into account factors which cause these prices to vary such as the length of the production series, the sales or aid terms, and the support

- ² The categories were:
- 1. Aircraft carriers
- 2. Submarines
- 3. Cruisers
- 4. Destroyers, 1300 tons and over
- 5. Frigates, corvettes, patrol vessels, 600-1300 tons
- 6. Patrol boats, torpedo boats, gunboats, etc. 300-550 tons
- 7. Patrol boats, torpedo boats, gunboats, etc. 100-300 tons
- 8. Patrol boats, torpedo boats, gunboats, etc. under 100 tons
- 9. Minesweepers
- 10. Minelayers

11. Landing ships, landing craft, transports, supply ships, survey ships, oilers, tugs etc.

222

facilities, spares and extra equipment included in the price. Secondly, we used kilo prices for the empty weight of different categories of aircraft,³ as a rule of thumb. These categories were roughly divided into older construction and fully modern construction. We included a certain percentage of the price for spares and equipment for each of the three categories of aircraft. Explosives, missiles and ground equipment were not included.

The problem of depreciation is much harder for aircraft than for ships. The life of an aircraft is shorter than that of a ship and the scrap value approaches zero. A simple exponential depreciation yielded too rapid a depreciation in early years. Many of the second-hand aircraft sold in the period had been part of a long production series. It was virtually impossible to discover the date the aircraft had been built, the extent they had been used, and the extent of refurbishing. Since second-hand aircraft are a rather small proportion of total aircraft deliveries⁴ a blanket assumption of 50 per cent of the original price for each second-hand aircraft was taken.

TANKS

We calculated individual prices for each armoured *fighting* vehicle. The prices were based on the type and the date when the vehicle had first been used. The five types were: main battle tank, light tank, tank destroyer, armoured car, and armoured personnel carrier. We made the same assumption about depreciation as we made for aircraft, for similar reasons.

MISSILES

Here again, we calculated individual prices for each missile. The prices were based on type, date of production, range and guidance. There were seven types: artillery rockets, anti-tank missiles, surface-to-surface missiles, air-tosurface missiles, long range surface-to-air missiles, short range surface-toair missiles and air-to-air missiles.

We had separate prices for launchers and missiles.

⁸ These categories were:

- (a) Combat aircraft (fighters, bombers) Supersonic
 Subsonic
 (i) conventional
 (ii) STOL (short take-off and land-ing)
- (c) Others (transport, trainers, etc.)(i) piston engined(ii) turbo jet
 - (iii) turbo fan jet

(b) Helicopters

[•] Unless our sources indicated that a particular aircraft was second-hand or unless they gave a delivery date after the production line had closed down, we assumed that it was new. If we did not know when the production line had closed down, we took as the closing date the last date the aircraft had appeared in Jane's All the World's Aircraft (London: Sampson Low, Marston & Co., annual).

Part II. Trade in major weapons

JOINT AND LICENSED PRODUCTION

Licensed production can vary from assembly to complete manufacture. In most cases, it is known what proportion of a particular weapon is imported and what proportion is produced at home. The tables include only the import content of the weapon. In obtaining values for weapons produced under license, we took a percentage of the total value of the weapon equivalent to the proportion of the weapon which was imported. In the few cases where this percentage was not known, it was assumed to be 50 per cent.

C. Rounding

All figures above \$10 mn in the main tables are rounded to the nearest \$10 mn. Figures below \$10 mn are rounded to the nearest \$5 mn. The erratic year-to-year movement makes it difficult to see the trend in the yearly figures: so five-year moving averages are presented in the tables (and in the charts in chapter 1). The five-year moving average shown under the year 1952 is the average for the years 1950 to 1954 inclusive; the figure under the year 1953 is the average for 1951 to 1955 inclusive, and so on.

The register

For the register, no attempt was made to estimate where information was not available or to reconcile conflicting data from equally unreliable sources. In such cases, two dots . . indicate that the information is not available.

The register is not simply a record of deliveries in 1968: it includes, as well as deliveries in that year, items known to be on order or ordered. The final columns indicate the information available about the dates of orders or deliveries. When no information is given about either the date of the order or of the delivery, this implies that the item is known to be on order. When deliveries have been spread over a number of years and it is not known how they have been divided among the years, the whole transaction has been entered, and the years over which the supplies were spread are shown in the delivery columns, thus: 1966–68.

The information is arranged by region.

Conventions

- \ldots = Information not available
- = Nil, or less than \$2.5 mn
- () = A greater degree of uncertainty about, for example, the date of an order or the identity of a supplier
- + = When + is added to a figure, it means at least the number given and probably more.
- u.c. = Unit cost
- t. = Tons
- 1968-=1968 and subsequent years
- Transport = Transport plane
- A-A = Air-to-air missile
- S-S = Surface-to-surface missile
- A-S = Air-to-surface missile

S-A = Surface-to-air missile

ASW = Anti-submarine warfare

COIN = Counter-insurgency action

- STOL = Short take-off and landing
- MAP = (US) Military Assistance Program

Part II. Trade in major weapons

		1950	1951	1952	1953	1954	1955	1956	195
Greece & Turkey	A B	20	20	10 60	80 100	150 110	210 130	80 190	110 190
Middle East	A B	20	40	20 50	90 80	80 120	150 160	280 190	220 220
North Africa	A B		_	-	-	_	_	20	:
Sub-Saharan Africa	A B			5 5	5 5	5 5	10 5	10 5	
South Africa	A B	5	20	30 20	10 20	10 20	10 20	40 20	1) 20
Indian Sub-continent	A B	40	20	20 50	80 60	100 70	80 100	100 160	18 16
Far East excl. Viet-Nam	A B	90	150	120 100	60 100	90 100	110 100	150 160	11 23
Central America	A B		5	30 10	10 10	5 20	20 10	20 10	: 10
South America	A B	40	100	30 80	110 100	120 90	130 120	80 120	14 11
Total excl. Viet-Nam	A B	220	350	260 370	440 470	560 550	720 650	770 860	78) 95(
Viet-Nam, North & South	A B	. —	_	_	-	10	10	5 10	1
Total	A B	220	350	260 370	440 470	570 550	730 650	780 870	78) 96)

Table 1 C. 1	. Values of	f imports of 1	naior weapons b	v certain areas.	1950-19684
TADIC I C. I	, values u	ιμαροιόσοιι	najoi weapons u	y certam areas,	1320-1300

Source: SIPRI (unpublished) worksheets of arms transfers, 1950-68.

^a Figures rounded to nearest 10, except for figures under 10 which are rounded to nearest 5. Items may not add to totals because of rounding.

Tables of values

US {	5	mn, a	t constant	1968	prices. A=	= Yearly	, figures,	B = F	ive-year	moving	averages
------	---	-------	------------	------	------------	----------	------------	-------	----------	--------	----------

1	1967	1966	1965	1964	1963	1962	1961	1960	19 5 9	1958
)	80	80 90	160 100	90 90	100 80	20 70	30 90	110 140	160 160	380 170
)	430	220 350	260 270	190 230	230 210	240 180	120 180	100 180	220 180	240 210
)	40	40 40	70 40	10 30	20 30	20 10	20 10	5 10	5 5	5
)	40	30 40	70 40	30 40	50 40	30 30	20 30	30 20	30 20	 10
)	70	130 80	100 80	20 70	70 40	10 20	20	5	10 10	10 20
)	160	170 140	80 120	60 120	140 130	150 150	190 160	190 200	130 200	340 190
)	90	250 150	140 180	230 200	190 180	200 220	120 260	370 290	410 270	350 280
-		10 10	10 10	20 40	20 60	150 70	100 60	40 60	10 30	10 20
-	_	80 60	60 50	20 50	30 50	60 60	100 70	100 90	40 100	140 100
)	950	1 020 960	950 890	680 880	860 810	880 800	700 880	930 1 000	1 000 980	1 470 990
1	530	270 270	50 180	30 100	40 70	120 70	120 60	20 60	5 40	30 10
) :	1 480	1 300 1 230	1 000 1 070	710 980	890 880	1 000 870	820 940	950 1 060	1 010 1 020	1 510 1 000

		1950	1951	1952	1953	1954	1955	19 56	1957
USA	A B	60	190	160 190	220 240	300 260	330 300	280 410	360 440
USSR	A B	40	60	30 30	10 30	5 40	50 60	100 90	140 110
UK	A B	70	40	40 80	150 90	110 120	120 140	160 160	160 160
France	A B			20	30 20	50 40	30 50	100 70	60 70
Canada	A B	20	10	20	30	70 30	70 30	30 30	5 30
Italy	A B	_	40	5 10	5 10	5 10	5 10	20 10	20 10
China	A B	—	—			—		_	_
Germany, West	A B		—	—	_	—	10 5	10 5	5 10
Czechoslovakia	A B		_			-	30	40	40
Japan	A B		—	—		20	5	5 10	5 5
Sweden	A B		—	—	5 5	 5	5 5	5 10	10
All other	A B	30	10 20	30 20	20 30	5 30	70 20	5 30	20 30
Total	A B	220	350	260 370	440 470	560 550	720 650	770 860	780 950

Table 1 C. 2. Values of exports of major weapons, to areas listed in table 1 C. 1, by main suppliers, $1950-1968^{a, b}$

Source: SIPRI (unpublished) worksheets of arms transfers, 1950-68.

^a Excluding North and South Viet-Nam.

^b Figures rounded to nearest 10, except for figures under 10, which are rounded to nearest 5. Items may not add to totals because of rounding.

Tables of values

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
800 470	420 450	510 410	160 320	160 290	350 290	290 310	500 330	270 310	210	290
140 130	110 160	160 240	280 270	540 280	250 280	170 300	180 290	370 320	500	380
230 170	140 170	140 150	180 120	70 110	70 100	70 100	130 100	130 130	110	210
110 70	40 50	20 50	30 50	60 60	110 60	80 80	30 80	120 100	70	220
5 20	50 20	5 10	10 20	5	10 10	10 10	20 10	5 20	5	40
20 20	10	10 5	5	5	10 5	10 10	5 10	10 10	10	30
80	70 40	50 40	20	10	5	10	40 10	10 10	10	10
10 10	20 10	20 10	10 20	5 20	10 10	20 30	10 30	80 30	10	5
5 30	120 30	5 30	30	5 5	10 5	5 5	5	5 5	5	
10 5	5	10	10 10	20 10	20 10	5 10	10 10	5 5	10	5
30 10	5		_	_	_	_	_	_	—	_
40 20	40 20	5 20	10 10	10 10	<u> </u>	10 20	30 10	20 10	5	10
1 470 990	1 000 980	930 1 000	700 880	880 800	860 810	680 880	950 890	1 020 960	950	1 200

.

US \$ mn, at constant 1968 prices. A=Yearly figures. B=Five-year moving averages

.

Middle East Abu DhabiUK2Britten-Norman IslanderSTOL transport support organization support organization (UK) 15Saladin SaladinAmoured carInitial equipment of air support organization (UK) .19(UK)3Fast patrol boat de RangerAmoured car $\$l.2 mn approx.$ (April 1968).(UK)3Fast patrol boat de RangerIranUSA24F-5A/B Freedom Fighter 2Fighter Cabin monoplane FighterFighter Bio monoplane (April 1967)2Cessaa 310L 2Cabin monoplane FighterMAP32F-4D PhantomFighter Patrol boatFor Phantoms (April 1967)Sparrow and Sidewinder missile 6A-A (For PhantomsFor Phantoms (April 1967)2CorvetteDisplacement: 85- Displacement: 85- 1 135 t<	Recipient	Supplier	Number	Item	Description	Comment	Date ordered	Date delivered
Abu Dhabi UK 2 Britten-Norman Islander STOL transport Initial equipment of air support organization ·· 19 15 Saladin Amoured car \$1.2 nn approx. (April 1968) ·· 19 (UK) 3 Fast patrol boat ·· 19 ·· 19 Italy 6 Agusta-Bell 206A Helicopter ·· 1967 19 Iran USA 24 F-5A/B Freedom Fighter Fighter Cabin monoplane MAP ·· 1967 19 2 Cessna 310L Cabin monoplane MAP April 1967) 19 ·· 1967 19 2 P-4D Phantom Fighter Billocopter MAP ·· 19 10 10	Middle East							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Abu Dhabi	UK	2	Britten-Norman Islander	STOL transport	Initial equipment of air support organization	••	1968
			15	Saladin	Amoured car	\$1.2 mn approx.	(April 1968)	••
$\left[\begin{array}{cccccccccccccccccccccccccccccccccccc$		(UK)	3	Fast patrol boat			••	1968
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		Italy	6	Agusta-Bell 206A. Jet Ranger	Helicopter		(April 1968)	1968: 2 1969: 4
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Iran	USA	24	F-5A/B Freedom Fighter	Fighter		1967	1968
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			2	Cessna 310L	Cabin monoplane	MAP	••	1968
 Sparrow and Sidewinder missile Kaman HH-43F Huskie Helicopter Patrol boat Displacement: 85- 107 t. Corvette Displacement: 900- 1135 t. WAP Sil10 mn Jan. 1967 Juntier MAP Sil10 mn Sil1			32	F-4D Phantom	Fighter	\$80 mn for 16	(April 1967)	1968: 16 1969: 16
6 Kaman HH-43F Huskie Helicopter (Jan. 1968) 19 2 Patrol boat Displacement: 85- Being built under MAP 19 2 Corvette Displacement: 900- MAP 19 1 135 t. 135 t. 19 19 USSR Armoured personnel carriers 1135 t. 19 UK Seacat naval missile S-A On order UK Seacat naval missile S-A On order			••	Sparrow and Sidewinder missile	A-A	For Phantoms	(April 1967)	(1968)
2 Patrol boat Displacement: 85- 107 t. Being built under MAP 2 Corvette Displacement: 900- 1 135 t. MAP 19 USSR Armoured personnel carriers \$110 mn Jan. 1967 19 UK Secara naval missile S-A On order UK Secara naval missile S-A On order 1 Hovercraft, S.R.N6, 45 t. Displacement: 1200 t. \$37 mn 1966 1 Hovercraft, S.R.N6, 45 t. (Dec. 1968) Italy 40 Agusta-Bell 205 Helicopter (1968) 194 Iraq France 32 Mirage IIIE Fighter 2 Mirage IIIE Fighter 2 \$160 mn, 12 Mirages to be loaned as stop-gap. Some uncertainty whether agreement was finally concluded 1968 194 100 Matra missile A-A A-A (March 1968) (156 12 Alouette III Helicopter (March 1968) (156 12 Alouette III Helicopter <			6	Kaman HH-43F Huskie	Helicopter		(Jan. 1968)	1968
2CorvetteDisplacement: 900- 1 135 t.MAP190- 1USSRArmoured personnel carriers\$\$110 mnJan. 1967190- 190UKSeacat naval missileS-AOn orderUKSeacat naval missileS-AOn orderUKSeacat naval missileS-AOn orderUKSeacat naval missileS-AOn orderItaly40Agusta-Bell 205Helicopter(1968)Italy40Agusta-Bell 205Helicopter(1968)190IraqFrance32Mirage VFighter Fighter\$160 mn, 12 Mirages to be loaned as stop-gap. Some uncertainty whether agreement was finally concludedFebApril 1968190IraqFrance32Mirage IIIEFighter Fighter 16Mirage IIID Trainer 12Alouette III Helicopter\$160 mn, 12 Mirages to be loaned as stop-gap. Some uncertainty whether agreement was finally concludedFebApril 196819019Matra missileA-AA-AA-AA-AA-A70Nord AS 30 missileA-SSurplus(March 1968) (151 (1968)(1968)70Panhard AML-90Armoured carSurplus(March 1968) (151 (1968)(1968)(1968)			2	Patrol boat	Displacement: 85– 107 t.	Being built under MAP	••	••
USSR··Armoured personnel carriers ··\$110 mnJan. 1967194UK··Seacat naval missileS-AOn order······4Frigate, Vosper Mk5Displacement: 1200 t.\$37 mn1966····1Hovercraft, S.R.N6, · 'Wellington class''45 t.(Dec. 1968)····1966··Italy40Agusta-Bell 205Helicopter(1968)··(1968)194IraqFrance32Mirage VFighter 16Mirage IIIE 			2	Corvette	Displacement: 900– 1 135 t.	МАР	••	1968: 1 1969: 1
UKSeacat naval missileS-AOn order4Frigate, Vosper Mk5Displacement: 1200 t.\$37 mn19661Hovercraft, S.R.N6, "Wellington class"45 t.(Dec. 1968)Italy40Agusta-Bell 205Helicopter(1968)196IraqFrance32Mirage V 16Fighter 16Fighter Fighter 2Mirage IIIEFighter Fighter 		USSR	••	Armoured personnel carriers Anti-aircraft weapons	}	\$110 mn	Jan. 1967	196768
4Frigate, Vosper Mk5 1Displacement: 1200 t. \$37 mn1966 (Dec. 1968)1Hovercraft, S.R.N6, "Wellington class"45 t.(Dec. 1968)Italy40Agusta-Bell 205Helicopter(1968)IraqFrance32Mirage V 		UK	••	Seacat naval missile	S-A	On order	••	••
1Hovercraft, S.R.N6, "Wellington class"45 t.(Dec. 1968)Italy40Agusta-Bell 205Helicopter(1968)194IraqFrance32Mirage VFighter 16Mirage IIIEFighter 2Mirage IIIR2Mirage IIIRReconnaissance 2Mirage IIIDTrainer 70AMX-30Tank A-A100Matra missileA-AJ100Matra missileA-SJ12Alouette IIIHelicopterSurplus(March 1968)12Alouette IIIHelicopterSurplus(March 1968)(1970Panhard AML-90Armoured carSurplus(March 1968)(19			4	Frigate, Vosper Mk5	Displacement: 1 200 t.	. \$37 mn	1966	••
Italy40Agusta-Bell 205Helicopter(1968)196IraqFrance32Mirage VFighter16Mirage IIIEFighter2Mirage IIIRReconnaissance2Mirage IIIDTrainer70AMX-30Tank100Matra missileA-A70Nord AS 30 missileA-S12Alouette IIIHelicopter8Nord AtlasTransport70Panhard AML-90Armoured car			1	Hovercraft, S.R.N6, "Wellington class"	45 t.		(Dec. 1968)	••
Iraq France 32 Mirage V Fighter 16 Mirage IIIE Fighter 2 Mirage IIIR Reconnaissance 2 Mirage IIID Trainer 70 AMX-30 Tank 100 Matra missile A-A 70 Nord AS 30 missile A-S 12 Alouette III Helicopter 8 Nord Atlas Transport 70 Panhard AML-90 Armoured car		Italy	40	Agusta-Bell 205	Helicopter		(1968)	1969
100Marx 30Tank100Matra missileA-A70Nord AS 30 missileA-S12Alouette IIIHelicopter(March 1968) (198Nord AtlasTransportSurplus(May 1968) (1970Panhard AML-90Armoured car(1968)	Iraq	France	32 16 2 2	Mirage V Mirage IIIE Mirage IIIR Mirage IIID	Fighter Fighter Reconnaissance Trainer	\$160 mn, 12 Mirages to be loaned as stop-gap. Some uncertainty whether agreement was finally	FebApril 1968	1970
12Alouette IIIHelicopter(March 1968)(198Nord AtlasTransportSurplus(May 1968)(1970Panhard AML-90Armoured car(1968)			100 70	Matra missile Nord AS 30 missile	A-A A-S	concluded		
			12 8 70	Alouette III Nord Atlas Paphard AMI -90	Helicopter Transport	Surplus	(March 1968) (May 1968) (1968)	(1968) (1968)
India 1 HS 748 Transport Gift Indian assembled Ea		India	1	HS 748	Transport	Gift Indian assembled		Eab 1069

230 1D. Arms Trade Register: register of major weapons transfers to developing countries, 1968

Israel	USA	73	A-4H Skyhawk	Fighter		(Feb. 1968:48) (Nov. 1968:25)	1968: 48 1969: 25
		48 ••• ••	F-4 Phantom Sparrow missile Bullpup missile	Fighter A-A A-S	\$200 mn	Dec. 1968	1969–70
		128	Hawk missile	S-A		••	1968
	UK	18 1	Centurion Submarine, T-class	Tank Displacement: 1310 t.	Ex-British . Ex-British	••	1968 1968
	France	7	SA 321 Super Frelon	Helicopter		••	1968
	France/Israel	••	MD-660 missile	SS	Developed by Dassult under contract from Israel; capable of carrying nuclear warhead. Two may have been delivered in 1968	(1968)	(1969)
	West Germany/ France	25	Fouga Magister	Trainer	Ex-Bundeswehr, supplied by France	••	1968
	Italy	20	Agusta-Bell 205	Helicopter		(Jan. 1968)	1968
	Japan	4	Patrol boat			••	1968: 3 1969: 1
Jordan	USA	18	F-104 Starfighter	Fighter	\$100 mn, paid with credit from Saudi Arabia, Kuwait and Libya;	May 1968	196869
		100	M-47 Patton	Tank J	option on further 18 F-104s	March 1968	1968: 60 (1968: 40)
	UK	••	Tigercat missile	S-A	\$14.4 mn, financed by Saudi Arabia	Mid-1968	1969
	UK/Nether- lands	26	HS Hunter	Fighter	11 UK-refurbished; to receive 15 from ex-Dutch stocks refurbished in UK	(1967)	1968: 11 Later: 15
	Saudi Arabia/	••	M-47 Patton	l		(Dec. 1068)	
	Kuwait	••	Centurion			(Dec. 1900)	
Kuwait	UK	12 2	BAC Lightning F-53 BAC Lightning T-55	Fighter Trainer	}	Dec. 1966	1968–
		6	BAC 167	Trainer	\$3.6 mn including spares, technical support, and maintenance training in UK. To train pilots for Lightning	(Oct. 1968)	1969
		50 2	Vickers 37 ton Patrol boat	Tank —	\$15–17.5 mn \$500 000	May 1968 Sept. 1966	Before 1972 1969
	Italy	6	Agusta-Bell 204B	Helicopter		• •	1968–1969
Lebanon	France	12	Mirage III	Fighter/ground attack	ς	1966	1968: 2 Later: 10

231

Recipient	Supplier	Number	Item	Description	Comment	Date ordered	Date delivered	
Muscat and Oman	UK	7	BAC 167	Trainer/ground attack	\$3.6 mn. For COIN	(May 1968)	(1968)	
	(UK)	1	Douglas C-47	Transport	Converted in UK.	(Aug. 1968)	••	
Saudi Arabia	USA	2 14	Lockheed Jet Star Northrop Ventura AQM-38	Transport Target drone	For VIP transport Held up in Germany, probably released	(Nov. 1968) 	 1968	
	UK	34	BAC Lightning F-53	Fighter }		Dec. 1965	1968_69	
		6 22	BAC Lightning T-55 Patrol boat	Trainer J		Jan. 1968	1908-09	
	France	220	Panhard AML-90	Armoured car	\$96 mn	1968	1969	
	Italy	24	Agusta-Bell 205 and 206A Jet ranger	Helicopter		(Jan. 1968)	1968–69	
South Yemen	USSR	65 4 000	Military vehicles Automatic and semi-automatic small arms			 	1968 1968	
	UK	8	BAC Jet Provost	Trainer		(Jan. 1968: 4)	196869	
	Canada	6	DHC-2 Beaver	STOL transport		(1967)	1968	
Syria	USSR	40	MiG-17 MiG-21	Fighter Fighter		••	1967–68 1968	
United Arab Republic	USSR	50 125	Sukhoi Su-7 MiG-21	Fighter Fighter		•••	1968 1967–68	
		20 30	Short range missiles Medium range, land and naval	S-S	Referred to in West as Frog-3, Styx	••	1968	
		250 250	T-54 T-55	Tank			1969	
Yemen	USSR	(25)	MiG-21 Il-18	Fighter }	Gift	••	1968	
		`	Tanks and small arms, mortars, artillery, and aircraft parts		Reported airlifted from Egyptian airfields		1968	

Africa							
Congo (Kinshasa)	Italy	17	Macchi MB326	Trainer	Probably military aid	(April 1968)	1969: 5 Later: 12
	China	4	Small patrol boat			••	1968
Ethiopia	UK	4	BAC Canberra	Bomber	Ex-RAF, refurbished	••	1968
Ivory Coast	France	1	Dassault Falcon	Transport		••	1968
	France/Belgium	1	Patrol boat	Displacement: 235 t.	Built by Franco-Belge	••	1968
Liberia	USA	1	Motor gunboat	Displacement: 100 t.	Being built under MAP	••	••
Libya	USA	10	F-5 Freedom Fighter	Fighter/reconnaissanc	e	(1968)	1968: 5 1969: 5
	UK	••	Jet Provost	Trainer		(1967)	••
		••	Swingfire missile	Anti-tank	Armed with Swingfire		
		••	Rapier missile)	S A	\$240 mps additional contract of	April 1069	1060 70
		••	Thunderbird missile ∫	2-A	\$120 mn for development and training	April 1966	1909-70
		1	Frigate Mk7	Displacement: 1 500 t.	\$15 mn approx.	(March 1968)	1971
		1	Repair ship	Displacement: 2500 t.	\$10 mn ⁺ , including patrol boats (below)	(March 1968)	(1968)
		3	Patrol boat		Equipped with Nord SS-12	(March 1968)	1968–69
	France	••	Nord SS-12 missile	S-S	For patrol boats (above)	(March 1968)	1968–69
Morocco	West Germany/ France	24	Fouga Magister	Trainer	\$4 mn, u.c.: \$60 000+\$106 500 for spares and refurbishing by Sud-Potez. Ex-Luftwaffe	••	1968
	Italy	11	Agusta-Bell 204B	Helicopter	-	••	1968
	Czechoslovakia	80	T-54	Tank	\$16 mn worth of arms, mostly tanks and field artillery, since mid-1967	••	1967–68
Nigeria	USSR	1 8 20	II-28 MiG 15 and/or 17 Jeeps and command cars	Bomber Fighter			1968
	UK	2	Seaward defence boat, "Ford" class	Displacement: 120 t.		••	••
		••	Saladin	Armoured car			
		••	Saracen	Armoured personnel carrier		••	1968

Recipient	Supplier	Number	Item	Description	Comment	Date ordered	Date delivered
	France	13	Panhard AML 60/90	Armoured car		1967	1968
	UAR	2	11-28	Bomber		••	1968
	Algeria	1	11-28	Bomber		••	1968
(Biafra	(France)	4	Alouette	Helicopter		••	1968)
Somalia	USSR	1+	Antonov An-24V	Transport		••	1968
South Africa	Italy/South Africa	300	Atlas-Macchi 326B	Trainer	Licenced production	(1966)	1967–
	France	16 3 3	Mirage IIIC Mirage IIIB Mirage IIID	Fighter Reconnaissance Trainer	>	(1967)	••
		9	Transall C160	Transport		••	1969
		••	Alouette III	Helicopter	To replace S-55	(Oct. 1968)	1968
		3	Submarine, "Daphne" class	Displacement: 850 t.	U.c. \$11 mn	••	(1968)
	Italy	9	Piaggio P166	Transport		(July 1968)	1969
Sudan	UK	5	BAC 145	Trainer		••	1969: 3
	Switzerland	8	Pilatus Turbo Porter	Transport		(1967)	••
Togo	France	1	Patrol boat		On order	••	••
Uganda	USA	1	Bell 206 A Jet Ranger	Helicopter		••	1968
	Israel	24	Fouga Magister	Trainer	Some may have come from France	••	196468
Zambia	UK	6	Provost	Trainer	Supplied by Target Towing Aircraft Ltd, ex-RAF piston-engined		(1968)
	Italy	••	Agusta-Bell 206A Jet Ranger	Helicopter			1968
		5	Agusta-Bell 205	Helicopter	\$2.5 mn	(Nov. 1968)	••
		••	Equipment for new air base		\$11.2 mn military aid. With capability for jet fighters	••	(1968)
Indian Subcont	inent						
Afghanistan	USSR	1	II-18	Transport		••	1968
India	USSR/India	••	MiG-21	Fighter	Licenced production. Up to Dec. 1968, 57 were produced	1963	1967–

		••	Small missile	A-A	Licenced production, for use with MiG-21 (above). Referred to in West as Atoll	(1963)	
	UK/India	27	HAL HS 748	Transport	Licenced production	1959	1968: 12 (Later: 15)
		66	Vijayanta	Tank	Licenced production	••	1965-68
	France/India	80	Alouette III	Helicopter	Licenced production	1963	1966-68
	USSR	100 4	Sukhoi SU-7 Submarine F-class	Fighter Displacement: 2000 t.	\$100 mn +, payable in rupees	April 1968 Aug. 1965	1968–70 1968: 1 Later: 3
		6	Motor torpedo boat		Scheduled for transfer	••	••
		3 2	Escort destroyer, "Petya" class Landing ship, "Polnochnyi" class	Displacement: 1 050 t. Displacement: 900- 1 000 t.		April 1968 ••	1969–70 1968
		1	Submarine tender	— ·	On order	••	
	_	••	(1-54)	Tank		••	1968-70
	France	3	Submarine, "Daphne" class	Displacement: 850 t.		••	1969
	Canada	2	DHC-4A Caribou	STOL transport		(July 1968)	••
Pakistan	USSR	200	130 mm guns		75 lb. shell, 17 mile range, on order	••	••
	(UK)	1	Hovercraft, Hovermarine		Side-wall type	••	1968
	France	18 3 3	Mirage IIIEP Mirage IIIRP Mirage IIIDP	Fighter Reconnaissance Trainer		(Feb. 1968)	1968: 6 Later: 18
		••	Alouette III	Helicopter		1968	••
		3	Submarine, "Daphne" class	Displacement: 850 t.	Being built	1967	1969–70
	Italy	100	M-47 Patton	Tank	\$3-4 mn, u.c.: \$20 000 approx. German surplus, reconditioned in Italy	April 1968	••
	Belgium	3	TF-104G	Trainer	Version of Starfighter	••	1968
Far East							
Brunei	UK	3 1	Westland Whirlwind 3 Westland Wessex Series 50	Helicopter Helicopter	On order	 (Jan. 1968)	 1969
Burma	USA	12	Cessna T-37C Kaman HH-43B Huskie	Trainer Helicopter	МАР	••	(1968) 1968
	_	(12)	F-86F Sabre	Fighter	MAP	••	1968
	Japan	••	Kawasaki-Vertol KV-107-11	Helicopter	A •	•••	1968
Cambodia	USSR		Infantry weapons, anti-aircraft guns, coastal defence installa- tions, army vehicles, munitions, and spare parts		\$6 mn	1967	1968

Arms Trade Register

235

.

Recipient	Supplier	Number	Item	Description	Comment	Date ordered	Date delivered
	France	••	Sud Horizon	Light plane	For initial training		1968–69
	China	3	MiG-17	Fighter)	
		4	Transport aircraft	-			
		4	Trainer			}	1968
		3	Patrol boat				
		••	Anti-aircraft guns		Several dozen]	
Indonesia	USA	3	Lockheed Jet Star	Transport			1968
	France	••	Nord Entac 58 missile	Anti-tank		••	(1968)
Korea, S.	USA	18	F-4 Phantom	Fighter	\$52 m	Feb. 1968	1969
·		1	Hydrographic survey vessel	Displacement: 267 t.		••	1968
		2	Coastal minesweeper	Displacement: 320 t.	Being built under MAP	••	••
Malaysia	USA	10	Sikorsky S-61 A4	Helicopter		1967	Nov. 1967– 69
	UK	14	Patrol boat	Displacement: 96 t.		1965	196668
		1	Frigate	Displacement: 1600 t.	\$10 mn approx.	Feb. 1966	1969
		2	HP Herald 401	Transport		••	1967–68
	France	5	Alouette III	Helicopter		(Dec. 1968)	••
	Canada	20	Canadair CL-41 Tutor	Trainer		••	196768
		9	DHC-4A Caribou	STOL transport	\$8.5 mn; Canada provides\$7.7 mn loan covering 90 per cent of purchase price	(May 1968)	1969
	New Zealand	2	HS Devon	Transport	Gift. Ex-RNZAF refurbished	••	1967–68
Philippines	USA		Missiles	A-S	Believed to be 3.5 in. and 2.75 in. rockets		1968
		2	Patrol boat		For ASW	(1968)	1969-70
Singapore	UK	16	BAC 167	Trainer/ground attack	s \$7 mn	(July 1968)	1969–
		10	HS Hunter	Fighter]	To be supplied against payment.	(June 1968)	1970
		10	HS Hunter	Trainer J	Refurbished		
		2	Fast patrol boat	Displacement: 100 t.	\$9.6 mn total value of 6, of which 4 will be built in Singapore by Vosper Thornevcroft	(June 1968)	1971
	France	4	Alouette III	Helicopter		(Nov. 1968)	1969

	New Zealand USA	/ 8	Cessna 172	Cabin monoplane	To be used for training. Sold by Cessna subsidiary in N.Z. but will probably be delivered directly from the USA	(Dec. 1968)	1969
Taiwan	USA	1 1 1	Fleet minesweeper Frigate, "Bostwich" class Coastal minesweeper	Displacement: 650 t. Displacement: 1 240 t. Displacement: 335 t.	MAP. Ex-US MAP Being built	 	(1969) (1969)
Thailand	USA	36+	Hawk missile	S-A		Jan. 1968	196970
	Canada	2	DHC-4A Caribou	STOL transport		(July 1968)	••
Viet-Nam, North	USSR	••	V750VK missile	S-A	Referred to in West as "Guideline"; mk 2 version	••	1965-
1.0.0.		••	II-28	Light attack bomber	A small number	••	(1968)
		30-40	MiG	Fighter	Mainly MiG-17, but including several MiG-21	••	1968
		4	Motor gunboat, PT6			••	1968
Viet-Nam, South	USA	60 (20–25) (16)	Cessna A-37 F-5 Freedom Fighter Fairchild C-1196	Ground attack Fighter Transport	Gift. For COIN 1 squadron 1 squadron	 (1967) 	1969 1968 1968
	2	00 000	Packet M-16 rifle				(1968–69)
Central Americ	ca.						(
El Salvador	USA	1	DC-4M	Transport		••	1968
		6	F-51 Mustang	Fighter	\$800 000+ \$700 000 for ground equipment	1967	1968
Jamaica	Canada	1	DHC-6 Twin Otter	STOL transport		1967	1968
South America	l						
Argentina	USA/Argenti	ina 😶	Cessna A-182	Cabin monoplane	Licenced production, 6 per month planned	1965	1968
	USA	4+	Bell UH-1D Iroquois	Helicopter	For COIN	(March 1968)	1968
		7	Bell Jet Ranger	Helicopter	\$626 500	(March 1968)	1069
		11	Aero Commander	Light aircraft	\$1.5 mn	(May 1968)	1968: 4 Later: 7
		25	A-4B Skyhawk	Fighter	Refurbished. Held up since 1966 because of Viet-Nam shortages	Nov. 1965	••
	UK	6	Small minesweeper, "Ton" class	Displacement: 360 t.	Ex-British	(1967)	1968
	France	60	AMX-13	Tank	\$10 mn. About 30 to be assembled locally	March 1968	1969

$\overset{\mathsf{N}}{\omega}$ 1D. Arms Trade Register. Continued

w
00

			. •			Date	Date
Recipient	Supplier	Number	Item	Description	Comment	ordered	delivered
	Canada	9	DHC-6 Twin Otter	STOL transport	\$5 mn	(May 1968)	1968: 3 1969: 6
	Netherlands	8	Fokker F-27Mk 400M	Transport	\$14.4 mn; to be financed by Nether- lands Bank. Order changed from HS 748 because of UK meat ban. 2 Mk200 on loan	July 1968	1969
		1	Aircraft carrier	Displacement: 15 892 t.	\$2.64 mn purchase price + \$0.99 mn initial refurbishing cost	(Nov. 1968)	1969
	Italy	6	Macchi MB326K	Trainer	\$3.5 mn, including spares. For Navy	(Sept. 1968)	1969
Bolivia	USA	12	Hughes 500M	Helicopter	U.c.: \$75 800. For COIN	••	1968: 4 (1968: 8)
		10	F-51 Mustang	Fighter	MAP. Refurbished	••	1968
Switzerland		••• ••	Automatic submachine guns Armoured vehicle	Light amphibious	}	(Jan. 1968)	••
Brazil	USA	5 11 7	Lockheed C-130E Hercules Hughes 500 Bell 206A Jet Ranger	Transport Helicopter Helicopter	\$15 mn \$978 375 3 for VIP transport, 4 for medical rescue	1968 (1967) (March 1968)	1969 1968: 2 (1968: 5)
		6 4	B ell UH-1D Iroquois Sikorsky S H-3D	Helicopter Helicopter	For ASW	(March 1968) (Aug. 1968)	1969 Oct. 1969– Jan. 1970
		25	Cessna T-37C	Trainer/ground attack	\$6 mn. For COIN	(Aug. 1968)	Oct. 1969– March 1970
		5 1 2	Lockheed T-33 Fairchild Hiller FH-1100 Destroyer, "Fletcher" class Gunboat	Trainer Helicopter Displacement: 2100 t.	MAP To replace Bell 47 Ex-US, launched in 1943 Being built under MAP	•• •• ••	1968 •• 1968 ••
	UK.	6 2	DH 125 BAC 111	Transport Transport	\$3.6 mn approx.	(Feb. 1968) (Jan. 1968)	 1968: 1 (1968: 1)
		4	Hovercraft N5		Part of \$74.9 mn credit	(Sept. 1968)	••
	France	7	Fouga Magister CM-170-2	Trainer	Brazil will return 23 MS-760 Paris in exchange	(June 1968)	1968: 5 1969: 2
	Canada	24	DHC-5 Buffalo	Transport	First batch: \$20 mn. Second batch: \$30 mn including spares and support	(Nov. 1968)	1968: 12 Later: 12

		Japan 7 Mitsubishi MU-2 STOL transport			(Oct. 1968)	••		
	Chile	UK	18 3 1	HS Hunter FGA-9 HS Hunter T-7 HS 748	Fighter } Trainer } Transport	\$9.6 mn, u.c.: \$456 000. Refurbished	(Nov. 1966) 1967	1969 1968
	Colombia	USA	2 12	Lockheed C-130E Hercules Hughes OH-6A	Transport Helicopter	\$6 mn	April 1968 (1966)	1968 1968: 4 1969: 8
			30 10	Cessna T-41D Cessna T-37C	Trainer	\$3 mn+, MAP	(April 1968)	1969
	Ecuador	USA	1 1	Cessna 177 Cardinal Cessna 320 Executive Skyknight	Cabin monoplane Cabin monoplane	For Navy, training and patrol For Navy, on order	••	1968 ••
	Guyana	(USA)	2	Helio H-295 Courier Light STOL mono- Initial equipment of newly formed glane Guyana defence force		Initial equipment of newly formed Guyana defence force	••	1968
		(UK)	4	Patrol boat		Launched Feb. 1968	••	1968
	Paraguay	Canada	1	DHC-6 Twin Otter	STOL transport	On order	••	••
	Peru	USA	1 1	C-54 Gunboat	Transport Displacement: 145.5 t.	MAP . Being built under MAP	••	1968 ••
		UK	6	BAC Canberra	Bomber	Refurbished	May 1968	••
		France	12 2	Mirage V Mirage VD	Fighter/ground attack	\$20-25 mn over 7 or 8 years, u.c.: \$1.2 mn	Dec. 1967	1968-
		Canada	78 AMX-13		Tank STOL transmost	Dec. 1967	1969-70	
		Canada 3		DHC-6 I will Otter	STOL transport	1907	1908	
	Venezuela	Japan	1	Mitsubishi MU-2	STOL transport		(Oct. 1968)	••
	Europe							
	Greece	USA	5	F-104 Starfighter	Fighter }	Under emberge April 1967-20 Oct	(1963)	1969
			10	Lockheed T-33	Trainer	1968 (The F-5's had been diverted	••	••
			30	F-5A/B Freedom Fighter	Fighter/reconnais-	to Taiwan. These, and the	(1964)	••
			••	M-48 Patton	Tank	minesweepers, were reported to	••	••
			2	Minesweeper	- ··· - }	be supplied under MAP.)	••	••
		West Germany	2	P-T boat	Displacement: 75– 80 t. and 95–110 t.	From West German Navy, refitted in UK		1968
		Italy	6	Agusta-Bell 205A	Helicopter	\$364 000	(Nov. 1968)	Jan.–March 1969
239	Portugal	USA	1	Destroyer escort	Displacement: 1700 t.	MAP	••	1968

Recipient	Supplier	Number	Item	Description	Comment	Date ordered	Date delivered
	France	12	Alouette III	Helicopter	\$3.15 mn. For COIN in Mozam- bique and Portuguese Guinea	Sep. 1968	
		4	Frigate, "Nantes" class		For COIN in Portuguese Guinea	••	1968: 2
		4	Submarine, "Daphne" class	Displacement: 869 t.		(1964)	Later: 2 1968: 2 Later: 2
	West Germany	6	Corvettes		Construction delayed because of West German fears that they would be used in Portuguese colonies	••	••
Turkey	USA	25	F-102 Delta Dagger	Fighter	MAP, from surplus USAF stocks		Oct. 1968
-		50	F-5 Freedom Fighter	Fighter		1967	1968: 25
		••	Bell OH-13	Helicopter		(196 5)	1969 : 25 1968
	West Germany	15	Siat 223 Flamingo	Basic trainer	Option on further 30	(July 1968)	••
	Italy	50	Agusta-Bell 206A	Helicopter	For Army and Police	July 1968	••

Section 2. The technological arms race

2A. Nuclear weapon testing programmes

Square brackets, [1], refer to the sources listed on page 256. Throughout this section AEC refers to the United States Atomic Energy Commission. 1 kiloton (kt) = 1000 tons (t) of TNT equivalent. 1 megaton (mt) = 1,000,000 tons of TNT equivalent.

Introduction

The two preambular paragraphs of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (referred to as the Moscow Treaty in the rest of this section) read as follows:

Proclaiming as their principal aim the speediest possible achievement of an agreement on general and complete disarmament under strict international control in accordance with the objectives of the United Nations which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons.

Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radioactive substances.

The nuclear weapon testing programmes of the two major powers have in fact been continued without abatement since the signing of the Moscow Treaty. It is clear that:

- the total numbers of tests are not publicly available.
- the yields and magnitude of underground tests have increased several fold.
- in very large measure it is now possible to conduct underground tests of weapons and components which are as effective as those previously conducted in the atmosphere.
- since the Moscow Treaty some of the tests have vented radioactive material which has crossed international borders.

This section examines each of these points.

There is a great deal more information available about the United States' nuclear weapon testing programme than about the Soviet Union's programme. This is a point to be borne in mind throughout.

Part II. Technological arms race

Table 2A.1. Reported nuclear test explosions, 1945-1968

Ĵ	Nu	mb	er
			•••

	USA											
	AEC!						LICOD	đ				
	Test de- tection	Plow- share	Safety ^b	Weapon	Total	FOA	AEC	FOA	UK	France	China	Total, all nations ^e
Pre-PTBT ^a		-	_							·		
1945				1	1	1						1
1946				2	2	2						2
1947				—								_
1948				3	3	3						3
1949							1	1				1
1950				_				_				_
1951				16	16	16	2	2				18
1952				10	10	10	_	_	1			11
1953				11	11	11	2	2	2			15
1954				6	6	6	ĩ	2				8
1955				15	15	15	4	4				10
1956			1	13	14	14	7	9 0	6			79
1957			4	24	78	26	12	12	7			40
1958			14	52	66	66	25	13	5			40
Dre-1050			14	52	00	00	23	201	5			20
1050								30-				30
1959				—	_	_			_	•		_
1900		1		_		_			_	3		3
1901		1		8	9	9	31	32		1		42
1962		3		86	89	88	40	42	2	2		135
1963 (pre-												
10 Oct.)		1		16	17	17		—		1		18
15 Sept. 1961–												
20 Aug. 1963					23	23 <i>ª</i>						23
Total pre-PTBT		5	19	263	310	309	126	163	23	7		503
Annual rate												
of testing.												
pre-PTBT:												
1951-1963					24 4			128				30.6
Deef DTDT					27.7		-	1 2.0				59.0
Post-PIBI												
1963 (post-				_		•						
10 Oct.)	1	1		7	9	8				1		10
1964	1	6		21	29	28	3	6	1		1	37
1965	1	1		24	27	27	4	9	1	2	1	40
1966	1	4		35	40	40	7	12	-	5	3	60
1967		3		25	28	28	4	13	—	3	2	46
1968	1	8 ^h		28	37	37	6	9	<u> </u>	5	1	52
Total												
post-PTBT	5	23		140	170	168	24	49	2	16	8	245
Annual rate												
of testing.												
post-PTRT												
1963-1968					32.0			9.2				46.2
Total, all tests	5	28	19	403	480	477	150	212	25	23	8	748
	-		-		*			-				

Source: See page 258.

^a Partial Test Ban Treaty (10 October 1963). ^b These are experiments to determine the safety of nuclear weapons in case of accident. ^c Swedish Research Institute for National Defence (Försvarets Forskningsanstalt). ^d No official information is available for the Soviet Union. ^e When two sources give different figures, the higher of the two is taken. ^f These tests are reported by FOA as additional tests which took place at unspecified dates before 1959. ^g These tests are reported by the AEC as having taken place between 15 September 1961 and 20 August 1963. ^h Including 5 devices separately used in the same test (Project Buggy), counted here as 5. ⁱ Atomic Energy Commission.

Mumber

					114/100
	Air	Underwater	Underground	Total	
USA	193	5	282	480	
USSR	161	1	51	212	
UK	21	0	4	25	
France	14	0	9	23	
China	8	0	0	8	
Total	397	6	346	749	

Table 2A.2. Reported nuclear test explosions, 1945-1968, by environment

Source: See page 258.

Number of tests

Tables 2A.1 and 2A.2 and chart 2A.1 present the essential information. All tests announced by an official source from 1945 through 1968 are listed. Sub-totals are given for:

- (1) Underground, atmospheric and undersea tests.
- (2) Pre-Moscow Treaty years and post-Moscow Treaty years.
- (3) Number of United States tests in the Plowshare (civil engineering with nuclear explosives) and Vela (seismic detection) programmes.

Table 2A.4 is a list of the test sites of all nuclear-weapon states.

There were few tests before 1951. In that year, the United States began a substantial programme. (In this period the United States was reviewing its stockpile and revising its nuclear weapon policy.) The Soviet Union's interest in testing does not seem to have become appreciable until 1956.

The Moscow Treaty does not appear to have had much success in reducing the amount of nuclear weapon testing. From available data, it appears that the annual average number of tests by all nations before the Treaty over the period from the end of 1950 to 10 October 1963—was 40. The annual average since the treaty has been 46. Comparing these pre-test ban

	First nuclear test explosion	First full-scale thermo- nuclear test explosion	Time-lag
USA	16 July 1945	1 November 1952	7 years
USSR	23 September 1949	21 August 1953	4 years
UK	2 October 1952	15 May 1957	4 ¹ / ₂ years
France	13 October 1960	24 September 1968	8 ¹ / ₂ years
China	16 October 1964	17 June 1967	$2\frac{1}{2}$ years

Table 2A.3. Dates of first nuclear test explosions

Source: See page 258.

Table 2A.4.	Testing	areas:	past and	present
-------------	---------	--------	----------	---------

	Still in use
1154	
1 Enjustok Atoll Pacific (US Trust Territory)	20
2 Bikini Atoll Pacific (US Trust Territory)	10
3 Johnston Island Pacific (US Trust Territory)	10
4 Christmas Island, Pacific (British colony)	no
5. Nevada Test Site. Yucca Flats	Ves
6. Nevada Test Site, Pahute Mesa	ves
7. Hot Creek Valley, Nevada	ves
8. Amchitka Island, Alaska	ves
9. Hattiesberg, Mississippi	?
10. Farmington, New Mexico	?
11. Rifle, Colorado	?
USSR ^a	
1. Seminalatinsk	ves
2. Novaya Zemlya	yes
France	
1 Reggan Algeria	no
2 Inn Ekker Algeria	no
3. Maruroa Atoll, Southeast of Tahiti	yes
UK	
1 Monte Bello Islands Australia	no
2 Woomera Australia	no
3. Maralinga Proving Ground, Australia	no
4. Christmas Island, Pacific (British colony)	no
5. Nevada Test Site, USA	yes
China	
1. Lop Nor	yes

Source: See page 258.

^a In addition, the AEC refers to sites described as "Siberian Test Site", "Central Asia" and "Artic". These names may in some instances refer to Semipalatinsk and Novaya Zemlya; in some instances they may refer to additional sites.

and post-test ban periods, it appears that the United States has increased its average annual number of tests from 24 a year to 32. The Soviet Union seems to have reduced the annual number of its tests from 13 to $9.^{1}$

The information published about nuclear weapon tests is not by any means comprehensive. The United States Atomic Energy Commission (AEC) announces United States tests regularly but, according to the AEC itself, it does not necessarily announce all United States tests. The AEC also announces certain Soviet tests—again, it states that it does not announce all those that it knows about. (This has been AEC policy both before and since

¹ The information for the Soviet Union is less adequate than that for the United States; but there is no reason to suppose that the proportion of tests identified before the test ban was higher than after.



Chart 2 A.1. Nuclear weapons tests, 1951-68°

Source: Table 2A.1.

^a I January 1963 to 10 October 1963.

^b 10 October 1963 to 31 December 1964.

^c The tests shown as being below ground include some 6 underwater tests: see table 2A.1, page 242.

the Moscow Treaty.) It is generally assumed that the United States is reluctant to reveal the detection threshold of its monitoring systems.²

Soviet authorities do not announce either Soviet tests or those of any other country. France now announces its own tests; it did not do so before 1966 when the test site was in Algeria. China also announces its own tests. The AEC also announces the Chinese tests and has announced one test (24 December 1967) that the Chinese authorities did not announce.

The number of tests listed in tables 1 and 2 is, therefore, almost certainly too low. The true figure could be anything up to twice as large. The following items of evidence indicate relatively large numbers of unannounced tests:

(1) The Swedish Research Institute for National Defence, FOA, has, for each year since the Moscow Treaty, reported about twice as many Soviet tests as the United States Atomic Energy Commission. [1] FOA states that at least 30 more Soviet atmospheric explosions took place in the years before 1959 than were reported by the AEC. (These additional tests are included in the tables.)

² AEC releases about Soviet tests are often couched in this form: "The United States has today recorded seismic signals which originated from the Soviet nuclear test area in the Semipalatinsk region. The signals were equivalent to those of a nuclear test in the low-intermediate range."

Part II. Technological arms race

(2) One American source, which may have had access to classified data, reports that "The Soviet 1961 and 1962 atomic test series ... included over one hundred detonations, most of which were atmospheric." [2] The AEC and FOA reported 71 and 74 tests respectively.

(3) A search was made in the Bulletin of the International Seismological Centre, Edinburgh, Scotland, for the period 16 January to 14 April 1964. This indicated 13 events whose location at the Nevada test site indicates that they were United States tests. During this period the AEC announced only 5 tests.

(4) Two newspaper reports refer to a large number of secret underground French tests in Algeria:

"Saturday's explosion was officially the 16th nuclear test, although if the 25 or so secret underground firings conducted at the Sahara testing station of Ain Ehker are included, it is probably about the 40th." [3] "France first exploded an atomic device Feb. 13, 1960, in the Sahara. Four above ground blasts and about 30 underground explosions were set off in the Sahara before the testing ground was closed and the area turned over to the Algerian government." [4]

We have included only 23 French tests in our tables.

(5) A British newspaper refers to some unannounced British nuclear weapon tests:

"Three weeks ago Mr. Wilson told the Commons that the evidence of the effectiveness of the British warhead rested on work done by the atom weapons laboratory in Britain and the results of tests on American devices. But he made no mention then of British tests. Some of these were carried out but not announced by the Conservative Government." [5]

Yield of tests

Official spokesmen appearing before the United States Senate in 1963 stated that United States underground testing experience, technique, and capability was much greater than that of the Soviet Union. Underground tests require the emplacement of weapon and instrumentation tunnels 3000-5000 feet under the ground. Nevertheless, human ingenuity, the intense research effort, and technical instrumentation being what they are, it has turned out to be:

- much easier than anticipated to do large underground weapons tests, up to and over one megation; and
- possible to gain much more information than had been expected from such underground tests.

Both of these advances and the subsequent advances in nuclear weapon design for which testing was necessary are, of course, exactly what many in the world had assumed the partial test ban would inhibit, if not prevent.

For example, during the test ban negotiations it was widely assumed that a ban on tests in the atmosphere would inhibit the further development of nuclear warheads. A technical magazine wrote: "[the] military issue underlying the East-West nuclear test ban talks that are to resume shortly is whether the United States will be permitted to increase the yield of Polaris and Minuteman warheads. Physicists believe megatonnage can be more than doubled, but not without more testing." [6]

Yields and magnitude of underground tests have continued to rise, reaching 1.2 megatons or higher in both United States and Soviet tests. For the United States, for example, the 1.2-megaton thermonuclear test on 26 April 1968 was the largest underground test ever detonated (including the tests at the pre-test ban Pacific underground test site), and the most powerful ever exploded in the continental United States in any environment [7, 8]. Tests seem certain to become bigger still [9]. The AEC has indicated that proposed tests at the Hot Creek Valley, Nevada, site would have a yield of "several megatons" and that nuclear detonations at Amchitka, Alaska, would be larger [11, 12]. By the rough formula customarily used for such calculation, the depth of two test site bore-holes recently let out to contract by the AEC would indicate that a test of a 3-megaton device was planned [10]. Other sources have predicted that a 3-megaton blast is within the safety limits of the Nevada test site; and this might be an indicator of levels anticipated. A 3-megaton limit would enable the United States to proof test nearly all the warheads for offensive weapons or for an anti-ballistic missile system. In the annual "Safeguards" statements, United States Senator Henry Jackson³ has suggested that several of the Soviet underground tests have been of higher yield than any United States tests, and AEC spokesmen have implied the same.

In order to carry out these new and larger tests, the AEC has had to open two new test sites: the magnitude of the blasts has made the old site too close to populated centers.

The AEC and the Department of Defense determined in mid-1966 that it was essential to establish a capability for conducting higher yield tests underground than was determined to be possible at the National Nuclear Test Site in Nevada. Originally, the Pahute Mesa, at the north end of the regular test site, was thought to be suitable for higher yield tests, but experience disproved this hope

^a Chairman of the Nuclear Safeguards Subcommittee of the United States Senate Committee on Armed Services, and Chairman of the Military Applications Subcomittee of the Joint Committee on Atomic Energy.

Part II. Technological arms race

and other sites have been selected. The first, still in Nevada, is about 70 miles northwest of Tonopah, Nevada, in an area named Hot Creek Valley. This area is thought suitable for going beyond the yields possible at the Pahute Mesa site. Next, an uninhabited island near the western end of the Aleutian Chain, Amchitka Island, is being developed for possible higher yield explosions. [11]

One of the recent tests opened a 4000-5000 foot surface fissure in the Nevada desert.

Relation of contained underground testing to weapon and warhead developments

The large increase in underground testing since the Moscow Treaty has been directly related to anti-ballistic missile (ABM) warhead development; and it will be given further and continuing impetus by the procurement of ABM systems. ABM systems require, in turn, new developments in ICBM warhead design: in the "hardness" of materials making up the warhead or re-entry vehicle, and in the electronic components within the warhead. The following discussion is dependent on material from United States sources, but there is no reason to assume that similar requirements do not obtain to some degree for the Soviet Union. Dr. John Foster, United States Department of Defense Director of Research and Engineering, testifying in 1966 before the House Armed Services Committee on the Nike-X anti-ballistic missile system, indicated that the need for testing would continue: "Following the deployment of the thin defense one can contemplate building up the defense to be more effective against sophisticated attacks. ... There is no question in my mind but that a series of experiments involving nuclear explosions would be of great benefit."

Senator Jackson similarly stated, in a speech on the floor of the United States Senate, 30 November 1967:

During the past year the Department of Defense ... has continued to develop methods of conducting underground tests in which results are being obtained that were previously thought impossible under the treaty restrictions. The accelerated underground test program ... for the next eighteen to twenty-four months consists of a relatively large number of tests on new reentry vehicles, guidance systems, and our anti-ballistic missile systems now under development. ... A large number of underground tests were conducted and very significant advances made in the area of weapons technology development, and in new and radically different weapon design concepts. ... The basic aims of upcoming underground tests are for the furthering of our knowledge of weapon effects, for improving weapon reliability, increasing penetration capability, and advancing technology. The large United States 1.2-megaton test on 26 April 1968 was termed "essential for the development of an anti-ballistic missile (ABM) system" [7]. It is reported that the United States Spartan ABM missile is to have a 2-megaton warhead [14]. To aid the development of these warheads, in the absence of the ability to test in the atmosphere, there has been extensive development of devices of two sorts [15–20]. One group enables underground tests to approximate the weapons effects that would be produced by atmospheric and exoatmospheric detonation. The second group are devices that simulate in the laboratory certain aspects of energy production that would occur in a nuclear explosion, so that warheads and components can be tested without nuclear explosions.

Venting

The Moscow Treaty, Article I, reads as follows:

1. Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control:

(a) in the atmosphere; beyond its limits, including outer space; or underwater, including territorial waters or high seas; or

(b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted.

There are no qualifications about significant or detectable amounts of radioactive debris, health hazards, or fractions of permissable exposure rates. Research has pointed up the discrepancy between the Treaty language, the testing programmes and test effects.

Environmental scientists have known for a long time that radioactive cloud debris persists in the lower atmosphere with half-residence times ranging from a few days to several weeks. There is no doubt that some of the debris from every radioactive cloud is present in the atmosphere when the contaminated air mass passes beyond the continental limits of the testing country. The treaty prohibits tests which result in atmospheric radioactivity outside the territorial limits of the testing country ... nothing is stated about the amount of radioactivity involved or the necessity of detecting it. Thus it is clear that all accidental releases from underground nuclear tests and all nuclear cratering experiments are at least technically in violation of the treaty, whether or not it is interpreted more broadly. Not known at the time the treaty was signed was the fact that even "contained" underground nuclear explosions release their gaseous radioactive products in the atmosphere. [21]

This implicates all instances of venting from weapons tests and all cratering experiments. This is at variance with the official United States view. On

Part II. Technological arms race

Date	Nation	Test name	Туре	Depth (feet)	Yield ^a	Cloud type
Announced by the nation concerned						
 28 September 1958 September-October 	USA USA	Mars	safety safety	450 350–484	13 t 1.5–38 t	low low–9 000
1958 (5 tests)				•••		feet
3. 8 October 1958	USA	Tamalpais	weapon	330	72 t	low
4. 14 October 1958	USA	Neptune	safety	98	115 t	11 000 feet
5. 29 October 1958	USA	Evans	weapon	848	55 t	
6. 30 October 1958	USA	Blanca	weapon	835	19 kt	7 700 feet
7. 13 March 1964	USA		weapon		low	
8. 18 December 1964	USA		Plowshare	90	100 t	
9. 12 February 1965	USA		weapon		low	
10. 14 April 1965	USA	Palanquin	Plowshare	280	. 4 kt	
11. 7 May 1965	USA	Tee	weapon		low	
12. 16 June	USA	Waters	weapon		low	
13. 5 March 1966	USA	Red Hot	weapon		low	
14. 25 April 1966	USA	Pin Stripe	weapon		low	
15. 15 June 1966	USA	Kankakee	weapon		low	
16. 12 September 1966	USA	Derringer	weapon		low	
17. 19 January 1967	USA	Nash	weapon		low-interme	diate
18. 29 June 1967	USA	Umber	weapon		low	
19. 31 August 1967	USA	Door Mist	weapon		low	
20. 18 January 1968	USA		-			
21. 26 January 1968	USA	Cabriolet	Plowshare	170	2.5 kt	1 900 feet
22. 8 December 1968 ^b	USA	Schooner	Plowshare		35 kt	
Reported by non- national sources						
23. 15 January 1965 ^b	USSR					
24. 27 October 1966 ^b	USSR					
25. 18 December 1966 ^b	USSR					

Table 2 /	1.5. `	Vented	underground	nuclear	tests
-----------	---------------	--------	-------------	---------	-------

Source: See page 258.

^a Low=less than 20 kt, low-intermediate=20-200 kt.

^b Reported as having released radioactive material across national borders.

weapons tests, "officials have said categorically that none of the radioactivity caused by venting has passed beyond the United States" [18]. And on the occasion of Plowshare tests, the official statements have read: "Any escaping radiation should be deposited within the government controlled test site."

Table 2A.5 lists 29 tests which are reported to have vented, 19 since the signing of the Moscow Treaty. The majority of them are weapon tests. There are many more United States than Soviet tests in the list. This may be partly —or entirely—due to the fact that we have much more information about United States tests: the AEC has announced that a number of tests vented within United States borders.⁴ The reports of the Soviet tests which vented come from non-Soviet sources.

* Not all Plowshare tests are listed in table 2A.5: only those which are recorded by the AEC specifically as having vented.
In some of the tests which vented, detectable amounts of radioactivity crossed borders. The 8 December 1968 United States Plowshare test, Schooner, produced radioactive fallout monitored on 13 December to 15 December at four Canadian ground stations, Hamilton, Ottawa, Montreal and Toronto [33, 34]. The AEC stated that it had followed the airborne debris to Dillon, Montana, close to the Canadian border.

This may well have happened earlier. Before the Moscow Treaty the AEC gave some indication of cloud characteristics of vented tests; these are shown for the first six examples in table 2A.5. In line with Martell's analysis [21], the cloud characteristics strongly suggest that for some of these tests significant amounts of radioactive debris will have crossed the border; for example, no. 6 (Blanca) and no. 4 (Neptune) with cloud heights of 7700 to 11,000 feet. The radioactive clouds released in some of these tests were followed within the United States to northern or southern borders. After the Moscow Treaty, the Plowshare test Cabriolet, on 26 January 1968, threw radioactive rock and dust 1900 feet into the air [35, 36]. Radio news reports at the time indicated that the vertical dust column intersected air moving northwards at its upper levels.

It is true that radioactive fallout was not reported in Canada or Mexico at the time of these tests, apart from Schooner. However, there is no evidence of systematic airborne monitoring of the United States borders. Soviet aircraft do not patrol the borders between the United States and Canada or Mexico collecting air samples.

There is, however, systematic United States airborne monitoring of the Soviet Union's eastern border. Of the three Soviet tests listed in table 2A.5 which were reported by non-Soviet sources as having released radioactivity which crossed borders, the first two, in January 1965 [22–26] and October 1966 [27, 28], were recorded and reported by United States air sampling aircraft flying over the Sea of Japan. These flights are part of the United States test detection network.⁵ Debris does not seem to have been reported from any ground stations. The third case, in December 1966 [29, 32], was widely reported and commented on in Scandinavia.

Island sites

In connection with the risk of radioactive debris crossing borders, the preparations which the Soviet Union and the United States have made for megaton shots on island sites are important. The accumulated experience of the con-

⁵ Nations interested in obtaining knowledge of another nation's nuclear devices will carry out such monitoring. For example, both Britain and the United States carried out extensive aircraft sampling in the area of France's Pacific ocean test site at the time of France's detonation of its first thermonuclear device.

Part II. Technological arms race

duct of such large tests is small; if venting does occur it will almost inevitably mean that debris will cross the national border, since the border is so close.

In February 1968, the AEC announced its intention of conducting underground tests in the megaton range on Amchitka Island in the Aleutians. On 29 October 1965, Amchitka was the site of one 80-kiloton nuclear test that was announced as part of the Vela test detection programme. This test, Long Shot, may also have served as a calibration shot for anticipated larger yield tests.

The question frequently comes up as to whether or not Long Shot did vent and permit radiation seepage from the hole. Presumably it did, even though geologists had calculated that no leakage of radioactive products into the surrounding sea would appear for a period of 400 years. Minute amounts have been found in the water near the site in the last two or three years, but it measures out, I am told, as insufficient by Federal Radiation Council standards to cause any concern. [37]

It is not stated at what distance from shore the measurements were made. Very high yield tests are planned at the Amchitka test site [11, 12].

The Soviet test on 27 October 1966 was reported by non-Soviet sources to be of a 1-megaton device, and the largest underground explosion so far at the Novaya Zemlya test site [28]. This is a much larger island than Amchitka but still far closer to international waters than sites within the Soviet landmass would be.

Venting from Plowshare experiments

The cratering experiments of the United States Plowshare programme are designed to develop nuclear explosives for civil engineering purposes, in particular for excavations of various kinds. In these experiments an attempt is made to set the depth at which the nuclear device is buried, in various kinds of rock or less solidified strata, at an "optimum" level. This "optimum" depth placement attempts to satisfy various aims, which work in large part in opposition to each other:

(1) to produce a crater of a desired depth and diameter subsequent to the explosion;

(2) to contain as much as possible of the refractory (solid) radioactive material by having the solid matter fall back into the crater;

(3) to vent as little as possible of the volatile (gaseous) radioactive material.

Considerable progress has been made in reducing the *local* fallout from Plowshare tests. It is indeed only the *local* fallout which is referred to when the "escape fraction" is discussed:

The escape fraction is arbitrarily defined as the fraction of the total gammaray activity produced which falls as local fallout outside the area of the crater and ejecta. [38]

Thus the term "escape fraction" as used by Plowshare spokesmen, that fraction of the total radioactivity which appears as local fallout, does not include all of the vented radioactivity. It omits the gaseous and volatile radioactive products and their radioactive daughter products which drift downwind in the debris cloud [21].

The definition of "escape fraction" then seems to have been arbitrarily set in some contradiction to experimental observations; and it defines out of existence just that portion of the vented material which may cross borders and which is of concern from the standpoint of the Moscow Treaty. Further, a "fully contained" nuclear explosion is described as one "so deeply buried that the fireball and the direct neutron flux will not reach the atmosphere and that no massive venting of radioactivity occurs." [38] It is not clear why all tests, except those which show "massive venting", are defined as "fully contained".

Techniques which reduce the "escape fraction"—that is, the local fallout —do not necessarily do much to reduce the quantity of volatile radioactive products released. It has been shown that the quantity of these products released is relatively insensitive to variations in crater formation and final crater form [39, 40]. On limited knowledge it has been estimated that 10 to 20 per cent of the volatile radioactivity escapes. This is the material that may cross borders. The estimate may be off by a factor of two or three. Thus official estimates of the extent of spread of radioactivity presented at hearings of United States Congressional committees would seem to have been optimistic [51, 52].

It would appear, therefore, that there is a problem with escaping radioactive products from Plowshare tests: they may well violate the Moscow Treaty. There has been some official recognition of this, in spite of the standard disclaimer, quoted on page 250 that escaping radiation should be deposited within the test site. It was widely recognised at the time that Cabriolet was detonated, and over the year in which its detonation was delayed, that the delay was due to the direct relation of the test effects to negotiations on the Non-Proliferation Treaty [41-43]. Plowshare tests have been repeatedly postponed or reduced in yield when finally held.

In spite of this, the number of Plowshare tests has been tending to in-

Part II. Technological arms race

crease (table 1): and there is pressure for more tests from the United States Atlantic-Pacific Interoceanic Canal Study Commission, which is concerned with suggesting methods of construction for a new Panama canal [21].

The ENDC and continued venting

The problem of continued test venting has received some attention at the ENDC in Geneva. During discussion of a comprehensive test ban, a joint memorandum was submitted by the eight non-aligned members in August 1968. It stated:

There have also been reports that large underground tests have led to leakages of radioactivity outside the territorial limits of testing States, thus causing infringements of the Partial Test Ban Treaty. Even if these incidents have not been deliberate, they may eventually lead to a weakening of the Partial Test Ban Treaty, and even endanger its very existence. [45]

In addition, two delegates from non-aligned countries amplifed the point. Mrs. Myrdal, Sweden, said:

... one other matter must be mentioned, namely, the obviously increasing frequency of radioactive leakages from underground tests, also across borders. When such radioactive debris has fallen over my country we have reacted, and shall continue to react, by notifying the government concerned. It seems that other such leakages occur elsewhere. In reality they constitute violations of the Moscow Treaty. However insignificant in radioactive yield and however technical in nature these violations have been so far, all signatories of the Moscow Treaty must be alert so as not by passivity to seem to condone explosions that result in leakages. This issue will take on greater practical significance in relation to the so-called peaceful explosions. Even when such projects may appear enticing they should not be allowed to proceed if they endanger an absolute adherence to international obligations. [46]

Mr. Husain, India, said:

The fact that underground testing has been conducted with what might appear to be renewed force and vigour, using larger and more sophisticated weapons, goes against the spirit of the partial test-ban Treaty as that treaty did not legitimize or give international sanction to such testing. The treaty was intended to be only a step towards a comprehensive test ban, to be concluded as early as possible. What is even worse, violations of the partial test-ban Treaty have occurred through venting of radioactivity from underground tests, which has spread outside the territory of the testing State. There is serious apprehension that these violations might become even more frequent as weapons of megaton yields are tested underground for the purpose of developing and testing newer and more destructive weapon systems, including warheads for anti-ballistic missiles. [47]

	1964	1965	1966	1967	1968	1969
Safeguard:						
1. Conduct of underground testing						
RDT& E (DASA) ^a	10.9	21.2	37.7	39.9	37.8	42.9
2. Maintenance of laboratory facilities						
and programmes	55.1	55.8	56.8	53.6	61.0	69.6
3. Maintenance of stand-by atmospheric						
test capability	82.9	72.4	33.7	24.5	22.7	15.6
4. Monitoring of Sino-Soviet activity	97.8	111.9	110.6	106.7	110.2	99.8
Total	245.6	261.3	238.8	224.7	231.7	22 7.9

Table 2A.6. United States Department of Defense budget supporting the four "Safeguards" related to the Partial Test Ban Treaty

Total obligational authority, US \$ mn, fiscal years

Source: Sources of the tables, page 258: [7].

^a Research, Development, Test and Engineering (Defense Atomic Support Agency).

The United States "Safeguards"

As part of the background to the increase in the frequency of nuclear tests since the Moscow Treaty, it should be recalled that the United States Joint Chiefs of Staff put forward a document which set out "Safeguards ... with regard to the Limited Nuclear Test Ban Treaty". These safeguards were considered by some Senators to be necessary conditions for their approval of the treaty: they were accepted by President Kennedy in his effort to gain ratification. The safeguards are:

A. The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future.

B. The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to these programs on which continued progress in nuclear technology depends.

C. The maintenance of the facilities and resources necessary to institute promptly nuclear tests in the atmosphere should they be deemed essential to our national security or should the treaty or any of its terms be abrogated by the Soviet Union.

D. The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations, and to maintain our knowledge of Sino-Soviet nuclear activity, capabilities and achievements. [48]

The pattern of expenditure on the four safeguards in recent years is shown in table 2A.6. The sums involved show that the safeguards are taken seriously [17, 49].

References

- 1. Zander, I., and Araskog, R. Kärnladdningsexplosioner 1945–1966 (FOA 4 Rapport No. A 4493). Stockholm: Swedish Research Institute for National Defence, June 1967.
- Soviet Military Technological Challenge (Special Report Series, No. 6). Washington, D. C.: Georgetown University Center for Strategic Studies, Sept. 1967.
- 3. Financial Times, 26 Aug. 1968: "France explodes its first H-bomb".
- 4. Boston Herald Traveler, 8 July 1968: "France resumes N-tests".
- 5. Sunday Telegraph, 28 Feb. 1965: "Britain plans more A-tests".
- 6. "More megatonnage", Missiles and Rockets, Vol. 8, no. 10 (6 March 1961).
- 7. New York Times, 27 April 1968.
- 8. International Herald Tribune, 27-28 April 1968: "Biggest U.S. blast felt for 250 miles".
- 9. O'Toole, T. "U.S. boosting underground A-arm tests", International Herald Tribune, 1-2 Feb. 1968.
- 10. "Shaking up Las Vegas", Scientist & Citizen, Vol. 10, no. 10 (Dec. 1968), 265.
- 11. Cohn, V. "U.S. trial of Spartan warhead, biggest underground tests ever projected in Aleutians", International Herald Tribune, 8 April 1969.
- 12. International Herald Tribune, 5-6 April 1969: "Bigger underground A-tests planned for Nevada".
- 13. Lough, T. S. "Peaceful nuclear explosions and disarmament: Plowshare, proliferation and testing", 30 Aug. 1967. (Unpublished paper.)
- 14. Cooke, Alastair. "Shock for the U.S. nuclear testers", Guardian, 1 April 1969.
- 15. "Nuclear effects tests R and D being upgraded", Aerospace Technology, Vol. 21, no. 20 (25 March 1968), 102-05.
- 16. "Atomic test simulation", Scientific Research, Vol. 3, no. 17 (19 Aug. 1968).
- 17. "Rockets developed in case nuclear tests are resumed", Technology Week, Vol. 20, no. 16 (17 April 1967).
- Garman, R. S., "Safeguarding nuclear superiority", Defense Industry Bulletin, Vol. 2, no. 5 (May 1966), 4, 12.
- 19. "Nuclear effects and nuclear test detection", Defense Industry Bulletin, Vol. 4, no. 4 (April 1968).
- 20. "Kirtland guides nuclear weapon effort", Aviation Week and Space Technology, Vol. 75, no. 3 (25 Sept. 1961), 251-59.
- 21. Martell, E. A. "Plowing a nuclear furrow", *Environment*, Vol. 11, no. 3 (April 1969), 3-10.
- 22. AEC press release, no. H-16 (9 Jan. 1965).
- Finney, J. W. "U.S. hints Soviet violated treaty on atomic tests", New York Times, 20 Jan. 1965.
- 24. Szulc, T. "Soviet note to Washington implies A-test was accident", New York Times, 26 Jan. 1965.
- 25. New York Times, 20 Feb. 1965: "U.S. bids Soviet give more data on A-test".
- 26. New York Times, 11 March 1965: "Soviet blast found not to void treaty".
- 27. Finney, J. W. "Soviet may have broken limited test ban treaty", New York Times, 9 Nov. 1966.

- 28. New York Times, 12 Nov. 1966: "U.S. asks Soviet about atom test".
- 29. Persson, G. Fraktioneringsfenomen i aktivitet från en underjordisk kärnexplosion (FOA 4 Rapport C 4296). Stockholm: Swedish Research Institute for National Defence, April 1967.
- 30. Persson, G. "Fractionation phenomena in activity from an underground nuclear explosion", *Health Physics*, Vol. 16 (1969), 515.
- 31. Huovila, S., and Kulmala, A. "Radioaktivisen laskeuman ennustamisesta", Ilmatieteen Laitos, Tutkimasseloste, no. 2 (1968).
- Kauranen, P., Kulmala, A., and Mattson, R. "Fission products of unusual composition in Finland", Nature, Vol. 216, no. 5112 (21 Oct. 1967), 238-41.
- O'Toole, T. "Underground A-test taints east Canada", Washington Post, 9 Jan. 1969. Reprinted in International Herald Tribune, 10 Jan. 1969.
- 34. Grose, R. "Radiation rise in Canada after U.S. test is studied", New York Times, 10 Jan. 1969.
- 35. Washington Post, 27 Jan. 1968: "A device sends up 2,000 foot cloud".
- 36. New York Times, 27 Jan. 1968: "Nuclear blast digs a crater in Nevada in excavation test".
- 37. Laycock, G. "The beautiful sad face of Amchitka", Audubon, Nov./Dec. 1968.
- 38. Teller, E., et al. The Constructive Uses of Nuclear Explosives, 1968 (New York), p. 110.
- Bonner, N. A., and Miskel, J. A. "Radioactive distribution from cratering in basalt", Science, Vol. 150, no. 3695 (22 Oct. 1965), 489-93.
- Miskel, J. H. Release of Radioactivity from Nuclear Cratering Experiments (UCRL-14778, 26 Aug. 1966). Livermore, Cal: Lawrence Radiation Laboratory, University of California.
- 41. Finney, J. W. "U.S. delays A-test as aid to treaty", New York Times, 11 Feb. 1967.
- 42. St. Louis Post Dispatch, 11 Feb. 1967: "AEC puts off blast to aid nuclear talks".
- Dudman, R. "State Department trying to halt Nevada test", St. Louis Post Dispatch, 9 Jan. 1968.
- 44. Times, 13 May 1966: "Leakages from nuclear tests regrettable".
- 45. ENDC/1235 (26 Aug. 1968): "Joint memorandum on a comprehensive test ban treaty".
- 46. ENDC/PV.399 (1 April 1969), p. 12.
- 47. ENDC/PV.404 (17 April 1969), pp. 38-40.
- 48. Nuclear Test Ban Treaty (Hearings before the U.S. Senate Committee on Foreign Relations). Washington, D.C., Aug. 1963.
- 49. "New nuclear standby test plan proposed", Aviation Week and Space Technology, Vol. 99, no. 17 (21 Oct. 1968), 107.
- 50. Defence Industry Bulletin. Vol. 4, no. 4 (April 1968).
- Peaceful Applications of Nuclear Explosives—Plowshare: Hearings before the Joint Committee on Atomic Energy, 89th Cong., 1st Sess. (5 Jan. 1965), p. 35.
- 52. U.S. Atomic Energy Commission, Annual Report to Congress, 1968 (Washington, D.C.), p. 199.

17 - 693310 SIPRI Yearbook

Sources of the tables

- 1. "Appendix B: Announced nuclear detonations", in *Effects of Nuclear Weapons*, rev. ed. Washington, D.C.: U.S. Atomic Energy Commission in cooperation with the U.S. Department of Defense, 1962.
- 2. "Announced underground nuclear detonations", in Major Activities of the U.S. Atomic Energy Programs, annual 1965–68. Washington, D.C.: U.S. Atomic Energy Commission.
- Hohenemser, C., and Leitenberg, M. "Announced nuclear detonations: 1964–1967" in "A comprehensive nuclear test ban: technical aspects 1957–1967", Scientist & Citizen, Vol. 9, nos. 9–10 (Nov.–Dec. 1967), 212–13.
- 4. Zander, I., and Araskog, R. Kärnladdningsexplosioner 1945–1966 (FOA 4 Rapport No. A 4493). Stockholm: Swedish Research Institute for National Defence, June 1967.
- 5. Financial Times, 26 Aug. 1968: "France explodes its first H-bomb".
- 6. Boston Herald Traveler, 8 July 1968: "France resumes N-tests".
- 7. Defense Industry Bulletin, Vol. 4, no. 4 (April 1968).

2B. Accidents of nuclear weapons and nuclear weapon delivery systems

The square-bracketed numbers, thus [1], refer to the sources at the end of the paper.

General dangers

Accidents involving nuclear weapons are important for two reasons:

(a) They might start a nuclear war. This could happen if one country detonated a bomb by accident on the territory of a nuclear power or a nuclear power's ally. It might also happen if it dropped a bomb on its own territory, and another country was suspected.

(b) An accidental detonation, even if it did not start a nuclear war, could do great damage if it were detonated over a populated area.¹

Accidents could result from some kind of mechanical failure, or from the miscalculation or insubordinate behaviour of members of the military forces who operate the weapons delivery systems.

The one case of insubordinate behaviour that could be found in the literature is, in a sense, an example in reverse. The fourth French nuclear weapon test was in preparation when the "Revolt of the Generals" of the French military forces in Algeria took place. The French scientists at the test site were apparently fearful for the security of their incipient nuclear explosive. They began hurried preparations to detonate the device, which they did against the wishes of the military commander of the test site, to forestall any possibility of its capture by dissident military forces [1].

The possibility of insubordinate behaviour is treated sufficiently seriously in the United States for there to be a standing research programme about it. In each year from 1963 to 1966 the annual report of the US Atomic Energy Commission had the phrase: "Research was also conducted with the objective of providing improved devices for installation in nuclear weapons to prevent unauthorized employment" [2].

Evaluation of the danger

It is possible that the danger is at present diminishing. This is the view of one authority, J. B. Phelps:

¹ There is also the possibility of radioactive contamination from weapons which are damaged or destroyed but not detonated. This contingency is not examined in this paper.

Part II. Technological arms race

Probably the danger of accidental war is, on balance, at the present time, diminishing, because the problem is receiving attention which was relatively lacking in former years and because the trend towards more invulnerable strategic missiles for retaliation helps to make unnecessary a quick response to ambiguous warnings [3].

Phelps also concluded that an accidental detonation within the borders of one of the major nuclear powers probably would not lead to war.

The fact that a sizeable number of weapons accidents has in fact occurred without a concurrent nuclear explosion has also led to confidence in the effectiveness of built-in safety features. On the other hand, the number of deployed weapons has increased greatly since Phelps wrote the above statement (in 1960). Further, it is possible, now that ICBMs are more vulnerable than they were to surprise attack, that there might be more occasions in which a quick response was again considered necessary.

Even if the danger has been reduced, there is, nevertheless, always a possibility, however remote, that nuclear weapons, either airborne or of other varieties, might be detonated in the aftermath of accidents which produce an environment of unusual physical stresses or energy inputs to the weapon. Such situations might occur for example as a result of the impact forces produced by an airplane crash, or as the result of ignition of missile fuels in a silo. The danger does not arise from the effect of such physical energy on the fissionable material itself, but from tripping the electronic, mechanical, pyrotechnic or explosive arming and safety devices meant specifically to prevent accidental detonation. Though the chances of this occurring are very low, the danger is quite real.

Insofar as the American stockpile is concerned, not even the Defense Department or the Atomic Energy Commission ever has made a claim of absolute perfection. In 1958, the official American position on accidental nuclear yield was straightforward and direct: "It is considered that the possibility of the accidental nuclear explosion of a nuclear weapon is so remote as to be negligible." In 1962, however, a revised edition of *The Effects of Nuclear Weapons*, an authorized publication of both agencies, revealed the guarded admission that "Nuclear weapons are designed with great care to explode only when deliberately armed and fired. Nevertheless, there is always a possibility that, as a result of accidental circumstances, an explosion will take place inadvertently" [4].

The possibility is considered real enough for there to have been some serious studies of the matter, published by the Mershon center in 1960 and 1967 [4, 5]; and the US Atomic Energy Commission also has been sufficiently concerned to carry out a series of nuclear safety experiments to determine the safety of nuclear weapons in case of accident [6, 4]. Data concerning 19 tests at the Nevada Test Site "which resulted in a measurable nuclear yield" were released. There may have been additional tests as well which resulted in no measurable yield. "These experiments were designed to provide data about the behavior of the various weapons and devices under conditions like those which might occur in case of fire or accident" [7]. The experiments were begun in November 1955, and the 19 announced safety tests were completed in October 1958. Weapons were purposefully dropped from aircraft, exploded with dynamite, set on fire, and involved in vehicle crashes [8, 9].

The rest of this paper discusses accidents involving nuclear weapons which have occurred. The examples are almost entirely American; this is because information has been published about American accidents, not because it is presumed that no accidents have taken place in other countries. This point is taken up on page 265.

The Goldsboro accident

Perhaps the single most important example in the published literature of an accident which nearly resulted in a catastrophe occurred in 1961 at Goldsboro in North Carolina. Dr. Ralph Lapp, who had been head of the nuclear physics branch of the Office of Naval Research, wrote:

According to a study of the accident problem made by an independent, nonmilitary group, nuclear weapons have been involved in about a dozen major incidents or accidents, mostly plane crashes, both in the United States and overseas. In one of these incidents, a B-52 bomber had to jettison a 24-megaton bomb over North Carolina. The bomb fell in a field without exploding. The Defense Department has adopted complex devices and strict rules to prevent the accidental arming or firing of nuclear weapons. In this case the 24-megaton warhead was equipped with six interlocking safety mechanisms, all of which had to be triggered in sequence to explode the bomb. When Air Force experts rushed to the North Carolina farm to examine the weapon after the accident, they found that five of the six interlocks had been set off by the fall! Only a single switch prevented the 24-megaton bomb from detonating and spreading fire and destruction over a wide area [10].

Further information has recently become available concerning this incident as a result of questions of public safety in regard to the siting of Spartan missiles (a part of the United States ABM system) near urban centers. Spokesmen of the US Department of Defense have indicated that two of the six switches remained untriggered following the accident [11, 12]. However, they also added, that "the bomb that fell was 'unarmed', that is, a crucial piece of fissionable material, necessary for a nuclear explosion to occur, was not in it. This piece was called the capsule. The capsule was not on board

Part II. Technological arms race

the plane. The flight was officially described as a 'airborne alert training mission'" [11].

This assertion raises in turn several interesting questions. If the capsule were in the aircraft, but not in the weapon, one might assume that its manual emplacement was part of the standard arming process. But if, as stated, the capsule was not in the aircraft at all, it is curious that otherwise complete weapons, containing a warhead, would be considered necessary for aircraft crew training purposes. Unless information related to these questions would have supplied information on US strategic force structure, it seems reasonable to believe that if the statements on the "capsule" had been released in 1961, fears of weapons accidents might have been diminished. In a more recent volume Dr. Lapp reiterates that the B-52 in the Goldsboro accident carried two 24-megaton bombs, and that as a result of the accident President Kennedy initiated a review of procedures and mechanisms for weapons safety [13].

It is fair to assume that safety devices were further improved following the evidence of this accident. Inertial forces can be utilized in such mechanisms so that one of the several fuses may be activated only during the acceleration of a missile or the fall of a bomb. In the Polaris missile for example, it is stated that at least certain of the arming mechanisms are not activated until terminal stages of the flight.

Subsequent to nose fairing ejection and upon generation by the guidance system of the proper permissive and directive signals, the re-entry body is sent a safe-to-arm signal. Ejection of the re-entry body occurs on a signal from the guidance system when the guidance resolves the fact that no further acceleration is necessary for the re-entry body to follow a free flight ballistic trajectory to the target [14].

Numbers of accidents

There are various estimates of the number of accidents which have involved nuclear weapons. Immediately following the 23 January, 1968 B-52 accident in Greenland, the US Department of Defense issued a list of "previous accidents involving nuclear weapons carried on Air Force planes" [15]. It listed twelve accidents from February 1958 to January 1966. The item discussed by Dr. Lapp is listed as "January 24, 1961. A B-52 from Seymour Johnson Air Force Base, Goldsboro, North Carolina, carrying unarmed bombs crashed 15 miles north of the base." The meaning of the term "unarmed", which is referred to in most of the other accidents too, is uncertain. It appears to refer to the condition of the bombs before, rather than after, the accident. In the light of what has been said about the Goldsboro accident (see above), it is not clear whether or when "unarmed" means that safety catches were not triggered or that a "capsule" had not been placed in the weapon, or both.

In addition to the accidents in the list released on this occasion by the Defense Department, three other accidents had been publicly reported on previous occasions [16]. According to Dr. Lapp, there had also been acknowledged accidents overseas at:

- a north African base (Morocco),
- --- in England,
- off the US Atlantic coastline,
- in the Arctic [14, 17].

The North African and English accidents are corroborated in the Mershon report [5]. There is further information about these accidents in Larus' volume, *Nuclear Weapons Safety and the Common Defense* [4]. The book also has some details about earlier accidents.

There have also been an unspecified number of accidents when intercontinental ballistic missiles, presumably fitted with nuclear warheads, have been destroyed by fire or explosion [16]. One operational ICBM blew up on its launching pad. Anti-aircraft missiles have misfired several times and have been accidentally launched at least twice [5].

Altogether these and other sources furnish a total of at least 33 major accidents up to March 1968. (These are listed in table 2B.1 below.) However, there are sources which suggest a higher number. One source refers to "lesser accidents", involved in the maintenance, transportation, or modernisation of actual nuclear weapons which are known to have occurred, and it places the number of these at about fifty for US weapons since WWII [5]. Another total has recently been given in relation to the 1961 investigation ordered by President Kennedy after the Goldsboro incident. President Kennedy was then reportedly told that since the end of WWII there had been more than 60 accidents involving nuclear weapons—including two cases in which nuclear-tipped anti-aircraft missiles were inadvertently launched [18].

Possible higher totals

There are reasons for thinking that the total number of accidents involving nuclear weapons systems is significantly higher than the number officially announced. First, there are two accidents listed in Larus' recent and authoritative volume as having involved a nuclear weapon, where the official statement about the accident either omitted mention of the involvement of a nuclear weapon or specifically denied such involvement [4, 19, 20, 21]. This raises the question whether there may not have been other occasions

in which a nuclear weapon was involved in a accident, and the official statement did not mention it.

Secondly, it is noticeable that all recorded nuclear-weapon aircraft accidents have been of long-range bombers. No accidents have been recorded involving nuclear-weapons and carrier or land-based fighter bombers, ASW aircraft, or for other smaller tactical weapons of naval and land forces. It is true that such weapons systems are likely to be loaded with nuclear weapons or put on alert rarely, compared with United States long-range bombers which are known to have been flown loaded, on airborne alert, in large numbers. But zero accidents involving nuclear weapons would be a remarkable record.

It is also difficult to know where to draw the line between accidents involving nuclear weapons and those not involving nuclear weapons. Thus there are records of five cases of fire and/or explosion on board United States aircraft carriers of types intended to carry nuclear weapons, but it is not known specifically whether nuclear weapons were on board in all these cases or were in any way involved.

Possible future incidence of accidents

Most recorded accidents so far have occurred in long-range bombers. These accidents are likely to decline in number so long as the practice of carrying nuclear weapons on airborne alert is curtailed or stopped and greater reliance is placed on missiles. B-52 aircraft were temporarily ordered not to carry nuclear weapons on their flights after the 23 January 1968 crash; however, the practice was to be resumed on 1 July 1968 [24]. Other press reports at the time indicated that some segments of the US administration favored reconsideration of the B-52 flight alert policy, since it no longer had its earlier relevance in view of the US missile force structure in 1968. This report also claimed that only a very few ("about three") of the B-52's aloft at any one time now carry nuclear weapons [25].

Reliance on submarines carrying nuclear weapons shows no sign of diminishing. Here there is the risk that the submarine may sink or be in collision. It is hard to say what risk of nuclear explosion is involved. Evidence of the risk of collision is to be found in a report of the collision of a US nuclear attack submarine and a Soviet submarine [26]. As a result of the major weapon delivery capacity of Polaris submarines and their deployment within specified patrol areas—where they may remain immobile for some time—peace-time ASW operations have come to involve a large measure of interaction between submarines of the two major powers. Two types of such interaction have been described. These are, (1) the game of the "cat and mouse" with a Russian submarine—this is fairly common practice during which each tries to enveigle the other into revealing capabilities and characteristics of his submarine [27];

and (2) the

"wiping off" of one or more Russian submarines trailing a Polaris submarine headed for patrol duty. There can be little doubt that few things would please the Russians more than discovering the general patrol areas of our missile craft. There is evidence that Soviet submarines have tried to do so by picking up a Polaris craft off their overseas ports of Holy Loch, Scotland, and Rota, Spain, and trailing it as long as possible. That's where the "wiping off" assignment of the nuclear attack subs comes in, inserting itself between the Soviet underseas craft and the Polaris [29].

It is for this reason that US nuclear attack submarines are sometimes reported to accompany Polaris submarines as they leave port to begin a patrol.

The risk of accident with land-based missiles is hard to assess. It may well be less than with aircraft or submarines, but little information is available. Hence the risk of accident *per nuclear weapon deployed* may be diminishing owing to the shift to missiles and improved safety systems. On the other hand, the number of nuclear weapons deployed, as shown elsewhere in this report, has been increasing rapidly and continues to do so.

Coverage of the material

The material in the list which follows, because it is dependent on random accounts in the public press, is definitely not a complete listing of accidents involving nuclear weapons and their delivery systems in any area or nation of the world, East or West. The sources are nearly exclusively the Western press. The great majority of the accidents listed are of United States weapons systems, and there is little doubt that some unknown quantity of similar accidents from other nations is missing, presumably from the USSR as the second major nuclear power. However, information is no better concerning the three remaining nuclear powers. The reason that we have US examples is that they are either announced by the US Government or revealed by other sources of the Western press. On the other hand "The Soviet Union, Great Britain, France and the People's Republic of China never mention publicly their own safety programs or anti-accident techniques ... [or] mechanical or personal mishaps" [4]. At the same time one must anticipate fewer accidents from nations whose nuclear arsenal is not kept in as high a state of readiness as that of the United States.

Only two reports of Soviet accidents have been found. "Premier Kruschev is reliably reported to have told Vice-President Nixon about an erratic Soviet missile which was destroyed by a signal from the ground as it headed towards Alaska" [5]. The source does not indicate if this was an operational

Table 2B.1. List of major accidens involving complete destruction of a nuclear weapon delivery system with nuclear weapons on board, and with destruction, loss, or other involvement of the weapons themselves

Date	Weapon System	Place	Source	Remarks (phrasing used in original sources has been retained)
1. 5 Aug. 1950	Unspecified	Fairfield-Suison Field, California (now Travis AFB)	[4]	Unspecified.
2. 1956	B-36 bomber	New Mexico, USA	[15, 16, 17]	B-36 bomber dropped an atomic bomb on barren territory near Kirtland Air Force Base, New Mexico.
3. 12 Dec. 1957	B-52 bomber	Fairchild AFB Spokane, Washington	[4, 19]	B-52 crashed on take off. The news report at the time spoke only of "a training mission", and made no mention of a weapon.
4. 5 Feb. 1958	B-47 bomber	Hunter Air Force Base, Georgia, USA	[15]	B-47 bomber, mid-air collision, accidentally jettisoned part of a nuclear weapon. Weapon was in a transportable condition and not capable of a nuclear explosion.
5. 12 Feb. 1958	Bomber	Off Savannah, Georgia coast, USA	[4]	Unspecified.
6. 5 March 1958	B-47 bomber	Georgia coast, USA	[16, 17]	B-47 bomber jettisoned an atomic bomb off the Georgia coast following a mid-air collision. This was listed as an "incident", not an "accident".
7. 11 March 1958	B-47 bomber	Florence, South Carolina, USA	[15]	B-47 from Hunter accidentally jettisoned an unarmed nuclear weapon because of a malfunction of the plane's bomb-lock system.
8. 4 Nov. 1958	B-47 bomber	Texas, USA	[15]	B-47 crashed after take-off from Dyess Air Force Base in Texas. The crash was the result of a fire.
9. 26 Nov. 1958	B-47 bomber	Louisiana, USA	[15]	B-47 caught fire and burned on the flight line at Chennault Air Force Base, Louisiana.
10. 6 July 1959	Nuclear weapon in transit	Louisiana, USA	[15]	C-124 transport plane carrying an unarmed nuclear weapon crashed and burned on take-off from Barksdale Air Force Base in Louisiana.
11. 15 Oct. 1959	B-52 bomber	Kentucky, USA	[15]	B-52 bomber carrying two unarmed nuclear weapons collided with a KC-135 tanker plane near Glen Bean, Kentucky. Both bombs were recovered undamaged.
12. 8 June 1960	Bomarc surface- to-air missile	New Jersey, USA	[16], NYT 8 June 1960	Bomarc air-defense missile site at McGuire Air Force Base, in New Jersey, caught fire. Fire and two explosions severely damaged one of the missiles, which carried a nuclear warhead.
13. 19 Jan. 1961	B-52 bomber	Monticello, Utah	[4, 20, 21]	B-52 exploded in the air.
14. 24 Jan. 1961	B-52 bomber	North Carolina, USA	[15]	B-52 from Seymour-Johnson Air Force Base, Goldsboro, North Carolina, carrying unarmed bombs crashed 15 miles north of the base.

15. 14 March 1961	B-52 bomber	California, USA	[15]	B-52 from Beale Air Force Base, in California, on an airborne alert training flight crashed with unarmed bombs on board.
16. 4 June 1962	Thor ICBM	Johnston Island, US Pacific Test Range	NYT 5 June 1962	First high altitude (30 miles) thermonuclear explosion of the test series. Launch vehicle failure; ICBM's "thermonuclear device destroyed in flight". Warhead yield was one megaton.
17. 20 June 1962	Thor ICBM	Johnston Island, US Pacific Test Range	<i>NYT</i> 21 June 1962	Second high altitude test shot fails. Thor missile and nuclear warhead again destroyed. The test was to have occurred at an altitude of 200 miles or higher. Warhead yield was again "in the one megaton range". "A radioactive hot spot on the floor of the Pacific may mark for centuries the United States second failure to explode a hydrogen bomb at altitude of about 200 miles."
18. April 1963	Thresher, US nuclear powered attack submarine	US Atlantic coastline	<i>Times</i> , 29 Jan. 1968	Submarine lost; Thresher had Subroc on board which carries a nuclear warhead.
19. 13 Jan. 1964	B-52 bomber	Cumberland, Maryland USA	[15]	B-52 from Turner Air Force Base, in Georgia, crashed near Cumberland, Maryland. It carried two unarmed bombs.
20. 8 Dec. 1964	B-58 bomber	Indiana, USA	[15]	B-58 Hustler bomber caught fire and burned on the flight line at Bunker Hill Air Force Base, in Indiana. It carried an un- armed bomb.
21. 12 Oct. 1965	Nuclear weapon components	Ohio, USA	[15]	C-124 transport caught fire and burned during a refueling stop at Wright-Patterson Air Force Base, in Ohio. Nuclear weapons were not carried on the plane, but non-explosive components of nuclear systems were.
22. 17 Jan. 1966	B-52 bomber	Palomares, Spain	[48] Boston Globe, 20 Jan. 1966; US News and World Report, 4 April 1966, pp. 66–8	A B-52 and a KC-135 refueling tanker collided in midair near Palomares, Spain. B-52 crashed and 4 unarmed hydrogen bombs separated from the aircraft. One landed intact in a dry riverbed. The second and third bombs released radioactive material in the middle of a populated area. The fourth was retrieved from the ocean April 7 after an intensive search. Some press reports indicated that this fourth weapon carried a 20 megaton warhead. Other reports credit all four weapons at 1.5 megatons.
23. Unspecified	Unspecified	A North African base; Morocco	[4, 17]	Unspecified.
24. Unspecified	Unspecified	In England	[4, 17]	Unspecified.
25. Unspecified	Unspecified	Off the US Atlantic coastline	[17]	Unspecified.
26. Unspecified	Unspecified	In the Arctic	[4, 17]	Unspecified.
27. 21 Jan. 1968	B-52 bomber	Thule, Greenland	[16]	Crash of B-52; four thermonuclear bombs lost.
28. 12 Feb. 1968	B-52 bomber	30 km north of Toronto, Canada	[30]	Alleged crash of B-52 with nuclear or thermonuclear weapons on board.

Table 2B.1. Continued

Date	Weapon System	Place	Source	Remarks (phrasing used in original sources has been retained)
29. 27 May 1968	Scorpion, nuclear powered US attack submarine	Lost at sea	[27]	Undetermined; perhaps mechanical problems.
30. Unspecified	"Operational ICBM"	Unspecified	[5]	"One operational ICBM blew up on its launching pad."
31. Unspecified	"Anti-aircraft missiles"	Unspecified	[5]	"Anti-aircraft missiles have misfired several times."
32-33. Unspecified	"Nuclear-tipped anti- aircraft missiles"	Unspecified	[18, 5]	"At least" two cases in which nuclear-tipped anti-aircraft missiles were actually launched by accident.

٠

ICBM or a test missile of another sort. Another reference, for which no corroboration has been found, states: "Helsinki—A tremendous explosion is reported to have blasted a Soviet ICBM base near Alakkrtti close to the Russo-Finnish border. Sources said they believed the blast was a nuclear explosion" [23].

In Great Britain "there are ... two advisory committees concerned with nuclear projects, one dealing with weapon safety and the other with propulsion reactor safety. The Nuclear Weapons Safety Committee examines weapon production and deployment plans and advises the Secretary of State for Defense on any aspects which may have safety implications" [28]. It is certainly justifiable to assume that similar advisory groups exist in the Soviet Union, France and in China. Some US reports supply at least oblique reference to Soviet precautionary efforts [18]. Further indication of recent British concern with these questions is indicated in the following recent parliamentary exchange:

Mr. Allaun asked the Secretary of State for Defence why British H-bombs and Polaris missile warheads had not been fitted with electronic locks to prevent explosion by accident or without Government approval; and if he would now provide such locks.

Mr. Morris.—I am satisfied with the present arrangements for the protection against accidental firing and for the political and physical control of British nuclear weapons.

Mr. Allaun.—If our precautions are adequate, why have America and Russia gone to the extent of fitting such locks? ... [29]

The table

The table is restricted to the most serious types of accident only—major accidents involving the complete destruction of a nuclear weapon delivery system with nuclear weapons on board, and with the destruction, loss, or other involvement of the weapons themselves.

The following abbreviation is used in the table: NYT-New York Times

References

- 1. Brennan, D. G. "The atomic risks of spreading weapons: A historical case", Arms Control and Disarmament, Vol. 1, no. 1 (1968), 59-60.
- 2. Major Activities of the Atomic Energy Program 1963. US Atomic Energy Commission, 1964.
- Phelps, J. B. "Man-machine failure and accidental war", New Scientist, no. 334 (11 April 1963), pp. 78-79.
- 4. Larus, Joel. Nuclear Weapons Safety and the Common Defense, Columbus: Ohio State University Press, 1957.
- 5. Phelps, J. B. et. al. Accidental War: Some Dangers in the 1960's (Mershon

National Security Program Research Paper RP-6, 28 June 1960). Columbus: Ohio State University.

- 6. "Appendix B: Announced nuclear detonations" in The Effects of Nuclear Weapons, rev. ed. U.S. Atomic Energy Commission, 1964.
- 7. Major Activities of the Atomic Energy Program, July-Dec. 1955, U.S. Atomic Energy Commission, p. 38.
- 8. Greene, J. "Experts show a bomb is foolproof", Daily News, 16 June 1960.
- 9. Ashworth, G. W. "Crucial decisions wait decision on ABM", Christian Science Monitor, 1 April 1969.
- 10. Lapp, R. E. Kill and Overkill, (1962), p. 127.
- May, Donald H. United International Press dispatch of 24 January 1969, (021 A), Washington, D.C.
- 12. Lapp, R. E. Private communication, 11 March 1968.
- 13. Lapp, R. E. The Weapon Culture. (1968).
- 14. Wilson, L. H. "The Polaris fleet ballistic missile", Interavia, no. 1, 1965.
- 15. Department of Defense press release, quoted in the New York Times, 23 Jan. 1968.
- 16. "Previous atom accidents", New York Times, 23 Jan. 1968.
- Shulman, J. "The seventeenth accident", Scientist and Citizen, Vol. 8, no. 6 (April 1966), 19–20. (Information for the article supplied by Dr. R. E. Lapp).
- 18. Klein, E. and Littell, R. "Shh! Let's tell the Russians", Newsweek, 5 May 1969.
- 19. "Crash of jet bombs near Spokane kills 8", New York Times, 13 Dec. 1957.
- 20. "5 men lost as B-52 burns over Utah", New York Times, 21 Jan. 1961.
- 21. "1 still missing in Utah B-52 blast", New York Times, 21 Jan. 1961.
- 22. Times, 15 Jan. 1969.
- 23. Missiles and Rockets. Vol. 6, no. 10 (7 March 1960).
- 24. "B-52's to carry bombs again" Times, 1 May 1968, quoting St. Louis Post Dispatch.
- Finney, V. W. "U.S. reviews need for H-bomb alert", New York Times, 27 Feb. 1968.
- 26. International Herald Tribune, 3 July 1968. The unidentified US submarine required two months at Rota, Spain, for repair of damage.
- 27. "What happened to U.S.S. Scorpion", Navy Magazine, Vol. 11, no. 7 (July 1968).
- Defense Research (Report, Minutes of Evidence, Appendices, Index): Second Report from the Select Committee on Science and Technology, Sess. 1968–69. London, 27 March 1969.
- 29. Times, 26 June 1969.
- Durand de M. "L'Epopée des B-52", La Tribune des Nations, 23 Feb. 1968. This report carries other information about B-52 accidents which has not appeared elsewhere.

The square-bracketed figures refers to the sources on page 274.

United States

Table 2C.1 collects such figures as have been published for United States expenditure on CBW preparation in recent years.

A comparison of the FY 1969 budgets of Edgewood Arsenal and Fort Detrick gives an idea of the relative emphasis given to BW and CW [14]. Edgewood Arsenal is the centre of the US Army's CW effort, controlling both R & D (research and development) and procurement. Fort Detrick is the equivalent centre for BW. The CBW preparedness of the other armed services rely in part on work done at, and organized by, these two Army establishments.

		US \$ mn, fiscal year 1969		
	Edgewood Arsenal	Fort Detrick		
R & D	57.3	19.4		
Procurement	266.4	10.0		

For FY 1959, the \$40 million R & D budget was split almost equally between CW and BW [21].

During the past five years, figures for CBW expenditure have become particularly inaccessible. On many of the items in the programme, the expenditures have apparently been treated as classified information, while figures for the remainder are scattered elusively throughout the budget. As the continued existence of the programme has attracted widespread hostility, the Department of Defense seems to have followed a deliberate policy of concealing the figures for overall expenditure [11], and even issuing statements about them that are misleading or patently incorrect. Thus, although the Pentagon has recently stated that about \$350 million was spent on the CBW programme during 1968–69, it is clear that the actual expenditure was considerably in excess of \$550 million. The detailed justification of this figure is as follows.

The Department of Defense has stated that the total funding for US CBW R & D totalled \$94 million in FY 1969 [3]. Information released by the Army earlier stated that the total national CBW R & D expenditure was \$90 million in FY 1969 [12]. These figures are not obviously contradicted by information published in the DMS Market Intelligence Report—a

	Research and	1 Development	Procurement	Procurement		
	Estimates	Expenditure	Estimates	Expenditure		
1947	5	••				
1947–1957 annu	al					
average	••	20	••	••		
1958	••	35	••	••		
1959	40	40	••	••		
1960	45	50	30	••		
1961	55	60	45	••		
1962	80	80	••	••		
1963	145	115	••	70		
1964	160	125	135	55		
1965	••	115	••	40		
1966	125	115	••	135		
1967	••	110	••	145		
1968	••	90	••	250		
1969	••	95	••	240		
1970	90	••	••	••		

Table 2C.1. Funding for US CBW Research and Development, and Procurement, 1947-1970

US	\$	mn,	to	nearest	\$	5	mn,	fiscal	years
----	----	-----	----	---------	----	---	-----	--------	-------

Source: The list of references, page 274: Estimates: [1, 2, 4–10]; Expenditure: [3, 24]. The Estimates for 1947 and 1959–62 are appropriations, for 1963–64 are new obligational authorities, and for 1966 and 1970 are those given in the President's Budget. The Expenditure figures for Research and Development are from the Department of Defense, while those for procurement are from the General Accounting Office of the Comptroller-General.

Note: There are two other items of annual expenditure over and above the figures given in this table: the maintenance of installations and stockpiles, and the pay of personnel involved in the programmes.

private newsletter published for the aerospace industry compiled largely by former officials and officers of the Defense Intelligence Agency [13]—on the R & D budgets of Edgewood Arsenal and Fort Detrick only for FY 1969, which together were said to total \$76.7 million [14]. The difference of 15-20 million could be accounted for by work at the Army's Pine Bluff Arsenal and Deseret Test Center, and the Navy and Air Force R & D programmes, although this would seem a rather meagre amount for these additional programmes.

Besides the R & D expenditure there is the CBW procurement budget, which, according to the Army, totalled \$240 million for FY 1969 [12]. This figure is open to dispute. First, the *DMS Report* states that the combined FY 1969 procurement budgets for Edgewood and Fort Detrick amount to \$276.4 million [14]. Secondly, the breakdown given by the Army showed only \$5 million for herbicide (defoliant) procurement, whereas it is known that US Air Force allocated \$70.8 million for herbicide procurement during 1969 [15]. Thirdly, the same breakdown shows \$81 million for procurement of riot-control weapons and, in view of the apparent omission of the figures for Air Force procurement of herbicides, this figure might well exclude Air Force and Navy procurement of the riot-control weapons that they are reported to be using in Viet-Nam. The Army has stated that during FY 1969 it used about 2745 tons of riot-control agent CS in Viet-Nam [16]. Typical Army procurement contracts for CS suggest that the agent costs the Army about \$8.6 per kilogram [17] so that quite apart from the necessary hardware, this quantity of CS costs about \$23 million. Figures have not been published for the other riot-control agents that have been used in Viet-Nam. Taking all these considerations into account, it seems likely that the actual US CBW procurement programme for FY 1969 exceeded \$350 million.

On the operation and maintenance of CW installations, the Army has stated that the total FY 1969 budget allowed \$20 million [12]. For FY 1960 the appropriation under this heading was about \$26 million [1]. The DMS Report records \$10 million for Fort Detrick and Edgewood Arsenal alone in FY 1969 [14].

The Amy breakdown of the CBW budget does not include figures for the payrolls of the various CBW establishments, neither is there mention of these in the DMS Report. The civilian payroll at Edgewood Arsenal in FY 1968 was \$44.4 million [18]; it was \$46 million in 1965 at a time when it employed about 3700 civilian workers [19]. These figures suggest that the Fort Detrick payroll is of the order of \$32 million, as the establishment employs about 2500 civilian workers [19]. At Pine Bluff Arsenal, the 1966 payroll for its 1700 civilian workers was about \$12 million in 1966 [19], which in turn suggests that the payroll at Rocky Mountain Arsenal, employing about 630 workers [19], is between \$4 and \$5 million. At the Dugway Proving Ground, part of the Deseret Test Center, where the civilian staff numbers about 1000, the payroll was \$8.4 million in 1966 [19]. For these five establishments, therefore, it appears that the total payroll is over \$100 million. To this must be added the service pay of the military personnel there (about 2600 [19]), the payrolls of the other Army establishments as well as those of the Air Force and the Navy, and the costs of the various training schools that run courses of instruction in CBW. The additional manufacturing and research establishments include the following [20]:

the Newport nerve gas plant the Weldon Springs defoliant plant the Muscle Shoals phosphate plant the Niagara Falls decontaminant plant the New Cumberland impregnated-clothing plant the Marshall smoke-chemicals plant

Part II. Technological arms race

the Seattle filter material plant the Naval Biological Laboratory at Oakland the Navy's China Lake Ordnance Station the Air Force Armaments Laboratory at Eglin AFB.

Under these four headings therefore—R & D, procurement, maintenance and payroll—it appears that the total US CBW expenditure in FY 1969 was greatly in excess of \$550 million. In this connection, an American journalist has written: "A Senate source with access to classified CBW spending totals told me: '\$650 million a year on CBW is a conservative figure'" [13].

Other countries

In 1968 it was stated that the annual costs of the two principal British research and development establishments, both at Porton, amounted to about £2.5 million, £1.6 million for the Chemical Defence Experimental Establishment (including its outstation at Nancekuke) and £0.9 million for the Microbiological Research Establishment [22].

The main CBW establishment in Canada is the Defense Research Establishment, Suffield, which is also concerned with problems of defence against nuclear weapons. In 1967 the budget for the DRES was about \$4 million [23].

CBW expenditure figures are not available for other countries. CBW research establishments are known to exist in Australia, Belgium, Czechoslovakia, Finland, France, East Germany, Italy, Hungary, the Netherlands, Norway, Poland, Romania, South Africa, Sweden, Switzerland, the UAR, the USSR, West Germany and Yugoslavia.

References

- 1. Chemical-biological-radiological (CBR) warfare and its disarmament aspects: Study prepared by the Subcommittee on Disarmament of the Committee on Foreign Relations, US Senate, 86th Cong., 2nd Sess., 29 August 1960.
- 2. "CBN defense", Ordnance, Vol. 49, no. 1 (Jan.-Feb. 1965), 356.
- 3. Statement by Bob Wilson: "CB weapons", Congressional Record (House), 17 June 1969, pp. E 5003-E 5005.
- 4. Leggin, Al. "War Department research and development", Chemical Corps Journal, Vol. 2, no. 1 (Jan. 1947), 18, 19, 47.
- 5. Creasy, William. "What the Chemical Corps is doing", Armed Forces Chemical Journal, Vol. 9, no. 4 (1955), 12, 14-16.
- 6. Statement by M. Stubbs: Department of Defense Appropriations for 1962: Hearings before the Committee on Appropriations, US House of Rep., 87th Cong., 1st sess. (1961), pp. 241-42.

- 7. Sikes, Robert L. F. "Sikes sees challenge in Army reorganization", Armed Forces Chemical Journal, Vol. 16, no. 1 (Jan.-Feb. 1962), 8, 10, 11.
- 8. "Non-destructive warfare", Missiles and Rockets, Vol. 16, no. 13 (29 March 1965), pp. 58-59.
- 9. United States Armament and Disarmament problems: Hearings before the Subcommittee on Disarmament of the Committee on Foreign Relations, US Senate, 7 Feb. 1967, pp. 54-55, 62-64.
- 10. International Herald Tribune, 4 July 1969.
- 11. Finney, J. W. "Army uses \$350 million yearly in chemical warfare project", International Herald Tribune, 6 March 1969.
- 12. Statement by R. D. McCarthy: "Chemical and biological warfare politics and practices", Congressional Record, 21 April 1969, pp. A 2858-A 2865.
- 13. Hersh, Seymour. "On uncovering the great nerve gas coverup", Ramparts, June 1969, pp. 13-18.
- 14. DMS Market Intelligence Report: "Edgewood analysis", "Edgewood FY 68 R&D Contracts", "Ft Detrick analysis", and "Ft Detrick FY 68 R&D contracts".
- 15. "Government begins buildup of defoliants to meet increasing use in Vietnam", Chemical and Engineering News, Vol. 46, no. 23 (1968), 26-27.
- 16. Statement by R. D. McCarthy: "Ban on gas and germ warfare", Congressional Record (House), 12 June 1969, pp. H 4773- H 4775.
- 17. "Thiokol Chemical Corporation is stepping up output of chemical warfare agents", Chemical and Engineering News, Vol. 46, no. 48 (1968), 27.
- 18. "CB Defense", Ordnance, Vol. 53, no. 294 (May-June 1969), 570.
- 19. Hersh, S. M. Chemical and Biological Warfare: America's hidden arsenal. London, 1968.
- 20. "Chemical Corps studies reorganization assignment", Armed Forces Chemical Journal, Vol. 16, no. 1 (1962), 4, 6, and insert.
- 21. Schneir, W. "The campaign to make chemical warfare respectable", The Reporter, 1 Oct. 1959.
- Statements by Godsby, G. N. and Gordon Smith: *Defense Research* (Minutes of Evidence, Select Committee on Science and Technology, Sess. 1967–68), 6 May 1968.
- 23. Defense Research Establishment, Suffield, Brochure, July 1967.
- 24. US Senate, Congressional Record, 8 Aug. 1969, p. S 9495.

ASW=Anti-submarine warfare AUW=All up weight S/L=Sea level		T-O=Take-off TOW=Tube-launched, optically- tracked, wire-guided					
Name, manufacturer/country	In production	Main rotor system	Cruising speed km/hr	Range km	Payload		Remarks
Light					Total numbe	er of people	
OH-13 Sioux Bell/USA	1963	Single, two-blade, semi-rigid	133	520 <i>ª</i>	3		Can be armed with two 7.62 mm machine guns.
OH-6A Cayuse Hughes/USA	1965	Single, four-blade	216	611 ^{<i>b</i>}	4–6		Provision for carrying package armament (machine gun, grenade launcher).
OH-58A Kiowa (Jet ranger) Bell/USA	1969	Single, two-blade	206	627 ^c	5		Can be armed (machine guns, rockets).
BO 105 Bölkow/Germany	1969	Single, four-blade of rigid unarticulated type, with folding blades	230 ^d	330	5–6		
SA-341 Sud Aviation/France	1970	Single, three-blade, rigid	245 ⁴	720 ^e	5		
VFW-H3 VFW/Germany	Prototype flight trials 1969	Single, three-blade; compressed air can be ejected at the blade- tip nozzles	210	420 <i>ª</i>	3		Autogiro with hovering capabilities.
DO 132 Dornier/Germany	Prototype flight testing mid-1970, production 1971	Single, two-blade, semi- rigid, tip-driven; gas ejected through blade-tin nozzles	214	450 ⁵	4–5		
		······ ··· ·····			Load Altern	atives	
Utility	1070		4.40	acolt	Equipped Soldiers	Kg	
Mil Mi-4/USSR	1952	Single, four-blade	160	250 ⁴⁴ – 400 ^{ee}	14	1600 (or jeep or 76 mm anti-tank gun)	Can be armed with gun turret and air-surface rockets. Also ASW version.

276 2D. List and certain specifications of modern helicopters

Abbreviations:

UH-1 Iroquois Bell/USA	1959 r	Single, two blade semi-rigid	230	460615 ⁵⁵	7–14	1754	Still in production. Several versions. Can be armed with machine-guns, rockets, grenade-launcher or missi- les. Twin-engined version to be deli- red end-1969.
Wasp/Scout Westland/UK	1961	Single, four-blade, blades fold	177/196	435/510 ⁱ	5	680 ^h	Wasp can be armed with two anti- submarine torpedoes; Scout with missiles and machine guns.
Alouette III Sud-Aviation/France	1962	Single, three-blade,	190 ⁴	100 ^{<i>j</i>} –620 ^{<i>k</i>}	6		Can be armed with wire-guided missiles, 20 mm cannon, machine gun, rockets, or (ASW version) a homing torpedo.
UH-2 Seasprite Kaman/USA	1962	Single, four-blade, manual blade fold	245	685 ¹	11		Naval helicopter; one of the latest models can be fitted with stub wing.
WG-13 Westland/UK	1970–73	Single, four-blade, semi-rigid	259	871 ^{<i>m</i>} -1 854 ^{<i>n</i>}	11	742	Weapons on armed reconnaissance (a 20 mm cannon or twin machine guns in a chin turret, guided missiles on the stub wings) and ASW ver- sions.
ASW (principal mission)							
Wessex Westland/UK	1960	Single, four-blade, manual blade fold	195 ^d	630 ^p	16°	957–1117	
Kamov Ka-20 /USSR	1961	Two three-blade co- axial contra-rotating rotors; automatic blade fold	(193)	(400 ⁴ –650 ^r)	(12)	(2 000)	()=Ka-25K. Can be armed with two externally mounted air-to-surface missiles alongside the fuselage.
SH-3 Sea King Sikorsky/USA	1961	Single, five-blade, automatic blade fold	219	1 005 ^s	26		
Cargo_light							
Mil Mi-8 /USSR	1961	Single, five-blade	200	360°-425"	28	4 000	
CH-46 Sea Knight Boeing/USA	1962	Two three-blade rotors in tandem, rotating in in opposite directions, manual or power- operated blade fold	241–259	370 °	26	1 814	Loading ramp and hatch at rear of fuselage can be opened in flight and on the water.
5A 330 Puma Sud-Aviation/France	1969	Single, four-blade; blades fold forward	270ª	615 ^y	16 *	2 500 ^h	

2D. Continued

Name, manufacturer/country	In production	Main rotor system	Cruising speed km/hr	Range km	Payload		Ramarks
Cargo-medium							
CH-47 Chinook Boeing/USA	1962	Two three-blade rotors in tandem, rotating in opposite directions; two blades of each rotor fold manually	212–277	185 ^z	33–44	5 911 ^{<i>b</i>} 10 890	Loading ramp forms undersurface of upswept rear fuselage. Armed version has a grenade launcher, 20 mm guns, rockets, and machine guns. Steel armour plates protect crew and vital areas of helicopter.
SA 321 Super Frelon (Hornet) Sud-Aviation/France	1965	Single, six-blade, automatic rearward fold	240–245	920–940 [»]	30	4 000–4 500	Equipment can be carried for anti- submarine detection and attack.
Cargo-heavy							
CH-53A Sea Stallion Sikorsky/USA	1966	Single, six-blade	277	415**	38	3 630 ¹	Rear loading ramp.
Mil Mi-6 /USSR	1957	Single, five-blade	250	620 ⁹⁹ — 1000 ^{hh}	65	12,000	Small wings off-load rotors in flight, removed for flying crane duties. Clam-shell rear loading doors and folding ramp.
Crane							
Mil Mi-10 /USSR	1961	Single, five-blade	180	250	28	15 000	
CH-54A Skycrane Sikorsky/USA	1964	Single, six-blade	175 ^ª	407 ^s	67 in pod	10 382	Equipped with interchangeable pods.
Kamov KA-25 K /USSR	1967	Two three-blade co-axial contra-rotating rotors, automatic blade fold	193	400¶-650	12	2 000	Developed from the ASW-heli- copter KA-20.
Armed					Armament		
AH-1G Hueycobra Bell/USA	1967	Single, two-blade, semi-rigid	267	684 ⁶⁶	In flexible chin turret either Small wings can be fitted. Steet two six-barrel 7.62 mm armour protects crew and vital machine guns and/or 40 mm areas of helicopter. grenade launchers or a 20 or 30 mm three-barrel gun (Early versions, single 7.62 mm machine gun); four external store attachments under the stub-wings, various loads including a total of		Small wings can be fitted. Steel armour protects crew and vital areas of helicopter.

				76 70 mm rockets, two gun pods or two pods or containing three TOW guided missiles.	mini- each wire-
AH-56 Cheyenne 1969 Lockheed/USA	Single, four rigid	blade, 389ª	1 400 ^{cc}	In nose turret 40 mm grenade launcher or 7.6 mm machine gun, with swivel; in belly turret 3 cannon with 360° swive two attachments under each wing for TOW an tank missiles, 70 mm ro pods, etc.; advanced fin control and navigation system.	Small low-set fixed wings which almost entirely off-load main rotor 180° in high-speed flight. Pusher pro- 0 mm peller at the extreme tail. Armour el; protects crew, engine and vital areas of helicopter. ti- ocket re-
 With maximum fuel at 1 525 reserves Normal at 1 500 m With maximum fuel and ma payload at 2 438 m, no allowa Maximum With maximum fuel at S/L With 290 kg fuel With 260 kg payload at 210 External cargo With maximum fuel, includi 	m, n ^o ances of 5 min and 15 min cru with 4 passenge inces * At best altitu ¹ Normal ^m Maximum or reserves km/hr * At 3 855 kg 7 fuel, standard r ng allow- * Assault version	for T-O and landing, ising at best height rs payload at S/L de a standard fuel, no F-O weight with auxiliar eserves on	 With standar With standar With maximus With maximus With 28 pass 30 min fuel res With 3 000 k With 3 000 k With 1 814 k With 2 064 k 20 in high de Maximum at 	rd fuel rd fuel, with reserves um fuel, with reserves um fuel, 10% reserve sengers, 560 kg cargo, erves rg cargo g payload, 10% reserve g ensity version S/L	 ² Radius of action ^{aa} With 1 814 kg fuel, 10% reserve ^{bb} At 3 912 kg AUW ^{cc} At design gross weight, with external fuselage tank, 10% reserve ^{dd} With 11 passengers and 100 kg baggage ^{ee} With 8 passengers and 100 kg baggage ^{ff} With maximum fuel, no allowances ^{eg} With 8 000 kg payload ^{hh} With external tanks and 4 500 kg payload

Section 3. Disarmament

3A. Chronology of major disarmament efforts: 1945 to mid-1969

Sources

The main sources have been original UN documents, official statements, and the UN publication *The United Nations and Disarmament*, 1945–1965 (New York, 1967).

The chronology could not include every single proposal or suggestion made. It concentrates on the disarmament negotiations undertaken within the framework of the United Nations. Important proposals made elsewhere are, however, included.

The items, in chronological order, are numbered throughout. A subject index follows.

Subject matter index

The numbers refer to the paragraphs.

I. Procedural questions: (1945-) 1, 2, 3, 4, 12, 16, 21, 25, 28, 29, 31, 32 33, 36, 37, 45, 60, 78, 91, 93, 99, 105, 114, 125, 134, 136, 137, 181, 187, 199, 242, 246, 250.

II. General regulation and reduction of armaments and armed forces (1945–1959):

A. Nuclear energy and nuclear weapons (1945–1952): 2, 4, 5, 6, 7, 10, 11, 13, 14, 15, 16, 20, 21, 28.

B. Conventional armaments and armed forces (1945–1952): 8, 10, 12, 17, 18, 22, 23, 24, 26.

C. Comprehensive measures and plans (1945–1959): 9, 10, 17, 18, 19, 24, 26, 30, 31, 32, 33, 34, 35, 36, 37, 38, 45, 46, 47, 48, 50, 51, 53, 54, 57, 58, 59, 62, 63, 72, 100.

III. General and complete disarmament (1959–1968): 101, 102, 110, 113, 116, 126, 127, 139, 142, 146, 154, 164, 165, 174, 182, 183, 197.

IV. Separate (partial) measures of disarmament (1945-):

A. Chemical and biological warfare: 39, 40, 208, 216, 217, 227, 229, 243, 244, 245, 251.

B. Military bases and troops on foreign territories: 41, 70, 76, 87, 101, 173, 184, 227.

C. Military budgets: 54, 55, 64, 66, 76, 82, 87, 175.

D. Nuclear weapons:

1. Discontinuance of nuclear weapon tests: 44, 49, 52, 60, 61, 64, 66, 67, 68, 69, 71, 73, 74, 75, 76, 79, 83, 85, 87, 89, 90, 94, 95, 96, 103, 106, 107, 109, 111, 112, 115, 119, 120, 121, 122, 123, 124, 125, 128, 131, 137, 140, 143, 144, 148, 151, 153, 155, 161, 162, 163, 168, 171, 173, 185, 188, 190, 191, 193, 197, 204, 211, 227, 228, 230, 231, 232, 237, 239, 241, 247, 248.

2. Non-proliferation of nuclear weapons: 75, 76, 87, 88, 104, 118, 132, 133, 156, 171, 173, 180, 185, 186, 189, 192, 193, 194, 195, 200, 201, 205, 207, 213, 214, 218, 219, 220, 221, 222, 225, 233.

3. Nuclear-free zones and freezing of nuclear weapons within certain areas: 77, 81, 92, 97, 98, 101, 117, 129, 135, 138, 147, 157, 158, 169, 170, 172, 173, 176, 181, 198, 206, 210.

4. Prohibition of emplacement and testing of weapons of mass destruction in: (a) Outer space: 75, 80, 82, 87, 160, 165, 166, 202, 203, 209. (b) Ocean floor and sea-bed: 212, 223, 224, 227, 236, 240, 249.

5. Prohibition of the use, production and stockpiling of nuclear weapons:
 27, 41, 43, 70, 72, 75, 76, 87, 130, 150, 167, 184, 206, 208, 215, 227.
 E. Observation posts, surprise attack and accident, miscalculation or failure of communication: 54, 56, 62, 72, 75, 76, 84, 87, 93, 101, 149, 171, 173, 177.

F. Reduction of armaments and armed forces: 27, 41, 64, 65, 70, 72, 75, 76, 87, 108, 173.

G. Various other measures: 27, 42, 54, 64, 70, 72, 101, 141, 145, 152, 159, 171, 173, 178, 179, 185, 196, 226, 227, 234, 235.

Abbreviations

AEC	Atomic Energy Commission
CCA	Commission on Conventional Armaments
DC	Disarmament Commission
ENDC	Eighteen-nation Committee on Disarmament
Geneva Conference	Conference on the Discontinuance of Nuclear Weapon
	Tests

1945

- 1 24 October UN Charter, signed on 26 June 1945, enters into force. It provides a legal basis (Articles 11, 26, 47) for the Organization's activity in the field of disarmament and the regulation of armaments.
- 2 15 November Heads of Government of Canada, the UK and USA, meeting in Washington, issue a declaration in which they offer "to share, on a reciprocal basis with others of the United Nations, detailed information concerning the practical industrial application of atomic energy just as soon as effective enforceable safeguards against its use for destructive purposes can be devised." They also propose that a Commission be set up under the UN to prepare proposals for the use of atomic energy for industrial and humanitarian purposes and for the elimination from national armaments of atomic weapons and all other weapons of mass destruction.
- 3 **26 December** Foreign Ministers of the USSR, USA and UK, meeting in Moscow, agree (Moscow Declaration) to recommend, for the consideration of the General Assembly, the establishment by the UN of a commission to consider problems arising from the discovery of atomic energy and related matters.

- 4 24 January UN General Assembly unanimously establishes (resolution 1 (I)) the Atomic Energy Commission (AEC), composed of all members of the Security Council and Canada, when not a member of the Security Council herself. The Commission is to inquire into all phases of atomic energy problems and to make recommendations about them. In particular, the Commission shall make specific proposals inter alia for the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction. The Commission is accountable for its work to the Security Council, to which it forwards its reports and recommendations.
- 5 14 June USA submits to the AEC a 14-point plan ("Baruch Plan") proposing the creation of an international authority which would own all fissionable materials in trust for the world, and would own, operate and manage all facilities handling dangerous amounts of such materials. The authority would be a completely independent body and implementation of its tasks, i.e. creation of an effective control system as a precondition of atomic disarmament, would not depend on veto power of its members. The veto power of the permanent members of the Security Council would be abolished in enforcement actions against

violators. A ban on the manufacture and use of atomic weapons and the disposition of existing stocks will be discussed when a control system becomes fully operational.

- 6 19 June USSR submits to the AEC a draft convention prohibiting the production and employment of weapons based on the use of atomic energy for the purpose of mass destruction ("Gromyko Plan"). The contracting parties should assume obligations not to use atomic weapons in any circumstances; to prohibit the production and storing of weapons based on the use of atomic energy; and to destroy, within a period of three months from the day of the entry into force of the proposed convention, all stocks of atomic weapons finished or unfinished.
- 7 July USA develops and elaborates, in several memoranda submitted to the AEC, its original proposal concerning functions and power of an international authority (14 June). It maintains the same approach: the development of atomic energy should be considered or dealt with in the framework of the UN Charter; but the power and competence for securing a full control system should be entrusted in a new agency.
- 8 20 November USSR submits to the General Assembly (Political Committee) a formal proposal under which information would be provided regarding armed forces in foreign countries; until the general problem of reduction of forces was examined, home forces would not be included. (On 25 November the UK proposes an amendment calling for information on home forces as well as forces stationed abroad. The USSR includes this amendment in her draft resolution of 29 November.)
- 9 29 November USSR submits to the General Assembly (Political Committee) a draft resolution on general reduction of armaments and prohibition of production and use of atomic energy for military purposes. For the implementation of these measures, there shall be established within the framework of the Security Council international control operating on the basis of special provisions which should provide for the establishment of special organs of inspection. All UN member states shall submit information regarding armed forces and armaments in their own territory—this information to be submitted when the Security Council considers the proposals for general reduction of armaments. (The proposal is repeated on 3 December, but subsequently withdrawn in favour of General Assembly resolution 41 (I).)
- 10 14 December UN General Assembly unanimously adopts resolution 41 (I) (Principles Governing the General Regulation and Reduction of Armaments) recommending inter alia that the Security Council give

Part II. Disarmament

prompt consideration to formulating the practical measures which are essential to provide for the general regulation and reduction of armaments and armed forces, with an international system of control and inspection within the framework of the Security Council. It urges, as an essential step toward the urgent objective of prohibiting and eliminating from national armaments atomic and other major weapons of mass destruction, the expeditious fulfillment by the AEC of its terms of reference.

11 **31 December** AEC adopts its first report to the Security Council by a vote of 10 to 0, with 2 abstentions (Poland, USSR), approving essential principles of the US plan for control of atomic energy ("Baruch Plan"). Poland and the USSR abstain on the grounds that abolition of the veto system in the Security Council when considering the questions connected with atomic energy, as suggested in the US proposal, is unacceptable.

- 12 13 February UN Security Council establishes (resolution 18) by a vote of 10 to 0, with one abstention (USSR), the Commission on Conventional Armament (CCA), composed of all members of the Security Council, to which it is accountable. The CCA shall submit to the Security Council proposals for the general regulation and reduction of armaments and armed forces and for practical and effective safeguards. Questions within the competence of the AEC are excluded from the CCA's terms of reference.
- 13 18 February USSR introduces in the Security Council draft amendments and additions to the first report of the AEC (31 December 1946), emphasizing that an effective system of control of atomic energy should be established within the framework of the Security Council and that an international convention outlawing the production and use of atomic weapons is an essential part of any such system of international control.
- 14 **11 June** USSR submits to the AEC, in addition to and in development of its draft convention (19 June 1946), a new proposal containing basic provisions on which an international convention on atomic energy should be based. It anticipates the establishment of an international commission but, contrary to the US proposal (14 June 1946), strictly within the framework of the Security Council, which has the primary responsibility for the maintenance of peace. The commission's power in the control sphere would be more restricted and its recommendations,

forwarded to the Security Council, would be subject to the unanimity rule (confirms veto power). Such a system would be introduced after the prohibition of the use of atomic weapons and the destruction of stocks.

15 **11 September** AEC adopts its second report to the Security Council by a vote of 10 to 1 (USSR), and one abstention (Poland), reproducing the basic provisions of the "Baruch Plan".

- 16 17 May AEC adopts its third report to the Security Council by a vote of 9 to 2 (USSR, Ukrainian SSR), stating that it has reached an impasse in trying to find some common ground between the position of the Western powers (effective international control before prohibition) and that of the USSR (prohibition of atomic weapons and thereafter setting up of control machinery). The report suggests suspension of the work of the AEC until its permanent members find through prior consultation that there exists a basis for agreement.
- 17 26 July USSR submits in the Working Committee of the CCA a supplementary proposal of its plan of work for the CCA, pointing out that the general regulation and reduction of armaments and armed forces should provide for: reduction of armies, navies and air forces, with respect to both strength and armaments; reduction of war budgets and state expenditure on production of armaments; reduction of production of war materials; and, in the first place, prohibition of production and use of atomic and other weapons of mass destruction and the destruction of stocks of such weapons. These measures should be carried out under a system of international control within the framework of the Security Council.
- 18 12 August CCA adopts by a vote of 9 to 2 (USSR, Ukrainian SSR) two resolutions: the first recommending to the Security Council that the CCA should continue to consider only questions concerning conventional armaments; and the second defining general principles to govern the regulation and reduction of armaments and armed forces. The USSR opposes both resolutions on the grounds that they controvene General Assembly resolution 41 (I), which treats the regulation and reduction of armaments as a single and indivisible question; and it asserts that the CCA should formulate promptly practical measures including complete prohibition of atomic weapons and weapons of mass destruction.
- 19 25 September USSR submits to the General Assembly a draft resolu-

Part II. Disarmament

tion proposing: the reduction by one-third, during the year, of all land, naval and air forces of the permanent members of the Security Council; prohibition of atomic weapons as weapons of aggression (but not defense); and establishment of international control within the framework of the Security Council. (On 19 November the General Assembly rejects a revised version of this resolution by a vote of 39 to 6, with 6 abstentions.)

- 20 2 October USSR proposes to the General Assembly (Political Committee) that the AEC continue its activity and prepare a draft convention on the prohibition of atomic weapons and a draft convention on the establishment of effective international control over atomic energy, both conventions to be signed and brought into operation simultaneously. (The proposal was not adopted in the General Assembly. The vote, on 4 November, was 40 to 6, with 5 abstentions.)
- 21 4 November UN General Assembly by a vote of 40 to 6, with 4 abstentions (resolution 191 (III)), (a) approves the general findings and recommendations of the AEC, based on US proposals (14 June 1946 and July 1947); (b) requests the six permanent members of the AEC to start mutual consultations in order to determine if there exists a basis for agreement; and (c) calls upon the AEC to resume its sessions.
- 22 19 November UN General Assembly decides by a vote of 43 to 6, with one abstention (resolution 192 (III)), that no agreement is attainable on any proposal for the reduction of armaments and armed forces unless the states: decide to supply each other with exact information on their conventional armaments and armed forces; conclude conventions regarding the types of military forces to which such reductions could apply; and establish an organ of control. The USSR votes against; it considers that the resolution, while stressing the disclosure and verification of information, does not formulate concrete tasks in the field of arms reduction and prohibition of atomic weapons.

- 23 1 August CCA adopts by a vote of 8 to 3 (USSR, Ukrainian SSR, Egypt), as its official document, the French working paper formulating a plan for a census and verification of information on armed forces and armaments, excluding atomic weapons.
- 24 **11 October** USSR vetoes in the Security Council the CCA proposal (1 August) forwarded to it, on the grounds that it imposes preliminary conditions on the reduction of conventional armaments and avoids the question of collection of information in the atomic field. The Security
Council also rejects by a vote of 3 to 1, with 7 abstentions, a Soviet proposal whereby the Council would recognize as essential the submission by states of information both on armed forces and conventional armaments and on atomic weapons.

- 25 23 November UN General Assembly decides by a vote of 49 to 5, with 3 abstentions (resolution 299 (IV)), to request the permanent members of the AEC to resume consultations in order to explore all possible avenues and examine concrete suggestions which would lead to an agreement.
- 26 **5 December** Having rejected by a vote of 39 to 6, with 9 abstentions, a USSR proposal calling upon the Assembly to declare it essential that the states submit information both on armed forces and conventional armaments and on atomic weapons, the General Assembly, by a vote of 44 to 5, with 5 abstentions (resolution 300 (VI)), approves the proposal formulated by the CCA for the submission of information on conventional armaments and armed forces and its verification.

- 27 23 October USSR submits to the General Assembly (Political Committee) a draft resolution on condemnation of war propaganda, prohibition of atomic weapons, and one-third reduction of great power forces. (The General Assembly does not adopt the draft resolution, 17 November.)
- 28 13 December Having rejected the USSR proposal requesting the AEC to continue its work and to submit to the Security Council a draft convention on prohibition of atomic weapons and full control of atomic energy, the General Assembly establishes by a vote of 47 to 5, with 3 abstentions (resolution 496 (V)), the Committee of Twelve (members of the Security Council plus Canada) to determine the "ways and means whereby the work of the AEC and CCA might be co-ordinated, and the advisability of their functions being merged and placed under a new and consolidated disarmament commission". (The AEC reaching an impasse suspended its work indefinitely on 29 July 1949. The six permanent members of the AEC continued consultations in December 1949, but adjourned on 19 January 1950 when the Soviet representative withdrew due to disagreement on further participation in the consultations of the representative of China-Kuomintang group. Due to the same problem, the Soviet representative also withdrew from the CCA on 27 March 1950. The CCA continued work until 9 August, when it adjourned indefinitely.)

1951

- 29 **29 August** Committee of Twelve adopts by a vote of 11 to 1 (USSR) its report to the General Assembly recommending dissolution of both the AEC and CCA, instead of which there should be established a new commission under the Security Council to carry forward the tasks of the dissolved commissions.
- 30 **7 November** France, the UK and USA announce that they will make new proposals in the General Assembly on the regulation, limitation and balanced reduction of all armaments and armed forces. A first step would be disclosure and verification in successive stages of all forces and armaments, including atomic.
- 31 **19 November** The three Governments—France, UK, USA—propose to the General Assembly (Political Committee) establishment of a new disarmament commission which should be directed to propose a draft treaty for the regulation, limitation and balanced reduction of all armed forces, based on the principles contained in the tri-partite declaration (7 November).
- 32 **11 December** USSR submits to the General Assembly (Political Committee) amendments to the tri-partite proposal on a new disarmament commission, requesting the General Assembly to recognize as the most important task of the commission the unconditional prohibition of the production of atomic weapons and the establishment of strict international control over the enforcement of this prohibition, along with a one-third reduction in armaments and armed forces.

1952

- 33 **11 January** UN General Assembly decides by a vote of 42 to 5, with 7 abstentions (resolution 502 (VI)), to dissolve the AEC, recommending at the same time to the Security Council that it dissolve the CCA. By the same decision the General Assembly establishes a single Disarmament Commission (DC) under the Security Council with the task of preparing proposals for the regulation, limitation, and balanced reduction of all armed forces and all armaments, for the elimination of all major weapons adaptable to mass destruction, and for effective international control of atomic energy. The members of the newly formed commission are the same as of the AEC and CCA (Security Council plus Canada).
- 34 **12 January** USSR submits to the General Assembly (Political Committee) a draft resolution on measures to combat the threat of a new world war and to strengthen peace and friendship among nations. The draft calls upon the General Assembly to recommend that all states

should, within a month after the adoption by the General Assembly of the decisions on the prohibition of atomic weapons and the reduction by one-third of the armaments and armed forces of the five powers (China PR, USSR, UK, France, USA), submit complete official data on the situation of their armaments and armed forces, including data on atomic weapons and military bases in foreign territories. The General Assembly should also call upon the five powers to conclude a peace pact.

- 35 **19 January** UN General Assembly decides by a vote of 40 to 5, with 3 abstentions (resolution 504 (VI)), to refer to the DC, for further deliberation, the USSR draft resolution, which repeats previous proposals (25 September 1948 and 11 December 1951) which were rejected.
- 36 **19 March** USSR submits to the DC a draft plan of its work. The plan puts emphasis on: (a) prohibition of atomic weapons—prohibition and control would be put into effect simultaneously; reduction of armaments and armed forces—one-third within a year; and provision of information on armaments and armed forces—including information on atomic weapons and military bases in foreign territories; (b) questions concerning biological weapons and the prohibition of their use; (c) preparation of a relevant convention and provisions for the establishment within the Security Council of an international control organ.
- 37 28 March DC adopts by a vote of 11 to 1 (USSR) its plan of work, originally submitted by France as a compromise between the USA (withdrawn) and Soviet (rejected) plans. The adopted plan anticipates the following order of items: disclosure and verification of all armed forces and armaments, including atomic; regulation of all armaments and armed forces including the elimination of weapons of mass destruction; and, procedure and time-table for giving effect to the disarmament programme. The USSR objects to the plan on the grounds that, while giving priority to disclosure and verification, it does not formulate the task of abolishing atomic weapons and making substantial reductions in armaments and armed forces.
- 38 April-August DC discusses proposals of the three Western Governments for disclosure and verification of forces and armaments and for fixing numerical limitation of all armed forces, submitted to it in April (USA), May (France, UK, USA) and August (France, UK, USA) 1952, as well as USSR proposals calling for the prohibition of atomic weapons and one-third reduction of all armaments and armed forces, submitted to the General Assembly's sixth session (12 January). The USSR rejects the Western proposals on the grounds that the question of

armed forces has been separated artificially from the prohibition of atomic weapons and reduction of armaments, which is the main issue. In turn, Western powers reject the Soviet proposals on the basis that they do not offer satisfactory solution for disclosure and verification.

- 39 18 June In connection with the alleged use of biological warfare in Korea, the USSR submits to the Security Council a draft resolution calling on all states to accept the 1925 Geneva Protocol. (The Security Council rejects the draft resolution on 26 June by a vote of 1 to 0, with 10 abstentions. In turn the USSR vetoes on 3 July the US resolution calling for an investigation of the charges that the UN Command uses biological weapons in Korea, to be carried out by the International Committee of the Red Cross.)
- 40 **15** August USA takes the position in the DC that the matter of biological warfare must be included as an essential part of a comprehensive and balanced disarmament programme and cannot be satisfactorily dealt with as a separate or isolated problem. (In a working paper submitted to the DC on 4 September, the US elaborates this position in more detail.)

1953

- 41 **21 September** USSR submits to the General Assembly a draft resolution proposing: (a) unconditional prohibition of atomic, hydrogen and other weapons of mass destruction, to be carried out under international control; (b) the reduction by one-third of the armed forces of the five big powers; and (c) the elimination of military bases in the territories of other states.
- 42 8 December President Eisenhower (USA), in speech before the General Assembly, proposes a plan for international development of peaceful uses of atomic energy ("Atoms for Peace"). According to this plan, Governments principally involved should begin to make joint contributions from their stockpiles of normal uranium and fissionable materials to an international atomic energy agency to be set up under the auspices of the UN. (The USSR refuses to take part in the plan unless there is prior agreement to prohibit atomic weapons.)

1954

43 30 January USSR proposes in a draft declaration that the five powers —China PR, France, UK, USA and USSR—undertake unconditional obligations not to use atomic, hydrogen and other weapons of mass destruction, and calls upon all other states to join the declaration.

- 44 2 April Prime Minister Nehru (India) proposes an early "standstill agreement for atomic explosions, pending the outcome of discussions on prohibition and elimination of weapons of mass destruction."
- 45 19 April DC establishes by a vote of 9 to 1 (USSR), with 2 abstentions (China [Taiwan] and Lebanon), a five-power Sub-Committee (Canada, France, USSR, UK, USA), thus rejecting a Soviet proposal for an eight-power sub-committee (including China PR, Czechoslovakia, India). The task of the Sub-Committee is to search in private for an agreement on a comprehensive and co-ordinated plan of disarmament. (The Sub-Committee meets between May 1954 and September 1957, discussing various working papers submitted to it.)
- 46 **25 May** USA submits to the DC Sub-Committee a working paper concerning the establishment of international control organs to ensure the implementation and enforcement of disarmament programmes.
- 47 11 June France and the UK submit to the DC Sub-Committee a comprehensive joint plan for disarmament, which to a great extent presents a compromise with the Soviet approach to this problem. The plan does not insist on disclosure and verification as a pre-condition for prohibition of nuclear weapons; treats equally problems of both conventional and nuclear disarmament; and anticipates that the transition from one stage to the next should be automatic, subject to the competence of the control organ to verify the next stage. (Canada and USA join the proposal on 8 March 1955.)
- 48 30 September USSR submits to the General Assembly a draft resolution on the conclusion of an international convention on the reduction of armaments and the prohibition of atomic, hydrogen and other weapons of mass destruction, based on the joint Franco-British proposal (11 June), but with amendments. These two proposals differ from each other as to (a) time-table: Soviets propose a precise time-table—Western powers make it contingent on the findings of the control organ; (b) prohibition of atomic weapons: Soviets propose prohibition by the end of the second stage—Western position is unclear; (c) timing of the control organ simultaneously with the prohibition of atomic weapons—Western powers as a precondition. (With certain changes in regard to the time-table, the USSR submits the same proposal to the DC Sub-Committee on 19 March 1955.)
- 49 1 October In the UN General Assembly the representative of Burma calls for an agreement on the "cessation of all further experiments designed to produce bigger and better thermonuclear and atomic weapons."

- 50 29 March France and the UK submit to the DC Sub-Committee a memorandum on reduction of armed forces proposing specific ceilings for the armed forces of the five permanent members of the Security Council.
- 51 19 April France and the UK submit to the DC Sub-Committe a memorandum on prohibition and elimination of nuclear weapons providing the total prohibition of nuclear weapons not at the end of the disarmament programme, as proposed earlier (11 June 1954) but as soon as 75 per cent of the reduction of conventional armaments and armed forces is accomplished.
- 52 24 April In its final communiqué, the Bandung Conference of the Afro-Asian countries appeals to all the powers possessing nuclear and thermonuclear weapons, pending the total prohibition of the manufacture of these weapons, to reach agreement to suspend experiments with such weapons.
- 53 10 May USSR submits to the DC Sub-Committee a comprehensive two-stage disarmament plan (corresponding to the years 1956 and 1957) accepting the major principles of the British-French memoranda (29 March and 19 April) with regard to the specific ceilings for armed forces and the prohibition of nuclear weapons. Concerning control, the plan anticipates in the first stage creation of an international agency, linked to the Security Council, which would be allowed to install in the territories of all states concerned on a basis of reciprocity, control posts at major ports, at railway junctions, on main highways and airfields. The functions of the agency would be extended in the second stage and would include inspection on a permanent basis. The plan also envisages as one of the first measures for the execution of the programme, discontinuance of atomic and hydrogen weapon tests, to be supervised by an international commission accountable to the Security Council and the General Assembly.
- 54 18-23 July The Heads of Government of France, UK, USA and USSR meet in Geneva. They discuss inter alia: a Soviet proposal for the reduction of armaments and the prohibiton of atomic weapons, modelled on the Soviet plan of 10 May; a US proposal for reciprocal aerial photography and the exchange of military blueprints ("Open Skies") to guard against surprise attack; a British memorandum on joint inspection of forces confronting each other in Europe; and a French memorandum on disarmament, proposing that resources made available by reduction in military budgets should be used in whole or in part to assist underdeveloped countries.

- 55 29 August France submits to the DC Sub-Committee a draft agreement on the financial supervision of disarmament and the allocation for peaceful purposes of the resulting funds.
- 56 **30 August** USA submits to the DC Sub-Committee on outline plan for the implementation of the "Open Skies" proposal. (The USA supplements the plan on 7 October.)
- 57 2 September France submits to the DC Sub-Committee working papers concerning the structure of the international disarmament organization and the powers of the control administration.
- 58 6 September US representative in the DC Sub-Committee places a reservation on the disarmament position taken by the USA before the "Open Skies" proposal, including its support for the British-French proposals (11 June 1954), pending the outcome of a study—joint or separate—of inspection methods, which is the first requirement of any agreement.
- 59 13 September UK submits to the DC Sub-Committee a memorandum concerning a control organ (methods, objects and rights of inspection and supervision).
- 60 3 December Having rejected a USSR amendment which calls upon states to reach agreement on the cessation of experiments with all nuclear weapons, the UN General Assembly accepts by acclamation a Western power draft resolution to establish (resolution 913 (X)) the Scientific Committee on the Effect of Atomic Radiation. Its task is to collect, evaluate, and disseminate information.
- 61 6 December India introduces in the General Assembly (Political Committee) a draft resolution calling for all states to initiate negotiations to suspend all nuclear explosions. The General Assembly decides on 16 December (resolution 914 (X)) that account should be taken of the proposal of the Government of India.
- 62 16 December UN General Assembly by a vote of 56 to 7 (resolution 914 (X)) inter alia reaffirms the US "Open Skies" proposal (23 July), and emphasizes the necessity for an early agreement on an adequately safeguarded disarmament plan. The USSR opposes this resolution on the grounds that it does not contain recommendation for reduction of all armaments and armed forces and does not even mention necessity for prohibition of atomic weapons.

1956

63 19 March France and the UK submit to the DC Sub-Committee a revised edition of their plan of 11 June 1954. Whilst maintaining the principle of a three-stage disarmament scheme, the new plan differs

from the previous in that it omits specific provisions for the elimination of nuclear weapons; provides for significant conventional reduction, instead of a "freeze" to be carried out in the first stage; provides for the limitation of nuclear tests at the beginning of the second stage and total prohibition at the beginning of the third; provides for the prohibition of manufacture of nuclear weapons—the cutoff—at the beginning of the third stage, instead of at the end; and spells out the necessary link between the achievement of political settlements and the performance of disarmament.

- 64 27 March In the DC Sub-Committee the USSR submits a plan of partial measures. It anticipates: (a) limitation and reduction of conventional armaments and armed forces not linked to nuclear disarmament, i.e. to a comprehensive disarmament programme; (b) creation of a zone in Europe—including Germany (both parts) and adjacent states with limitation and inspection of armaments, and with, in particular, prohibition of the stationing of atomic military formations and the location of atomic and hydrogen weapons in the zone; (c) discontinuance of all nuclear tests, independently of other disarmament measures; and (d) reduction of the military budgets of all states by up to 15 per cent.
- 65 **3** April USA submits to the DC Sub-Committee a scheme for a first phase of disarmament. It provides for the establishment of an armaments regulation commission and certain demonstrations of international control; reduction of armed forces; exchange of information regarding the position and production of nuclear materials and weapons; and, subject to the possibility of effective control, limitation of nuclear tests. In US opinion, the execution of this "partial" plan can start without waiting for agreement on other more complicated questions, in particular on important political questions whose solution is a condition for a comprehensive agreement for disarmament.
- 66 **10 July** Yugoslavia, in a draft resolution submitted to the DC, urges inter alia cessation of nuclear tests with such control as might prove necessary, and a reduction of military expenditure.
- 67 12 July India, at a meeting of the DC, repeats her "standstill" proposal, maintaining that it does not require supervision at this stage, because no significant testing can go undetected with proper use of monitoring devices.
- 68 11 September Prime Minister Bulganin (USSR) in a letter to the President of the USA, proposes an agreement on discontinuing tests of atomic and hydrogen weapons, emphasizing that such an agreement does not itself require any international control agreement, since the

present state of science and engineering makes it possible to detect any explosion of a nuclear weapon, wherever it may be set off.

- 69 21 October President Eisenhower (USA), in his reply to Premier Bulganin, maintains that effective discontinuation of tests requires a system of inspection and control.
- 70 17 November USSR, in a statement directed to the General Assembly, proposes inter alia: the reduction of armed forces (accepts the Western figures for force levels proposed on 3 April); the ban of atomic and hydrogen weapons (as a first step, to cease testing immediately); the reduction by one-third of the armed forces on the territory of Germany; and the liquidation within two years of foreign bases.

- 71 **14 January** USSR submits to the General Assembly (Political Committee) a draft resolution calling upon the states conducting atomic and hydrogen weapon tests to discontinue them forthwith. (There was no vote on the proposal, which was referred to the DC.)
- 72 18 March USSR submits to the Security Council a new set of proposals, which include partial disarmament measures, as well as a twostage general disarmament plan. Both plans mainly repeat the ideas contained in previous Soviet proposals.
- 73 **14 June** USSR proposes in the DC Sub-Committee the immediate cessation of all atomic and hydrogen tests, if only for a period of two or three years, independent of other measures, as well as the establishment of an international commission to supervise the agreement. There would also be established control posts in the territory of the USA, UK, and USSR and in the Pacific Ocean area, for the purpose of supervising the fulfillment by states of their obligation to cease testing.
- 74 2 July Western powers welcome the Soviet proposal (14 June), but link with it agreement on other provisions of the first-stage disarmament plan, i.e. reduction of armed forces and armaments and cessation of production of fissionable material.
- 75 2 and 29 August Western powers (Canada, France, UK, USA) submit to the DC Sub-Committee a plan for partial disarmament. Concerning systems of inspection to safeguard against surprise attack, the plan insists (2 August) on aerial inspection, ground post and mobile ground teams. As to other measures, the plan proposes (29 August) limitation and reduction of armaments and armed forces in verified stages; prohibition of atomic weapons for offensive purposes; non-dissemination of atomic weapons; suspension of nuclear tests and cessation of production of fissionable materials; and peaceful use of outer space.

- 76 20 September USSR submits to the General Assembly a memorandum on partial measures in the field of disarmament. It suggests inter alia: reduction of armed forces; reduction of armaments and military budgets; prohibition of atomic weapons and in particular prohibition of the transfer of these weapons to other states as well as of the stationing of atomic military units and stockpiling of nuclear weapons in foreign territories; discontinuance of tests of atomic and hydrogen weapons; abolition of foreign military bases and aerial photography.
- 77 2 October Poland declares in the UN General Assembly her readiness to accept a prohibition on the production and stockpiling of nuclear weapons on her territory if both German States accept the same restrictions on their territory ("Rapacki Plan"). Czechoslovakia and Germany DR declare their readiness to accede to the zone (6 October).
- 78 **19** November UN General Assembly decides by a vote of 60 to 9, with 11 abstentions (resolution 1150 (XII)), to increase the membership of the DC from 11 to 25. USSR announces refusal to participate in future negotiations of the DC due to rejection of her proposal for inclusion in the DC of all members of the United Nations.
- 79 21 December The Supreme Soviet of the USSR proposes that the USSR, UK and USA assume an undertaking to discontinue all tests of atomic and hydrogen weapons as from 1 January 1958.

- 80 12 January In a letter to Premier Bulganin (USSR), President Eisenhower (USA) proposes inter alia: that the USSR and USA agree that outer space be used only for peaceful purposes; and that as part of a programme to check and reverse the accumulation of nuclear weapons, testing of nuclear weapons be indefinitely stopped.
- 81 14 February Poland submits a memorandum to a number of countries presenting a more detailed elaboration of its proposal of 2 October 1957. The proposed nuclear-free zone should include the territory of Poland, Czechoslovakia, Germany DR and Germany FR. (On 20 February the USSR expresses support for the proposal and readiness to respect the status of the zone if the UK and USA do the same.)
- 82 **15 March** USSR proposes the conclusion of an agreement for: a ban on the use of outer space for military purposes; the elimination of foreign military bases; and the establishment of a UN agency for international co-operation in the study of outer space. (The same proposal is included in a Soviet draft resolution on 7 November, and in a new draft resolution of 18 November.)

- 83 **31 March** The Supreme Soviet of the USSR announces, after completing an intensive series of tests, a decision to discontinue nuclear weapon tests. If the other nuclear powers continue these tests, the USSR will be free to carry out further tests. (In April the UK and USA initiate an intensive test programme which they had announced earlier. The USSR resumes tests on 30 September and, after a new series of tests, suspends them again on 3 November.)
- 84 28 April USA submits to the Security Council a draft resolution proposing the establishment of an Arctic zone for international inspection against surprise attack. (The USSR vetoes the resolution on 2 May.)
- 85 **1 July–21 August** A conference of East–West experts meets in Geneva to discuss methods of detecting nuclear tests. In agreed conclusions, they recommend a network of control posts under an international control organ.
- 86 22 August UK and USA offer to suspend nuclear tests for one year from the beginning of negotiations, provided that the USSR does not resume testing during that time, and to negotiate an agreement banning tests for one year at a time, the ban to continue if the control system works satisfactorily and progress is made in implementing other disarmament measures. (The UK suspends nuclear tests on 31 September and the USA on 30 October.)
- 87 **18 September** USSR submits to the General Assembly a memorandum on measures in the field of disarmament, which repeats the main proposals contained in its memorandum of 20 September 1957. It also contains a proposal for a ban on the use of outer space for military purposes and for international co-operation in the study of outer space.
- 88 17 October Ireland submits to the General Assembly (Political Committee) a draft resolution on further dissemination of nuclear weapons. (The Political Committee approves by a vote of 37 [USSR] to 0, with 14 abstentions [UK, USA], para. 2 of the draft. However the representative of Ireland does not press the whole draft to a vote and withdraws it on 3 November. He also withdraws on 31 October the Irish amendments to the 17-power draft resolution A/C. 1/L 205, urging the parties to the Geneva negotiations not to furnish nuclear weapons to other nations while the negotiations are in progress.)
- 89 20 October France declares in the General Assembly (Political Committee) that the cessation of nuclear tests is conceivable only within the framework of effective nuclear disarmament, and that the nuclear powers should first take steps to stop stockpiling.
- 90 31 October Conference on the Discontinuance of Nuclear Weapons Tests (UK, USA, USSR) meets in Geneva. The main and most

disputed problem is that of control. (Western powers refuse to accept Soviet demands for vetoes.)

- 91 4 November UN General Assembly decides by a vote of 76 to 0, with 2 abstentions (resolution 1252D, (XIII)) that the DC shall, for 1959, and on an ad hoc basis, be composed of all members of the UN. (From September 1957 until September 1959 neither DC nor Sub-Committee held meetings.)
- 92 **4 November** Poland submits, in order to meet some Western objections, a new version of "Rapacki Plan". It anticipates two stages within which denuclearization would be combined with the reduction of conventional forces under appropriate control.
- 93 10 November Conference of Experts on Prevention of Surprise Attack opens at the UN office in Geneva. Participants are experts from Canada, France, Italy, UK and USA on one side and from USSR, Poland, Czechoslovakia, Romania and Albania on the other side. The experts from the Western countries consider their task to be that of preparing a technical, military analysis of the problem and of evaluating the effect of various systems of inspection and observation. The five Eastern delegations submit detailed proposals for a system of inspection and disarmament in Europe including a one-third reduction of foreign forces and non-stationing of nuclear weapons and rockets on the territory of Germany, as one means of preventing surprise attack. (The Conference adjourns without result on 18 December.)

- 94 **5 January** USA issues a statement saying that studies undertaken by American seismologists show that it is more difficult to identify underground explosions than had previously been believed.
- 95 **19 January** UK and USA announce in the Geneva Conference on Nuclear Weapons Tests their readiness to drop the previous requirement that any discontinuance of nuclear weapons tests must depend on explicit progress towards major disarmament measures.
- 96 **13 and 23 April** President Eisenhower (USA) in a letter to Premier Khrushchev (USSR) proposes the conclusion of an agreement banning nuclear weapons tests under water and in the atmosphere up to 50 kilometers. In his answer the Soviet Premier rejects this proposal and suggests cessation of all types of test, accepting in principle a predetermined number of an annual quota of on-site inspections.
- 97 **25 June** USSR issues a statement proposing the creation of a nuclear-free zone in the Balkan-Adriatic region.

- 98 14 August USSR expresses support for the creation of a nuclear-free zone in the Baltic area.
- 99 7 September Foreign Ministers of France, UK, USA and USSR, meeting in Geneva, agree on a procedure for resuming disarmament negotiations and decide to create a Ten-Nation Disarmament Committee consisting of five Western (France, Canada, Italy, UK, USA) and five East European countries (Bulgaria, Czechoslovakia, Poland, Romania, USSR), to consider disarmament questions. The Committee is not a UN body, but will keep DC informed.
- 100 **17 September** UK submits to the General Assembly a three-stage plan for comprehensive disarmament, based on the principle of balanced stages towards the abolition of all nuclear weapons and the reduction of all other weapons to levels which would rule out the possibility of aggressive war. (The plan becomes the basis for the subsequent Western plan submitted to the Ten-Nation Committee.)
- 101 **18 September** USSR submits to the General Assembly a three-stage programme (four years) providing for the first time for general and complete disarmament under effective control. The programme anticipates elimination of all armed forces and armaments within four years and under international control. Access of the control organ to the inspected objects would be gradually enlarged to become completely free after progress of disarmament has been completed. At the end of the disarmament process states would retain only strictly limited and agreed contingents of police (militia) equipped with light fire arms. The USSR also submits a plan for partial measures, proposing establishment of a nuclear-free zone in Central Europe; abolition of foreign military bases; conclusion of an East–West non-aggression pact; and agreement on the prevention of a surprise attack.
- 102 20 November UN General Assembly unanimously expresses the hope (resolution 1378 (XIV)) that measures leading towards the goal of general and complete disarmament under effective international control will be worked out in detail and agreed upon in the shortest possible time.
- 103 20 November UN General Assembly by a vote of 51 to 16 (UK and USA), with 15 abstentions (resolution 1379 (XIV)), expresses its concern over the intention of the French Government to conduct nuclear tests in Sahara.
- 104 20 November UN General Assembly by a vote of 68 to 0, with 12 abstentions (resolution 1380 (XIV)), adopts a revised Irish draft, whereby it recognizes the danger of dissemination of nuclear weapons

and suggests that the Ten-Nation Disarmament Committee should pay attention to this problem. (France and the USSR abstain.)

- 105 **21** November UN General Assembly unanimously decides (resolution 1403 (XIV)) that the DC shall continue to be composed of all members of the UN.
- 106 1 December Twelve nations, including USSR, USA, UK and France, sign the Antarctic Treaty, prohibiting the establishment of military bases and fortifications and the carrying out of military maneuvers and nuclear explosions in the Antarctic, under full international control including complete access at all times to the whole territory.
- 107 **29 December** President Eisenhower (USA) states that the voluntary moratorium on testing expires on 31 December and that the USA considers itself free to resume testing, but will not do so without giving advance notice of that intention.

- 108 **15 January** The Supreme Soviet of the USSR says it has reduced USSR armed forces to the level of 2.5 million men and has withdrawn or substantially reduced its troops in East European countries; it appeals to all other countries to reduce their own forces both on their home territory and on the territory of other countries.
- 109 11 February UK and USA in the Geneva Conference on Nuclear Weapons Tests put forward a proposal to ban all testing in environments where control, in their view, seems possible—the atmosphere, outer space, under water, and underground above a seismic magnitude of 4.75. There should also be a certain number of on-site inspections to check 30 per cent of all unidentified seismic events or 20 per cent of all seismic events.
- 110 **15 March** Ten-Nation Disarmament Committee meets in Geneva. The Western powers (Canada, France, Italy, UK, USA) submit to it a three-stage plan for general and complete disarmament based on an earlier British proposal (17 September 1959); and the USSR introduces a revised detailed version of its plan of 18 September 1959.
- 111 **19 March** USSR puts forward in the Geneva Conference on Nuclear Weapons Tests a proposal to ban all tests in the atmosphere, in outer space, under water, and underground to a seismic threshold of 4.75. There should be a moratorium on underground tests below the threshold of 4.75.
- 112 **29 March** USA and UK declare that as soon as a treaty has been signed and arrangements made for a co-ordinated research programme for the purpose of progressively improving control methods

for events below a seismic magnitude of 4.75, they will be ready to institute a voluntary moratorium of agreed duration on nuclear weapons tests below that threshold.

- 113 2 June USSR sends to the Governments of other states a proposal containing the basic provisions of a treaty on general and complete disarmament. The plan calls for the elimination of all vehicles capable of delivering nuclear weapons, and the simultaneous abolition of all Western foreign bases, all in the first stage, to be completed in an 18-month period. In the second stage the plan anticipates the complete prohibition of weapons of mass destruction and reduction of armed forces. The third stage would complete the process of general and complete disarmament. Measures for preserving peace would be carried out under the UN Charter by the Security Council, having at its disposal units from the contingents of police remaining at the disposal of the states.
- 114 **27 June** Five East European countries decide to cease their participation in the work of the Ten-Nation Disarmament Committee inter alia on the grounds that Western powers avoid the question of an agreement for the implementation of any disarmament measure. The USSR also suggests that some other nations should be invited to take part in disarmament negotiations. In turn Western countries accuse East European powers of avoiding the question of preliminary measures and control.
- 115 20 July USA submits to the Geneva Conference on Nuclear Weapons Tests a revised draft on a detection and identification system.
- 116 23 September USSR, developing an earlier proposal on general and complete disarmament (2 June), submits to the General Assembly a new document in which it suggests inter alia that measures of nuclear disarmament should be implemented simultaneously with the measures of conventional disarmament.
- 117 **5 December** Seven African countries (Ethiopia, Ghana, Guinea, Mali, Morocco, Nigeria and the UAR) submit to the General Assembly a draft resolution whereby all states would be requested: to refrain from carrying out nuclear or ballistic weapons tests in Africa; to eliminate bases and launching-sites with such weapons; and to regard and respect the African continent as a nuclear-free zone. (The draft was not put to a vote. The Soviet Union expressed its support for the draft.)
- 118 20 December UN General Assembly by a vote of 68 to 0, with 26 abstentions (resolution 1576 (XV)), adopts a revised Irish draft resolution which, pending the signing of a permanent agreement, calls upon the nuclear powers to refrain from transmitting the control of nuclear

weapons or the information necessary for their manufacture to nonnuclear powers; and which calls upon non-nuclear powers to refrain from manufacturing these weapons and from otherwise attempting to acquire them. (The USSR votes in favour; France, UK and USA abstain.)

119 20 December UN General Assembly decides by a vote of 88 to 0, with 5 abstentions (resolution 1577 (XV)), and by a vote of 83 to 0, with 11 abstentions (resolution 1578 (XV)), to urge the nuclear powers negotiating in Geneva to continue their present voluntary suspension of the tests. The USA abstains from voting, stating that such suspension cannot be an acceptable alternative to a safeguarded agreement on nuclear testing.

- 120 **21 March** USSR proposes in Geneva Conference establishment of a control organization on the basis of equal participation of the representatives of the Western, East European, and non-aligned countries ("Troika System").
- 121 **18** April Western powers in the Geneva Conference submit a draft treaty on the discontinuance of nuclear weapons tests below the 4.75 seismic magnitude; reducing number of control posts and on-site inspection (ranging from 12-20), as well as parity representation between East and West in a control commission.
- 122 **15 May** USSR declares at the Geneva Conference that the continuance of nuclear weapons tests by France, which is a member of NATO, places the USSR in a situation which may compel it to resume atomic and hydrogen bomb tests. (The USSR resumes testing on 31 August, carrying out an extensive series of tests, including one of over 50 megatons.)
- 123 **4 June** Premier Khrushchev (USSR), meeting President Kennedy (USA) in Vienna, announces the possibility of merging test-ban talks with general disarmament discussion if the Western powers continue to refuse Soviet proposals (19 March 1960), including the "Troika System" (21 March 1961).
- 124 **3 September** USA and UK propose immediate conclusion of an agreement banning all atmospheric tests relying upon existing means of detection. USSR rejects this proposal, asking for a ban on all tests. (The USA resumes underground testing on 15 September.)
- 125 6 September In a declaration issued at the end of its work, the Belgrade Conference of Non-aligned Countries expresses the view that the

non-aligned nations should be represented at all further world conferences on disarmament and that an agreement on the prohibition of all nuclear and thermonuclear weapons tests should be urgently concluded.

- 126 **20 September** Following an exchange of views on a bilateral basis held in June, July and September, the USA and USSR issue a Joint Statement of Agreed Disarmament Principles ("McCloy-Zorin Statement"). In exchanged letters enclosed with the statement, the USA maintains that verification must assure that agreed levels of forces are not exceeded, while the USSR expresses strong opposition to the establishment of control over armaments.
- 127 **25 September** USA submits to the General Assembly a Program for General and Complete Disarmament in a Peaceful World.
- 128 6 November UN General Assembly decides by a vote of 71 to 20, with 8 abstentions (resolution 1648 (XVI)), to urge nuclear powers to refrain from further tests. All the nuclear powers oppose this resolution the Western ones on the grounds that an uncontrolled moratorium has already failed once, and the USSR on the grounds that consideration of a moratorium separate from the question of disarmament as a whole cannot lead to constructive results.
- 129 24 November UN General Assembly, on request of a number of African countries, decides by a vote of 55 to 0, with 44 abstentions (resolution 1652 (XVI)), to call upon member states to refrain from carrying out nuclear tests in Africa and to consider and respect the continent as a denuclearized zone. (The USSR votes in favour; France, UK and USA abstain.)
- 130 24 November UN General Assembly by a vote of 55 to 20, with 26 abstentions (resolution 1653 (XVI)), adopts a declaration on the prohibition of the use of nuclear and thermonuclear weapons, declaring inter alia that the use of these weapons is contrary to the spirit, letter and aims of the UN Charter. It also requests the UN Secretary-General to consult the member states on the possibility of convening a special conference for signing a convention on the prohibition of the use of these weapons for war purposes. (The USSR votes in favour; France, UK and USA vote against.)
- 131 28 November USSR proposes in the Geneva Conference a test ban (atmosphere, outer space, under water) monitored by existing national means of detection. As to underground tests, states should undertake not to conduct such tests until agreement is reached on a system of control over underground explosions as a constituent part of an international system of control over the implementation of a programme of general and complete disarmament. (The Western powers reject the

Soviet proposal and suggest on 16 January 1962 that the test ban question be sent to the ENDC.)

- 132 **4 December** UN General Assembly by a vote of 58 to 10, with 23 abstentions (resolution 1664 (XVI)), adopts a Swedish draft whereby it requests the Secretary-General to make an inquiry as to the conditions under which non-nuclear states would be willing to refrain from manufacturing or acquiring nuclear weapons.
- 133 **4 December** UN General Assembly unanimously adopts (resolution 1665 (XVI)) an Irish draft whereby it calls upon all states, in particular upon nuclear states, to do their best to secure the conclusion of an international agreement banning dissemination of nuclear weapons.
- 134 13 December UN General Assembly unanimously endorses (resolution 1722 (XVI)) the Eighteen-Nation Committee on Disarmament (ENDC) established by joint Soviet-American agreement. The ENDC consists of the members of the Ten-Nation Committee and eight non-aligned nations: Brazil, Bulgaria, Burma, Canada, Czechoslovakia, Ethiopia, France, India, Italy, Mexico, Nigeria, Poland, Romania, Sweden, USSR, UAR, UK and USA.

- 135 **16 February** Sweden declares its willingness—provided satisfactory agreement can be reached between the Governments concerned—to become part of a nuclear-free zone in Europe, comprising all states in Central and Northern Europe which do not possess atomic weapons of their own.
- 136 **15 March** Eighteen-Nation Committee on Disarmament starts its work in Geneva. France refuses to participate. (In a letter to Premier Khrushchev dated 18 February 1962 President De Gaulle gives detailed explanations of French views on disarmament problems and the forthcoming negotiations in the ENDC.)
- 137 **21 March** The Geneva Conference on the Discontinuance of Nuclear Weapons Tests having suspended its work (29 January), the ENDC decides to establish a Sub-Committee (UK, USA, USSR) to continue consideration of a test-ban treaty.
- 138 **28 March** Poland submits in the ENDC a modified version of the "Rapacki Plan", anticipating a possibility for other European states to accede to the proposed nuclear-free zone.
- 139 March-April USSR submits in the ENDC (15 March) the "Draft treaty on general and complete disarmament under strict international control", comprising three stages to be completed within four (later extended to five) years. The plan provides inter alia for the complete

elimination of nuclear delivery vehicles by the end of the first stage. The total elimination of nuclear weapons and fissionable material would take place during the second stage. The USA submits (18 April) an "Outline of basic provisions of a treaty on general and complete disarmament in a peaceful world", comprising three stages. The first and second stages would be completed each within a three-year period. The third stage would be completed within an agreed period of time as promptly as possible. The plan provides inter alia for ending production of fissionable material and the reduction by 30 per cent of nuclear delivery vehicles in the second stage. It also envisages that stocks of nuclear weapons would be reduced by an agreed percentage and that production would be subject to agreed limitation in the second stage. The total elimination of such weapons would take place in the third stage. (The two documents, amended from time to time, become the basis of all future discussions on general and complete disarmament.)

- 140 **16 April** Eight non-aligned members of the ENDC submit a joint memorandum favouring a system for continuous observation and effective control on a purely scientific and non-political basis, which could be based or built upon already existing national networks of observation posts. An international scientific commission would be entrusted with the tasks of processing all data received from the agreed systems of observation posts and of reporting any nuclear explosion or suspicious event.
- 141 **25 May** ENDC, meeting in the Committee of the Whole, unanimously adopts a declaration against war propaganda as recommended by the co-chairmen (Soviet and American representatives). In the plenary meeting the Soviet delegate suggests some changes in the declaration. These do not meet with unanimous approval, and the discussion of the subject is adjourned.
- 142 **31 May USSR** and USA submit to the ENDC a working draft of part 1 of the Treaty on General and Complete Disarmament.
- 143 27 August USA and UK submit in the ENDC two draft test ban treaties. The first, a comprehensive treaty, anticipates a ban on tests in all environments, but still insists on on-site inspection and control posts (reducing the number from 180 to 80), nationally manned, with only one international observer. The other, a partial treaty, proposes a test ban in the atmosphere, in outer space and under water, without international verification. The USSR rejects the first plan because of the obligatory on-site inspection, and the second one because it excludes underground tests.
- 144 3-7 September American and Soviet scientists at the unofficial "Pug-

wash" conference suggest that a system of automatic seismic stations ("Black Boxes") might be used to help in the verification process.

- 145 **21 September** USSR submits to the General Assembly a draft declaration proposing condemnation of all proposals for preventive nuclear war and "first strike" attack.
- 146 22 September USSR submits to the General Assembly a revised version of the draft treaty submitted to the ENDC (15 March), by which USSR and USA would be allowed to retain on their national territory an agreed and strictly limited number of nuclear delivery vehicles (intercontinental missiles, anti-missile missiles and anti-aircraft missiles in the "ground-to-air" category, as well as a number of rockets to be later converted to peaceful uses) until the second stage of disarmament ("nuclear umbrella").
- 147 **15 November** Brazil submits to the General Assembly a draft resolution—co-sponsored by Bolivia, Chile and Ecuador—proposing the establishment of a denuclearized zone in Latin America. The Assembly decides to refer this proposal to the ENDC.
- 148 **10 December** USSR proposes in the ENDC, as an additional guarantee for the effectiveness of test-ban control, a system of automatic seismic stations ("Black Boxes"). International personnel would participate in the delivery and removal of the "boxes", together with domestic personnel, who would be responsible for the technical organization.
- 149 **12 December** USA submits in the ENDC a working paper on the reduction of the risk of war through accident, miscalculation or failure of communication.
- 150 **14 December** UN General Assembly decides by a vote of 33 to 0, with 25 abstentions (resolution 1801 (XVII)), to request the Secretary-General to consult member states to ascertain their views on the possibility of convening a special conference for signing a convention on the prohibition of the use of nuclear and thermonuclear weapons. (The USA abstains on the grounds that this problem should be dealt with together with the question of general and complete disarmament. The USSR votes in favour.)
- 151 **19 December** Premier Khrushchev (USSR), in a letter to President Kennedy (USA), expresses willingness to accept for a comprehensive test ban treaty an annual quota of two to three on-site inspections on Soviet territory. President Kennedy, in his answer (28 December), still considers 8–10 on-site inspections as the minimum requirement for adequate control.

- 152 February USSR submits in the ENDC a draft declaration on renunciation of the use of foreign territories for stationing strategic means of delivery of nuclear weapons (12 February), and a draft non-aggression pact between the states which are parties to the Warsaw Treaty and the states which are parties to NATO (20 February).
- 153 22 February At the ENDC the USA and UK agree, in the context of a comprehensive test ban treaty, to 7 on-site inspections per year; the USSR still considers 2 to 3 as a maximum.
- 154 **27 March** USSR expresses in the ENDC a willingness to allow, under certain conditions, UN inspectors to check the nuclear delivery vehicles remaining—under the USSR proposal of 22 September 1962—on their launching-sites.
- 155 **1 April** USA and UK submit in the ENDC a memorandum concerning the test ban treaty. It deals mainly with the conduct of on-site inspection, proposing that the designation and selection of events to be inspected as well as the inspection arrangements should be entrusted to the nuclear power which is going to inspect and not to the power to be inspected.
- 156 8 April In a note sent to NATO countries, the USSR puts forward the view that a plan for establishing a NATO multilateral nuclear force (MLF) is, in Soviet opinion, contrary to the principle of non-dissemination and would lead to a nuclear arms race.
- 157 29 April Presidents of Bolivia, Brazil, Chile, Ecuador, and Mexico issue a joint declaration expressing their readiness to conclude an agreement proclaiming Latin America a nuclear-free zone and inviting other Latin American states to accede to the declaration.
- 158 20 May USSR in a note sent to all Mediterranean countries (except Albania and Yugoslavia) and UK and USA, proposes that the whole area of the Mediterranean Sea should be declared a zone free from nuclear missile weapons or their means of delivery.
- 159 **20 June** USA and USSR sign a memorandum of understanding about establishing a direct communication link between the two Governments for use in time of emergency ("hot line").
- 160 **21 June** Mexico submits in the ENDC a working paper containing a draft treaty prohibiting the placing in orbit and stationing in outer space of nuclear weapons and other weapons of mass destruction. The draft also prohibits tests in outer space of all weapons of mass destruction.
- 161 **2 July** Premier Khrushchev (USSR) announces readiness to sign a limited test ban treaty concerning the three non-controversial environments without insistence on a moratorium on underground testing.

- 162 **15-25 July** Negotiations on a partial test ban treaty take place in Moscow between the USA, UK, and USSR. After successful negotiations the draft treaty is initialled on 25 July.
- 163 **5** August The representatives of the USSR, UK and USA sign the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water. (Treaty enters into force on 10 October.)
- 164 **14 August** USA submits in the ENDC a revised version of an earlier draft treaty (18 April 1962) on first-stage nuclear measures, including a cut-off of the production of fissionable material and the transfer of some quantities to peaceful uses. (USSR rejects this proposal on the grounds that it leaves intact nuclear weapons stockpiles, proposing elimination of all nuclear weapons not in the second stage but in the first one.)
- 165 **19 September** Foreign Minister Gromyko (USSR) declares the readiness of his Government to agree that limited quantities of intercontinental anti-missile and anti-aircraft missiles should remain at the disposal of the USSR and USA in their own territories not only until the end of the second stage but also until the end of the third stage. He also announces the readiness of the USSR to reach an agreement with the USA to ban the placing in orbit of objects equipped with nuclear weapons or other weapons of mass destruction. The USA welcomes the proposal.
- 166 **17 October UN** General Assembly welcomes by acclamation (resolution 1884 (XVIII)) the intention of the USSR and USA not to station nuclear or other weapons of mass destruction in outer space, and calls on all states to refrain from orbiting such weapons, installing them on celestial bodies, or stationing them in outer space.
- 167 **27** November UN General Assembly decides by a vote of 64 to 18, with 25 abstentions (resolution 1909 (XVIII)), to refer the question of convening a conference for the purpose of signing a convention on the prohibition of the use of nuclear and thermonuclear weapons to the ENDC for urgent consideration. USSR votes in favour; France, USA and UK vote against.
- 168 27 November UN General Assembly decides by a vote of 104 to 1 (Albania), with 3 abstentions (France) (resolution 1910 (XVIII)), to call upon all states to become parties to the test ban treaty and to request the ENDC to continue negotiations to achieve further results in this field.
- 169 **27 November** UN General Assembly decides by a vote of 91 to 0, with 15 abstentions (resolution 1911 (XVIII)), to encourage Latin American

countries in their efforts to establish a nuclear-free zone in Latin America.

170 **28 December** Poland conveys to the countries concerned a new plan for a nuclear-free zone in Europe ("Gomulka Plan"). The plan proposes a freeze at existing levels of nuclear and thermonuclear weapons, accompanied by control exercised by representatives of the two military blocs (NATO and Warsaw Pact) on a parity basis. The plan does not mention reduction in nuclear weapons already in the area covered.

- 171 **21 January** USA, in a message from President Johnson to the ENDC, suggests discussion on a number of collateral measures that might be agreed upon outside the framework of general and complete disarmament: verified freeze of strategic nuclear offensive and defensive vehicles; verified halt of production of fissionable materials; creation of a system of observation posts as a measure to reduce the danger of war by accident, miscalculation or surprise attack; and ban on all nuclear weapon tests under effective verification and control, as well as prohibition of the spread of nuclear weapons.
- 172 23 January Ceylon announces a decision not to allow ships carrying nuclear weapons to enter its territorial waters or ports nor to allow aircraft with nuclear weapons to land at its airfields.
- 173 28 January USSR submits in the ENDC a memorandum on various measures for slowing down the armaments race and relaxing international tension: withdrawal of foreign troops from the territories of other countries; reduction of the total numbers of the armed forces of states; non-aggression pact between the NATO and the Warsaw Pact countries; establishment of denuclearized zones; prevention of the further spread of nuclear weapons; measures to prevent surprise attack; elimination of bomber aircraft; and prohibition of underground tests. (In a memorandum on 7 December the USSR puts forward the same proposals again.)
- 174 **4 February** USSR introduces in the ENDC a revised draft treaty on general and complete disarmament incorporating the "Gromyko" proposal of 19 September 1963.
- 175 **13 February** Brazil submits to the ENDC a working paper calling for an agreement on the use of savings on military expenditure for assisting underdeveloped countries.
- 176 24 February Poland proposes in a memorandum submitted to the interested governments a freeze of nuclear and thermonuclear arma-

ments in Central Europe, including the territories of Poland, Czechoslovakia, Germany D R and Germany F R.

- 177 26 March UK submits in the ENDC a working paper outlining a system of observation posts to prevent war by accident, miscalculation or surprise attack.
- 178 20 April USA and USSR announce a unilateral decision to reduce the production of fissile material for use in weapons.
- 179 **25 June** USA submits in the ENDC a working paper on inspection of a cut-off in production of fissionable material.
- 180 **21 July** The Heads of State of the Governments belonging to the Organization of African Unity declare their readiness to undertake, through an international agreement, not to manufacture or control atomic weapons.
- 181 22-27 November Representatives of seventeen Latin American countries, meeting in Mexico City, establish a Preparatory Committee to prepare a preliminary draft of a treaty for the denuclearization of Latin America.

- 182 **28 April** USSR submits in the ENDC a revised draft treaty on general and complete disarmament (15 March 1962) as amended on 22 September 1962 and 4 February 1964.
- 183 29 April USA submits in the ENDC an outline of the basic provisions of a treaty on general and complete disarmament (18 April 1962) as amended 6 August and 8 August 1962 and 14 August 1963.
- 184 27 May USSR submits to the DC a draft resolution calling upon states to conclude a convention on the prohibition of nuclear and thermonuclear weapons and a draft resolution proposing liquidation of foreign bases. (Neither resolution is put to a vote.)
- 185 **1 June** USA submits to the DC a draft resolution urging the ENDC to resume negotiations on a comprehensive test ban treaty, to undertake drafting of a non-proliferation agreement, to conclude an agreement to halt all production of fissionable materials and to explore a freeze of strategic nuclear offensive and defensive weapons. (This resolution is replaced by a revised one on 10 June.)
- 186 **15 June** DC by a vote of 83 to 1, with 18 abstentions, decides to call upon the ENDC to reconvene and take into consideration as a matter of priority the question of non-proliferation of nuclear weapons.
- 187 July-September ENDC reconvenes and continues discussion of general and complete disarmament, but giving, from this time on, more attention to collateral measures.

- 188 **17** August UAR suggests in the ENDC an agreement on a partial underground test ban which would ban explosions of seismic magnitude of 4.75 and over, and establish a moratorium on tests below that magnitude. The USSR supports the proposal.
- 189 **17** August USA submits in the ENDC a draft treaty to prevent the spread of nuclear weapons. The USSR objects to the draft on the grounds that it does not preclude the establishment of a multilateral NATO nuclear force, which would in fact be a disseminatory measure.
- 190 **2 September** Sweden proposes in the ENDC international co-operation in the detection of underground explosions by the exchange of seismic data and the establishment of a world-wide network of technically advanced seismological stations to form a "detection club".
- 191 9 September UK submits in the ENDC notes on UK research on techniques for distinguishing between earthquakes and underground explosions.
- 192 **14 September** Italy submits in the ENDC a draft unilateral declaration (for an agreed period only) of non-acquisition of nuclear weapons as a provisional solution of the non-proliferation question.
- 193 **15 September** The eight non-aligned powers submit in the ENDC a joint memorandum emphasizing that a non-proliferation treaty is not an end in itself and that it should be followed by other steps of nuclear disarmament. The same eight powers also submit a joint memorandum on a comprenhensive test ban treaty, urging its early conclusion.
- 194 **24 September** USSR submits to the General Assembly a draft treaty on the non-proliferation of nuclear weapons, paying special attention to the prevention of indirect proliferation through military alliances. The draft in particular provides for the prohibition of transmission of any kind of manufacturing, research or other information which can be employed for the purposes of manufacturing or using nuclear weapons.
- 195 23 November UN General Assembly by a vote of 93 to 0, with 5 abstentions (France) (resolution 2028 (XX)), decides inter alia to call upon the ENDC to give urgent consideration to the question of non-proliferation, which should be based on five principles: (a) the treaty should not contain any loop-holes which might permit direct or indirect proliferation; (b) the treaty should embody an acceptable balance of mutual responsibilities and obligations of the nuclear and non-nuclear powers; (c) the treaty should be a step towards the achievement of general and complete disarmament, particularly nuclear disarmament; (d) the provisions should ensure the effectiveness of the treaty; and (e) the states should retain their rights to conclude regional treaties for the total absence of nuclear weapons in their territories.

Part 11. Disarmament

- 196 **30 November** Malta submits to the General Assembly (Political Committee) a draft resolution on international transfers of arms, inviting the ENDC to prepare proposals for the establishment of a system of publicity through the UN. (On 2 December the Political Committee rejects the resolution by a vote of 19 to 18, with 39 abstentions.)
- 197 **3 December** UN General Assembly decides by a vote of 102 to 0, with 6 abstentions, (France) (resolution 2031 (XX)), to request the ENDC to continue its efforts towards reaching agreement on general and complete disarmament. It also decides by a vote of 92 to 1, with 14 abstentions (France, USSR) (resolution 2032 (XX)), to urge that all tests be suspended, to call upon states to respect the partial test ban treaty and to request the ENDC to continue with a sense of urgency its work on a comprehensive treaty.
- 198 **3 December** UN General Assembly, on the suggestion of a number of African countries, adopts by a vote of 105 to 0, with 3 abstentions (France) (resolution 2033 (XX)), the Declaration of the Denuclearization of Africa, reaffirming its call upon states expressed in resolution 1652 (XVI) (24 November 1961), and emphasizing that the denuclearization of Africa would be a step towards achievement of general and complete disarmament.

- 199 January August ENDC continues its work, still giving priority to collateral measures of disarmament.
- 200 27 January USSR introduces in the ENDC the Soviet draft non-proliferation treaty submitted in the General Assembly on 24 September 1965.
- 201 21 March USA submits in the ENDC amendments to the US draft non-proliferation treaty (17 August 1965). The draft distinguishes "nuclear-weapon" and "non-nuclear-weapon" states and defines "control" as "the right or ability to fire nuclear weapons without the concurrent decision of an existing nuclear-weapon state".
- 202 **16 June** USSR submits to the UN Secretary-General a draft treaty on the exploration and use of outer space, the moon and other celestial bodies, requesting that it be considered at the twenty-first session of the General Assembly.
- 203 16 June USA submits to the UN a draft treaty governing the exploration of the moon and other celestial bodies. (A revised draft is submitted to the Secretary-General on 17 September, with the request that it be included on the agenda of the twenty-first General Assembly.)
- 204 17 August In relation to a comprehensive test ban treaty, the eight

non-aligned powers submit in the ENDC a joint statement once again urging the nuclear powers to reconsider the possibility of adopting suggestions previously expressed by the same eight powers, including the concept of "verification by challenge", so that the treaty may be concluded soon.

- 205 **19 August** The eight non-aligned powers submit in the ENDC a joint memorandum on non-proliferation, reaffirming the importance of the principles on which such a treaty should be based, embodied at their request in UN General Assembly resolution 2028 (XX) (19 November 1965).
- 206 **22 August** Ethiopia submits in the ENDC a memorandum on the banning of nuclear weapons, denuclearization of Africa and a world disarmament conference.
- 207 **17 November** UN General Assembly by a vote of 48 to 1 (India), with 59 abstentions (USA, USSR) (resolution 2153B (XXI)), decides to convene a conference of non-nuclear states to consider their security and other related questions.
- 208 **5 December** Having considered, on Hungarian initiative, the question of the use of chemical and biological weapons (draft resolutions of 7 and 22 November), the General Assembly decides by a vote of 91 to 0, with 4 abstentions (resolution 2162B (XXI)), to call upon all states to observe strictly the principles and objectives of the 1925 Geneva Protocol, and to invite all states to accede to it.

The General Assembly also decides by a vote of 80 to 0, with 23 abstentions (resolution 2164 (XXI)), to request that the forthcoming world disarmament conference give serious consideration to the question of signing a convention on the prohibition of nuclear and thermonuclear weapons.

- 209 **27 January** Outer Space Treaty is signed in Moscow, London and Washington. The treaty codifies the UN General Assembly resolution of 17 October 1963 (1884 (XVIII)), calling upon states to refrain from placing in orbit any objects carrying nuclear weapons or other weapons of mass destruction. The treaty does not prohibit military use of outer space.
- 210 **14 February** The Treaty for the Prohibition of Nuclear Weapons in Latin America is signed in Mexico City.
- 211 **19 July** Sweden submits to the ENDC a memorandum on the control of an underground test ban treaty, suggesting certain political and technical requirements to make a control system effective.

- 212 **17 August** Malta submits to the UN Secretary-General a memorandum on the reservation of the sea-bed and the ocean floor for peaceful purposes.
- 213 24 August USA and USSR submit to the ENDC separate but identical draft texts for a Treaty on the Non-Proliferation of Nuclear Weapons. Due to still existing differences in approach toward the question of the control mechanism, the drafts leave blank the article on international safeguards.
- 214 August-November Many countries, both members and non-members, submit to the ENDC various proposals aimed at improving the draft non-proliferation treaty. The main remarks refer to the peaceful use of atomic energy, reciprocal obligations between nuclear and nonnuclear powers, and to non-nuclear powers' security.
- 215 22 September USSR submits to the General Assembly a draft convention on the prohibition of the use of nuclear weapons.
- 216 **11 December** Hungary submits to the General Assembly (Political Committee) a draft resolution demanding strict and absolute compliance by all states with the 1925 Geneva Protocol. The resolution also declares that the use of chemical and biological weapons is a crime against humanity and appeals to those states which have not done so to accede to the Protocol. (The draft resolution is co-sponsored by Madagascar and Mali. It is not put to a vote.)
- 217 **13 December** Malta submits to the General Assembly (Political Committee) a revised draft resolution recommending that the ENDC consider as a matter of urgency the problems relating to the definition and use of chemical and biological weapons, with a view to the revision, updating or replacement of the 1925 Geneva Protocol. It also requests the Secretary-General to prepare a report on the nature and probable effects of existing chemical and biological weapons and on the economic and health implications of the use of such weapons. (The original draft was submitted on 7 December. Neither draft is put to a vote.)

- 218 **18 January** USSR and USA submit in the ENDC a revised draft of the non-proliferation treaty (24 August 1967), incorporating a number of views and proposals presented by other states. The draft contains an article on international safeguards.
- 219 **7 March** USSR, UK and USA submit in the ENDC a draft resolution regarding the question of assurances to non-nuclear-weapon states, under a non-proliferation treaty, for appropriate consideration by the Security Council.

- 220 **11 March** USA and USSR submit in the ENDC a revised draft of the non-proliferation treaty, improving it further in the light of the Committee's discussions.
- 221 **12 June** UN General Assembly commends the Treaty on the Non-Proliferation of Nuclear Weapons and expresses hope for the widest adherence to it (resolution 2373 (XXII)).
- 222 **19 June** UN Security Council adopts (resolution 255) the tri-partite proposal (7 March) concerning assurances to the non-nuclear states in the case of aggression—or the threat of aggression—with nuclear weapons against them. The UK, USSR and USA make similar declarations of intention to support the principles of the resolution.
- 223 **20 June** USSR submits a draft resolution requesting the General Assembly to call upon all states to use the sea-bed outside their territorial waters only for peaceful purposes, and to request the ENDC to consider this question as a matter of priority.
- 224 **28 June** USA submits a draft resolution requesting the ENDC to consider the question of limitation of armaments on the sea-bed.
- 225 1 July The Non-Proliferation Treaty is opened for signature.
- 226 **1 July** USA and USSR reach an agreement to enter at an early date into negotiations on limitation and reduction of both the delivery systems of offensive nuclear weapons and the system of defence against ballistic missiles.
- 227 **16 July** USSR submits to the ENDC a memorandum of 1 July on some urgent measures for stopping the arms race and for disarmament, containing: prohibition of the use of nuclear weapons; measures for stopping the manufacture of nuclear weapons and for reducing and destroying stockpiles; limitation and subsequent reduction of means of delivery of strategic weapons; prohibition of flights beyond national borders of bombers carrying nuclear weapons and limitation of navigation zones for ballistic submarines; ban on underground nuclear weapon tests; prohibition of the use of chemical and bacteriological weapons; elimination of foreign military bases; measures for regional disarmament; and peaceful uses of the sea-bed and ocean floor. The memorandum is also placed on the agenda of the twenty-third session of the UN General Assembly.
- 228 **29 July** Sweden forwards to the ENDC a summary Report of a Seismic Study Group (seismological experts from 10 countries including four nuclear powers) convened by the Stockholm International Peace Research Institute (SIPRI). The report shows that it is now possible to distinguish large and medium-sized underground explosions from earthquakes.

- 229 6 August UK submits to the ENDC a working paper on microbiological warfare, proposing that this subject be considered separately from chemical warfare, and that the aim be a convention prohibiting microbiological methods of warfare, which should supplement (but not supercede) the 1925 Geneva Protocol.
- 230 **20 August** UK submits to the ENDC a working paper on the comprehensive test ban treaty proposing the establishment of a committee whose function would be to consider evidence of possible infringement of the treaty and to carry out on-site inspections only if strong evidence were produced of an infringement of the treaty.
- 231 **23 August** Italy submits to the ENDC a working paper on underground nuclear explosions suggesting that the regulation of underground explosions for peaceful purposes should for the time being be separated from regulation for military purposes. (Some additional suggestions are made on 22 May 1969.)
- 232 **26** August The eight non-aligned powers submit in the ENDC a joint memorandum on a comprehensive test ban treaty, urging its early conclusion. Pending the conclusion of such a treaty the eight powers reaffirm their view that the nuclear-weapons states should immediately discontinue all nuclear tests.
- 233 **29** August Conference of Non-Nuclear-Weapon States (92 nonnuclear states; 4 nuclear states as observers) opens a four-week session of 96 participants in Geneva. The items discussed concern non-nuclear weapon country interests in relation to Non-Proliferation Treaty.¹
- 234 **21** November Denmark, Iceland, Malta and Norway submit to the UN General Assembly (Political Committee) a draft resolution whereby the General Assembly would request the Secretary-General to seek members' views on the possible registration and publication of all imports and exports of conventional arms, ammunition and implements of war. (Decision not to press to a vote announced on 5 December.)

- 235 **17 March** The member states of the Warsaw Pact, meeting in Budapest, issue an appeal to all European countries, which repeats their earlier proposal to call a general European Conference to consider questions of European security and peaceful co-operation.
- 236 **18 March** USSR submits in the ENDC a draft treaty on prohibition of the use for military purposes of the sea-bed and ocean floor and the subsoil thereof.

¹ The resolutions of the Conference are listed on page 355.

- 237 **1** April Sweden submits in the ENDC a working paper containing a draft treaty banning underground nuclear weapon tests.
- 238 21 April Italy submits in the ENDC a working paper setting forth suggestions for the adoption of an organic disarmament programme.
- 239 **15 May** Nigeria submits in the ENDC a working paper on the comprehensive test ban treaty.
- 240 22 May USA submits in the ENDC a draft treaty prohibiting the emplacement of nuclear weapons and other weapons of mass destruction on the sea-bed and ocean floor.
- 241 23 May Canada submits in the ENDC a working paper on a comprehensive test ban. (Further remarks concerning seismic data exchange are made on 14 August and a revised paper is submitted on 18 August.)
- 242 **23 May** The co-chairmen of the ENDC, in an agreed statement, suggest the enlargement of the Committee with two new members—Mongolian PR and Japan. (Both countries take part in the session opened on 3 July.)
- 243 1 July UN Secretary-General in accordance with General Assembly resolution 2454 A (XXIII) transmits to the General Assembly, the Security Council and the ENDC his Report on Chemical and Bacteriological (Biological) Weapons and the Effects of their Possible Use, prepared with the assistance of consultant experts.
- 244 **10 July** UK submits in the ENDC a draft convention on biological warfare and accompanying draft Security Council resolutions. (A revised draft is submitted on 26 August.)
- 245 22 July Poland submits in the ENDC a working paper concerning the UN Secretary-General Report (1 July) emphasizing that it can serve as a suitable basis for further deliberations in the Committee. Poland also expresses the view that it becomes imperative to ensure universal applicability of the 1925 Geneva Protocol's prohibitions and their observance.
- 246 **30 July** Co-chairmen of the ENDC, in an agreed statement, suggest further enlargement of the Committee with six new members—Argentina, Hungary, Morocco, the Netherlands, Pakistan and Yugoslavia. (All six countries take part in the work of the Committee beginning 7 August.)
- 247 **13 August** An informal meeting of the ENDC is held on the question of a comprehensive nuclear test ban treaty.
- 248 **14 August** UK submits in the ENDC notes on British research in techniques for distinguishing between earthquakes and underground explosions, and Sweden submits a working paper on a seismological observatory in Sweden.

- 249 **21 August** Brazil submits in the ENDC a working paper on the control provisions for a treaty on the non-armament of the sea-bed and ocean floor.
- 250 **26 August** Following its enlargement with eight new members, the ENDC decides, on the suggestion made by the co-chairmen on 21 August, to change its name to the Committee on Disarmament and that of the Conference into the Conference of the Committee on Disarmament.
- 251 26 August The twelve non-aligned members of the ENDC submit to it the draft of a declaration which the ENDC might recommend to the General Assembly regarding prohibition of the use of chemical and biological methods of warfare. Canada also submits the draft of a resolution which the ENDC might recommend to the General Assembly on chemical and biological warfare.

Short bibliography of disarmament

Documents: Official collections of the United States and the Soviet Union

- Documents on Disarmament, I (1945-56), II (1957-59), US Department of State; Annual, 1961-1967, US Arms Control and Disarmament Agency (ACDA), Washington, D.C.
- 50 let bor'by SSSR za razoruzenie, 1917-67, Sbornik dokumentov, Moscow, 1967.

Books

- Aboltin, V. Ja., ed. Sovremennye problemi razoruzenija. Moscow, 1969.
- Aboltin, V. Ja., ed. Politika gosudarstv i razoruzenie: Zapadnaja Evropa: militarizm i razoruzenie. Moscow, 1966. SSSR, SSHA i razoruzenie. Moscow, 1967. Molodye nacional'nye gosudarstva i razoruzenie. Moscow, 1967.
- Aboltin, V. Ja. Gonka jadernyh vooruzeniji-ugroza miru. Moscow, 1968.
- Antonov, A. Bor'ba SSSR za razoruzenie (Kratkiji istoricheskiji ocherk). Moscow, 1960.
- Arkad'ev, N. Vseobschee razoruzenie-put'k prochnomu miru. Moscow, 1962.
- Barker, C. A., co-ordinator. Problems of world disarmament: A series of lectures delivered at the John Hopkins University. Boston, 1963.
- Bechhoefer, Bernhard G. Postwar negotiations for arms control. Washington, D.C., 1961.
- Bloomfield, Lincoln P. Disarmament and arms control. New York, 1968.
- Bogdanov, O. V. Vseobschee i polnoe razoruzenie (Mezhdunarodno-pravovye voprosy). Moscow, 1964.
- Kaliadin, Alexander. Aspects of security in Europe. Birmingham, 1967.
- Lall, Arthur S. Negotiating disarmament. The Eighteen-Nation Disarmament Conference: The first two years, 1962–1964. New York, 1964.
- Luard, Evan., ed. First steps to disarmament. London, 1965.
- Malinin, S. A. Pravovye osnovy razoruzenija. Leningrad, 1966.

- Masyukevich, V. General and complete disarmament: What it means for Asia and Africa. London, 1963.
- Myrdal, Alva. Nedrusting-realitet eller utopi. Stockholm, 1965.
- Noel-Baker, Philip. The arms race: A programme for world disarmament. London, 1958.
- Nutting, Anthony. Disarmament: An outline of the negotiations. London, 1959.

Shevchenko, A. N. Problema razoruzenia na sovremennom etape. Moscow, 1966.

Sovetskiji Sojuz v Organizacii Ob'edinennyh Naciji, 2 vols. Moscow, 1965.

- Stone, J. J. Containing the arms race: Some specific proposals. Cambridge, Mass., 1966.
- The United Nations and Disarmament, 1945-1965. United Nations Office of Public Information, 1967.
- Willot, A. Le désarmement géneral et complete: Une approche. Bruxelles, 1964. Willot, A. Désarmement: Les postes d'observation. Bruxelles, 1968.
- Zorin, Valerian A., ed. Bor'ba Sovetskogo Sojuza za razoruzenie: 1946-1960 gg. Moscow, 1961.

Articles

- Alexeyev, A. "Non-Proliferation Treaty and Security", International Affairs, Moscow, no. 1 (Jan. 1969).
- Beaton, L. "Kernwaffen-Sperrvertrag und nationale Sicherheit. Die Bedeutung der Sicherheitszusagen der Atommächte", Europa Archiv, no. 1 (Jan. 1969).
- Clemens, W. C. "Arms control for outer space", *Disarmament*, no. 12 (Dec. 1966).
- Genevey, P. "Actualité du désarmement", Politique Étrangère, no. 2 (1967).
- Glagolev, J. "Reducing military expenses. A Soviet view", *Disarmament*, no. 12 (Dec. 1966).
- Grinyov, O. "Soviet efforts for disarmament", International Affairs, Moscow, no. 12 (Dec. 1967).
- Kaliadin, A. "Atomnaja tehnika i mezdunarodnaja bezopasnot", Mirovaja Ekonomika i Mezdunarodnie Otnoshenija, Moscow, no. 5 (May 1967).
- Kaliadin, A. "Orgranichenie gonki jadernih vooruzheniji i mezhdunarodnaja bezopasnot", Mirovaja Ekonomika i Mezdunarodnie Otnoshenija, Moscow, no. 4 (April 1968).
- Mendl, W. "French attitudes on disarmament", Survival, Vol. 9, no. 12 (1967).
- Myrdal, Alva, "Political problems of peace", Internationale Spectator, no. 9 (May 1968).
- Nikolajev, N. and Shestov, V. "Decisive round at Geneva", International Affairs, Moscow, no. 3 (March 1968).
- Petrov, M. "The USSR all-out to ban nuclear weapons (Sketching in the background)", International Affairs, Moscow, no. 2 (Feb. 1969).
- Shestov, V. "Conference of non-nuclear countries", International Affairs, Moscow, no. 11 (Nov. 1968).
- Shubik, M. "On the study of disarmament and escalation", Journal of Conflict Resolution, Vol. 12, no. 1 (1968).
- Vernant, J. "Un pas vers le désarmement?", Revue de Défense Nationale, no. 8-9 (Aug.-Sept. 1968).

3B. List of states which have signed or ratified the arms regulation treaties

The list includes signatures and ratification up to 31 August 1969.

Antarctic Treaty Antarctic Treaty. Signed at Washington on 1 December 1959. Came into force on 23 June 1961. (United Nations Treaty Series, Vol. 402, 1961, p. 72.)

Partial Test Ban Treaty Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water. Signed at Moscow, on 5 August 1963, and subsequently at London, Moscow and Washington. Came into force on 10 October 1963. (United Nations Treaty Series, Vol. 480, 1963, p. 43.)

	Antarctic Treaty		Partial Test Ban Treaty		
	Signed	Ratification deposited	Signed	Ratification deposited	
Afghanistan			8 Aug. 1963 ⁸ 9 Aug. 1963 ⁴	12 Mar. 1964 ¹¹ 13 Mar. 1964 ¹³ 23 Mar. 1964 ¹²	
Albania				25 Widi, 1904	
Algeria			14 Aug. 1963 ⁸ 19 Aug. 1963 ⁴		
Argentina	1 Dec. 1959	23 June 1961	8 Aug. 1963 ⁵ 9 Aug. 1963 ⁷		
Australia	1 Dec. 1959	23 June 1961	8 Aug. 1963 ⁶	12 Nov. 1963 ¹⁴	
Austria			11 Sept. 1963 ⁹ 12 Sept. 1963 ³	17 July 1964 ¹⁴	
Barbados					
Belgium	1 Dec. 1959	26 July 1960	8 Aug. 1963 ⁶	1 Mar. 1966 ¹⁴	
Bolivia			8 Aug. 1963 ⁵ 21 Aug. 1963 ³ 20 Sept. 1963 ⁴	4 Aug. 1965 ¹³ 25 Jan. 1966 ¹¹	
Botswana				5 Jan. 1968 ¹⁹ 14 Feb. 1968 ¹⁸ 4 Mar. 1968 ²⁰	
Brazil			8 Aug. 1963 ⁸ 9 Aug. 1963 ⁴	15 Jan. 1965 ¹⁷ 4 Mar. 1965 ¹¹	
Bulgaria			8 Aug. 1963 ⁶	13 Nov. 1963 ¹³ 21 Nov. 1963 ¹² 2 Dec. 1963 ¹¹	
Burma			14 Aug. 1963 ⁶	15 Nov. 1963 ¹⁴	
Burundi			4 Oct. 1963 ⁵		
Byelorussian SSR			8 Oct. 1963 ⁴	16 Dec. 1963 ^{12,27}	
Cambodia					
Cameroon			27 Aug. 1963 ⁵ 6 Sept. 1963 ³		
Canada			8 Aug. 1963 ⁶	28 Jan. 1964 ¹⁴	

Outer Space Treaty Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. Signed at London, Moscow and Washington on 27 January 1967. Came into force on 10 October 1967.

Latin American Nuclear-Free Zone Treaty Treaty for the Prohibition of Nuclear Weapons in Latin America, with Additional Protocols I and II (Treaty of Tlatelolco). Signed at Mexico City on 14 February 1967.

Non-Proliferation Treaty Treaty on the Non-Proliferation of Nuclear Weapons. Signed at London, Moscow and Washington on 1 July 1969.

Outer Space Treaty		Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited
27 Jan. 1967 ⁵ 30 Jan. 1967 ⁴				1 July 1968 ⁶	
27 Jan. 1967 ⁵ 18 Apr. 1967 ⁴	26 Mar. 1969 ¹⁷	27 Sept. 1967 ³⁷			
27 Jan. 1967 ⁵	10 Oct. 1967 ¹⁴				
20 Feb. 1967 ⁶	26 Feb. 1968 ¹⁴			1 July 1968 ⁶	27 June 1969 ¹⁶
27 Jan. 1967 ⁷ 2 Feb. 1967 ⁵	12 Sept. 1968 ²⁴	18 Oct. 1968	25 Apr. 1969 ³⁹	1 July 1968 ⁵ 20 Aug. 1968 ⁶	
27 Jan. 1967 ⁵		14 Feb. 1967	18 Feb. 1969 ³⁹	1 July 1968 ⁵	
27 Jan. 1967 ⁵				1 July 1968 ⁵	28 Apr. 1969 ¹¹
30 Jan. 1967 ⁴ 2 Feb. 1967 ⁸	5 Mar. 1969 ^{14, 34}	9 May 1967 ³⁸	29 Jan. 1968 ³⁸		
27 Jan. 1967 ⁶	28 Mar. 1967 ¹² 11 Apr. 1967 ¹³ 19 Apr. 1967 ¹¹			1 July 1968 ⁶	
22 May 19676	•				
27 Jan. 1967 ⁵					
10 Feb. 1967 ⁴	31 Oct. 1967 ^{12, 27}				
27 Jan. 1967 ⁵				17 July 1968 ⁵ 18 July 1968 ⁴	8 Jan. 1969 ¹³
27 Jan. 1967 ⁶	10 Oct. 1967 ¹⁴			23 July 1968 ⁸ 29 July 1968 ⁴	8 Jan. 1969 ¹⁴

	Antarctic Treaty		Partial Test Ban Treaty			
	Signed	Ratification deposited	Signed	Ratification deposited		
Central African Rep.				22 Dec. 1964 ²⁴ 24 Aug. 1965 ²² 25 Sept. 1965 ²³		
Ceylon			22 Aug. 1963 ⁸ 23 Aug. 1963 ⁴	5 Feb. 1964 ¹³ 12 Feb. 1964 ¹² 13 Feb. 1964 ¹¹		
Chad			26 Aug. 1963 ⁵	1 Mar. 1965 ¹³		
Chile	1 Dec. 1959	23 June 1961	8 Aug. 1963 ⁵ 9 Aug. 1963 ⁷	6 Oct. 1965 ¹¹		
China, P. Rep. of*						
Colombia			16 Aug. 1963 ⁹ 20 Aug. 1963 ³			
Congo, Brazzaville						
Congo, Kinshasa			9 Aug. 1963 ⁸ 12 Aug. 1963 ⁴	28 Oct. 1965 ¹³		
Costa Rica			9 Aug. 1963 ³ 13 Aug. 1963 ⁵ 23 Aug. 1963 ⁴	10 July 1967 ¹³		
Cuba						
Cyprus			8 Aug. 1963 ⁶	15 Apr. 1965 ¹¹ 21 Apr. 1965 ¹² 7 May 1965 ¹³		
Czechoslovakia		14 June 1962 ¹	8 Aug. 1963 ⁶	14 Oct. 1963 ¹⁵ 17 Oct. 1963 ¹³		
Dahomey			27 Aug. 1963 ⁵ 3 Sept. 1963 ³ 9 Oct. 1963 ⁴	15 Dec. 1964 ¹³ 23 Dec. 1964 ¹² 22 Apr. 1965 ¹¹		
Denmark		20 May 1965 ¹	9 Aug. 1963 ⁶	15 Jan. 1964 ¹⁴		
Dominican Republic			16 Sept. 1963 ⁵ 17 Sept. 1963 ³ 19 Sept. 1963 ⁴	3 June 1964 ¹² 18 June 1964 ¹¹ 22 July 1964 ¹³		
Ecuador			27 Sept. 1963 ⁵ 1 Oct. 1963 ⁷	6 May 1964 ¹³ 8 May 1964 ¹¹ 13 Nov. 1964 ¹²		
El Salvador			21 Aug. 1963 ⁵ 22 Aug. 1963 ³ 23 Aug. 1963 ⁴	3 Dec. 1964 ¹³ 7 Dec. 1964 ¹¹ 9 Feb. 1965 ¹²		
Equatorial Guinea						
Ethiopia			9 Aug. 1963 ⁸ 19 Sept. 1963 ⁴			
Finland			8 Aug. 1963 ⁶	9 Jan. 1964 ¹⁴		
France	1 Dec. 1959	16 Sept. 1960				
Gabon			10 Sept. 1963 ⁵	20 Feb. 1964 ¹³ 4 Mar. 1964 ¹⁵		
Outer Space Treaty		Latin Americar Nuclear-Free Z	Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
---	---	----------------------------------	--	--	----------------------------	--
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited	
27 Jan. 1967 ⁵		<u>, 19., 9</u>				
10 Mar. 1967 ³				1 July 1968 ⁶		
27 Jan 1967 ⁵		14 Feb 1967		1 July 1968 ⁴		
3 Feb. 1967 ³ 20 Feb. 1967 ⁴		14 1 00. 1907				
27 Jan. 1967 ⁵		14 Feb. 1967		1 July 1968 ⁵		
27 Jan. 1967⁵ 29 Apr. 1967⁴ 4 May 1967³				22 July 1968 ⁵ 26 July 1968 ⁴ 17 Sept. 1968 ³		
		14 Feb. 1967	27 Aug. 1969 ³⁹	1 July 1968 ⁵		
27 Jan. 1967 ⁵ 15 Feb. 1967 ⁴ 16 Feb. 1967 ³				1 July 1968 ⁶		
27 Jan. 1967 ⁶	11 May 1967 ¹¹ 18 May 1967 ¹² 22 May 1967 ¹³			1 July 1968 ⁶	22 July 1969 ¹⁴	
				1 July 1968 ⁵		
27 Jan. 19676	10 Oct. 1967 ¹⁴			1 July 1968 ⁶	3 Jan. 1969 ¹⁴	
27 Jan. 1967 ⁵	21 Nov. 1968 ¹³	28 July 1967	14 June 1968 ³⁹	1 July 1968 ⁵		
27 Jan. 1967 ⁵ 16 May 1967 ³ 7 June 1967 ⁴	7 Mar. 1969 ¹³	14 Feb. 1967	11 Feb. 1969 ³⁹	9 July 1968 ⁵	7 Mar. 1969 ¹³	
27 Jan. 1967 ⁵	15 Jan. 1969 ¹³	14 Feb. 1967	22 Apr. 1968 ³⁹	1 July 1968 ⁵		
27 Jan. 1967 ⁸				5 Sept. 1968 ⁶		
10 Feb. 1967 ⁴						
27 Jan. 1967 ⁶ 25 Sept. 1967 ⁶	12 July 1967 ¹⁴			1 July 1968 ⁶	5 Feb. 1969 ¹⁴	

	Antarctic Treaty		Partial Test Ban Treaty		
	Signed	Ratification deposited	Signed	Ratification deposited	
Gambia				27 Apr. 1965 ²⁰ 6 May 1965 ¹⁸	
German Dem. Rep.*			8 Aug. 1963 ⁴	30 Dec. 1963 ^{12,28}	
Germany, Fed. Rep. of*			19 Aug. 1963 ⁶	1 Dec. 1964 ^{16,29}	
Ghana			8 Aug. 1963 ⁴ 9 Aug. 1963 ⁵ 4 Sept. 1963 ³	27 Nov. 1963 ¹¹ 9 Jan. 1964 ¹³ 31 May 1965 ¹²	
Greece			8 Aug. 1963 ⁵ 9 Aug. 1963 ⁷	18 Dec. 1963 ¹⁴	
Guatemala			23 Sept. 1963 ⁵	6 Jan. 1964 ^{13,30}	
Guinea					
Guyana					
Haiti			9 Oct. 1963 ⁵		
Honduras			8 Aug. 1963 ⁵ 15 Aug. 1963 ³ 16 Aug. 1963 ⁴	2 Oct. 1964 ¹³ 2 Dec. 1964 ¹¹	
Hungary			8 Aug. 1963 ⁶	21 Oct. 1963 ¹⁵ 22 Oct. 1963 ¹³	
Iceland			12 Aug. 1963 ⁶	29 April 1964 ¹⁴	
India			8 Aug. 1963 ⁶	10 Oct. 1963 ¹¹ 14 Oct. 1963 ¹² 18 Oct. 1963 ¹³	
Indonesia			23 Aug. 1963 ⁶	20 Jan. 1964 ¹² 27 Jan. 1964 ¹³ 8 May 1964 ¹¹	
Iran			8 Aug. 1963 ⁶	5 May 1964 ¹⁴	
Iraq			13 Aug. 1963 ⁶	30 Nov. 1964 ¹¹ 1 Dec. 1964 ¹³ 3 Dec. 1964 ¹²	
Ireland			8 Aug. 1963 ⁸ 9 Aug. 1963 ⁴	18 Dec. 1963 ¹⁶ 20 Dec. 1963 ¹²	
Israel			8 Aug. 1963 ⁶	15 Jan. 1964 ¹⁶ 28 Jan. 1964 ¹²	
Italy			8 Aug. 1963 ⁶	10 Dec. 1964 ¹⁴	
Ivory Coast			5 Sept. 1963 ⁵	5 Feb. 1965 ¹³	
Jamaica			13 Aug. 1963 ⁶		
Japan	1 Dec. 1959	4 Aug. 1960	14 Aug. 1963 ⁶	15 June 1964 ¹⁴	
Jordan			12 Aug. 1963 ⁸ 19 Aug. 1963 ⁴	29 May 1964 ¹¹ 7 July 1964 ¹² 10 July 1964 ¹³	
Kenya				10 June 1965 ²² 11 June 1965 ²⁴ 30 June 1965 ²³	

Korea, P. Dem. Rep. of*

Outer Space Treaty		Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited
2 June 1967 ³				4 Sept. 1968 ³ 20 Sept. 1968 ⁵ 24 Sept. 1968 ⁴	
27 Jan. 1967 ⁴	2 Feb. 1967 ^{12, 28}			1 July 1968 ⁴	
27 Jan. 1967 ⁶					
27 Jan. 1967 ⁵ 15 Feb. 1967 ⁴ 3 Mar. 1967 ³				1 July 1968 ⁹ 24 July 1968 ³	
27 Jan. 1967 ⁵				1 July 1968 ⁹	
		14 Feb. 1967		26 July 1968 ⁵	
3 Feb. 1967 ⁵					
27 Jan. 1967 ⁵		14 Feb. 1967	23 May 1969 ³⁹	1 July 1968 ⁵	
27 Jan. 1967 ⁵		14 Feb. 1967	23 Sept. 1968 ³⁹	1 July 1968 ⁵	
27 Jan. 1967 ⁶	26 June 1967 ¹⁴			1 July 1968 ⁶	27 May 1969 ¹⁴
27 Jan. 1967 ⁶	5 Feb. 1968 ¹⁴			1 July 1968 ⁶	18 July 1969 ¹⁶
3 Mar. 1967 ⁶					
27 Jan. 1967 ⁵ 30 Jan. 1967 ⁴ 14 Feb. 1967 ³					
27 Jan. 1967				1 July 1968 ⁶	
27 Jan. 1967 ⁸ 9 Mar. 1967 ⁴	4 Dec. 1968 ¹²			1 July 1968 ⁴	
27 Jan. 1967 ⁸	17 July 1968 ¹³ 19 July 1968 ¹¹			1 July 1968 ⁶	1 July 1968 ¹⁶ 2 July 1968 ¹²
27 Jan. 1967 ⁶					
27 Jan. 1967 ⁶				28 Jan. 1969 ⁶	
				1 July 1968 ⁵	
29 June 1967 ⁶		26 Oct. 1967	26 July 1969 ³⁹	14 Apr. 1969 ⁶	
27 Jan. 1967 ⁶	10 Oct. 1967 ¹⁴				
2 Feb. 1967 ⁵				10 July 1968 ⁵	
				1 July 1968 ⁵	

	Antarctic Treaty		Partial Test Ban Treaty		
	Signed	Ratification deposited	Signed	Ratification deposited	
Korea, Rep. of*			30 Aug. 1963 ⁸	24 July 1964 ^{16,31}	
Kuwait			20 Aug. 19636	20 May 1965 ^{13,32} 21 May 1965 ¹¹ 17 June 1965 ¹²	
Laos			12 Aug. 1963 ⁶	10 Feb. 1965 ¹¹ 12 Feb. 1965 ¹³ 7 Apr. 1965 ¹²	
Lebanon			12 Aug. 1963 ⁵ 13 Aug. 1963 ⁷	14 May 1965 ¹³ 20 May 1965 ¹¹ 4 June 1965 ¹²	
Lesotho					
Liberia			8 Aug. 1963 ⁵ 16 Aug. 1963 ³ 27 Aug. 1963 ⁴	19 May 1964 ¹³ 22 May 1964 ¹¹ 16 June 1964 ¹²	
Libya			9 Aug. 1963 ³ 16 Aug. 1963 ⁹	15 July 1968 ¹¹	
Luxembourg			13 Aug. 1963 ³ 3 Sept. 1963 ⁵ 13 Sept. 1963 ⁴	10 Feb. 1965 ¹⁴	
Madagascar			23 Sept. 1963 ⁵	15 Mar. 1965 ¹³	
Malawi				26 Nov. 1964 ²¹ 7 Jan. 1965 ¹³	
Malaysia			8 Aug. 1963 ⁵ 12 Aug. 1963 ³ 21 Aug. 1963 ⁴	15 July 1964 ¹² 16 July 1964 ¹⁶	
Maldive Islands					
Mali			23 Aug. 1963 ⁶		
Malta				25 Nov. 1964 ²¹ 1 Dec. 1964 ¹⁸	
Mauritania			13 Sept. 1963⁵ 17 Sept. 1963³ 8 Oct. 1963⁴	6 Apr. 1964 ¹³ 15 Apr. 1964 ¹¹ 28 Apr. 1964 ¹²	
Mauritius				30 Apr. 1969 ²⁰ 12 May 1969 ¹³ 19 May 1969 ¹⁹	
Mexico			8 Aug. 1963 ⁶	27 Dec. 1963 ¹⁴	
Monaco*					
Mongolia			8 Aug. 1963 ⁷	1 Nov. 1963 ¹² 7 Nov. 1963 ¹¹	
Morocco			27 Aug. 1963 ⁹ 30 Aug. 1963 ³	1 Feb. 1966 ¹¹ 18 Feb. 1966 ¹² 21 Feb. 1966 ¹³	
Nepal			26 Aug. 1963 ⁷ 30 Aug. 1963 ⁵	7 Oct. 1964 ¹⁴	

•

Outer Space Treaty		Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited
27 Jan. 1967 ^{5, 31}	13 Oct. 1967 ¹³			1 July 1968 ^{5, 31}	
				15 Aug. 1968 ⁹ 22 Aug. 1968 ³	
27 Jan. 1967 ⁸ 2 Feb. 1967 ⁴				1 July 1968 ⁶	
23 Feb. 1967 ⁶	31 Mar. 1969 ¹⁵ 30 June 1969 ¹³			1 July 1968 ⁶	
27 Jan. 1967 ⁵				9 July 1968 ⁵	
				1 July 1968 ⁵	
	3 July 1968 ²⁴			18 July 1968 ³ 19 July 1968 ⁵ 23 July 1968 ⁴	
27 Jan. 1967 ⁹ 31 Jan. 1967 ³				14 Aug. 1968 ⁶	
	22 Aug. 1968 ^{24, 35}			22 Aug. 1968 ⁵	
20 Feb. 1967 ⁵ 21 Feb. 1967 ³ 3 May 1967 ⁴				1 July 1968 ⁶	
				11 Sept. 1968 ⁵	
	11 June 1968 ¹²			14 July 1969 ⁵ 15 July 1969 ⁴	
				17 Apr. 1969 ⁵	
	7 Apr. 1969 ²⁰ 21 Apr. 1969 ¹⁸ 13 May 1969 ¹⁹			1 July 1968 ⁵	8 Apr. 1969 ¹³ 25 Apr. 1969 ¹²
27 Jan. 1967 ⁶	31 Jan. 1968 ¹⁴	14 Feb. 1967	27 Sept. 1967 ³⁹	26 July 1968 ^{6,43}	21 Jan. 1969 ¹⁴
27 Jan. 1967 ⁴	10 Oct. 1967 ¹²			1 July 1968 ⁴	14 May 1969 ¹²
	22 Dec. 1967 ²⁵			1 July 1968 ⁶	
3 Feb. 1967 ⁹ 6 Feb. 1967 ³	10 Oct. 1967 ¹¹ 16 Oct. 1967 ¹² 22 Nov. 1967 ¹³			1 July 1968 ⁶	

	Antarctic Treaty		Partial Test Ban Treaty		
	Signed	Ratification deposited	Signed	Ratification deposited	
Netherlands		1 Mar. 1967 ^{1,2}	9 Aug. 1963 ⁶	14 Sept. 1964 ^{2, 14}	
New Zealand	1 Dec. 1959	1 Nov. 1960	8 Aug. 1963 ⁶	10 Oct. 1963 ¹⁶ 21 Oct. 1963 ¹²	
Nicaragua			13 Aug. 1963 ⁸ 16 Aug. 1963 ⁴	26 Jan. 1965 ¹¹ 26 Feb. 1965 ¹⁷	
Niger			24 Sept. 1963 ⁸	3 July 1964 ¹² 6 July 1964 ¹¹ 9 July 1964 ¹³	
Nigeria			30 Aug. 1963 ⁴ 2 Sept. 1963 ³ 4 Sept. 1963 ⁵	17 Feb. 1963 ¹¹ 25 Feb. 1967 ¹² 28 Feb. 1967 ¹³	
Norway	1 Dec. 1959	24 Aug. 1960	9 Aug. 1963 ⁶	21 Nov. 1963 ¹⁴	
Pakistan		-	14 Aug. 1963 ⁶		
Panama			20 Sept. 1963 ⁵	24 Feb. 1966 ¹³	
Paraguay			15 Aug. 1963 ⁸ 21 Aug. 1963 ⁴		
Peru			23 Aug. 1963 ⁶	20 July 1964 ¹³ 4 Aug. 1964 ¹¹ 21 Aug. 1964 ¹²	
Philippines			8 Aug. 1963 ⁸ 14 Aug. 1963 ⁴	10 Nov. 1965 ¹¹ 15 Nov. 1965 ¹³ 8 Feb. 1966 ¹²	
Poland		8 June 1961 ¹	8 Aug. 1963 ⁶	14 Oct. 196314	
Portugal			9 Oct. 1963 ⁸		
Romania			8 Aug. 1963 ⁶	12 Dec. 1963 ¹⁴	
Rwanda				22 Oct. 1963 ²² 27 Dec. 1963 ¹³	
San Marino			17 Sept. 1963 ⁵ 20 Sept. 1963 ³ 27 Sept. 1963 ⁴	3 July 1964 ¹¹ 9 July 1964 ¹³ 27 Nov. 1964 ¹²	
Saudi Arabia					
Senegal			20 Sept. 1963 ⁵ 23 Sept. 1963 ³ 9 Oct. 1963 ⁴	6 May 1964 ¹¹ 12 May 1964 ¹² 2 June 1964 ¹³	
Sierra Leone			4 Sept. 1963 ³ 9 Sept. 1963 ⁴ 11 Sept. 1963 ⁵	21 Feb. 1964 ¹¹ 4 Mar. 1964 ¹³ 29 Apr. 1964 ¹²	
Singapore				12 July 1968 ²¹ 23 July 1968 ¹⁸	
Somalia			19 Aug. 1963 ⁹		
South Africa	1 Dec. 1959	21 June 1960		10 Oct. 1963 ²⁶	
Southern Yemen Spain			13 Aug. 1963 ⁵	17 Dec. 1964 ¹⁶	
Sudan			14 Aug. 1963 ³ 9 Aug. 1963 ⁶	4 Mar. 1966 ¹⁶ 20 Mar. 1966 ¹²	

Outer Space Treaty		Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited
10 Feb. 1967 ⁶		15 Mar. 1968 ^{2,4}	0	20 Aug. 19686	
27 Jan. 1967 ⁶	31 May 1968 ¹⁴			1 July 19686	•
27 Jan. 1967 ⁵ 13 Feb. 1967 ⁸		15 Feb. 1967	25 Oct. 1968 ³⁹	1 July 1968 ⁸	
1 Feb. 1967 ⁵	17 Apr. 1967 ¹¹ 3 May 1967 ¹³				
	14 Nov. 1967 ²²			1 July 1968 ⁶	27 Sept. 1968 ¹¹ 7 Oct. 1968 ¹³ 14 Oct. 1968 ¹²
3 Feb. 1967 ⁶	1 July 1969 ¹⁴			1 July 1968 ⁶	5 Feb. 1969 ¹⁴
12 Sept. 1967 ⁶	8 Apr. 1968 ¹⁴				
27 Jan. 1967 ⁵		14 Feb. 1967		1 July 1968 ⁵	
		26 Apr. 1967	19 Mar. 1969 ³⁹	1 July 1968 ⁵	
30 June 1967 ⁵		14 Feb. 1967	4 Mar. 1969 ³⁹	1 July 1968 ⁵	
27 Jan. 1967 ⁸ 29 April 1967 ⁴				1 July 1968 ⁵ 18 July 1968 ⁴	
27 Jan. 1967 ⁶	30 Jan. 1968 ¹⁴			1 July 1968 ⁶	12 June 1969 ¹⁴
27 Jan. 1967 ⁶	9 Apr. 1968 ¹⁴			1 July 1968 ⁶	
27 Jan. 1967 ⁵					
21 Apr. 1967 ⁵ 24 Apr. 1967 ³ 6 June 1967 ⁴	29 Oct. 1968 ¹³ 21 Nov. 1968 ¹² 3 Feb. 1969 ¹¹			1 July 1968⁵ 29 July 1968³ 21 Nov. 1968⁴	
				1 July 1968 ⁹ 26 July 1968 ³	
27 Jan. 1967 ⁷ 16 May 1967 ⁵	13 July 1967 ¹² 14 July 1967 ¹³ 25 Oct. 1967 ¹¹				
2 Feb. 1967 ⁵				1 July 1968 ⁶	
1 Mar. 1967 ⁵	30 Sept. 1968 ¹³ 8 Oct. 1968 ¹¹				
	AR 37 1010			14 Nov. 1968 ⁴	
	27 Nov. 1968 ²² 7 Dec. 1968 ²⁴				
				24 Dec. 1968 ⁴	

	Antarctic Treaty		Partial Test Ban Treaty		
	Signed	Ratification deposited	Signed	Ratification deposited	
Swaziland			29 May 1969 ²⁶ 3 June 1969 ²³		
Sweden			12 Aug. 1963 ⁶	9 Dec. 1963 ¹⁴	
Switzerland*			26 Aug. 1963 ⁶	16 Jan. 1964 ¹⁴	
Syrian Arab Republic			13 Aug. 1963 ⁶	1 June 1964 ¹⁴	
Taiwan			23 Aug. 1963 ⁵	18 May 1964 ¹³	
Tanzania, Un. Rep. of			16 Sept. 1963 ³ 18 Sept. 1963 ⁵ 20 Sept. 1963 ⁴	6 Feb. 1964 ¹⁶	
Thailand			8 Aug. 1963 ⁶	15 Nov. 1963 ¹¹ 21 Nov. 1963 ¹² 29 Nov. 1963 ¹³	
Togo			18 Sept. 1963 ⁵	7 Dec. 1964 ¹³	
Trinidad and Tobago			12 Aug. 1963 ⁸ 13 Aug. 1963 ⁴	14 July 1964 ¹³ 16 July 1964 ¹¹ 6 Aug. 1964 ¹²	
Tunisia			8 Aug. 1963 ⁵ 12 Aug. 1963 ³ 13 Aug. 1963 ⁴	26 May 1965 ¹⁵ 3 June 1965 ¹³	
Turkey			9 Aug. 1963 ⁶	8 July 1965 ¹⁴	
Uganda			29 Aug. 1963 ⁸	24 Mar. 1964 ¹¹ 2 Apr. 1964 ¹³	
Ukrainian SSR			8 Oct. 1963 ⁴	30 Dec. 1963 ^{12, 27}	
USSR	1 Dec. 1959	2 Nov. 1960	5 Aug. 1963 ¹⁰	10 Oct. 1963 ¹⁰	
United Arab Republic			8 Aug. 1963 ⁶	10 Jan. 1964 ^{14, 33}	
United Kingdom	1 Dec. 1959	31 May 1960	5 Aug. 1963 ¹⁰	10 Oct. 1963 ¹⁰	
United States	1 Dec. 1959	18 Aug. 1960	5 Aug. 1963 ¹⁰	10 Oct. 1963 ¹⁰	
Upper Volta			30 Aug. 1963 ⁵		
Uruguay			12 Aug. 1963 ⁵ 27 Sept. 1963 ⁷	25 Feb. 1969 ¹¹	
Venezuela			16 Aug. 1963 ⁹ 20 Aug. 1963 ³	22 Feb. 1965 ¹² 3 Mar. 1965 29 Mar. 1965 ¹³	
Viet-Nam, Dem. Rep.	of*				
Viet-Nam, Rep. of*			1 Oct. 1963 ⁵		
Western Samoa			5 Sept. 1963 ³ 6 Sept. 1963 ⁹	15 Jan. 1965 ¹³ 19 Jan. 1965 ¹¹ 8 Feb. 1965 ¹²	
Yemen			13 Aug. 1963 ⁴ 6 Sept. 1963 ⁵		
Yugoslavia			8 Aug. 1963 ⁶	15 Jan. 1964 ¹¹ 31 Jan. 1964 ¹² 3 Apr. 1964 ¹³	
Zambia				11 Jan. 1965 ²¹ 8 Feb. 1965 ¹⁸	

•

Outer Space Treaty		Latin American Nuclear-Free Zone Treaty		Non-Proliferation Treaty	
Signed	Ratification deposited	Signed	Ratification deposited	Signed	Ratification deposited
				24 June 1969 ³	
27 Jan. 1967 ⁶	11 Oct. 1967 ¹⁴			19 Aug. 1968 ⁶	
27 Jan. 1967 ⁵ 30 Jan. 1967 ⁴					
	19 Jan. 1968 ¹²			1 July 1968 ⁴	
27 Jan. 1967 ⁵				1 July 1968 ⁵	
27 Jan. 1967 ⁶	5 Sept. 1968 ¹¹ 9 Sept. 1968 ¹² 10 Sept. 1968 ¹³				
27 Jan. 1967 ⁵				1 July 1968 ⁵	
24 July 1968 ³ 17 Aug. 1967 ⁴ 28 Sept. 1967 ⁵		27 June 1967		20 Aug. 1968 ⁵	
27 Jan. 1967 ⁸ 15 Feb. 1967 ⁴	28 Mar. 1968 ¹¹ 4 Apr. 1968 ¹² 17 Apr. 1968 ¹³			1 July 1968 ⁶	
27 Jan. 1967 ⁶	27 Mar. 1968 ¹⁴			28 Jan. 19696	
	24 Apr. 1968 ²⁴				
10 Feb. 1967 ⁴	31 Oct. 1967 ^{12, 27}				
27 Jan. 1967 ⁶	10 Oct. 1967 ¹⁴			1 July 1968 ⁶	
27 Jan. 1967 ⁹	10 Oct. 1967 ¹³ 23 Jan. 1968 ¹²			1 July 1968 ⁷	
27 Jan. 1967 ⁶	10 Oct. 1967 ^{14, 36}	20 Dec. 1967 ⁴²		1 July 1968 ⁶	27 Nov. 1968 ¹⁶ 29 Nov. 1968 ¹²
27 Jan. 1967 ⁶	10 Oct. 1967 ¹⁴	1 April 1968 ⁴¹		1 July 1968 ⁶	
3 Mar. 1967 ⁵	18 June 1968 ¹³			25 Nov. 1968 ⁵ 11 Aug. 1969 ⁴	
27 Jan. 1967 ⁵ 30 Jan. 19674		14 Feb. 1967	20 Aug. 1968 ³⁹	1 July 1968 ⁵	
27 Jan. 1967 ⁵		14 Feb. 1967		1 July 1968 ⁵	
27 Jan. 1967⁵				1 July 1968 ⁵	
				23 Sept. 1968 ⁴	
27 Jan. 1967 ⁶				10 July 1968 ⁶	

- * Non-member of the United Nations.
- 1. The date of accession.
- 2. Including Surinam and Netherlands Antilles.
- 3. Signed at London.
- 4. Signed at Moscow.
- 5. Signed at Washington.
- 6. Signed at London, Moscow and Washington.
- 7. Signed at London and Moscow.
- 8. Signed at London and Washington.
- 9. Signed at Moscow and Washington.
- 10. Original Party.
- 11. Instrument of ratification deposited at London.
- 12. Instrument of ratification deposited at Moscow.
- 13. Instrument of ratification deposited at Washington.
- 14. Instrument of ratification deposited at London, Moscow and Washington.
- 15. Instrument of ratification deposited at London and Moscow.
- 16. Instrument of ratification deposited at London and Washington.
- 17. Instrument of ratification deposited at Moscow and Washington.
- 18. Notification of succession deposited at London.
- 19. Notification of succession deposited at Moscow.
- 20. Notification of succession deposited at Washington.
- 21. Notification of succession deposited at Moscow and Washington.
- 22. Instrument of accession deposited at London.
- 23. Instrument of accession deposited at Moscow.
- 24. Instrument of accession deposited at Washington.
- 25. Instrument of accession deposited at London, Moscow and Washington.
- 26. Instrument of accession deposited at London and Washington.
- 27. With the reference to the signature and deposit of ratification by the Byelorussian SSR and the Ukrainian SSR, the Government of USA considers those two constituent republics as already covered by the signature and deposit of ratification of the treaty by the USSR.
- 28. With the reference to the signature and deposit of ratification by the Government of German Democratic Republic, the Government of USA issued the following statement: "Inasmuch as the Government of the United States of America does not recognize the 'German Democratic Republic' as a State or as an entity possessing national sovereignty, it does not accept notice of signature in behalf thereof. Bearing in mind, however, the purpose of the treaty, the Government of the United States of America notes that the East German regime has signified its intention with respect to the matters dealt with in the treaty." This view was reaffirmed by the Government of the United States in connection with deposit of ratification by the German Democratic Republic.
- 29. The instrument of ratification contains the following declaration: "The aforementioned Treaty is also applicable in Land Berlin with effect from the date on which it enters into force in the Federal Republic of Germany, taking into account the rights and responsibilities of the Allied authorities and the powers they retain

in the fields of disarmament and demilitarisation."

- 30. The instrument of ratification contains the following statement designated as a "reservation": "The signing, approval, ratification and application by the Government of Guatemala ... does not imply that the Republic of Guatemala accords recognition as a legal government to any regime which it does not at present recognize. Nor does it imply the establishment or restoration of diplomatic relations with those countries with which such relations are not at present maintained."
- 31. Both in connection with the ratification of the Partial Test Ban Treaty and in connection with the signature of the Non-Proliferation Treaty, the following statement was attached: "...the ratification (the signing) by the Government of Korea of the said Treaty does not in any way mean or imply the recognition of any territory or regime which has not been recognized by the Republic of Korea as a State or Government."
- 32. The note transmitting the instrument of ratification contains the following statement: "... The Government of the State of Kuwait takes the view that its signature and ratification of the said Convention does not in any way imply its recognition of Israel, nor does it oblige it to apply the provisions of the Convention in respect of the said country."
- 33. The note transmitting the instrument of ratification contains the following statement: "... The ratification by the Government of the United Arab Republic of this Treaty does not mean or imply any recognition of Israel or any Treaty Relations with Israel."
- 34. The note transmitting the instrument of ratification contains the following statement: "The Brazilian Government interprets Article 10 of the Treaty as a specific recognition that the granting of tracking facilities by the parties to the Treaty shall be subject to agreement between the States concerned."
- 35. The instrument of accession contains the following statement: "The Government of the Malagasy Republic understands that the provisions of Article 10 may in no way affect the principle of the national sovereignty of the State, which shall retain its freedom of decision with respect to the installation of foreign observation bases in its territory and shall continue to possess the right to fix, in each case, the conditions for such installation."
- 36. In regard to the Outer Space Treaty the instrument of ratification states that it is also ratified in respect of "the Associated States (Antigua, Dominica, Grenada, Saint Christopher-Nevis-Anguilla and Saint Lucia) and Territories under the territorial sovereignty of the United Kingdom, as well as the State of Brunei, the Kingdom of Swaziland, the Kingdom of Tonga and the British Solomon Islands Protectorate." In regard to the Non-Proliferation Treaty the same statement is made, except that the Kingdom of Swaziland is omitted.

In connection with the ratification of both treaties the following declaration is made:

"... the provisions of the Treaty shall not apply in regard to Southern Rhodesia unless and until the Government of the United Kingdom informs the other depository Governments that it is in a position to ensure that the obligations imposed by the Treaty in respect of that territory can be fully implemented."

- 37. In connection with the signing the Government of Argentina stated: "The Government of the Republic of Argentina in conformity with the Article 28, first paragraph, wants to express its satisfaction with the inclusion of clauses which preserve the right of pacific development of nuclear energy and, among these, Article 18, which recognizes the right of the parties concerned to carry out, by their own means or in association with third parties, peaceful nuclear explosions, including explosions for which it might be necessary to use devices similar to those used in nuclear weapons. The Government of the Republic of Argentina understands that these clauses guarantee that nuclear energy can be used, as a necessary part of the process of development in Latin America, and in consequence, represent a fundamental prior condition for an acceptable equilibrium of mutual responsibilities and obligations of nuclear and nonnuclear powers in matters of proliferation. When signing the Treaty the Government of the Republic of Argentina expressly states its agreement with the interpretative resolution, designated as Resolution 20 (Four) of the Preparatory Commission for the Denuclearization of Latin America."
- 38. In connection with the signing the Government of Brazil stated: "... In the judgement of the Brazilian Government the Article 18 above mentioned gives the signatory Nations the right to carry out by their own means or in association with third parties, nuclear explosions for peaceful purposes, including those which presuppose devices similar to those used in military armaments." The note transmitting the instrument of ratification contains the following statement: "The Government of Brazil when ratifying the Treaty declares that it is not making use of the dispensation to which it is entitled in accordance with paragraph 2 of Article 28. The Government of Brazil also reiterates the terms of its Note on the interpretation of Article 18 of the Treaty, that was deposited on the day of signing"
- 39. Treaty is in force through a declaration in accordance with paragraph 2 of the Article 28.
- 40. Only the Additional Protocol I, which applies to all the extra-continental and continental states which are de jure or de facto internationally responsible for the territories which lie within the limits of the geographical zone established in the Treaty, i.e. France, the Netherlands, United Kingdom and United States.

In connection with the signing the Government of the Netherlands stated: "No provision of the Protocol shall be interpreted as prejudicing the position of the Kingdom of the Netherlands as regards its recognition or non-recognition of the rights of or claims to so" reignty of the Parties to the Treaty, or of the grounds on which such claims are made.

"No provision of the Protocol shall be interpreted as implying that, with respect to the carryingout of nuclear explosions for peaceful purposes on the territory of Surinam and the Netherland Antilles, other rules apply than those operative for the Parties to the Treaty."

41. Only additional Protocol II, which applies to the powers possessing nuclear weapons, i.e. China P.R., France, United Kingdom, United States and USSR.

In connection with the signing the Government of the United States stated inter alia that: "I.... As regards the undertaking in Article 3 of the Protocol II not to use or threaten to use nuclear weapons against the Contracting Parties, the United States would have to consider that an armed attack by a Contracting Party, in which it was assisted by a nuclear-weapons State, would be incompatible with the Contracting Party's corresponding obligations under Article 1 of the Treaty.

"II. The United States wishes to point out again the fact that the technology of making nuclear explosive devices for peaceful purposes is distinguishable from the technology of making nuclear weapons... Therefore we understand the definition contained in Article 5 of the Treaty as necessarily encompassing all nuclear explosive devices. It is our understanding that Articles 1 and 5 restrict accordingly the activities of the Contracting Parties under paragraph 1 of Article 18..."

42. Only additional Protocols I and II.

In connection with the signing the Government of the United Kingdom stated inter alia that: "... (b) Article 18 of the Treaty, when read in conjunction with Articles 1 and 5 thereof, would not permit the Contracting Parties to the Treaty to carry out explosions of nuclear devices for peaceful purposes unless and until advances in technology have made possible the development of devices for such explosions which are not capable of being used for weapons purposes: ... (d) the Government of the United Kingdom would, in the event of any act of aggression by a Contracting Party to the Treaty in which that Party was supported by a nuclear-weapons State, be free to reconsider the extent to which they could be regarded as committed by the provisions of Additional Protocol II ..."

43. In connection with the signing the Government of Mexico stated it understood: "1. That, in view of Article VII of the Treaty, none of the provisions of the Treaty shall be interpreted as affecting in any way the rights and obligations of Mexico as a State Party to the Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco Treaty), ...; and 2. That, at present time, any nuclear explosive device may be used as a nuclear weapon, and that there is no indication that in the near future it will be possible to manufacture nuclear explosive devices that are not potentially nuclear weapons. Nevertheless, if technological progress should change that situation, it would be necessary to amend the pertinent provisions of the Treaty, in accordance with the procedure established therein."

3C. List of states which have signed or ratified the 1925 Geneva Protocol

Protocol for the prohibition of the use in war of asphyxiating, poisonous or other gases, and of bacteriological methods of warfare. Signed at Geneva, 17 June 1925.

The undersigned Plenipotentiaries, in the name of their respective Governments, "Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilized world; and

"Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are Parties; and

"To the end that this prohibition shall be universally accepted as a part of International Law, binding alike the conscience and the practice of nations; "Declare:

"'That the High Contracting Parties, so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition, agree to extand this prohibition to the use of bacteriological methods of warfare and agree to be bound as between themselves according to the terms of this declaration.

"The High Contracting Parties will exert every effort to induce other States to accede to the present Protocol ..."

"The present Protocol will come into force for each signatory Power as from the date of deposit of its ratification, and, from that moment, each Power will be bound as regards other Powers which have already deposited their ratifications."

Signatures and ratifications

	Signed	Ratification deposited
Argentina		12 May 1969 ¹⁰
Australia		22 Jan. 1930 ^{10, 12}
Austria	17 June 1925	9 May 1928
Belgium	17 June 1925	4 Dec. 1928 ¹²
Brazil	17 June 1925	
Bulgaria	17 June 1925	7 March 1934 ¹²
Canada	17 June 1925	6 May 1930 ¹²
Ceylon		20 Jan. 1954 ¹⁰
Chile	17 June 1925	2 July 1935 ¹²
China ¹		7 Aug. 1929 ¹⁰
Cuba		24 June 1966 ¹⁰
Cyprus		12 Dec. 1966 ¹¹
Czechoslovakia	17 June 1925	16 Aug. 1938 ¹³
Denmark	17 June 1925	5 May 1930
Egypt ² (United Arab Republic)	17 June 1925	6 Dec. 1928

		Ratification
	Signed	deposited
El Salvador	17 June 1925	
Estonia	17 June 1925	28 Aug. 1931 ¹²
Ethiopia	17 June 1925	18 Sept. 1935
Finland	17 June 1925	26 June 1929
France	17 June 1925	9 May 1926 ¹²
Gambia		16 Nov. 1966 ¹¹
Germany ³	17 June 1925	25 April 1929
Ghana		3 May 1967 ¹⁰
Greece	17 June 1925	30 May 1931
Holy See		18 Oct. 1966 ¹⁰
Hungary		11 Oct. 1952 ¹⁰
Iceland		2 Nov. 1967 ¹⁰
India	17 June 1925	9 April 1930 ¹²
Indonesia ⁴		31 Oct. 1930 ¹⁰
Iraq		8 Sept. 1931 ^{10, 12}
Irish Free State (Ireland)		18 Aug. 1930 ^{10, 12}
Israel		20 Feb. 1969 ¹⁰
Italy	17 June 1925	3 April 1928
Japan	17 June 1925	
Latvia	17 June 1925	3 June 1931
Lebanon		17 April 1969 ¹⁰
Liberia		2 April 1927 ¹⁰
Lithuania	17 June 1925	15 June 1933
Luxembourg	17 June 1925	1 Sept. 1936
Madagascar		12 Aug. 1967 ¹⁰
Maldive Islands		6 Jan. 1967 ¹⁰
Mexico		15 March 1932 ¹⁰
Monaco		6 Jan. 1967 ¹⁰
Mongolia		6 Dec. 1968 ¹⁰
Nepal		9 May 1969 ¹⁰
Netherlands ⁵	17 June 1925	31 Oct. 1930 ¹³
New Zealand		22 Jan. 1930 ^{10, 12}
Nicaragua	17 June 1925	
Niger		19 April 1967 ¹¹
Nigeria		15 Oct. 1968 ¹⁰
Norway	17 June 1925	27 July 1932
Pakistan ⁶		9 April 1930 ¹²
Paraguay		22 Oct. 1933 ¹⁰
Persia (Iran)		4 July 1929 ¹⁰
Poland	17 June 1925	4 Feb. 1929
Portugal	17 June 195	1 July 1930 ¹²
Romania	17 June 1925 ⁹	23 Aug. 1929
Rwanda		25 June 1964 ¹¹
Serbs, Croats and Slovenes, ⁷		
Kingdom of the (Yugoslavia)	17 June 1925	12 April 1929
Siam (Thailand)	17 June 1925	6 June 1931

		Ratification
	Signed	deposited
Sierra Leone		20 March 1967 ¹⁰
South Africa, Union of		22 Jan. 1930 ^{10, 12}
Spain	17 June 1925	22 Aug. 1929 ¹⁴
Sweden	17 June 1925	25 April 1930
Switzerland	17 June 1925	12 July 1932
Syria		17 Dec. 1968 ¹⁰
Tanganyika ⁸		22 April 1963 ¹⁰
Tunisia		12 July 1967 ¹⁰
Turkey	17 June 1925	5 Oct. 1929
Uganda		24 May 1965 ¹⁰
USSR		5 April 1928 ¹⁰
UK of Great Britain and Northern Ireland	17 June 1925	9 April 1930 ¹²
USA	17 June 1925	
Uruguay	17 June 1925	
Venezuela	17 June 1925	8 Feb. 1928

¹ On 13 July 1952, the People's Republic of China issued a statement recognizing as binding upon it the accession to the Protocol "in Name of China".

² All international agreements concluded by Egypt remain in force for the United Arab Republic.

³ On 2 March 1959 Czechoslovakia transmitted to France, the depositary government, an instrument of adherence from the German Democratic Republic.

⁴ On 27 December 1949, sovereignty over the Netherlands Indies (Indonesia) was transferred from the Netherlands to the Republic of Indonesia. The Agreement on Transitional Measures, adopted by the Round Table Conference at The Hague on 2 November 1949, provides that treaties and other international agreements concluded by the Netherlands are in force for the Republic of Indonesia.

⁵ Including Surinam, the Netherlands Antilles and the Netherlands Indies (Indonesia). ⁶ When the Protocol was ratified by India, Pakistan had no separate existence. On 13 April 1960 Pakistan informed the depositary government that it considered itself bound by the Protocol, by reason of Paragraph 4 of the Annex to the Indian Independence Act.

⁷ Yugoslavia is a Party by virtue of deposit of the instrument of ratification in the name of the Kingdom of Serbs, Croats and Slovenes on 12 April 1929. The Kingdom changed its official title to "Kingdom of Yugoslavia" in 1929 and in 1946 to the "Federal People's Republic of Yugoslavia".

⁸ In a note dated 6 May 1964, the United Republic of Tanganyika and Zanzibar informed the U.N. Secretary-General that all international agreements formerly in force between either country and other States would continue in force for the newly formed Republic of Tanzania.

[°] The reservation (see note 12) was made when signing and was not contained in the instrument of ratification.

¹⁰ Date of accession.

¹¹ Date of succession.

¹² Protocol only binding as regards states which have signed or ratified it or which acceded to it and ceases to be binding with reference to the ratifying State in regard to all enemy States whose armed forces or whose allies fail to respect the Protocol.

In addition the British instrument of ratification contains the reservation that the Protocol does not bind India or any British Dominion which is a separate Member of the League of Nations and does not separately sign or adhere to the Protocol.

¹³ Protocol ceases to be binding with reference to the ratifying or adhering State in regard to all enemy States whose armed forces or whose allies fail to respect the Protocol.

¹⁴ Ratified on condition of reciprocity.

3D. List of United Nations resolutions on disarmament and related matters, 1967-681

1. Security Council resolutions

Resolution no.	Subject	Date of adoption	Voting resul	ts	
255 (1968)	Recognizes that aggression with nuclear weapons or the threat of such aggression against a non-nuclear state would create a situation in which the Security Council, and above all its nuclear-weapon state permanent members, would have to act immediately in accordance with their obligations under the UN Charter, and welcomes the intention expressed by certain states that they will provide or support immediate assistance to any non-nuclear-weapon party to the Non-Proliferation Treaty that is a victim of an act an or an object of a threat of aggression in which nuclear weapons are used.	19 June 1968			
2. General	Assembly resolutions				
2258 (XXII)	Effects of atomic radiation Requests the Scientific Committee to continue its programme, including its co-ordinating activities, to increase the knowledge of the levels and effects of atomic radiation from all sources.	25 October 1967	Adopted unanimously		
2286 (XXII)	Treaty for the Prohibition of Nuclear Weapons in Latin America Calls upon all states to give their full co-operation to ensure that the regime laid down in the Treaty enjoys universal observance; recommends states which are or may become signatories and those contemplated in Additional Protocol I to strive to take all the measures to ensure that the Treaty speedily obtains the widest application among them; and invites powers possessing nuclear weapons to sign and ratify Additional Protocol II as soon as possible.	5 December 1967	In favour Against Abstentions	79 0 21	(UK, USA) (France, USSR ²)
2289 (XXII)	Conclusion of a convention on the Prohibition of the use of nuclear weapons Urges all states to examine the question of the prohibition of the use of nuclear weapons and the draft convention concerning this problem proposed by the USSR, as well as to undertake negotiations concerning the conclusion of an appropriate convention, through the convening of an international conference, by the Conference of the ENDC, or directly between states.	8 December 1967	In favour Against Abstentions	77 0 29	(USSR) (France, UK, USA)
2342 (XXII)	Question of general and complete disarmament Resolution A Requests the Secretary-General to arrange for the reproduction of his full report (on the effects of the use of nuclear weapons and on the security and economic implications for states of the acquisition and further development	19 December 1967	In favour Against Abstențions	113 0 1	(France, UK, USA, USSR

22-693310 SIPRI Yearbook

ŝ	D.	Continued
1.0	<i>.</i>	Continueu

Resolution no.	Subject	Date of adoption	Voting results			
	of these weapons) as a United Nations publication and recommends to all Governments the wide distribution of the report, and recommends that the ENDC should take into account the report and the conclusion thereof.	-				
	<i>Resolution B</i> Requests the ENDC to resume at the earliest possible date consideration of the question of general and complete disarmament.		In favour Against Abstentions	113 0 3	(UK, USA, USSR) (France)	
2343 (XXII)	Urgent need for suspension of nuclear and thermonuclear tests Urges all states which have not done so to adhere to the Partial Test Ban Treaty; calls upon all nuclear weapon states to suspend nuclear weapon tests in all environments; and requests the ENDC to take up as a matter of urgency the elaboration of the Partial Test Ban Treaty.	19 December 1967	In favour Against Abstentions	103 0 7	(UK, USA, USSR) (France)	
2344 (XXII)	Elimination of foreign military bases in the countries of Asia, Africa and Latin America Requests the ENDC to resume consideration of the question and to report to the General Assembly at its XXIII session on the progress achieved.	19 December 1967	In favour Against Abstentions	105 0 13	(UK, USSR) (France, USA)	
2346 (XX11)	Non-proliferation of nuclear weapons Resolution A Calls upon the ENDC urgently to continue its work concerning the question of non-proliferation and requests it to submit to the General Assembly, on or before 15 March 1968, a full report on the negotiations regarding a draft treaty. It also recommends that upon the receipt of the report appropriate consultations should be initiated on the resumption of the General Assembly's XXII session to consider the question of non-proliferation.	19 December 1967	In favour Against Abstentions	112 1 4	(UK, USA, USSR) (France)	
	Resolution B Decides to convene the Conference of Non-Nuclear-Weapon States at Geneva from 29 August to 28 September 1968.		In favour Against Abstentions	110 4 2	(UK, USA, USSR) (France)	
2373 (XXII)	Treaty on the Non-Proliferation of Nuclear Weapons Commends the Treaty (which is annexed to the resolution) and expresses the hope for the widest possible adherence to it.	12 June 1968	In favour Against Abstentions	95 4 2	(UK, USA, USSR) (France)	
2382 (XXIII)	Effects of atomic radiation Requests the Scientific Committee to complete its current programme of work and to review and formulate plans for its future activities.	1 November 1968	Adopted unanimously			
2387 (XXIII)	Conversion to peaceful needs of the resources released by disarmament Takes note of the Secretary-General's report (economic and social conse- quences of disarmament: conversion to peaceful uses of the resources released	19 November 1968	In favour Against Abstentions	94 0 15	(UK, USA) (France, USSR)	

338

by disarmament) and requests him to draw attention of the member states to the present resolution and to suggest that they may wish to embody, in some of their studies, considerations on the anticipated effects of important partial disarmament measures.

2454 (XXIII)	Question of general and complete disarmament Resolution A Requests the Secretary-General to prepare, with the assistance of qualified consultant experts, a concise report on chemical and bacteriological weapons in accordance with the recommendation of the ENDC.	20 December 1968	In favour Against Abstentions	107 0 2	(France, UK, USA, USSR)
	Resolution B Requests the ENDC to pursue renewed efforts toward achieving substantial progress in reaching agreement on the question of general and complete disarmament and to see how in particular rapid progress could be made in the field of nuclear disarmament, as well as to continue its urgent efforts to negotiate collateral measures of disarmament.		In favour Against Abstentions	109 0 4	(UK, USA, USSR) (France)
2455 (XXIII)	Urgent need for suspension of nuclear and thermonuclear tests Urges all states which have not done so to adhere to the Partial Test Ban Treaty; calls upon all nuclear weapon states to suspend nuclear weapon tests in all environments; and requests the ENDC to take up as a matter of urgency the elaboration of the Partial Test Ban Treaty.	20 December 1968	In favour Against Abstentions	109 0 5	(UK, USA, USSR) (France)
2456 (XXIII)	Conference of Non-Nuclear-Weapon States Resolution A Inter alia requests the Secretary-General to transmit the resolutions and the Declaration adopted by the Conference to the states which are members of the UN, its specialized agencies, or of the Atomic Energy Agency, for careful consideration. It also requests him to appoint a group of experts to prepare a full report on all possible contributions of nuclear technology to the economic and scientific advancement of the developing countries.	20 December 1968	In favour Against Abstentions	103 7 5	(France, UK, USA) (USSR)
	Resolution B Reiterates the recommendation of the Conference concerning the establish- ment of nuclear weapon-free zones, and makes an urgent appeal for full compliance by the nuclear weapon Powers with paragraph 4 of General Assembly resolution 2286 (XXII) in which the Assembly invited these Powers to sign and ratify Additional Protocol II of the Treaty for the Prohibition of Nuclear Weapons in Latin America as soon as possible.		In favour Against Abstentions	98 0 16	(UK, USA) (France, USSR)
	Resolution C Requests the Secretary-General to prepare, in consultation with the UN Member States, a report on the establishment, within the framework of the International Atomic Energy Agency, of an international service for nuclear explosions for	er l	In favour Against Abstentions	75 9 30	(UK, USSR) (France, USA)

peaceful purposes, under appropriate international control.

339

D. Continued							
no.	Subject	Date of adoption	Voting results				
	<i>Resolution D</i> Urges the Governments of the USA and the USSR to enter at an early date into bilateral discussions on the limitation of offensive strategic nuclear weapon delivery systems and systems of defence against ballistic missiles.		In favour 1 Against Abstentions	00 0 7	(UK, USA, USSR) (France)		

¹ A list of the resolutions adopted at previous sessions can be found in *The United Nations and Disarmament*, 1945–1965, United Nations, New York, 1967. ² The USSR abstained, first, on the grounds that the United States refused to agree to the inclusion, in the atom-free zone, of the territories of Puerto Rico, the Virgin Islands, and the Panama Canal, which are part of Latin America, and refused to liquidate its military and naval base in Guantanamo, and second, on the grounds that the right of contracting parties to carry out nuclear explosions using devices similar to those used in nuclear weapons (Article 18) is incompatible with the idea of an atom-free zone, and that the Treaty does not contain clear provision prohibiting transit of nuclear weapons on the territory of the zone.

Sources:

Resolutions: GAOR-Twenty-second Session, Supplement No. 16 (A/6716) and No. 16 A (A/6716/Add. 1) — Twenty-third Session, Supplement No. 18 (A/7218)

Voting results: Aktstycken utgivna av Kungl. Utrikesdepartementet, Ny serie 1:A:17, Stockholm, 1968. Aktstycken utgivna av Kungl. Utrikesdepartementet, Ny serie 1:A:18, Stockholm, 1969.

340

3E. List of regional multilateral defence organisations and treaties

Anzus Treaty—Security Treaty between the Governments of Australia, New Zealand and the United States

The treaty was signed in San Francisco (USA) on 1 September 1951, and came into force on 29 April 1952.

Member countries

Australia, New Zealand, United States.

Main clauses

ARTICLE III

The Parties will consult together whenever in the opinion of any of them the territorial integrity, political independence or security of any of the Parties is threatened in the Pacific.

ARTICLE IV

Each Party recognizes that an armed attack in the Pacific Area on any of the Parties would be dangerous to its own peace and safety and declares that it would act to meet the common danger in accordance with its constitutional processes.

Any such armed attack and all measures taken as a result thereof shall be immediately reported to the Security Council of the United Nations. Such measures shall be terminated when the Security Council has taken the measures necessary to restore and maintain international peace and security.

Duration

The Treaty remains in force indefinitely. Any party may withdraw by notifying the other parties of that intention a year in advance.

CENTO—Central Treaty Organisation

A pact of mutual defence was signed in Bagdad (Iraq) by Turkey and Iraq on 24 February 1955, and came into force on 26 February 1955. On 21 August 1959 the name of the organisation was changed from Bagdad Pact to Central Treaty Organisation (CENTO).

Member countries

Iran, Iraq, Pakistan, Turkey, United Kingdom, United States.

The United Kingdom joined the Pact on 5 April, at the same time signing a special defence agreement with Iraq. Pakistan joined the Pact on 23 September and Iran on 19 October 1955.

The United States became a full member of the economic and countersubversion committees in April 1956, of the military committee in March 1957, and of the scientific council in May 1961. It is represented at the Council meetings by observers.

Bilateral defence agreements between the United States and Turkey, Iran and Pakistan were signed in Ankara (Turkey) on 5 March 1959.

Iraq withdrew from the Pact on 24 March 1959, after the 1958 revolution.

Main clauses

ARTICLE I

Consistent with Article 51 of the United Nations Charter the High Contracting Parties will co-operate for their security and defence. Such measures as they agree to take to give effect to this co-operation may form the subject of special agreements with each other.

Duration

The Pact was concluded for a period of five years renewable for other five year periods. Any party may withdraw by notifying the other parties of that intention six months before the expiration of the five year period. The Pact has been renewed and is still in force.

NATO—North Atlantic Treaty Organisation

The Treaty was signed in Washington (USA) on 4 April 1949, and came into force on 24 August 1949.

Member countries

Belgium, Canada, Denmark, France, Germany FR, Greece, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Turkey, United Kingdom, United States.

Greece and Turkey were admitted in October 1951 (effective February 1952).

West Germany was admitted in October 1954 (effective May 1955). In March 1966 France withdrew from the integrated military commands, while remaining a member of NATO itself. By the end of 1967, NATO headquarters had been moved to Belgium and allied military forces withdrawn from France.

Main clauses

article 3

In order more effectively to achieve the objectives of this treaty the parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack.

ARTICLE 5

The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all and consequently they agree that, if such an armed attack occurs, each of them, in exercise of the right of individual and collective self-defence recognized by the Article 51 of the Charter of the United Nations, will assist the Party or Parties so attacked by taking forthwith, individually and in concert with other Parties, such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area. Any such armed attack and all the measures taken as a result thereof shall immediately be reported to the Security Council. Such measures shall be terminated when the Security Council has taken the measures necessary to restore and maintain international peace and security.

Duration

After the Treaty has been in force for 20 years, any party may withdraw by notifying the other parties of that intention a year in advance.

OAS—Organisation of American States

The Charter of the Organisation was adopted on 30 April 1948 by the Ninth International Conference of American States, at Bogotá (Colombia), and came into force 13 December 1957. The Charter co-ordinated the work of all the former independent official entities in the inter-American system and defined their mutual relationships. The Organisation regards itself as an agency falling under Chapter VII (Article 51) of the United Nations Charter.

Member countries

Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras,

Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, United States, Uruguay, Venezuela.

Cuba was excluded on 31 January 1962 by a vote of 14 to 0, with 6 abstentions (Argentina, Bolivia, Brazil, Chile, Ecuador and Mexico).

Trinidad and Tobago were admitted on 23 February 1967.

Barbados was admitted on 15 November 1967.

Main clauses

article 24

Every act of aggression by a State against the territorial integrity or the inviolability of the territory or against the sovereignty or political independence of an American State shall be considered an act of aggression against the other American States.

article 25

If the inviolability or the integrity of the territory or the sovereignty or political independence of an American State should be affected by an armed attack or by an act of aggression that is not an armed attack, or by extracontinental conflict, or by a conflict between two or more American States, or by any other fact or situation that might endanger the peace of America, the American States, in furtherance of the principles of continental solidarity or collective self-defence, shall apply the measures and procedures established in the special treaties on the subject.

Duration

The Charter remains in force indefinitely. Any party may withdraw by notifying the other parties of that intention two years in advance.

Rio Treaty—Inter-American Treaty of reciprocal assistance

The Treaty was signed in Rio de Janeiro (Brazil) on 2 September 1947, and came into force on 3 December 1948.

Member countries

Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Panama, Paraguay, Peru, United States, Uruguay, Venezuela.

Cuba withdrew from the Treaty on 29 March 1960.

Main clauses

article 6

If the inviolability or the integrity of the territory or the sovereignty or political independence of any American State should be affected by an aggression which is not an armed attack or by an extra-continental or intracontinental conflict, or by any other fact or situation that might endanger the peace of America, the Organ of Consultation shall meet immediately in order to agree on the measures which must be taken in case of aggression to assist the victim of the aggression or, in any case, the measures which should be taken for the common defence and for the maintenance of the peace and security of the Continent.

ARTICLE 8

For the purposes of this Treaty, the measures on which the Organ of Consultation may agree will comprise one or more of the following: recall of chiefs of diplomatic missions; breaking of consular relations; partial or complete interruption of economic relations or of rail, sea, air, postal, telegraphic, telephonic, and radiotelephonic or radiotelegraphic communications; and use of armed forces.

Duration

The Treaty remains in force indefinitely. Any party may withdraw by notifying the other parties of that intention two years in advance.

Application of the treaty

The Rio Treaty has been applied in the following disputes and civil conflicts in Latin America:

- 1948. Dispute between Costa Rica and Nicaragua.
- 1950. Dispute between the Dominican Republic and Cuba and Guatemala. Dispute between Haiti and the Dominican Republic.
- 1954. Civil war in Guatemala.
- 1955. Dispute between Costa Rica and Nicaragua.
- 1957. Border dispute between Honduras and Nicaragua.
- 1959. Attempted invasion of Panama. Attempted coup d'état in Nicaragua.
- 1960. Dispute between Venezuela and the Dominican Republic.
- 1962. Treaty invoked twice because of events in Cuba.
- 1963. Dispute between Haiti and the Dominican Republic. Dispute between Venezuela and Cuba.

- 1964. Dispute between Panama and the United States. Venezuelan accusation of aggression by Cuba.
- 1965. Civil war in the Dominican Republic.
- 1969. Dispute between Honduras and El Salvador.

SEATO—South-East Asia Treaty Organisation

The Treaty was signed in Manila (Philippines) on 8 September 1954, and came into force on 9 February 1955.

Member countries

Australia, France, New Zealand, Pakistan, Philippines, Thailand, United Kingdom, United States.

Main clauses

article 2

In order more effectively to achieve the objectives of this Treaty, the Parties separately and jointly, by means of continuous and effective self-help and mutual aid will maintain and develop their individual capacity to resist armed attack and to prevent and counter subversion activities directed from without against their territorial integrity and political stability.

ARTICLE 4

(1) Each Party recognizes that aggression by means of armed attack in the Treaty area against any of the Parties or against any State or territory which the Parties by unanimous agreement may hereafter designate would endanger its own peace and safety, and agrees that it will in that event act to meet the common danger in accordance with its constitutional processes. Measures taken under this paragraph shall be immediately reported to the Security Council of the United Nations.

(2) If in the opinion of any of the Parties the inviolability or the integrity of the territory or the sovereignty or political independence of any Party in the Treaty area or of any other State or territory to which the provisions of paragraph (1) of this Article from time to time apply is threatened in any way other than by armed attack or is affected or threatened by any fact or situation which might endanger the peace of the area, the Parties shall consult immediately in order to agree on the measures which shall be taken for the common defence.

(3) It is understood that no action on the territory of any State designated by unanimous agreement under paragraph (1) of this article or on any terri-

tory so designated shall be taken except at the invitation or with the consent of the government concerned.

The following "understanding" of the United States was added to the text of the Treaty:

The United States of America in executing the present Treaty does so with the understanding that its recognition of the effect of aggression and armed attack and its agreement with reference thereto in the Article 4, paragraph (1), apply only to Communist aggression, but affirms that in the event of other aggression or armed attack it will consult under the provisions of Article 4 (2).

A Protocol of the Treaty states:

The Parties to the South-East Asia collective defence treaty unanimously designate for the purpose of Article 4 of the Treaty the States of Cambodia and Laos and the free territory under jurisdiction of the State of Viet-Nam.

The Parties further agree that the above mentioned States and territories shall be eligible in respect of the economic measures contemplated by article 3.

A joint statement by Thailand and the United States on 6 March 1962 says that the treaty obligations of the United States do not depend upon the prior agreement of all other parties to the Treaty; a majority of the members have accepted this view.

Duration

The Treaty remains in force indefinitely. Any party may withdraw by notifying the other parties of that intention a year in advance.

Warsaw pact—Treaty of friendship, co-operation and mutual assistance

The Treaty was signed in Warsaw (Poland) on 14 May 1955, and came into force on 5 June 1955.

Member countries

Albania, Bulgaria, Czechoslovakia, Germany DR, Hungary, Poland, Romania, USSR.

Albania did not participate in the meetings of the member countries after 1962. On 12 September 1968 in a unilateral declaration adopted by the Parliament it announced its formal withdrawal from membership.

Main clauses

ARTICLE 3

The contracting Parties shall take council among themselves on all important international questions relating to their common interests, guided by the interests of strengthening international peace and security.

They shall take council among themselves immediately, whenever, in the opinion of any of them, there has arisen the threat of an armed attack on one or several states that are signatories of the Treaty, in the interests of organising their joint defence and of upholding peace and security.

ARTICLE 4

In the event of an armed attack in Europe on one or several states that are signatories of the Treaty by any state or group of states, each state that is a Party to this Treaty shall, in the exercise of the right to individual or collective self-defence in accordance with Article 51 of the Charter of the United Nations Organisation, render the state or states so attacked immediate assistance, individually and in agreement with other states that are Parties to this Treaty, by all the means it may consider necessary, including the use of armed force. The states that are Parties to this Treaty shall immediately take council among themselves concerning the necessary joint measures to be adopted for the purpose of restoring and upholding international peace and security.

In accordance with the principles of the Charter of the United Nations Organisation the Security Council shall be advised of the measures taken on the bases of the present Article. These measures shall be stopped as soon as the Security Council has taken the necessary measures for restoring and upholding international peace and security.

Duration

The Treaty remains in force for 20 years. For the parties which do not submit a statement denouncing the Treaty a year before the expiration of its term, it remains in force throughout the following ten years.

3F. Text of the Treaty on the Non-Proliferation of Nuclear Weapons¹

1. The States concluding this Treaty, hereinafter referred to as the "Parties to the Treaty",

2. Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,

3. *Believing* that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war,

4. In conformity with resolutions of the United Nations General Assembly calling for the conclusion of an agreement on the prevention of wider dissemination of nuclear weapons,

5. Undertaking to co-operate in facilitating the application of International Atomic Energy Agency safeguards on peaceful nuclear activities,

6. *Expressing* their support for research, development and other efforts to further the application, within the framework of the International Atomic Energy Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points,

7. Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States,

8. Convinced that, in furtherance of this principle, all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in co-operation with other States to, the further development of the applications of atomic energy for peaceful purposes,

9. Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament,

10. Urging the co-operation of all States in the attainment of this objective,

11. Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapon tests in the atmosphere, in outer space and

¹ The text is taken from UN document A/RES/2373 (XXII). A list of the states which have signed or ratified the Treaty is given in the reference section, page 320.

under water in its Preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end,

12. Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a treaty on general and complete disarmament under strict and effective international control,

13. Recalling that, in accordance with the Charter of the United Nations, States must refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the Purposes of the United Nations, and that the establishment and maintenance of international peace and security are to be promoted with the least diversion for armaments of the world's human and economic resources,

Have agreed as follows:

Article I

Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclearweapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

Article II

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

Article III

1. Each non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfillment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.

2. Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this article.

3. The safeguards required by this article shall be implemented in a manner designed to comply with article IV of this Treaty, and to avoid hampering the economic or technological development of the Parties or international co-operation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this article and the principle of safe-guarding set forth in the Preamble of the Treaty.

4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations.

Article IV

1. Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with articles I and II of this Treaty.

2. All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials

and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also co-operate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

Article V

Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States. Negotiations on this subject shall commence as soon as possible after the Treaty enters into force. Nonnuclear-weapon States Party to the Treaty so desiring may also obtain such benefits pursuant to bilateral agreements.

Article VI

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

Article VII

Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.

Article VIII

1. Any Party to the Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, to consider such an amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclearweapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. The amendment shall enter into force for each Party that deposits its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment.

3. Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized. At intervals of five years thereafter, a majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences with the same objective of reviewing the operation of the Treaty.

Article IX

1. This Treaty shall be open to all States for signature. Any State which does not sign the Treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by the States, the Governments of which are designated Depositaries of the Treaty, and forty other States signatory to this Treaty and the deposit of their instruments of ratification. For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967.

4. For States whose instruments of ratification or accession are deposited

subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to article 102 of the Charter of the United Nations.

Article X

1. Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

2. Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty.

Article XI

This Treaty, the Chinese, English, French, Russian and Spanish texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

In witness whereof the undersigned, duly authorized, have signed this Treaty.

3G. Resolutions adopted by the Conference of Non-Nuclear-Weapon States

The Conference of Non-Nuclear-Weapon States was held at Geneva from 29 August to 28 September 1968. The resolutions adopted were as follows.¹

The Conference:

On the item Measures to assure the security of non-nuclear-weapon states:

1. "Reaffirmed the principle of the non-use of force and the prohibition of the threat of force in relations between States; the right to equality, sovereignty, territorial integrity, non-intervention in internal affairs and selfdetermination of every State; and the inherent right recognized under Article 51 of the Charter of individual or collective self-defence 'which, apart from measures taken or authorized by the Security Council of the United Nations, is the only legitimate exception to the overriding principle of the non-use of force in relations between States'." (Adopted by 56 votes in favour to 5 against, with 26 abstentions.) (Sponsor: Federal Republic of Germany.)

On the item Establishment of nuclear-weapon-free zones:

2. "Declared that establishment of nuclear-weapon-free zones is one of the measures which can contribute most effectively to halting proliferation, and that for maximum effectiveness of any such treaty 'the co-operation of the nuclear-weapon States is necessary and that such co-operation should take the form of commitments likewise undertaken in a formal international instrument which is legally binding'; recommended that non-nuclear States study the possibility of establishing by treaty the military denuclearization of their zones; and regretted that not all the nuclear-weapon Powers had signed Additional Protocol II of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco), under which they assume obligations to respect the nuclear-weapon-free status of Latin America and not to use or threaten to use nuclear weapons against parties to that Treaty." (Adopted by 74 votes in favour to none against, with 10 abstentions.) (Sponsored by 16 Latin American States.)

On the item Effective measures for the prevention of further proliferation of nuclear weapons, the cessation of the nuclear arms race at an early date and nuclear disarmament:

3. "Requested the General Assembly at its twenty-third session to re-

¹ The resolutions are given in full in the final document of the Conference, UN document A/Conf. 35/10. The excerpts given here are the operative parts of the adopted resolutions, as summarized by the UN Office of Public Information (November 1968).

commend that the Eighteen-Nation Disarmament Committee begin not later than March 1969 to undertake negotiations for (a) prevention of further development and improvement of nuclear weapons and their delivery vehicles; (b) a comprehensive test ban treaty as 'a matter of high priority'; (c) immediate cessation of the production of fissile materials for weapons purposes and the stoppage of the manufacture of nuclear weapons; and (d) reduction and subsequent elimination of stockpiles of nuclear weapons and delivery systems." (Adopted by 76 votes in favour to none against, with 8 abstentions.) (Sponsored by 21 countries.)

4. "Urged the Soviet Union and United States to enter at an early date into bilateral discussions on the limitation of offensive strategic nuclear weapons delivery systems and systems of defence against ballistic missiles, and expressed deep concern at 'the imminent danger of a renewal of the strategic nuclear arms race and its escalation to new levels which become uncontrollable." (Adopted by 79 votes in favour to none against, with 5 abstentions.) (Sponsor: Pakistan.)

On the item Safeguards against the diversion of source or special fissionable material from peaceful to military uses, and safeguards against industrial espionage:

5. "Recommended the acceptance by all non-nuclear States of the International Atomic Energy Agency (IAEA) system of safeguards, as may be evolved from time to time and which would provide against diversion of source or fissionable material; recognized the urgency of preventing proliferation of nuclear weapons, and stated that the IAEA is most suited to administer safeguards." (Adopted by 34 in favour to 8 against, with 41 abstentions.) (Sponsor: Pakistan.)

6. "Recommended the establishment within the IAEA and under its Board of Governors of institutional machinery on safeguards, of which both suppliers of nuclear materials and other member countries shall form part; recommended that the IAEA simplify the safeguard procedures through use of instruments and other technical devices at certain strategic points, simplify safeguards concerning fissionable materials in small quantities for research, and incorporate in agreements rules laid down against industrial risks including industrial espionage; and urged the nuclear-weapon Powers to conclude safeguards agreements with the IAEA." (Adopted by 35 in favour to 5 against, with 45 abstentions.) (Sponsored by Argentina, Brazil, Chile, Colombia, Ecuador, Spain and Switzerland.)

On the item Programmes for co-operation in the field of peaceful uses of nuclear energy:

7. "Requested the Secretary-General to appoint a group of experts to prepare a full report on 'all possible contributions of nuclear technology to the economic and scientific advancement of the developing countries." (Adopted by 69 votes in favour to none against, with 1 abstention.) (Sponsored by 16 Latin American States.)

8. "Called on the IAEA to undertake studies on arrangements to facilitate exchange of scientific and technical information, on ways to increase funds available for technical assistance, on effective means to ensure access to special fissionable materials, and on the Agency's possible role in regard to nuclear explosions for peaceful purposes; invited the nuclear-weapon States to advise the IAEA at regular intervals on the possibility of declassifying scientific and technical information; urged the nuclear States to facilitate the availability of fissionable materials for peaceful nuclear programmes of the non-nuclear-weapon States 'accepting the application of safeguards as envisaged in Article III of the Treaty'; and expressed the assumption that the IAEA would examine its procedures, as well as the composition of its Board of Governors, with a view to adapting them as necessary in the light of its new responsibilities." (Adopted by 51 votes in favour to 15 against, with 10 abstentions.) (Sponsored by Austria, Denmark, Finland, Japan, Norway, Sweden and Switzerland.)

9. "Recommended that the IAEA should undertake to examine the basis on which arrangements can be made by the Agency to secure finances from international sources for the creation of a 'Special Nuclear Fund' to provide loans and grants for nuclear projects." (Adopted by 70 in favour to none against, with 4 abstentions.) (Sponsor: Pakistan.)

10. "Requested the General Assembly to consider at its twenty-third session the establishment of a nuclear technology development programme for the benefit of developing countries within the United Nations Development Programme; requested the World Bank to consider establishing a similar programme; invited the nuclear States to assume the main responsibility for financing the two programmes; requested the IAEA to consider establishing a 'Fund of Special Fissionable Materials', and invited the nuclear States to give 'a firm undertaking' regarding the supply of such materials to the Fund." (Adopted by 51 in favour to none against, with 22 abstentions.) (Sponsored by 15 Latin American States and Jamaica.)

11. "Recommended that the IAEA broaden the representation on its Board of Governors so as to reflect equitable geographical distribution and the views of a broad spectrum of developing countries." (Adopted by 47 in favour to none against, with 29 abstentions.) (Sponsored by Cameroon, Dahomey, Ivory Coast, Kenya, Uganda, United Republic of Tanzania and Zambia.)

12. "Expressed its conviction on the 'urgent need' to obtain a comprehensive test ban treaty, and on the other hand to create a separate inter-

national instrument for international regulation and control of all explosions for peaceful purposes as exceptions from the general prohibition under a comprehensive test ban; and endorsed the views of the eight non-aligned members of the Eighteen-Nation Disarmament Committee concerning the close link between a comprehensive test ban and a solution of the problem of nuclear explosions for peaceful purposes." (Adopted by 61 in favour to none against, with 16 abstentions.) (Sponsored by Sweden and Nigeria.)

13. "Requested all nuclear-weapon States and non-nuclear States in a position to do so 'to provide access for students and scientists for purposes of training and acquisition of knowledge on a non-discriminatory basis to their scientific institutions and nuclear establishments engaged in research and development of the peaceful uses of nuclear energy.'" (Adopted by 37 in favour to none against, with 43 abstentions.) (Sponsor: Pakistan.)

On the item Implementation of Conference decisions:

14. "Invited the General Assembly at its twenty-third session 'to consider the best ways and means for the implementation of the decisions taken by the Conference' and to consider at a subsequent session the question of convening a second Conference of Non-Nuclear Weapon States." (Adopted by 75 in favour to none against, with no abstentions.) (Sponsor: Brazil.)
Section 4. Conflicts

4A. Post-World War II armed conflicts and disputes

Introduction

This section presents reference material on armed conflicts and disputes since the end of World War II.

There exists no common definition of "armed conflict" among the students of the subject. Indeed, many students have not provided a definition at all, implying that in their view there was no ambiguity. This is particularly true for civil conflicts. The student of war is clearly not interested in individual brawls; at the other end of the scale, he clearly is interested in major civil wars, such as the struggle between Nigeria and Biafra. Between these two extremes there are large numbers of incidents with different degrees of violence and of varying importance in international relationships. There is no clear demarcation line in civil disputes, which marks off armed conflict from other forms of violence.

Table 4 A.1 illustrates these points. It is a total list of 11 different studies of international wars and armed conflicts in the post-war period. It is a "list of lists".

The table shows that different researchers come to different conclusions about what is and what is not a conflict; for instance, some include the 1962 Cuban confrontation between the USA and USSR and some do not. In addition, they also differ considerably about the duration of recent conflicts. This is because relatively few post-war conflicts have taken the form of declared wars; and a fairly large number have consisted of prolonged insurgencies or civil conflicts, with periods of hostility alternating with periods of passivity.

The eleven lists end at various dates from 1949 to 1968. Some of them —Holsti, Bloomfield, Wainhouse—deal with selected conflicts only. They do not set out to give a comprehensive list: so the fact that they omit a particular conflict is not to be taken as implying that they do not consider it to have been a conflict.

Characteristics of the eleven lists

A. Richardson, Lewis F. Statistics of Deadly Quarrels (ed. Quincy Wright and Carl C. Lienau). Pittsburgh: Boxwood and Chicago: Quadrangle, 1960. This study covers the period 1820-1954. It classifies conflicts by size: only wars with 317 or more killed are listed. The dates of duration are

given, and there is a list of sources from which the information was compiled.

B. Wright, Quincy. "Appendix C" in A Study of War, rev. ed. Chicago, 1965.

This study covers the period 1945–1964. It includes the following definitions: *International war* is a conflict between Governments on opposite sides of a generally recognized boundary, cease-fire, or armistice line. War between two factions within a state or between a government *de facto* or *de jure* and insurgents, guerillas or irregular forces within its territory, as determined by a generally recognized boundary, cease-fire or armistice line is considered *civil war*. In many cases even if the hostilities were primarily civil, the intervention of outside forces made them international.

Wright identifies all hostilities in which more than 317 persons were killed, using Richardson's magnitude scale of approximate fatalities. He gives the following characteristics:

a) The nature of wars-"international" or "civil" or both.

b) The duration of hostilities.

c) The initiator of hostilities or the "aggresor".

d) The motivation of the initiator as follows: self-determination (S), communist revolt (Co), or other revolution (R).

Sometimes both (S) and (Co) were involved. In all these situations the Government opposing change deemed itself to be defending legal (L) or political (P) claims which it considered threatened.

e) Number of wars participated in by each state.

f) Number of participants in each hostility.

C. Holsti, K. J. "Appendix B" in "Resolving international conflicts: a taxonomy of behavior and some figures on procedures", *Journal of Conflict Resolution*, Vol. 10, no. 3 (1966), pp. 272–96.

This study covers the period 1945–1965. Holsti defines conflict as formed by "incompatible objectives and policy actions between interacting states". The emphasis is on the resolution of international conflicts. The list identifies:

a) The approximate duration of the conflict.

b) The procedures used in the settlement attempts: bilateral negotiations, mediation, international organizations, multilateral conferences, and judicial settlement.

c) The instrument of settlement: treaty, cease-fire, partition, armistice, decision of the International Court of Justice.

d) The nature and outcome of the settlement: conquest, annexation; forced submission, withdrawal (forced or otherwise), deterrence; compromise; award; and two categories of "passive" and "frozen".

D. Deitchman, Seymour J. Limited War and American Defence Policy. Washington D. C.: Institute of Defense Analysis, 1964.

This study covers the period 1945–1962. It identifies active or incipient military engagements and their duration, the belligerents and approximate number of men on each side. It isolates what it calls "vertical characteristics" of limited wars: conventional, unconventional, and deterrent (or no hostility); and certain "horizontal" characteristics:

a) Major wars (over 100,000 men on at least one side in the combat area).

b) US-USSR confrontation directly involved.

c) Wars between third powers, US-USSR confrontation not directly involved.

d) Number of wars lasting over two years.

E. Greaves, Col. Fielding V. "Peace in our time-fact or fable?", *Military Review* (Dec. 1962), pp. 55-58.

This study covers the period 1945–1962. It uses the classification of warfare, sporadic warfare, revolt or attempted revolt, coup d'état or attempted coup, and crisis (brief or continuing) for five different regions: Europe, Middle East, Far East, Africa and Western Hemisphere.

F. Kellog, James C. A synopsis of military conflict 1945–1964 (unpublished paper prepared at Bendix Systems Division, Arms Control Project Office, Ann Arbor, Michigan).

This study covers the period 1945–1964. It uses the classification of limited wars, localised wars, civil-guerilla wars, coup d'états, attempted coups, revolts and military crises. These are grouped by region. It lists the belligerents, and gives a chronological account of the progress of each conflict.

G. Wood, David. Conflict in the Twentieth Century (Adelphi Papers no. 48). London: Institute for Strategic Studies, May 1968.

This study covers the period 1898–1967. Wood uses as a definition of conflict a situation where the regular armed forces of a country or community are involved (either on both sides, or on one side only) and where weapons of war are used by them with intent to kill or wound over a period of at least one hour. (Civil riots, mutinies, coup d'états and frontier incidents, including boycotts, blockades and quarantines are thereby excluded.)

Wood gives the duration of the conflict, the number of participants and the number of casualities.

H. Leiss, Amelia C. and Bloomfield, Lincoln P. et al. The Control of Local Conflict. A Design on Arms Control and Limited War in the Developing Areas (prepared for the US Arms Control and Disarmament Agency), 4 vols. Cambridge: Center for International Studies, Massachussetts Institute of Technology, 1967.

This covers the period 1945–1965. It classifies conflicts by regions into conventional interstate; unconventional interstate; internal with significant external involvement; primarily internal; and colonial. It also has a classification according to the level or index of hostility: hostilities continued with intensification, hostilities continued without intensification, hostility terminated quickly after intensification, hostilities terminated quickly without intensification, and no outbreak of hostilities.

The study also indicates the direct and indirect involvement of the United States, Soviet Union and China.

I. Wainhouse, David D., et al. International Peace Observation: a History and Forecast. Baltimore: The Johns Hopkins Press, 1966.

This study examines some seventy cases of "peace observation" activities of the League of Nations, the United Nations and the Organization of American States from 1920 to 1965. It does not, therefore, provide a comprehensive list of conflicts: but it does provide certain estimates of duration.

J. Kende, Istvan, Nyolcvannyolc Haboru 1945-67 (Neo-colonialism). Budapest, 1968.

This covers the period 1945–1967. Kende's definition of war requires that regular armed forces (army, police, etc.) participate on at least one side; and that, on the other side, if the party concerned does not also consist of regular armed forces, it should at least have organized leadership and command. Thus guerilla warfare and wars of national liberation are included. Spontaneous riots, situations in which one of the parties did not have an organized defence (as in the Indonesian massacre), and situations in which one of the sides did not use lethal weapons, are not considered as wars. The classification covers border wars, tribal wars—divided into internal separatist, religious and anti-minority—and political wars, which include class warfare and liberation wars. The foreign participation of the USA, UK, France and Portugal is shown.

K. Carroll, B. A. *How wars end* (unpublished, prepared at the University of Illinois).

This covers the period from 1945 to 1968, and concentrates particularly on the way in which wars end.

Conflicts since the beginning of 1965

Table 4A.1 is simply a list of lists. The question, therefore, of selecting a definition of conflict does not arise. In table 4A.2, the list of conflicts is brought up-to-date. For this purpose, a definition is needed: we have taken the following one:

Inter-state or international conflict includes all organised armed hostility between two or more states, in which armed forces of a state or any force supported by a state cross a recognised boundary, cease-fire, or armistice line. Since the UN intervenes in hostilities only if there is a breach of, or threat to, international peace, every case in which the UN was or is presently involved is considered as an international conflict. This means that civil conflicts—like the Congolese war—in which the UN intervenes are also indicated as international conflicts.

Intra-state or civil conflict includes all hostility in which the organised armed forces of a state are used on at least one side. For a conflict of this type to be included in our list, it should either be brought up for consideration in a regional or international organisation (for example, the Organisation of American States, the Organisation of African Unity, the United Nations, etc.) or it should have a casualty list of 500 killed in any one year period. Most civil riots and most, but not all, military coups and unscheduled and illegal changes of government are excluded by this definition.

The table gives estimates of the duration of the conflicts: sources for these estimates are given at the end of the table. It also lists the procedures attempted to bring the conflict to a pacific settlement. The definitions of the columns used are as follows:

Cols 1–2. The parties to the conflict.

3. Bilateral negotiations: direct negotiations between the belligerents.

- 4. Resolution passed in either the General Assembly or Security Council, or both.
- 5. UN intervention either with observers or with military force.
- 6. UN mediation efforts.
- 7. All mediation outside the UN.
- 8. Any multilateral meetings or conferences—of the great powers, for example—to attempt to resolve the conflict outside the UN.
- 9. All references to or decisions by the International Court of Justice, or by any *ad hoc* commissions for arbitration.
- 10. This column indicates whether hostilities are still continuing, at 30 June 1969.
- 11. Instrument of settlement: this indicates formal termination of the conflict and/or existence of a negotiated agreement between the belligerents.

Abbreviations and conventions

Table 4A.1 Summary of eleven lists of post-World War II conflicts.

Type of conflict: C = Civil, I = International, NH = No Hostility, BC = Border Conflict

Size: This is according to Richardson's scale of numbers of deaths:

Range $7 \pm 1/2 = 31,622,777$ to 3,162,278 $6 \pm 1/2 = 3,162,277$ to 316,228 $5 \pm 1/2 = 316,227$ to 31,623 $4 \pm 1/2 = 31,622$ to 3,163 $3 \pm 1/2 = 3,162$ to 317 $2 \pm 1/2 = 316$ to 32

Parties: Any party included in any of the lists is shown.

The eleven lists: (For full sources see page 360.) The year in brackets after each author is the last year covered by his list.

A = Richardson	(1954)	E = Greaves	(1962)	I = Wainhouse	(1965)
$\mathbf{B} = \mathbf{W}$ right	(1964)	F = Kellog	(1964)	J=Kende	(1967)
C = Holsti	(1965)	G = Wood	(1967)	K = Carroll	(1968)
D=Deitchman	(1962)	H = Bloomfield	(1965)		

Duration:

3.VIII. 46 indicates, for the time span of the conflict, day. month. year. 62- indicates that no terminal date for the conflict is given.

- X indicates that the conflict is listed, and that it follows the duration given for the column nearest to its left.
- indicates that the source does not list the conflict. In some cases this is because the conflict occurred after the list was published—see the dates of the coverage of the lists above.

Table 4A.2. List of conflicts, 1965-68. In addition to the abbreviations used for table 4A.1, the following signs are used:

+ = Action taken; in column 10, hostilities continuing, and in column 11, an instrument of settlement signed.

0 = No action taken; in column 10, hostilities not continuing, and in column 11, an instrument of settlement not signed.

Table 4A.1. Summary of eleven lists of post-World War II conflicts

	Conflict	Туре	Size	Parties	A	В
Europe	· · · · · · · · · · · · · · · · · · ·					
1	Greek Civil War	CI	4.65	Greece, Yugoslavia, Albania Bulgaria, United States	21.1x.46-	46-48
2	Berlin crisis	I	2.0	Soviet Union, NATO		48-49
3	Trieste question	I		Yugoslavia, Italy	—	—
4	Corfu channel rights	I	• •	United Kingdom, Albania	_	
5	Cyprus independence	C	3.0	United Kingdom, EOKA forces	-	_
6	Hungarian crisis	CI	4.0	Soviet Union, Hungary	_	14.x.56– 10.x1.56
7	Cyprus	CI	3.0	Cyprus, Greece and Turkey, UN intervention		xii.63– viii.64
Middle	e East					
8	Iran	I	ΝH	Iran, Soviet Union	_	45-46
9	Egypt independence	CI		United Kingdom, Egypt	_	—
10	Palestine question	CI	3.55	Israel, Egypt, Iraq, Transjordan, Syria, Lebanon	40-vii.49	48-49
11	Arab-Israeli War I	I	3.5	Israel, Egypt, Iraq, Transjordan, Syria, Lebanon		
12	Morocco	С	ΝH	France, Morocco	_	12.viii.52-
13	Tunisia	С	3.5	France, Tunisia	-	52-54
14	Iran	CI		United Kingdom, Iran		_
15	Algerian war of independence	ĊI	5.0	France, Algeria	_	1.xi.54-
16	Aden-Yemen border	ВС		United Kingdom, Yemeni tribes		<u> </u>
17	Suez invasion	I }	3.0	United Kingdom, France, Israel, Egypt	_	20.x.56-
18 19	Sinai campaign Spanish Morocco	I J B C		Israel, Egypt J Spain, Morocco		_
20	Muscat-Oman revolt	I		United Kingdom, Muscat-Oman	—	
21	Lebanon	T)		United Kingdom, United States	_	
22	Lebanon civil war	ci}	3.0	Jordan, Lebanon		v.58– viii.58
23	Mosul (Irag) revolt	С		Iraq Government, rebel officers		_
24	Tunisia-Bizerta crisis	Ι		France, Tunisia	—	_
25	Iraq–Kurds	С		Civil Government, Kurds	—	—
26	Kuwait intervention	CI	ΝH	Iraq, Kuwait, United Kingdom, Arab League	—	_
27	Morocco-Algeria border	ВС		Morocco, Algeria OAS intervention		
28	Yemen Civil War	CI	3.0	Royalists, republicans, UAR and Saudi Arabia	_	59–64
29	Aden Civil War	CI		United Kingdom, Aden, Yemen UAR	_	
30 31	Syrian coup d'état Arab–Israeli War II	с I	4.5	Civil Government, military rebels Israel, UAR, Jordan, Syria, Iraq, Lebanon	_	
Far E	ast					
32	Indonesian War of independ-	CI	3.2	Dutch Government, nationalists	x.45–1.49	47–48
33	ence Indo-China War (Viet-Nam I)	CI	4.0	France, Indo-China, Laos and	22.VIII.45-	4754
34	Chinese Civil War	CI	5.0	Kuomintang, Chinese Communist Party, United States		49

<u>c</u>	D	E	F	G	н	I	J	ĸ
46 51	46 49	46 40	9 yr 45	46 49	44 40	AG 51	46 40	100 46
40-31	40-49	40-49	8.11.45– 8.11.50	40 ~4 9	44-49	40-31	40-49	x.49
48-49		48-49	_			_	_	_
46-53								
40-33							_	—
46-49	<u> </u>	—	—			22.x.46		-
-	55–59	×	30.vi.53-	52–59	—	—	55-59	IV.55 11.11.59
×	×	×	×	×		23.x.56-		23.x.56-
-			_	×	_	23.x.50 21.xii.63– 22.iii.65	x11.63 V111.64	62–v111.64
X 47 54	-	×	_	41–47	41–47	_	45-46	_
4/-34		52				—	51-52	
			27.x11.45– 23.x11.48	45–48	45–48	2.1 v.4 7–		
47	48–49	47–49				20.vii.49		_
			48–49	48–49	48–49		48–49	IV.48– 20.VII.49
_	—	×	×	×	×		×	_
	_	—		_	_	_	52–54	ш.52– 15.х.63
51-53	_	51-53	_		_	_		_
—	56-62	54–62	×	×	×	—	×	52-18.111.62
_	_	54–59	54–59	7.1.54 5.x.59	54–59	_	56–58	_
×	×	_	20.x.56– 8.xi.56	×	×	7.xi.56–	20.x.56– 8.xi.56	29.x.56– 6.xi.56
_	_	23.xi.57-	×	×	×	—	×	
_	—	57–58	х.55- 11.vпг.56	viii.57–58	57–58	_	55-63	55–59
17.vii.58		×	_	—	- 1	21.v.58-	× v 58-	11.58–x1.58
2.7.1.00					[21.viii.58	1.50-	
-	×	×		x	×J		VIII.38	
—	—	111.59		×			—	vn.58–59
VII.61		×	_	×	_	_	x	(see 13)
		61 62	50 62	11 61 67	50 62		61 67	61
_		×	<u> </u>		×			
62x.63		-	_	_	×		×	62
	×	_	27.н61	1x.62	×	26.1x.62-	1x.62–1x.67	62
_	_		20.111.62 —	1x.67 x11.63-x1.67	_	4.IX.64 —	_	63
				11 66-111 66	_		_	
_	—	_		5.vī.67-	_	_	5.vi.67–	5.vi.67–
				10.VI.67			9. v 1.67	12.VI.67
4649	45–47	45–49	×	×	×	25.VIII.45-	45–49	x.45
51–54	45–54	4754	45–50	45–54	4554	27.XII.49 —-	45–54	47- 21 vr 54
-	45–49	46–50	4649	×	4549	_	4649	45–7.xii.49

	Conflict	Туре	Size	Parties	A	В
35	Indian communal riots	CI	5.9	India, Pakistan	11.46–18.1.48	47–48
36	Taiwan (Formosa)	CI	3.2	Kuomintang, Taiwanese	28.II.47–	47
37	Hyderabad, India	С	3.3	Indian Government, Nizam	13.IX.48–	48
38	Kashmir	CI	3.0	India, Pakistan	x.47–111.49	48–49
39	Philippines Civil War	С	3.0	Philippine Government, Hukbalahan rebels	—	_
40	Burmese Civil War	С		Burmese Government, Karen	_	
41	Malayan insurgency	С	3.0	United Kingdom, Malaya, and Malayan Communist Party	_	47–52
42	Burmese border conflict	BC		Burma, Kuomintang forces	_	_
43	Korean War	Ĩ	6.0	North Korea, China, South Korea, United States and		25.vi.50– 27.vii.53
44	Tibet I	CI		Tibetan Government-China	_	_
45	Quemoy-Matsu Islands	Ι	3.0	China, Kuomintang troops, United States	_	54–56
46	Tibet II	CI	4.0	China, Tibetan rebels	_	59
47	Viet-Nam War II	ĊĨ	5.0	North Viet Nam, South Viet Nam, United States	<u> </u>	61–64
48	Naga revolt in India	С	3.5	Indian Government, Nagas	_	
49	Burmese border conflict	BC		Burma, China	_	—
50	Indonesian Civil War	С	4.5	Government, Communists	—	—
51	Laotian Civil War	CI	4.0	Royalists, republicans	—	59–64
52	Longiu and Ladutch incidents	BC		China, India		_
53	Thailand, Cambodian border	BC		Cambodia, Thailand		—
54	West Irian	I	2.0	Indonesia, Netherlands	_	62
55	Goa, India	I	2.0	India, Portugal	—	61
56	Nepal Civil War	С		Government, insurgents	—	_
57	Viet-Nam War III	CI		South Viet-Nam, FNL, North Viet-Nam, USA, Philippines, South Korea, Thailand, Australia, New Zealand	_	_
58	Brunei revolt	CI		Brunei, United Kingdom, Sarawak, North Borneo	_	—
59	Indian frontier war	ВC	4.0	India, China	—	62
60	Malaysian confrontation	I	3.0	Indonesia, Malaysia, United Kingdom, Australia, New	—	63
61	Thailand insurgency	С		Government, insurgents,	_	_
62	Rann of Kutch	ВC		Pakistan, India		
63	India-Pakistan	Ι	4.0	Pakistan, India	—	_
64	Indonesian crisis	С	5.5	Government, insurgents	_	
Latin 65	America Bolivia	С	3.0	Government, insurgents	18.vii.46– 22.vii.46	-

с	D	E	F	G	Н	I	J	К
_		4648	27.vm.45	_	45-48	_	4648	16.viii.46
50	_		17.viii.48 —	_		_	_	30.1.48 28.11.47–
48	_			—		_	48	21.111.47 13.1x.48–
48	47–49	_	×	×	×	1.1.48-	47–49	17.1x.48 20.x.47–
_	48 -52	48–55	29.v.42-	48–54	48–54	1. 1.49 	4654	1.1.49 49–55
_	_	_	17.V.54 9.VIII.48–	48–54	×	_	48–54	48
	45–54	48–58	1.vi.54 ×	47–60	×	_	48–59	47–52
_		1x.50–54	50-53	50-54	×	_		_
x	x	×	×	×	×	×	×	×
x.50 –v.51	—	x.50–v.51	1.1.50- 20 IX 50	×		-		x.50-
58	54–58	58		54–58	×		5558	54 ^a
_	50–59	50-60	55-59	×	x		59	111.59-60
—	59–62	59–62	—	54–62	59–62		5562	59
-	_	54–62	_	ш.55–62		_	5664	54-6.ix.64
_	—	—	21.vii.56– 12.xii.56	—	_	_	—	—
_	_		_	_		—	16.xi.56– vi.61	5661
59–62	vii. 59 –62	60–62		5 9–67	59–62	7.ix.59–62	59–62	59– 23.vii.62
_	_	viii.59–x.59	—	×	_	<u> </u>	_	
60–63			_	_		x.59– 16.vii.62		_
54-62	62	60–62		15.1.62 4.vii.62	62	17.vні.62– 1.v.63	62	1.62– 15.viii.62
55–61	хн.61- 14.н.62	×	×	×	×		×	хн.61
_	<u> </u>	6162	30.v1.59– 9.x11.60	ш.61– хп.61		_	61–62	—
_		—		62–	-		61–	(see 47)
_	<u> </u>	<u> </u>	_	хн.62	_	_	8.хн.62– 17.хн.62	
55-62	59–62	55–62		хп.62–	54-62	_	62	11.62 21.x1.62
_	_		_	IV.63 VI.66	63–65	-	6366	11.v111.66
_	_	—	_	—	—	—	—	61
_		-	_	1v.65 VI.65		—	3.iv.65–	
	_			1x.65–1.66	×	—	5.VIII.65- 26.XI.65	14.vin.65– 10.i.66
		—	—	x.65–1.66	—			x.65-v11.66
_	_	×	_	_	_	_	_	×

	Conflict	Туре	Size	Parties	A	В
66	Bolivia	с	2.65	Government, insurgents	9.IV.52-	×
67	Paraguay	с	2.7	Government, insurgents	12.iv.52 7.iii.47–	×
68	Costa Rica	CI		Costa Rica, Nicaragua		_
69	Colombia	С	6.0	Government, insurgents	9.IV.48-	4864
70	Honduras	BC		Honduras, Nicaragua	<u></u>	_
71 72	Honduras Nicaragua	B C B C		Honduras, Nicaragua, Guatemala Nicaragua, Costa Rica	_	_
73 74	Guatemalan intervention Cuba	C I C	1.5 3.0	Guatemala, United States Government, Castro rebels	_	
75 76	Venezuela Dominican Republic	C CI		Venezuela, Dominican Republic Dominican Republic, United States		
77	Cuba (Bay of Pigs)	Ι		Cuba, United States		
78	Cuba crisis	I		Cuba, Soviet Union, United States		61–62
79	Cuba missile crisis	I	ΝH	Cuba, Soviet Union, United States, Organization of American States	-	_
80	Panama canal	I	1.5	Panama, United States	_	_
81	Guatemala	С		Government, insurgents		
82	Dominican Republic	CI	3.5	Government, insurgents, United States, Organization of American States	_	65
83	Peru	С		Government, insurgents	_	_
Africa						
84	Madagascar	С	3.0	France, Madagascar	29.11.47– 3.v11.47	×
85	Kenya (Mau-Mau)	С	4.0	United Kingdom, Mau Mau	_	
86	Cameroons	С	3.0	France, United Kingdom, nationalists		_
87	Ruanda-Urundi	С	5.0	Bahutus and Watusi	_	_
88	Congo	CI	5.0	Congo, Katanga province, UN forces		60–64
89	Angola	С	4.0	Portugal, Angolans		62–63
90	Somalia-Ethiopia	BC	2.5	Somalia, Ethiopia	—	<u> </u>
91	Burundi	C	3.0	Ruanda, Burundi	—	62-63
92	Portuguese Guinea	CI		Portugal, nationalists,		
03	Kenva Somalia	BC		Kenya Somalia United Kingdom		_
94	East African mutinies	ĩ	2.5	Kenya, Uganda, Tanganika.	_	_
		-		United Kingdom		
95	Congo (Kinshasa)	CI		Government, insurgents, Belgium, United States	_	
96	Mozambique	С		Portugal, nationalists		—
97	Nigeria	С		Coup d'état: Government, army	—	_
98	Ghana	C	2.5	Coup d'état: Government, army	_	_
99	Congo (Kinshasa)	C	2.5	Kisangani mutiny: Government, army		_
100 101	Nigeria Sudan, Uganda	C B C		Government, "Biafra" Sudan, Uganda	_	_

" Caroll gives two separate periods, 54-56 and 23.VIII.58-58.

Post-World War II conflicts

с	D	Е	F	G	Н	I	J	К
_	_	×	_		_	_	×	47–11.iv.52
_	_	_	_			_	×	×
_	_	_	47		8.11.47–	48–49	48	48–21.п.49
_	60	48-49		48-53	3.111.47 60	_	48-53	48
4963	—	57	18.iv.57-	iv.57–v.57	57	57	57	57–5.v.57
54		_				_	_	
55	_	55	11.1.55– 21.1.55	×	×	55	×	55–56
	_	54	_	×	×	×	×	vi.54-vii.54
	58–59	×	_	x11.56–1.59	58–59	—	56-59	30.x1.56- 1.1.59
<u> </u>		—	_	6066	_	60	_	
_	<u> </u>	61–62	30.v.61–62	x1.61–1.62	×			—
17.vi.61- 20 iv 61	×	×	—	×	60–61	_	×	17.IV.61-
		_	_	_	_	-	62	
3.xi.62– 10.xi.62	×	—	_	_	_	62	_	—
6364		×	—		—	64		1.64-
		—		04-00		_		
_	—		_	IV.03–IX.00	x		24.1V.65– 25.x.65	24.IV.65– 3.IX.65
—	—		_	_	_	-	6.IX.65	—
_		×	×	×	×	_	×	29.111.47–48
	57	50 50	53 59	50 57	50 50		50 54	F2 FF
		56-60	52-58 55-60	52–57 55–61	52–58 55–60	_	52-56 55-60	53-55 56-60
_		59	xi.58–	хі.59	_	_		61–62
_	60–62	60–64	58-63	6064	6064	11 . v1.60-6	4 6064	6065
	60	61-	4 u 61–63	60	61	4 u 61_	61_	60-
_		6064	60-	60-64	60-64		63-64	60
		_	_			_		62-63
	_	—		63-68	<u> </u>		×	_
_			 .	хн.63–х.67			×	
<u> </u>	—	—	—	1.64	-	_		
_	_	_		VIII.64-	6164	_	хп.63-	_
_	<u> </u>	-		XI.04 65-		_	25 TV 64	
_				1.66	_	_	2J.IA.04-	
	_	_		111.66	_	-	_	
	—	—	—	1x.66-v.67	_	_	×	5.vii.67-
_		_		6.VII.67		_	_	66-
_		—		_	—	<u> </u>		68

3. E 4. F	3. Bilateral negotiations5. Interventions4. Resolutions passed (UN)6. Me		tervent ediatio	tion (UN)7. Other mediation9. Judicialon (UN)8. Multilateral conferences10. Continued hostilities			11. Instrument of settlement								
			-				Pro for	rocedures attemp or settlement				1			
					Parties			U.	N. a	ction					
No.	Conflict	Туре	Size	Duration	1	2	3	4	5	6	7	8	9	10	11
Euro	ope														
1	Greek military coup	С		21.Iv.67–	Civil Government and Political parties	Military Junta	0	0	0	0	0	0	0	0	0
2	Cyprus question	CI		1 5.x1.67 – 16. 1.68	Civil Government and Greece	Turkish minority and Turkey	0	+	+	+	+	0	0	0	+
3	Czechoslovakian crisis	I		21–27.viii.68	Czechoslovakia	Soviet Union, Poland, East Germany, Bulgaria and Hungary	+	0	0	0	0	0	0	0	+
Mid	dle East														
4	Kurds' rebellion	С		u1.61–	Iraq Government	Kurds	+	0	0	0	0	0	0	+	0
5	Yemen Civil War	CI		26.1x.62– 12.x.67	Yemeni Royalists, Saudi Arabia	Yemeni Republicans, UAR	+	+	+	+	+	0	0	0	+
6	Aden independence	CI		63–31.x1.67	United Kingdom	Aden, South Yemen and UAR	+	+	+	+	0	0	0	0	÷
7	Arab-Israeli War	I	4.5	5 –11.vi.67	Israel	UAR, Jordan, Syria, Iraq and Lebanon	0	+	+	÷	0	+	0	+	0
Far	East														
8	Laotian Civil War	CI		62–	Royal Laotian Government and USA	Pathet Lao and North Viet-Nam	0	0	0	0	0	0	0	+	0
9	Viet-Nam War III	CI		62-	South Viet-Nam, Thailand, Philippines, South Korea, Australia, New Zealand and USA	National Liberation Front and North Viet-Nam	+	0	0	0	÷	0	0	+	0
10	Malaysian confrontation	Ι	3.0	1x.64–11.vm.66	Malaysia, Australia, New Zealand, and United Kingdom	Indonesia	÷	0	0	0	÷	0	0	0	+
11	Thailand insurgency	С		61–	Civil Government	Insurgents	0	0	0	0	0	0	0	+	0
12	Indo-Pakistan War	Ι	4.0	14.∨111.65 10.1.66	India	Pakistan	+	+	+	+	+	+	0	0	+

C -.

13	Indonesian crisis	С	5.5	30.1x.65 28.v11.66	Civil Government and Army officers	PKI (Indonesian Com- munist party) and Air Force officers	0	0	0	0	0	0	0	0	+
Lati	n America														
14	Dominican Republic	CI	3.5	24.1v.65– 3.1x.65	Military junta, USA and OAS	Insurgents	+	+	+	+	+	+	0	0	+
Afrie	ca														
15	Angolan insurgency	С		4.11.61-	Portuguese Government	Angolan nationalists	0	+	0	0	0	0	0	+	0
16	Mozambique insurgency	С		65	Portuguese Government	African nationalists	0	+	0	0	0	0	0	+	0
17	Kisangani Mutiny	С	2.5	5.vii.67– 4.ix.67	Congo (Kinshasa) Government	Dissident ex-Katangese gendarmes at Kisangani (Stanleyville)	0	+	0	0	+	+	0	0	+
18	Rhodesian crisis	CI		11 .x1.65 –	United Kingdom	White Rhodesian minority rule	+	+	0	0	0	0	0	+	0
19	Nigerian Civil War	С		27.v.67	Nigerian Federal Government	Secessionist Biafra region	+	0	0	0	+	+	0	+	0

¹ For conventions, see page 365, and for full definitions of the columns 3-11, page 363.

Introduction

The list of boundary disputes presented here, and shown on the five maps, covers the two-year period 1967–1968. It includes disputes where one or other party is known to have brought up, or repeated, demands for a change in the existing state boundary during these two years. It does not include disputes which have been completely dormant since the beginning of 1967, nor those where claims may have been made which were not reported in our sources.²

A boundary dispute is defined here as a situation where at least two sovereign states, in official statements, advance conflicting claims in regard to their boundaries. We are concerned with disputes between sovereign states generally recognised as such; so the Nigerian Civil War, for example, is not included as a boundary dispute. Nor do we include cases where one state lays claim to the entire territory of a neighbouring state: thus Morocco's claim to the entire territory of Mauritania has not been classified as a boundary dispute.

The boundary disputes are divided into two types, active and passive. When at least one party has advanced demands for a change during 1967– 68, but where there has been no violation of the border, the dispute is classified as passive. When there has been an overt violation of the state boundary by at least one of the parties to the dispute, the dispute is classified as active. These classifications apply to the years 1967 and 1968. (There are examples of disputes—that between China and the USSR, for instance which were passive in 1967 and 1968, but became active in 1969.)

We also indicate, as *settled*, disputes in which the parties involved arrived at some form of resolution during these two years.

On the maps we have followed the principle of marking the entire boundary line in question, even if, as is usually the case, the dispute concerns only a specific area or sector of the boundary. Where we have information about the sector or sectors which are disputed, we have inserted an arrow.

¹ A team at the Department of History, University of Lund (Lund, Sweden)—Gerner, Molander and Tägil—supervised the arrangement of the data presented here and the preparation of the maps.

³ Sources: Keesing's Contemporary Archives; Europa-Archiv; African Boundary Problems, ed. Carl Gösta Widstrand (Uppsala: Scandinavian Institute of African Studies, 1969), Chapter 12; and newspaper and periodical clippings from SIPRI's archive, which includes Christian Science Monitor, Dagens Nyheter, Daily Telegraph, Financial Times, International Herald Tribune, Le Monde, Neue Zürcher Zeitung, New York Times, London Observer, Peking Review, Pravda, Soviet News, Svenska Dagbladet, Times.

Boundary disputes are, of course, potential sources of armed conflict for example, the conflict between India and China over the Himalaya border. The maps are presented to show where this kind of conflict might arise. (Sometimes, however, boundary disputes are the ostensible rather than the real cause of conflict.)

The boundary disputes in the past two years were for the most part between countries recently freed from colonial rule. The boundaries of these countries have often been fixed by the play of interests between the colonial powers, with little regard for local factors. Not surprisingly, some of them are now being brought into question.

List of boundary disputes

The list is arranged by region: Africa, Asia, Middle East, Central and South America, and Europe. The numbers in each list refer to the relevant map.



Map 4B.1. Boundary disputes in Africa

Key to symbols: + + + = active. - - = passive. $\cdots =$ settled.

1.	Sudan/Ethiopia	active + settled	10.	Somali Republic/Ethiopia	passive
2.	Algeria/Morocco	active + settled	11.	Morocco/Spain (Spanish Sahara)	passive
4.	Morocco/Spain (Ifni)	passive ¹	12.	Dahomey/Niger (Island of	F
5.	Chad/Central African	•		Lete in Niger River)	passive
	Republic	passive	13.	Tunisia/Algeria (southern	
6.	Gabon/Congo Brazzaville			part of the Tunisia/Algerian	
	(gold mine region, south of			border)	passive
	Franceville)	passive	14.	Lesotho/South Africa	passive
7.	Ghana/Upper Volta	passive	15.	Sudan/Chad	passive
8.	Ghana/Togo	passive	16.	Sudan/Central African	
9.	Somali Republic/French			Republic	passive
	Somaliland	passive	17.	Tanzania/Malawi (the Lake	
				Nyassa border)	passive

¹ Spain ceded Ifni to Morocco on 1 July 1969.



Map 4B.2. Boundary disputes in Asia

Key to symbols: + + + = active. - - = passive. $\cdots =$ settled.

1. USSR/China	
---------------	--

	A. Manchuria, Amur	
	River	passive
	B. Vladivostok	passive
	C. Mongolian border	passive
	D. Sinkiang border	passive
2.	Hongkong (UK)/China	active
3.	South Viet-Nam/	
	Cambodia	active
4.	India/Pakistan	
	A. Rann of Kutch	passive + settled
	B. Jammu and Kashmir	passive
5.	India/China	
	A. Aksai Chin	passive
	B. Sikkim border	active
	C. Nefa region	passive

6. 7.	Pakistan/Afghanistan (Pushtunistan) Laos/North Viet-Nam	passive
	(border territory near	
-	1/th parallel)	active
8.	Cambodia/Thailand	
	(Temple of Preah Vihear)	passive
9.	Philippines/Malaysia (the	
	Sabah territory in North	
	Borneo)	passive
10.	Japan/USA (Ryukyu	-
	Islands)	passive
11.	Burma/China	passive
12.	Japan/USSR (Kuril	-
	Islands)	passive



Map 4B.3. Boundary disputes in the Middle East

1000

Key to symbols: + + + = active. - - - = passive. $\cdots =$ settled.

1.	Israel/Syria	active	6. Qatar/Saudi Arabia	passive
2.	Israel/Jordan	active	7. Iran/Bahrein	passive
3.	Israel/Egypt	active	8. Iran/Kuwait	passive
4.	Iraq/Iran (Schatt-el-Arab)	passive	9. Yemen/South Yemen	passive
5.	Oman and Muscat/Trucial States	passive	10. South Yemen/Saudi Arabia	passive



Map 4B.4. Boundary disputes in Latin America

Key to symbols: + + + = active. - - = passive. $\cdots =$ settled.

1. Ecuador /Peru a 2. Guatemala/Honduras a 3. Argentina/Bolivia a 4. Argentina/Chile (the area of Patagonia) b	active 5. active 6. passive 7. 8. passive	Argentina/UK (Falkland Islands) Venezuela/Guyana Costa Rica/Panama Honduras/Nicaragua	passive active passive passive
--	---	--	---

Map 4B.5. Boundary disputes in Europe



Key to symbols: +++= active. ---= passive. $\cdots =$ settled.

passive

1. Spain/UK (Gibraltar)

- 2. Poland/West Germany
- (Oder-Neisse border)passive3. DDR/West Berlinpassive

Introduction

This section presents chronologies of the Nigerian Civil War to the end of 1968, and of the Arab-Israeli War of 5-11 June 1967. This second chronology covers events to the end of 1967.

It was hoped to provide a chronology of the Viet-Nam War: but the length and complications of the conflict were such that it was found impossible to produce a balanced chronology of reasonable dimensions in the time.

The purpose of the chronologies is simply to be a reference source for the dating and sequence of events. They make no claim to be a history or an analytic study.

The chronologies have been compiled from reports appearing in publications in SIPRI's archive, which includes: Christian Science Monitor, Dagens Nyheter, Daily Telegraph, Financial Times, International Herald Tribune, Le Monde, Neue Zürcher Zeitung, New York Times, London Observer, Peking Review, Pravda, Soviet News, Svenska Dagbladet, Times. It has drawn particularly on the calendar of world events published by the Institute of Foreign Affairs in Stockholm, Utrikespolitiska Institutets Kalendarium, 1967–1968.

1. Chronology of events in the Nigerian Civil War: 1967-1968¹

The chronology lists, day by day, the major military and political events of the civil war in Nigeria in 1967 and 1968. It also gives some information on foreign involvement in the war, in items concerning, for example, the supply of weapons, attempts at mediation, provision of relief aid, and official political reactions.

For many events in the war, the news reports have been based on official communications from the parties to the conflict. Such communications often contradict one another. All events in the chronology for which the sources are official communications are presented in paragraphs introduced by

¹ The following summary articles, inter alia, have been used: Neville Brown, "The Nigerian Civil War", *Military Review*, Vol. 48: 10 (1968), pp. 20-30; Billy J. Dodley, "Nigeria's Civil War", *The Round Table*, Vol. 229 (Jan. 1968), pp. 28-34; John D. Chick, "Nigeria At War", *Current History*, 1968: 318, pp. 67-71, 113; Colin Legum, "New Hope For Nigeria", *The Round Table*, Vol. 230 (April 1968), pp. 127-136; V. Laptev, "Lessons of the Nigerian Tragedy", *International Affairs* (Moscow), 1969: 4, pp. 52-58.

"Lagos:" or "Biafra:". Most of the Biafran reports were announcements made on Biafra Radio, first from Enugu, and later from Umuahia. The Nigerian reports, originating in Lagos, were made in various forms: statements by military or government spokesmen, radio announcements, press releases, and so on.

Subject matter index

The numbers refer to paragraphs.

Progress of the war (paragraphs including reported casualty figures are set in boldface):

21, 23–29, **30**, **31**, **32**, 33, 34, **36**, 38–42, **43**, 44, 46, 48, 52, 54, **55**, 56, 59, 60, 62–64, 67, 71–73, 75, 77, 80, 81, 84, 85, 89–94, 96, **97**, 98, 100, 101, 105, 107, 111–114, 117, 119, 120, 122, 126, 128–130, **136**, 137, **138**, 145, **147**, **149**, 150, **159**, 161, 165, 186, 189, 199–201, 204, 206, **207**, 208, 211, **212**, 213, 217, 220, 222, 226, 229–231, **232**, **233**, 237, 240, 241, **242**, **246**, 247, **250**, 252, 253, 255, 256, 258, **260**, 261, 262, 264–266, **272**, **273**, 276, **278**, 281, **283**.

Negotiation towards a settlement (third party involvement boldface): 10, 22, 74, 79, 82, 83, 87, 95, 109, 110, 113, 115, 119, 121, 126, 127, 131–133, 135, 139, 141, 144, 146, 150, 152, 153, 154, 157, 158, 162, 168, 169, 180, 182, 185, 190–194, 196, 202, 215, 219, 241, 245, 248, 269, 270, 271, 275, 276, 280.

Other internal political developments (items concerning foreign relations boldface): 1, 2, 4–9, 11–20, 37, 45, 47, 49, 50, 51, 53, 56, 57, 61, 62, 64, 66, 68–70, 76, 78, 88–90, 92, 93, 95, 102, 113, 118, 126, 127, 129, 134, 140, 149, 150, 224, 254, 270.

Foreign political reaction: 86, 87, 99, 102, 109, 163, 168, 169, 173, 174, 183, 187, 197, 218, 219, 223, 249, 254, 275.

Recognition of Biafra as a sovereign state: 130, 142, 143, 148.

Supply of arms: 54, 58, 65, 71, 73, 80, 85, 104, 106, 108, 111, 112, 124, 160, 163, 164, 181, 203, 230, 235, 238, 240, 241, 243, 249, 251, 253, 259, 260, 272, 277.

Mercenaries and foreign forces: 25, 31, 103, 116, 236, 239, 257, 260, 272, 277.

Relief aid, refugees, foreign intervention for protection of civilians: 123, 149, 151, 155, 157, 166, 167, 169–178, 184, 188, 190, 195, 198, 202, 205, 207–209, 210, 214–216, 221, 225, 227, 234, 244, 250, 263, 267, 268, 274, 275, 279, 282.



Map 4C.1. The four Regions and the principal tribes of Nigeria, January 1967

Map 4C.2. The area and principle towns of Biafra, May 1967 (Biafra = Eastern Region of Nigeria) and May 1969



Source: Joan Forbes, from the Christian Science Monitor © TCSPS

1966

Background

- 1 15-16 January President Nnamid Azikiwe and Prime Minister Sir Abubakar Tafawa Balewa are deposed by a military coup. Maj. Gen. Johnson T. U. Aguiyi Ironsi becomes the new Head of State.
- 2 19 July In a military coup, Lt. Col. Yakubu Gowon, Head of the Supreme Military Council, replaces Maj. Gen. Ironsi as Head of State and Government. (It is confirmed from official sources on 14 January 1967 that Maj. Gen. Ironsi was killed during this coup.)
- 3 September-October Riots in the Northern Region of Nigeria result in a large-scale massacre of Ibos. (Deaths are estimated in tens of thousands.) Surviving Ibos migrate en masse to the Eastern Region (homeland of the Ibo tribe).
- 4 16 November Lt. Col. Gowon announces that a previously announced constitutional conference has been "adjourned indefinitely."
- 5 30 November Lt. Col. Gowon warns in a radio address that attempts at secession by any of Nigeria's four Regions will be met with force.

1967

Before secession

- 6 **5 January** After meeting two days in Aburi, Ghana, on a new Federal constitution for Nigeria, the Supreme Military Council announces that this problem will be discussed further at a later date. In the meantime, a committee is formed to rehabilitate and restore the property and rights of the tribes (Ibos) who have been forced out of their homes and villages (September–October 1966, above).
- 7 **13 March** The military governor of Nigeria's Eastern Region, Lt. Col. Odumegwu Ojukwu warns that "the East will secede if attacked" either physically or by an economic blockade.
- 8 16 March The Supreme Military Council reconstitutes the Federal Government of Nigeria. The legislative and executive powers are held by the Council. A constitutional decree restores certain rights to the governments of the four Regions, but retains emergency powers for the Supreme Military Council. The Council is authorized to appoint foreign ambassadors, Supreme Court judges, and senior police officers; and to take all necessary actions against attempted secession.

In a White Book published in Enugu, capital of the Eastern Region, the Eastern Region government criticizes the decree as a plot against the Eastern Region, and a breach of the Aburi agreement (5 January, above). 9 1 April The Eastern Region government decides to stop depositing regional taxes in Lagos, on the grounds that the Federal Government owes the Eastern Region $\pounds 10$ million for FY 1966.

Col. Gowon denounces the decision of the Eastern Region as an illegal unilateral action.

- 10 3 April Col. Ojukwu proposes that the military leaders of the four Regions of Nigeria and the Chiefs of State of other African countries meet to resolve Nigeria's domestic political crisis. He has informed the leaders of other African States that he will accept their mediation.
- 11 4 April Air service between Lagos and the Eastern Region is closed by the Federal Government. From Enugu, capital of the Eastern Region, it is reported that the Region will secede from the Federation if a Federal blockade is imposed against it.
- 12 18 April Col. Ojukwu announces that the Eastern Region government has taken over control of all Federal services, including ports, railroads, postal, telegraph and telephone services, radio and TV broadcasting, shipping and commerce.
- 13 23 April In a communiqué the Supreme Military Council announces a package plan for the stabilization of the Federal Government. The communiqué states that the Government's political and administrative programme is designed to protect the Federation from disintegration, and that it recognizes the existence of federal states as fundamental for Nigeria's political stability. The plan calls for a new constitution; the election of a new civil government and the introduction of civil administration within two years; an early return to normal economic relations among the federal states; and stern reprisals against the recent illegal action of the Eastern Region.
- 14 21 May In Lagos it is announced that the economic sanctions levied in April against the Eastern Region will be lifted on 23 May. Col. Ojukwu announces that in the interests of the nation his government will relinquish the Federal services taken over by the Eastern province (18 April, above).
- 15 26 May Col. Ojukwu, speaking before 300 delegates to the Eastern Region's Consultative Assembly, asserts that the East must "make plans for a separate existence."

"Biafra" secedes

16 27 May The Eastern Region's Consultative Assembly gives Col. Ojukwu a mandate to secede from the Nigerian Federation. The Consultative Assembly announces that the Eastern Region will be called the

Democratic Republic of Biafra. (Independence is formally declared on 30 May.)

- 17 28 May The Federal Government proclaims a state of emergency. Col. Gowon assumes full powers as Commander-in-Chief; he decrees the division of Nigeria into 12 federal states. (The former Eastern Region encompasses three of these states.)
- 18 **31 May** The Federal Government declares a blockade on all land and sea routes to Biafra. Telephone and teletype connections between Lagos and Enugu are broken.
- 19 2 June Maj. Gen. Gowon announces that a Federal Executive Council has been formed comprising nine representatives from the 12 newly formed federal states (28 May, above).
- 20 **12 June** Eleven civilians are added to the Federal Executive Council, which is to take over some of the duties of the ruling Military Council. Gowon declares that he intends to put down Ojukwu's revolt and re-unite Nigeria under a civilian government.
- 21 Biafra Radio calls the people of the Eastern Region to bear arms and defend the integrity of their decision to secede. The Federal Government has practically declared war on Biafra. Troops from the Northern Region have tried to attack along the border separating the Eastern and Northern Regions, but they have been forced back after heavy casualties.

This is the first reported military confrontation or fighting since Biafra declared independence on 30 May.

- 22 1 July The Federal Government publishes a list of pre-conditions for the resolution of the domestic conflict: among other things, the Eastern Region must suspend its declaration of independence, recognize Federal authority, and, in particular, accept the conversion of the Region into three federal states. A Government spokesman announces that Col. Ojukwu has been suspended from the Federal Army and that reconciliation with Ojukwu is impossible.
- 23 7 July Gen. Gowon orders the Federal Army to attack Biafra, occupy its capital, Enugu, and capture its leader, Col. Ojukwu.
- 24 *Lagos:* Federal troops have invaded Biafra and are rapidly advancing on Nsukka, university town of Biafra.
- 25 Biafra (Enugu): Biafran forces have repelled an attack by the Federal Army under the leadership of white mercenaries.
- 26 8 July Federal troops capture the towns Obudu, near the Cameroon border, and Obolo, near Nsukka.
- 27 Lagos: Biafran forces are suffering heavy casualties.

- 28 Biafra (Enugu): Federal troops have been forced to retreat and the town Okpo has been recovered.
- 29 10 July *Biafra (Enugu):* Federal troops are retreating along the entire border of the Eastern Region except near Ogoja, where fighting is still continuing.
- 30 *Lagos:* Heavy fighting is going on in Nsukka, 60 km north of Enugu, where Federal troops have encircled about 3000 Biafran soldiers.
- 31 **11 July** *Lagos:* Recent fighting around Nsukka has resulted in about 300 Biafran casualties, including an unknown number of white mercenaries. Nigerian troops have lost six killed and 12 injured.
- 32 13 July Lagos: 2000 Biafran soldiers have been killed since the fighting started on 7 July. Some 23 killed and 150 injured, including 20 missing, are reported on the Nigerian side. Federal troops are advancing into the southern parts of the Eastern Region and have captured the town Ogoja.
- 33 14 July After a week of intensive fighting, the key university town Nsukka, 60 km north of Enugu, is captured by Federal troops.

Biafra (Enugu): Fighting continues in the area of Ogoja, which has not been captured.

- 35 **15 July** *Lagos:* Federal troops are advancing toward Enugu, with Biafran forces on retreat before them.
- 36 *Biafra (Enugu):* Biafran "betrayers" were responsible for the capture of Nsukka.
- 37 Gen. Gowon admonishes the people of the Eastern Region to rise and overthrow Col. Ojukwu. The Federal Government issues a decree establishing national control over all petroleum storage, transportation and distribution facilities.
- 38 **18 July** *Lagos:* The Nigerian Air Force has started bombing selected military targets in Enugu.
- 39 20 July Both the Federal Government and the Biafran government claim control of Nsukka, the Federal Government announcing that its troops are advancing toward Enugu, and the secessionist regime claiming that Biafran forces have recaptured Nsukka and now control it.
- 40 Civilians arriving at hospitals in Enugu report that the killing of civilians in areas overrun by Nigerian troops is increasing.
- 41 23 July Lagos: Enugu, capital of Biafra, is surrounded by Nigerian troops, at a distance of about 30 km. People of Biafra have been friendly to the Federal troops, although armed forays are taking place sporadically.
- 42 26 July Federal troops capture the port Bonny, a strategic oil depot

on the southern coast of the Eastern Region. Although the town has been badly damaged, the oil pipelines are intact.

43 Biafra (Enugu): The Biafran Air Force killed approximately 1000 Nigerian soldiers in an attack on a convoy transporting war material to the Biafran border.

· · · · ·

- 44 **27 July** *Biafra* (*Enugu*): Fighting is still going on in Bonny and around Nsukka. The Nigerian forces, however, have full control over the central town in Ogoja province and the important centers in Ikom.
- 45 *Lagos:* Biafran authorities have kidnapped the manager for Shell-BP in Nigeria, Mr. Stanley Grey, in order to insure that the oil royalties which they claim from Shell-BP are paid.

(Early in July the Company reportedly offered the Biafran government a token payment for its quarterly royalty of \$19.5 million.)

- 46 28 July Federal troops, advancing from Bonny, now command the entire seacoast of the Eastern Region.
- 47 **31 July** *Biafra (Enugu)*: The installations of the Shell-BP Company of Nigeria have been seized by Biafran authorities for the Company's protection. Shell-BP's personnel, of whom only 35 are still in Biafra, have been guaranteed free escort to the Biafran borders if they want to leave Biafra.
- 48 1 August Biafra (Enugu): Heavy fighting is taking place around Enugu. Three battalions from other areas have been moved in to defend the capital.
- 49 The British High Commissioner in Lagos, Sir David Hunt, reports that anti-British demonstrations have begun in Port Harcourt, a coastal city in the Eastern Region.
- 50 2 August Biafra Radio attacks the activities of the British High Commissioner, Sir David Hunt, and in particular his failure to condemn the massacre of the Ibo tribe in September 1966. Anti-British demonstrations are held in Enugu and Aba in the Eastern Region.
- 51 5 August Lagos: During their retreat, Biafran troops blew up the Shell-BP oil pipeline between Bonny and Port Harcourt.
- 52 Biafra (Enugu): Biafran forces have prevented the capture of the town Ikrika. Air strikes have been made by the Biafran air force against the areas around Nsukka which are still occupied by Federal troops.
- 53 Mr. Stanley Grey, of the Shell-BP Company is released by Biafran authorities. (He was imprisoned on 27 July.)
- 54 8 August Lagos: Biafran aerial attacks have caused heavy civilian casualties, but have not resulted in any change in the deployment of Federal troops. The Biafran planes are forced to fly at high altitudes

in order to avoid Federal anti-aircraft batteries. The Nigerian Air Force identified the Biafran planes as B-26 and DC-3 aided by heli-copters.

- 55 Biafra (Enugu): 200 Nigerian troops were killed in fighting in Bonny on 6 August. Biafran forces have recaptured the town Oboloeke.
- 56 9 August Lagos: Through the betrayal of military officers who belong to the Ibo tribe, Benin, capital of the Mid-Western Region, has fallen into the hands of Biafran forces. Biafran troops have also occupied the oil towns Ughelli (an important business center) and Warri. Federal troops have been dispatched to Benin.

(A considerable portion of the 2.5 million inhabitants of the Mid-Western Region belong to the Ibo tribe, which represents the majority of the people in Biafra.)

- 57 Biafra (Enugu): The Mid-Western government under the leadership of David Ejoor has resigned. A new "liberation regime" will soon be formed. Lt. Col. Victor Banjo of the Yoruba tribe (a close associate of Col. Ojukwu) has been named Commander-in-Chief of the Mid-Western regional army.
- 58 The British Government confirms that a "small purchase" of arms is being sent to the Federal Government of Nigeria.
- 59 11 August Lagos: The fight against the rebellious Biafrans is now a "total war", and no mercy will be shown towards them. Federal troops are advancing on Warri (Mid-Western Region).
- 60 **13** August Biafra (Enugu): Biafran troops have captured three towns in the Northern Region, including Okene, some 25 km north of the border between the Mid-Western and Western Regions. Contingents of Biafran forces are on their way to Ibadan, capital of the Western Region.
- 61 14 August Military officers of the Mid-Western Region declare the Region an independent state.
- 62 **15** August Brig. Com. Banjo takes over full powers in the Mid-Western Region. The civil and military administration of the Region will be separate from those in Biafra, which supports the revolt. Troops from the two secessionist Regions will co-operate in their fight against Federal forces.
- 63 Federal troops continue to advance toward Benin, capital of the Mid-Western Region.
- 64 Lagos (capital of the Federation), located in the Western Region, is guarded by heavily armoured street patrols. The Federal military regime is trying to keep law and order in an atmosphere of increasing animosity toward the Ibos. There is a nightly curfew in Ibadan, where

authorities reportedly lost control of the situation on 14 August, when a group of Hausa and Yoruba tribes attacked the Ibos (approximately 10,000 of the roughly 1 million inhabitants) still living in the area.

- 65 The Federal Government has reportedly received 20 jet planes from the Soviet Union.
- 66 **16 August** Biafra (Enugu): The situation in Ibadan (capital of the Western Region) is tense; young Yoruba nationalists have been demonstrating for a separate state for the Yoruba.
- 67 A unit of the Biafran army which was moving toward Ibadan (13 August) has been annihilated near the town Ore.
- 68 17 August Federal Finance Minister and political leader of the Yoruba tribe, Chief Obafemi Awolowo, declares his support for the Federal Government, after meeting with Yoruba tribesmen in Ibadan. He decries the assumption made by the Eastern Region that the Federation is dominated by the Hausa and Fulani tribes.
- 69 Col. Ojukwu announces that Maj. George Okonkwo has been appointed Military Head of the Mid-Western Region. Okonkwo is one of the officers of the Region who took part in the mutiny against the Federal Army (9 August, above).
- 70 18 August Maj. Okonkwo declares the Mid-Western Region independent of both Federal and Biafran authority.
- 71 Biafra (Enugu): Biafran troops continue to advance in the western sector of the Western Region. The Biafran air force has shot down one of the two Czechoslovak planes recently delivered to the Lagos Government.
- 72 *Lagos:* No federal aircraft have been destroyed.
- 73 20 August Biafra (Enugu): A number of Soviet MiG's were destroyed on the ground by a Biafran raid on Kano airport, in northern Nigeria, on 19 August. Nine Czechoslovak planes, with pilots, have been delivered to the Federal Government at the request of the Soviet Union.
- 74 **21 August** Col. Ojukwu calls for a negotiated settlement of the Nigerian civil war, the main condition for negotiations being the recognition of the sovereignty of Biafra.
- 75 Biafran troops are fighting in Ore, 200 km east of Lagos in the Western Region, while Federal troops are advancing toward Enugu, capital of Biafra.
- 76 **26** August It is announced in Lagos that a war cabinet has been formed, including military and civilian leaders. Gen. Gowon's position as Head of Government and Commander-in-Chief is not affected by the formation of the war cabinet.
- 77 28 August Lagos: Federal troops have overrun Biafran positions

around Ore, in western Nigeria. Government troops have also recaptured the towns Ogudu, Igbara, and Upkilla in the Mid-Western Region near the border of the Northern Region.

- 78 From unofficial sources it is reported that the chief of the Yoruba tribe, Awolowo, is one of the four civilian representatives in the new war cabinet (26 August, above).
- 79 29 August Biafra (Enugu): Biafra is ready to negotiate with representatives of the Federal Government on the establishment of common civil services, such as railroads, highways, harbours, water canals, currencies and customs. Negotiations might also be held on cultural and scientific exchanges and on diplomatic relations. The possibility of establishing a council or congress of the chiefs of the federal states, and an executive council in which all member states were represented could also be considered.
- 80 1 September Lagos: Soviet MiG 15 jet bombers have been put into action for the first time against the secessionist region of Biafra. Their main targets were oil depots in Port Harcourt and the airport in Calabar.
- 81 *Biafra (Enugu)*: Fighting between Federal and Biafran troops continues around Nsukka (north-west Biafra), Okitipupa (the eastern sector of the Western Region), Okene (the Northern Region near the border of the Western Region).
- 82 The Biafran representative in Great Britain, Ikuk- Inam Bassey, announces at a press conference in London that the Biafran government is ready to undertake peace talks with the Nigerian Government.
 - 83 2 September Nigerian Head of State Gowon explains that he is ready to undertake peace talks with representatives from Biafra. He will not, however, negotiate with Ojukwu. He accuses Ojukwu and his followers of the forceful subjection of five million people, and of an attempt "to dominate . . . the whole of Nigeria."
 - 84 *Lagos:* Federal troops have cleared the Western Region of all but a few stragglers from Biafra.
 - 85 9 September Chief Enahoro, Minister of Information of the Federal Government, confirms that British and Czechoslovakian aircraft, flown by Nigerian pilots, have bombed selected strategic and tactical military targets in Biafra during the past few weeks. He also says that the Biafran air force has been reduced to a few helicopters.
 - 86 **11 September** The representatives of 17 African nations meet at Kinshasa, Congo, to consider the problems of the Congo and the Nigerian civil war.
 - 87 14 September A team composed of representatives from Ethiopia, Ni-

ger, Ghana, Cameroon, Liberia, and the Congo is formed to visit Nigeria and consult with Col. Gowon on the means of ending the civil war.

- 88 **20 September** The Military Commander of the Mid-Western Region, Okonkwo, proclaims in a radio broadcast the formation of the autonomous republic of Benin, comprising the Mid-Western Region.
- 89 The British High Commissioner in Benin, Mr. George Bell, reports to the Federal Government in Lagos that Benin was recaptured by Federal troops within hours after the proclamation of independence. The troops were welcomed with fanfare and gaiety by the people of Benin, according to Bell.
- 90 **21 September** The federally appointed Military Governor of the Mid-Western Region, Samuel Ogbemudia, declares the lifting of the emergency martial law proclaimed when the city was captured by Biafran troops six weeks ago. Col. Shuwa Mohammed, chief of the Federal troops which took Benin, says that the entire Mid-Western Region has been liberated with the exception of the towns Agbor and Asaba, on the Niger River.
- 91 23 September Lagos: Warri, the most important port in the Mid-Western Region, has been recaptured. Federal troops are converging on the Biafran troops remaining in the province.
- 92 27 September Informed sources report that Federal troops are firing upon Enugu, from five km, and that the Biafran government has left the capital.
- 93 **3 October** Federal troops bomb Enugu. Biafran leader Ojukwu has moved his headquarters, and in a radio broadcast he exhorts all non-combatants to vacate the city.
- 94 4 October Lagos: Enugu has been captured by Federal troops after a six-day seige.

Biafra: Federal troops under Biafran attack have been forced to withdraw from Enugu.

- 95 Lagos: The six-nation OAU commission on Nigeria formed in Kinshasa (14 September, above) has postponed its visit, and two members of the commission will not participate at all. Gowon considers the commission an advisory body in no way competent to mediate in the Nigerian domestic crisis.
- 96 7 October A Biafran plane attempting to bomb Lagos is shot down by Federal troops.
- 97 8 October Lagos: There is no longer any organized resistance against Federal troops in Enugu.

Biafra (Umuahia): Biafran troops control Enugu. Between 4 and

5 October Federal troops tried to capture the city, but they were successfully forced back. 200 Federal soldiers were killed in the fighting.

- 98 **14 October** According to an unofficial report in Lagos, Federal troops with support from tanks and artillery have captured Enugu airport, the last strategic point in the city occupied by Biafran forces.
- 99 **16 October** Premier Kosygin, in a personal statement to Gen. Gowon, announces the Soviet Union's "complete understanding" of the Federal Government's problem. The Soviet leader declares that he hopes that Nigeria can resolve the problem and strengthen the unity of the country. The Soviet Union will not become involved in the internal affairs of the African nations. It is hoped that the friendship and co-operation between Nigeria and the Soviet Union will be strengthened, particularly in the areas of economic and cultural relations, in order to support "Africa's complete liberation from the bonds of colonialism."
- 100 **17 October** Fighting between Federal and Biafran troops continues in the strategically important Onitsha, on the Niger River (separating Biafra from the Mid-Western Region). A nearby bridge has been badly damaged.
- 101 **19 October** Lagos: The city Calabar in south-east Biafra, center for all traffic to Cameroon, has been taken by Federal troops. About 14,000 Federal soldiers were involved in the capture of the city.
- 102 20 October Biafra establishes a private mission in Lisbon, Portugal.
- 103 **21 October** For the first time a white soldier in Biafran uniform, killed in action, is positively identified.
- 104 **30 October** Gen. Gowon accuses Portugal of being a major supplier of arms to Biafra.
- 105 **31 October** *Biafra* (*Umuahia*): Biafran forces opening an offensive in Eha Amufu, north-east of Enugu, have forced Federal troops to with-draw from their defensive posts.
- 106 1 November Lagos: An arms cache originating in Spain, delivered to Biafra by ship during the week 22-29 October, has been captured. Included were more than 11,000 single and double barrel rifles and ammunition.
- 107 13 November Lagos: In heavy fighting during the weekend 10–12 November, Federal troops repelled a Biafran attempt to recapture Enugu.
- 108 16 November It is reported that the Soviet Union has delivered three motor torpedo boats to the Nigerian Government.
- 109 22 November A Commission from OAU (Organization for African Unity) arrives in Lagos. The Commission, led by Ethiopian Emperor

Haile Selassie, includes Pres dent Ahmadon Ahidjo of Cameroon, Josef Ankrah, Chairman of the National Liberation Council and Head of State of Ghana, President Hamani Diori of the Niger Federal Republic, as well as two members who are unable to be present, the Presidents of Liberia and the Congo (Kinshasa), Tubman and Mobutu. The General Secretary of the OAU, Diallo Telli, also arrives in Lagos.

- 110 23 November The OAU Commission on Nigeria exhorts the Biafran government to revoke its decision to build an independent state. In a communiqué published after talks between the Commission and Gen. Gowon, it is announced that Ghana's Head of State Ankrah will continue talks with Col. Ojukwu in an attempt to find a peaceful solution to the conflict. Haile Selassie (head of the Commission) states that the unity and territorial integrity of Nigeria are not negotiable.
- 111 5 December Heavy fighting continues around Enugu.
- 112 Biafra (Umuahia): A Nigerian MiG fighter has been shot down by Biafran troops.
- 113 23 December Gen. Gowon explains in a Christmas message to the Nigerian people that the civil war will continue until the revolt of the Eastern Region has been put down. The Federal Government, which has thus far devoted not more than one-tenth of its national resources to the war, will continue to fight to the end. The price for a united Nigeria cannot be too high. The conditions under which the Federal Government will cease fighting are, still: the rebels must suspend their proclamation of independence, accept the new federation composed of 12 federal states, and prepare a delegation which wants national unity, peace and reconstruction.

1968

- 114 1 January Heavy fighting is reported at Calabar, Enugu and Nkalagu.
- 115 8 January Gen. Gowon says at a press conference that military operations against the secessionist region will be terminated immediately if Ibo leaders agree to his offer of negotiations (23 December 1967, above). The leaders with whom Gowon would be willing to negotiate include former President Nnamid Azikiwe (deposed 15 January 1966, above). Asked if he would be willing to negotiate with Ojukwu, Gowon says that he has no more confidence in Ojukwu than in the devil himself.
- 116 **17 January** British authorities deny the Biafran report that British soldiers have been dispatched to help the Nigerian Army.
- 117 Lagos: Federal troops have occupied seven villages around Onitsha, on the right bank of the Niger River. Biafra denies this report.
- 118 Biafra (Umuahia): Two buildings belonging to British firms in Port Harcourt have been burnt down by 50,000 anti-British demonstrators.
- 119 **29 January** Col. Ojukwu calls for a cease-fire and "unconditional negotiations."
- 120 12 February Biafra (Umuahia): Biafran troops have recaptured the university town Nsukka, captured by Federal troops in May 1967. During the past two weeks Biafran forces have also recaptured the villages Opi and Ukehe, which are between Nsukka and Enugu.

Lagos: The Biafran report is denied.

- 121 **16 February** Col. Ojukwu says in a radio broadcast that Biafra welcomes every peace initiative which can bring about an "honourable" end to the war. In any future negotiations Biafra will demand guarantees of the "internal and external security" of Biafra.
- 122 19 February Lagos: After heavy fighting Federal troops have captured the town Awka and are marching toward Onitsha, on the right bank of the Niger River.
- 123 26 February Biafra requests UN Secretary-General U Thant to take immediate action on the claim that genocide is being committed in Biafra by the Nigerian Government, and to see that the current session of the Human Rights Commission takes up the matter. Ojukwu accuses the Governments of Great Britain, the Soviet Union, Sudan and Chad, as well as individual Egyptians of having taken part in the genocide of the Ibo people.
- 124 **3 March** A spokesman for the British Government announces that the delivery of conventional arms to Nigeria will continue.
- 125 13 March Heavy fighting is still reported around Onitsha, Biafra's important commercial center on the Niger River. The major portion of the local population is reported to have fled after today's heavy aerial and artillery attacks.
- 126 **31 March** In a radio and TV broadcast Gen. Gowon says that the revolt of the secessionist Biafra region has been checked by the recent military successes of Federal troops. Ten of the 12 newly created federal states will from 1 April be functioning under their own state administration. In the remaining two states, Federal troops will not relent until the rebellion is ended. All military action will, however, be terminated once the break-away Biafra regime recognizes the authority of the Federal Government and withdraws its claim to independence and sovereignty.

- 127 Ojukwu replies in a radio broadcast that Gowon's conditions are unthinkable. Biafra will continue its struggle until the last vestiges of Federal force have been removed from the territory.
- 128 6 April Lagos: Abakaliki, a provincial headquarters in Biafra, has been captured.
- 129 **13** April Biafra threatens to nationalize US and British firms if they continue to collaborate with Nigeria.
- 130 Tanzania recognizes Biafra as an independent and sovereign nation. Nigeria's President Gowon announces that Nigeria's representative in Tanzania will be recalled as soon as possible.
- 131 22 April Col. Ojukwu, proposing negotiations within 48 hours after a cease-fire, declares that Biafra will not abstain from the demand for independence from the Federation.
- 132 23 April The Nigerian Government makes known, in a comment on Ojukwu's proposal (22 April, above), that it is not eager to discuss a cease-fire before agreement is reached on the major conditions for ending the civil war.
- 133 **25** April Nigerian Foreign Minister Okoi Arikpo announces at a press conference in London—where he is currently discussing the civil conflict with the British Government—that peace talks, without prior conditions, can begin in London between the representatives of the Federal Government and the secessionist Biafra state, under the general chairmanship of the Commonwealth Secretary Mr. Arnold Smith. There will be no cease-fire until the London discussions produce agreement on a termination of hostilities.
- 134 The Federal Government is concerned about the condition of the oil depots in Port Harcourt. As soon as the rebellion is put down, Shell and other oil companies will be advised to return to the Eastern Region and take over their activities.
- 135 26 April The Nigerian Government clarifies in a communiqué that there can be no discussion whatsoever with regard to recognition of Biafra's sovereignty.
- 136 27 April Biafra (Umuahia): The Federal Government is raiding heavily populated areas in Biafra. Nearly 300 civilians have been killed in Nigerian air raids in the past few days.
- 137 28 April Lagos: Air raids in Biafra are directed at important military targets only.
- 138 **29** April *Biafra (Umuahia):* Casualties resulting from Nigerian air raids during the week 21–27 April include 650 civilians killed, primarily in the towns Aba, Umuahia, and Owerri.
- 139 2 May Col. Ojukwu announces in Umuahia that he is prepared to

396

listen to all Nigerian proposals, which guarantee the security of the people of Biafra, even ones which do not explicitly acknowledge the full sovereignty of Biafra.

This is perhaps the first time that Ojukwu has publicly moderated earlier demands for recognition of Biafra's sovereignty as a prerequisite to peace talks.

- 140 **4 May** *Biafra* (*Umuahia*): British property in Port Harcourt has been set on fire—with damage estimated in millions of pounds—by demonstrators protesting Britain's support of the Nigerian military regime. 50,000 demonstrators marched through the city.
- 141 6 May In London preliminary discussions on the place for negotiations on the civil war are undertaken by Minister of Information Anthony Enahoro, representing the Nigerian Government, and President of the Biafran Supreme Court Sir Louis Mbanefo, representing Biafra. This is the first meeting between the two parties since the civil war started ten months ago.
- 142 8 May Gabon recognizes Biafra as an independent state, declaring that it is an act of hypocracy to hide behind the principle of non-intervention in the internal affairs of another country when faced with the organized annihilation of 14 million Africans (Ibos).
- 143 14 May Ivory Coast recognizes Biafra as an independent state.
- 144 15 May Representatives of Nigeria and Biafra meeting in London decide that peace talks will be initiated in Kampala, capital of Uganda, on 23 May.
- 145 **19 May** *Lagos:* Biafra's strategically most important oil depot and rail center, Port Harcourt, has been captured.
- 146 Col. Ojukwu states in a radio broadcast that Biafra does not seek a victory over the Federal Government and that Nigeria can never defeat Biafra. This fundamental fact must be accepted before peace talks can succeed in bringing the civil war to an end.
- 147 Biafra (Umuahia): Over 1000 Biafrans have been killed in Nigerian bombing raids since the first contacts in London on peace talks (6 May).
- 148 20 May Zambia recognizes Biafra as an independent state.
- 149 21 May Biafra (Umuahia): Twenty-one persons were killed yesterday in a Nigerian air raid on Umuahia. More than 1000 have been killed in aerial bombardments on Aba, Owerri and Umuahia during the past 10 days. Anti-British demonstrations are taking place all over Biafra. Waves of refugees (mostly Ibos) from Port Harcourt have been making their way along the 112 km route to Aba since Federal troops captured the port city (19 May, above).

- 150 Gen. Gowon announces that Federal forces will continue their military operations against Biafra in spite of the capture of Port Harcourt and the initiation of peace talks. Military activity will be terminated as soon as Biafra withdraws its claim to independence. There can be no discussion about leaving Port Harcourt to any special ethnic group. Gowon accuses Tanzania, Gabon, Ivory Coast and Zambia—who have recognized Biafra as an independent state—of having violated the treaty obligations of OAU.
- 151 The International Red Cross energetically protests against Nigerian aerial attacks on Biafra. It protests in particular the bombardment of hospitals carrying the Red Cross mark, and stresses that such actions are against the rules of the Geneva Convention. It further exhorts the Nigerian Government to stop aerial attacks on the civilian population.
- 152 23 May Peace talks between the Nigerian and Biafran governments open in Kampala, Uganda. Minister of Information Anthony Enahoro leads the 16-man Nigerian delegation, and President of the Biafran Supreme Court Sir Louis Mbanefo heads the five Biafran delegates. Other participants in the talks include President Milton Obote of Uganda and Commonwealth Secretary Arnold Smith of Great Britain.

In his first statement, Biafra's representative Mbanefo says that with the experience of the 1966 attack upon the Ibo people in northern Nigeria ever-present in the background, it is impossible to force Biafra to return to the federation: that would be "like forcing Israelis to return to Nazi Germany." Only sovereignty can guarantee the security of Biafra. Mbanefo proposes an immediate cease-fire, the lifting of the Nigerian economic blockade of Biafra, and the withdrawal of military forces to positions held at the beginning of the civil war. An international force should be invited to enforce the cease-fire line.

Nigeria's representative Enahoro rejects the Biafran proposal for a ceasefire before the conditions for the cessation of hostilities have been discussed. He suggests that when the "rebel army" has laid down its weapons, a federally trained police force be moved into the Eastern Region (Biafra) to preserve order. A conference will then be called to work out a new constitution for the federation, with all 12 federal states—including the three secessionist states (Biafra)—represented.

153 25 May At the peace talks in Kampala (opened 23 May) conditions for a cease-fire are discussed. According to press reports, Nigerian representative Enahoro states outside the conference room that the Federal Government would have nothing against a demand for an Ibo police force or for the stationing of an international police force for Ibo security. According to the same report, Enahoro says he has nothing against the continued use of the name "Biafra" as long as the claim to sovereignty is dropped. The Federal Government is prepared to hold a plebiscite in the Niger delta area (part of Biafra) so that the minority groups there—Ibo, Efik and Ijaw—can decide whether they want to be part of the Ibo state or to form their own federal state.

- 154 26 May At the peace talks in Kampala, Ugandan President Milton Obote and Commonwealth Secretary Arnold Smith intervene to persuade Biafran representative Mbanefo not to cut short the talks as a result of Nigerian refusal to agree to a cease-fire prior to further negotiations.
- 155 28 May The Nigerian Government rejects an International Red Cross request that the maritime blockade against Biafra be lifted to allow the passage of food and other relief supplies to the starving civilian population. According to reports from Red Cross representatives in Biafra, about 600,000 refugees are assembled in the interior regions of Biafra.
- 156 Lagos: The Red Cross will find it difficult to convince skeptics that it is not allowing itself to be used as a tool by the rebels. Nigeria is prepared to discuss the transportation of relief supplies by air to any airport under Federal control (e.g., Enugu, Port Harcourt) or overland to any agreed destination in Biafra.
- 157 At the Kampala peace talks, Nigerian negotiator Enahoro presents a plan to end the civil war: Biafra renounces secession; 12 hours later a cease-fire is declared; 24 hours after the declaration of a cease-fire, a peace-keeping force made up of Nigerians and Biafrans establishes a neutral zone along the cease-fire line and begins to supervise the disarming of Biafran forces. The Biafran representative Mbanefo characterizes the Nigerian plan as a demand for Biafra's capitulation and declares it absolutely unacceptable. The formal talks are adjourned and the leaders of the two delegations meet for private consultations.
- 158 **31 May** The Kampala peace talks collapse alltogether. The Biafran delegate Mbanefo denounces the Federal Government for setting conditions which make further negotiation impossible. Nigerians report that the Biafrans are "obviously not interested in negotiating."
- 159 **3 June** According to reports of foreign journalists and Biafrans, Biafra has recaptured Afam, the town 40 km east of Port Harcourt where most of Biafra's electricity is produced. Biafra Radio announces that 200 Federal troops and 10 Biafrans were killed in the battle.
- 160 **7 June** The Government of the Netherlands announces that the export of arms and ammunition to Nigeria has been stopped since the beginning of the Kampala peace talks (23 May),

- 161 8 June Fighting continues around Port Harcourt, with heavy casualties on both sides.
- 162 10 June Lord Shepherd, British State Secretary for Commonwealth Affairs, meets in London with Sir Louis Mbanefo, chief Biafran negotiator. This is the first official meeting of British and Biafran representatives since the civil war started in June 1967.
- 163 12 June British Foreign Minister Michael Stewart says in the House of Commons that while the primary concern of Great Britain is to end the civil war, arms contracts with the Nigerian Government will be fulfilled; unilateral actions, like, for example, an embargo on arms deliveries, could only aggravate the situation. He supports the stationing of an international peace force accepted by both parties to ensure the security of the Ibo people.
- 164 **13 June** Biafran Minister of Information Ifeqwu Eke requests Belgium, West Germany, and Italy to follow the example of Czechoslovakia, the Netherlands and France and stop the delivery of arms to the Nigerian Government: to supply arms to Nigeria is to participate in genocide.
- 165 **18 June** Lagos: Federal troops have captured the strategically important town Awgu, 50 km north of Enugu.
- 166 **19 June** The International Red Cross is supervising the distribution of tons of food and drugs in war-ravaged areas of Nigeria.
- 167 22 June Distribution of emergency food in Biafra is being delayed while investigators check charges of food poisoning.
- 168 **24 June** In a communiqué following talks with Gen. Gowon in Lagos, British representative Lord Shepherd reports he is satisfied that the Nigerian Government is prepared to undertake informal discussions with Biafran representatives in order to reconvene the Kampala peace talks (broken off 31 May).
- 169 27 June The British Minister of Commonwealth Affairs, George Thompson, announces in the House of Commons that Gen. Gowon has agreed to the stationing of an international observer group or peace force in Nigeria to enforce a cease-fire; the termination of aerial bombing of all points in Biafra except important military targets; and the opening of a mercy air corridor to Biafra under the supervision of the Red Cross.
- 170 **4 July** Biafra refuses to accept the use of over-land routes for relief. International relief agencies propose to fly in the emergency food cargoes.
- 171 5 July The Nigerian Government refuses to permit air shipment of food to Biafra.

- 172 7 July A plane carrying 10 tons of food and medicine, sent by the World Council of Churches, is reported to have landed safely in Biafra. Many thousands of tons of food per month are said to be needed.
- 173 10 July UN Secretary-General Thant says at a press conference in Geneva that he is doubtful of the possibility of UN intervention in Nigeria, mainly because it is an internal conflict. When a journalist recalls previous UN interventions concerning internal affairs in the Congo, South Africa and Rhodesia, Thant replies that the UN can take no action until member states take an initiative in the Security Council or the General Assembly, as in the three cases mentioned.
- 174 **11 July** President Johnson announces that the United States proposes to assist the Red Cross to aid the suffering civilian population in Nigeria. The President appeals to responsible parties on both sides (Biafra is not named) not to block or hinder relief aid in any way.
- 175 12 July Lagos: The Federal Government is prepared to open air routes for delivery of food and medicine to Biafra, under the auspices of the International Red Cross. The road from Enugu to Awgu and then into Biafran territory would be the most practical over-land route for relief supplies and is acceptable to the Government if the Red Cross can give assurance that the "rebels are prepared to cooperate."
- 176 **14 July** Biafran special representative to the UN Nwonye Otue, explaining that over-land routes for relief supplies are ruled out because they have been mined to prevent invasion by Federal troops, appeals for airlifts of the supplies to starving Biafrans.
- 177 15 July In a telegram to the Nigerian Government, UN Secretary-General Thant says that while the Government has facilitated the transportation and distribution of food and other necessities to regions under Federal control, the distribution of relief supplies in other critical regions has been a big problem. He hopes that the Nigerian Government will immediately welcome a UN special representative to discuss the matter and will do all to assist the UN, Red Cross, and other independent aid organizations in their humanitarian undertakings.
- 178 At the meeting of the World Council of Churches in Uppsala, Sweden, it is proposed to send \$3 million in aid to the hunger-stricken regions of Nigeria. A new attempt will be made to open an air corridor for the relief aid.
- 179 The OAU Advisory Committee on Nigeria, including the Heads of State of Mali, Cameroon, Niger and Ghana under the chairmanship of Ethiopian Emperor Haile Selassie, meets in Naimey, Niger. Nigerian Gen. Gowon is present. The Committee requests Col. Ojukwu to send a representative, or come himself, to Naimey in order to bring about

a quick solution—and one satisfactory to the African states—to the Nigerian conflict. Gen. Gowon declares that he is against a unilateral cease-fire, which would allow Biafra to strengthen its defence and at the same time give it a diplomatic advantage in a situation where its existence is in balance. Gowon reiterates his acceptance of an international observer force to assure the personal safety of Ibos living in areas now occupied by rebel forces.

- 180 17 July The OAU Advisory Committee on Nigeria, meeting in Naimey, proposes a limited cease-fire and the establishment of a demilitarized zone to facilitate transportation of food and other basic necessities to the Biafran civil population. The demilitarized zone would be approved by both parties and maintained by an observer group. The Committee further exhorts the Nigerian Government to guarantee an air corridor and land and sea routes through federally controlled areas for delivery of relief supplies; and it exhorts both parties to reconvene peace talks as soon as possible.
- 181 The Belgian Parliament passes a law forbidding further export of arms to Nigeria. The Government revokes existing export licences.
- 182 **19 July** In a communiqué from Naimey, the OAU Advisory Committee on Nigeria announces that Nigerian and Biafran representatives will reconvene peace talks in Addis Ababa, Ethiopia.

Col. Ojukwu arrives in Naimey to lead the Biafran delegation in preliminary discussions concerning the planned peace talks. Niger's President Hamain Diori is chairman of the discussions.

- 183 22 July Following a visit by Nigeria's Foreign Minister, the Soviet Union announces it is convinced that division of Nigeria is against the national interest of the people and the interest of peace. The Soviet Union will continue to support the Nigerian Government, which, it is noted with satisfaction, is prepared to continue negotiations for the peaceful settlement of the civil war.
- 184 23 July The International Red Cross charters a DC-6 four engine plane to help shuttle food and medicine to Biafra.

The Vatican announces that Federal troops are shooting at planes flying food into Biafra.

- 185 **26 July** Preliminary discussions in Naimey, Niger, conclude with agreement on the agenda for the peace talks scheduled to begin in Addis Ababa on 5 August. Included in the agenda are: (1) arrangement for a permanent settlement, (2) conditions for the cessation of hostilities, and (3) concrete proposals for the transportation of food and medicine to the victims of the war.
- 186 29 July Lagos: Federal troops have captured the town Ahoada, 40 km

north-west of Port Harcourt. Two towns south-east of Awgu, Ndeaboh and Onoli, have also been captured.

If this report is correct, Federal forces now control two of the three (Federal) states in Biafra.

- 187 **31 July** The French Government declares that the conflict between Nigeria and Biafra should be resolved on the basis of self-determination. Questioned if this implies that the French government considers Biafra as an independent state, a spokesman replies "That is an interpretation which is not inaccurate."
- 188 **1 August** UN Secretary-General Thant announces that Mr. Nils-Göran Gussing (Sweden) will be sent to Nigeria to coordinate help to the victims of the civil war.
- 189 *Biafra (Umuahia*): Biafran forces have repelled a Nigerian offensive in the area of Igritta on the way to Port Harcourt.
- 190 **5** August The OAU convenes the new round of peace talks in Addis Ababa. Chief Anthony Enahoro leads the Nigerian delegation; Col. Ojukwu leads the Biafran delegation. Ojukwu stresses that Biafran sovereignty cannot be discussed: only sovereignty will ensure the survival of the Biafran or Ibo people. According to the Nigerian delegation renouncement of sovereignty is the central condition for further peace talks. (In a message to the meeting President Johnson indicates that the USA will provide extended aid to Nigeria and Biafra as soon as they end the civil war.)
- 191 **6** August Ojukwu, leaving the Addis Ababa peace talks without formal explanation, calls Gowon Africa's Hitler and accuses Nigeria of being solely responsible for the present conflict. Unofficial sources report that Ojukwu's departure follows a dispute over the presence of Gabonese officials brought by the Biafran delegation.
- 192 7 August At Addis Ababa the Nigerian delegation presents a 15-point peace plan including (1) renunciation of Biafran claims to sovereignty;
 (2) establishment of an international police force (Canada, Ethiopia, and India proposed) to keep a cease-fire; (3) reunification along the boundaries established in 1963; (4) establishment of a procedure for disarming the troops; (5) administration of areas still occupied by Biafran troops by Ibo police and establishment of state governments for the regions inhabited by Ibos made up of as many Ibos loyal to the Federal Government as to Biafra.
- 193 8 August Former President of Nigeria (now political advisor to Ojukwu) Nnamdi Azikiwe delcares in an announcement from Paris that the first point in the Nigerian peace plan—renunciation of sovereignty by Biafra—is unacceptable. Biafra declared sovereignty when

the Federal Government demonstrated its incapacity to protect the Biafran (Ibo) people.

- 194 9 August The Biafran delegation, now led by Eni Njoku, returns to the Addis Ababa talks to reject the Nigerian 15-point plan. Njoku presents the Biafran plan: (1) the OAU recognizes Biafra as an independent and sovereign state; (2) the Nigerian economic blockade is lifted; (3) Federal troops withdraw to positions held at the start of the civil war; (4) there is an immediate cease-fire, guaranteed by an international police force, whose composition is subject to negotiation. In addition a plebiscite might be held in contested areas of both Nigera and Biafra by the OAU. The OAU should consider indemnification payments for the damages suffered by Biafra during the war.
- 195 10 August Nigerian anti-aircraft fire causes the suspension of International Red Cross flights to Biafra.
- 196 **13 August** The Nigerian Government rejects the Biafran peace plan. Chief Enahoro underscores at the Addis Ababa talks that any plan which is not founded on the unity and territorial integrity of Nigeria will be unacceptable to the Nigerian Government.
- 197 13 August Following a cabinet meeting, President de Gaulle again speaks in support of self-determination in Biafra: the problem in Nigeria cannot be resolved by military means.
- 198 15 August The Nigerian Government, rejecting a plan to establish a neutral air corridor under the control of the International Red Cross, proposes air shipment of relief supplies to Enugu, and then over-land transportation into Biafra.
- 199 19 August Biafra (Umuahia): Heavy fighting is taking place at the railway junction in Owaza, 30 km south of Aba (an important administrative center).
- 200 Lagos: Federal troops under the command of Col. Adekunle are closing in on Aba: the western flank is moving against Owerri from Igritta; the eastern flank is fighting in the Ikot-Ekpene area, where Biafrans are reportedly employing guerilla tactics; and a central column is making its way along the main road from Port Harcourt. In the north-west, Federal troops are trying to break through towards the south from Onitsha, to join Adekunle's western flank.
- 201 23 August Biafra's administrative center Aba is evacuated. Biafra TV has gone off the air. Aba's inhabitants flee to Umuahia. Umuahia and Owerri are the only two towns of any size still in the hands of Biafran forces.
- 202 24 August At the Addis Ababa peace talks there is a deadlock on ways of supplying relief aid to Biafrans. The Nigerian Government

refuses to open an air corridor unless Nigerian planes are permitted to escort the transport planes. OAU General Secretary Diallo Telli announces that Nigeria and Biafra have agreed in principle on opening an air corridor and an over-land route for relief supplies.

- 203 27 August In the British House of Commons, a resolution put forward by the left wing of the Labour Party to stop arms exports to Nigeria is not put to the vote.
- 204 **28** August *Biafra (Umuahia)*: After heavy fighting in Aba, Federal troops have retreated to a point about 24 km south of the town, near Akwete on the other side of the Imo River. Heavy casualties on both sides.
- 205 **29 August** The Nigerian Government requests UN Secretary-General Thant, the OAU, and the Governments of Canada, Poland, Sweden and UK to send observers to Nigeria to visit the battle areas and establish for themselves whether Nigerian forces are guilty of genocide or other war crimes. In another announcement the Nigerian Government describes as a "hostile action" the offer of the four Scandinavian countries to place transport planes at the disposal of the International Red Cross.
- 206 **30 August** Federal troops begin a "final offensive"; fighting is reported on all fronts. Wounded soldiers begin arriving in Umuahia, provisional capital of the Biafran territory, which is now roughly 100 km long and the same distance wide.
- 207 According to Biafran reports the number of refugees in Biafra has increased from 4.5 million to close to 6 million since the beginning of the Federal offensive against Aba (19 August, above); and 5000 to 6000 people die or are killed every day. Neutral observers confirm these figures.
- 208 **31** August In a radio speech Gen. Gowon tells the Nigerian people that they are threatened with invasion by foreign fighter planes escorting the transport planes carrying relief aid to Biafra.
- 209 2 September Samuel Gonard, Chairman of the International Red Cross, announces that relief supplies will be transported to Biafra even in daylight. As a result of the assistance of the Scandinavian Red Cross organizations, the International Red Cross now has five transport planes.

The Nigerian Government considers the planned relief flights to Biafra "unpermissible and illegal".

210 **3 September** According to an agreement announced in Lagos, the Red Cross will, beginning 5 September, transport relief supplies directly

from Fernando Poo (an island off the Nigerian-Cameroon coast) to the Uli-Ihiala airstrip in Biafra during a ten-hour daytime period.

- 211 4 September Lagos: Aba has been captured by Federal troops, who are pushing toward Owerri in the western part of Biafra. Other troops have captured Owutu, about 24 km south-west of Afikpo. (Owerri and Umuahia are the only important towns under Biafran control.)
- 212 Biafra (Umuahia): Forty people were killed during a Nigerian aerial attack on Ihiala, 50 km south of Onitsha.
- 213 5 September *Biafra* (*Umuahia*): Fighting continues east of Aba and the city is under heavy artillery and grenade bombardment.
- 214 The Red Cross does not start its daytime flights to Biafra. Biafran authorities will allow landings only at Obilagu, not at Uli-Ihiala.
- 215 9 September The Addis Ababa peace talks (which began on 5 August) are indefinitely adjourned. The questions of relief work, which have occupied most of the negotiations, are now postponed until the next OAU-Advisory Committee meeting in Algiers.
- 216 **10 September** The Red Cross announces in Geneva that the military situation makes daytime relief flights to Biafra impossible; night flights will continue.
- 217 **11 September** Nigerian troops capture Oguta, 12 km from the Uli-Ihiala airstrip (i.e. the road between the two towns), which is used by the Biafrans for landing military forces, and, at night, for receiving shipments of weapons and ammunition.
- 218 **13 September** At the fifth meeting of OAU member Heads of State, in Algiers, Zambian President Kenneth Kaunda refuses the vice-presidency because of his opposition to OAU support for federal Nigeria.
- 219 **16 September** The OAU meeting in Algiers passes a resolution (33 to 4) exhorting Biafra to terminate her struggle for independence and "cooperate with the federal authorities to re-establish peace and unity in Nigeria." The resolution also calls for a cease-fire and requests the Nigerian Government to give amnesty to those who have fought for Biafra. The meeting rejects a proposal by Tanzania, Zambia, Gabon and Ivory Coast that a Biafran representative be allowed to participate in its proceedings. (A Biafran delegation waiting in Tunisia has been refused a visa to enter Algeria.)
- 220 22 September Lagos: Federal troops have captured Biafra's main airport in Obilagu and thereby completely encircled Umuahia.
- 221 23 September Gen. Gowon tells the international observer group invited by the Nigerian Government that it has permission to investigate as fully as possible the charge that Nigerian forces are committing

genocide: it is allowed to visit the battle fronts on its own initiative as well as in the company of Nigerian representatives.

- 222 Biafra (Umuahia): Biafran forces have broken the federal encirclement of Umuahia and are moving in the direction of Aba.
- 223 According to a New China News Agency telegram, the Chinese Government supports Biafra: Biafrans are being massacred in great numbers, but they are a long way from laying down their weapons, in spite of continued British, Soviet and US support for the Nigerian Government.
- 224 **26 September** In a talk to tribal leaders, Ojukwu rejects the notion that Biafra's capitulation is imminent. Ojukwu appeals to friendly countries to press Biafra's case at the UN.
- 225 The international observer group invited by the Nigerian Government arrives in Enugu. Its members are: Gen. Henry Alexander (former Supreme Commander of the Armed Forces of Ghana), UK; W. A. Milroy, Canada; Arthur Rabb, Sweden; and Nils-Göran Gussing, UN representative; and representatives of Poland and the OAU.
- 226 1 October Fighting continues in Okigwi and Owerri.
- 227 **3 October** Official observers from Canada, Poland, Sweden and UK, having followed a Federal division advancing toward Umuahia for a week, report that they have not found evidence of genocide in Biafra. They have, however, found that humanitarian help to the war-victims camped in federally controlled areas is insufficient.
- 228 Ojukwu appeals to the UN and its members to intervene and stop genocide in Biafra.
- 229 **7 October** The offensive against Umuahia has been stopped and Federal troops, digging in for a prolonged struggle, are defending the recently captures Okigwi.
- 230 A Russian-built Nigerian bomber is shot down by Biafran antiaircraft guns during a raid against Umuahia. At least ten planes have been put into operation in an air corridor from Gabon's capital Libreville to deliver arms and ammunition to Biafra.
- 231 9 October Lagos: The efforts of the Nigerian forces to capture the last Biafran strongholds have been stopped. Biafran defence has been strengthened by recent intensified delivery of arms, and difficult terrain gives an advantage to Biafran guerrilla tactics.
- 232 **12 October** Two Biafran villages, Amuda and Amanbu, have been left in ruins following raids by two Nigerian bombers. About 50 civilians were killed and about 50 wounded.
- 233 Biafra (Umuahia): 300 Nigerian soldiers have been killed in recent

Biafran attempts to recapture lost areas. Biafra has a good chance of recapturing Owerri.

- 234 **15 October** In a second report, from the southern battle front, the international observer group says that it has not found evidence of genocide by Nigerian forces. Arrangements for getting relief aid to war-victims are, however, chaotic. The main dangers are the lack of medical doctors, and the risk that the flood of victims will soon drown the authorities and the independent relief organizations. More than half of the victims or refugees in federal areas are in good condition, but a great number of children are starving.
- 235 20 October Planes carrying arms cargoes from Gabon, Ivory Coast and the Portuguese island São Tomé to the Biafran Uli-Ihiala airstrip are said to be also delivering about 80 tons daily to another airstrip 80 km west of Umuahia. Gabon denies that its territory is being used for arms shipments.
- 236 Biafra (Umuahia): Ghanian soldiers are fighting alongside Nigerian troops in some combat zones—Ghanian emblems were captured in the Ikot-Ekpene sector.
- 237 **22 October** *Lagos:* Federal troops have taken Oguta, which guards the southern approach to the Biafran Uli-Ihiala airstrip.
- Reports from London indicate the danger of a fresh crisis over arms supplies to Nigeria: weapons continue to be flown into Biafra in quantities estimated at 100 tons a day. Col. Ojukwu's forces are getting not only adequate supplies of ammunition for current British- and Czechoslovak-made weapons, but also some of the very latest French light anti-tank weapons, which are effective against the British-made Saladin armoured cars used so decisively in the Nigerian advance into Biafra. It is almost impossible to explain the new weapons without official French sanction and, probably, finance. The main take-off point for the deliveries is Abidjan airport (Ivory Coast), which is controlled by a French "token force" of one battalion. Federal troops have been halted for a long period, and Col. Ojukwu should soon be well-equipped to mount a counter-offensive.
- 239 23 October The Federal Army's Third Division Commander, Col. Adekunle, claims that more than 100 French mercenaries have been killed in recent fighting. Earlier the Colonel has on various occaions claimed that his troops had met Chinese, Tanzanian, Zambian and French mercenaries on the Biafran side.
- 240 **26 October** Raids by two Nigerian II-28 medium jet bombers have failed to stem the flow of war supplies to Biafra, now believed to possess heavier artillery and some armoured cars. Persons returning

from inside Biafra report that Nigerian planes strafed a new airstrip at Uga, 40 km north-east of Oguta, on the western front. The same sources indicate that Biafrans have reduced the shipment of relief supplies to make way for more arms cargoes.

- 241 October Col. Ojukwu says in Umuahia that the war fronts are now "pretty well stabilized". Biafra is getting more arms, although the supply is still insufficient: Nigerian officials deliberately exaggerate the quantity to induce increased Soviet and UK deliveries. Biafra is not getting military aid from the French or West German Governments: such rumours emanate from Nigerian and British sources. He would welcome military aid from both Governments to offset the increase in arms supplies to Nigeria. There are no plans for further peace talks. On Biafra's communications with the outside world, he says: "We have many airstrips. It is a question of which one we put into operation and at what time."
- 242 **31 October** *Biafra (Umuahia)*: All-out battles are taking place. Biafran forces have beaten back an intensified Nigerian offensive in the Ahoada sector, and more than 175 Nigerians have been killed. Biafran forces successfully counter-attacked Nigerian troops trying to advance "from already contested positions in the Aba sector". Heavy fighting continues in the upper Etu-Ikot-Okpora axis and in the Ikot-Ekpene sector.
- 243 Lagos: The Nigerian Air Force is now capable of intercepting planes making night flights into Biafra. (Until now the Federal Air Force, virtually grounded at dusk, has been powerless to prevent night airlifts of cargoes to Biafra.)
- According to a report from UN representative Gussing, present in Nigeria 5-18 October, the number of refugees in areas south and west of the battlefront is increasing by about 10,000 per week. The number dying is about 30-40 per 1000 every day, mainly the children and aged. Relief help is effective but not adequate. Lack of medicine is enormous. Food supplies are lagging behind dangerously. The situation varies from area to area: Benin, in the Mid-Western Region, has hardly been touched by the war, but Onitsha and surrounding areas have been completely destroyed, and a large fertile section north of Port Harcourt has been desolated. Wounded soldiers from both sides are being cared for in the same hospital in Port Harcourt; they are in relatively good condition.
- 245 2 November Gen. Gowon says that the Federal Government is always prepared to reconvene peace talks. He has discussed plans for con-

vening a new meeting of the OAU Advisory Committee on Nigeria with Presidents Diori of Niger and Asahri of Sudan.

- 246 Biafra (Umuahia): About 200 Nigerian soldiers have been killed in a Biafran offensive in the Itu area. In the Azumini area Biafran troops, repelling a Nigerian offensive, have advanced some 8 km.
- 247 **5** November *Biafra* (*Umuahia*): Fighting continues in the Ahoada sector and in the Owerri region. In the Afikpo area Biafran troops have held their positions.
- 248 Col. Ojukwu announces that Biafra is ready for meaningful negotiations for a "just peace"; but there is no question of Biafran surrender of sovereignty.
- 249 **7 November** In Paris French Foreign Minister Debré tells the National Assembly that the restoration of peace in Nigeria would be easier if Britain prohibited the supply of arms to Lagos.
- 250 In London it is announced that relief flights to Biafra are meeting with more trouble: two Canadian relief aircraft have been shot or damaged in an attack on a Biafran airstrip by a Federal fighter plane, resulting in 5 dead and 35 wounded Biafrans and 5 wounded Europeans. Canada has suspended all mercy flights under the auspices of the Red Cross.
- 251 8 November In London it is announced that Nigerian Chief Enahoro, meeting with Prime Minister Wilson and Foreign and Commonwealth Secretary Stewart, has received assurances that Nigerian requests for more British arms would be favourably considered.
- 252 9 November Biafra (Umuahia): Biafran forces have advanced 5 km toward Owerri.
- 253 Lagos: Federal anti-aircraft guns have shot down two planes carrying arms to Biafra.
- 254 11 November A Soviet delegation is in Lagos on a 12-day visit. An agreement on economic and technical aid, described as "wide ranging", is expected to be signed on 21 November.
- 255 **13 November** Biafran forces have attacked Onitsha and heavy fighting continues there.
- 256 **14 November** *Biafra (Umuahia):* Nigerian troops have withdrawn from three villages—occupied for many weeks—along the Aba-Owerri road. Biafran forces have advanced 5 km in the Ahoada area.
- 257 Col. Ojukwu announces that he dismissed eight white "volunteer fighters" four days ago for "acts of brigandage, indiscipline and the waylaying of relief supplies". All white fighters in Biafra are "volunteers who decline to receive pay. We don't like mercenaries in Biafra because of the nature of the struggle," Ojukwu tells a group of visiting

parliamentarians and journalists from Denmark, Canada, Holland and USA and a Labour Party official from UK. Federal Nigeria is using mercenaries "extensively".

- 258 **16** November Biafran troops, re-entering Onitsha, are reportedly engaged in a non-stop battle with Nigerian forces in an effort to recapture the town.
- 259 18 November Pressed by some Members of the House of Commons to explain the continued delivery of British arms to Lagos, Foreign Secretary Stewart recalls the Government position, that stopping arms supplies would in fact help the Biafran "rebellion".
- 260 **19** November Biafra (Umuahia): About 2000 people have been killed and 3000 injured in Nigerian air raids on "civilian targets" in Biafra during the last six months (May-October). The worst of the 100 air raids was an attack on Otuocha in September, when 510 people were killed. The raids have been made by Soviet-built rocket-carrying fighters and Il-28 bombers, almost all piloted by Egyptians.
- 261 **24 November** *Lagos:* Nigerian troops have captured Adazi and Agulu. The capture of these two small towns south of Awka is the first reported Federal advance since the fall of Okigwe seven weeks ago.
- 262 **28** November *Biafra (Umuahia):* Adazi and Agulu have not been captured. Biafran forces have captured two Nigerian locations in the Aba sector. Nigerians bombed Biafran positions, but Biafran pressure was so heavy that they abandoned their fortifications, leaving behind tons of heavy equipment and ammunition.
- 263 It is reported from the UN in New York that in the opinion of numerous international relief experts, world efforts to avert a tragedy of unimagined proportions are grossly inadequate. Because of the prolongation of the civil war, virtually the entire population of about 7 million in the secessionist Ibo area might face starvation early in 1969. By conservative estimates one million persons, largely children, have already died and another one million will probably die by the end of 1968. Projecting into 1969, the experts estimate that a bare subsistence diet for the remaining population would require import of at least 2000 tons of concentrated food-stuffs daily, meaning 200 flights by planes of the type now being used. The Biafran airstrip at Uli can accommodate about 30-50 flights a night, and about 10 nightly flights of arms are coming in on the airstrip. Col. Ojukwu refuses to grant permission for daytime relief flights. At the peak of international efforts in early October, flights were bringing in only 150 tons of food. (The UN Children's Fund, UNICEF, reports in New York in January 1969

that 1.5 million persons, mostly children, died of starvation in Nigeria in 1968.)

- 264 2 December Biafra (Umuahia): Fighting continues unabated in the Afikpo area, 128 km north-east of Umuahia.
- 265 **3 December** *Lagos:* Federal forces have attacked a second secret Biafran airstrip east of the Umuahia headquarters. Nigerian forces are trying to cross the Niger River south of Onitsha, in an effort to knock out the Biafran airstrip between Uli and Ihiala.
- 266 Biafran troops have re-occupied Obinze, on the main Port Harcourt highway. Federal forces are receiving supplies by one earth road, in a corridor five miles wide between Olakwu and Obinze.
- 267 9 December A DC-7 aircraft which left São Tomé for a night-time mercy flight to Biafra's Uli-Ihiala airstrip on 7 December is missing and believed to have crashed, killing all four crew members, an official of the Joint Church Aid announces in Geneva.
- 268 10 December A Red Cross hospital in Biafra has been bombed by a Nigerian plane, killing three persons, Red Cross sources announce in Geneva. The hospital, located about two miles from the Uli-Ihiala airstrip near Awo-Omama, was clearly marked with a Red Cross sign.
- 269 11 December Both Nigeria and Biafra have rejected the latest British moves for a negotiated settlement to the civil war.
- 270 12 December Biafra (Umuahia): "Our continued existence as part of the human race depends on our survival as an independent nation. We should have lived and died in vain if we agreed to become part of that defunct federation. Any peace negotiations would mean nothing to us. Fourteen million Biafrans are under arms because we want to survive as a nation. Give us Biafra or nothing. Any political settlement must take into account the separate existence of Biafra and Nigeria as two independent sovereign states." This hard line, taken by Information Minister Ifeagwu Eke, surprises some of the Biafran Government's closest advisers, who have recently been talking in terms of a possible confederation.
- 271 Mr Maurice Foley, Under-Secretary at the Foreign and Commonwealth Office, leaves Addis Ababa for Nairobi, after delivering a message from Prime Minister Wilson to Emperor Haile Selassie and holding talks with OAU Secretary Diallo. Reliable sources state that it has been agreed to co-ordinate all peace moves under the OAU.
- 272 **14 December** *Biafra (Umuahia)*: Nigerian jets have bombed Umuahia for the second time in 24 hours, killing 28 people and wounding 187 others. The jets attacked in relays for more than 15 minutes, using rockets, cannons and machine-guns. Four Nigerian jets raided the town

earlier killing 27 and wounding 105. The major targets for the bombing have been Queen Elizabeth Hospital and the local headquarters of the International Red Cross. One of the jets, an Il-28 bomber, crashed 200 miles south-east of Umuahia on its way back to Calabar. The four occupants, including two British, one Soviet and one Nigerian were killed.

- 273 **16 December** *Biafra (Umuahia):* About 75 Nigerian soldiers were killed when Biafran forces repelled a Federal attack in the Ikot-Ekpene sector.
- 274 The UK and Nigeria call on Biafra to open land routes on its territory for the passage of relief supplies (food), following talks in Lagos between the Federal Government and Lord Shepherd.
- 275 **17 December** British Prime Minister Wilson charges that Col. Ojukwu is blocking efforts to step up the shipment of relief supplies to his own people. The Nigerian Government, on the other hand, Mr. Wilson tells the House of Commons, has been extremely co-operative with Britain's efforts to promote a cease-fire.
- 276 20 December Gen. Gowon orders a two-day truce on Christmas Eve and Christmas Day. The order follows private talks in Lagos with Lord Brockway and Mr. James Griffiths, M.P. The Nigerian Air Force will halt the bombing during the 48-hour truce, but maintain surveillance of Biafran territory for unauthorized arms flights. Lord Brockway says: "It is now up to Col. Ojukwu to accept the truce ... This is the beginning of a break in the war which may result in a more prolonged cease-fire." Describing the reactions of Col. Ojukwu to peace proposals, Lord Brockway says further that the Biafran leader would accept a peacekeeping force, preferably under UN auspices, which was responsible for the whole of the former Eastern Region of Nigeria. This, Lord Brockway continues "we thought would not be acceptable to Gen. Gowon, as indeed it turned out".
- 277 Biafra (Umuahia): East German Air Force pilots have taken part in air raids by Nigerian Soviet-built Ilyushin-28 bombers on Umuahia.
- 278 Oxfam estimates of casualties for October are 200,000, for November 300,000; figures for December should be more than 500,000.
- 279 23 December It is announced in Geneva that the Government of Equatorial Guinea has suspended all Red Cross mercy flights from the island Fernando Poo to Biafra.
- 280 **24 December** The Nigerian Government formally rejects an Ethiopian one-week cease-fire proposal, arguing that it would only "create an illusion to the world and raise false hopes".
- 281 Biafra (Umuahia): Biafran forces are observing the 8-day truce (23

December-1 January 1969) ordered by Col. Ojukwu, in spite of provocations from Federal troops.

- 282 The International Red Cross Committees and the Interfaith relief organizations have each received six Globemaster transport planes from the USA for the airlift of food and medical supplies to Biafra; the Globemasters can carry 20 tons, twice the capacity of the present planes. The Red Cross must supply the crews.
- 283 **27 December** *Biafra:* The Federal Army violated its own cease-fire shelling Owerri and Aba areas on Christmas Day. Eleven soldiers and seven civilian refugees were killed in the shooting.

2. The Arab-Israeli War, 5 to 11 June 1967

This chronology lists the main events immediately preceding the Arab-Israeli War, the events of the war itself, and post-war developments up to the end of 1967.

Subject matter index

The numbers refer to paragraphs.

Progress of the war (paragraphs including reported casualty figures are in bold face):

1, 2, 3, 5, 8, 10, 13–18, 20–23, 25–28, 33, 34, 36, 41, 43, **49**, 51, 52, 55, 58, **59**, 60, 61, 65–68, 72–75, 79, 85, 86, 120, 130, 137, 138, **140**, 142, 143, 147, 151, **153**.

Negotiation toward a settlement (United Nations involvement bold face): 8, 20, 22, 24, 37, 42, 45, 50, 54, 64, 69, 70, 71, 76, 84, 87, 89, 90, 91, 97, 98, 100, 102, 105, 110, 111, 112, 114, 115, 118, 119, 122–126, 130, 132, 135, 144, 145, 148, 149.

Political and position statements made by countries involved in the war: 8, 11, 23, 28, 36, 50, 53, 63, 81, 88, 121, 122, 126, 134, 136, 146, 150, 152.

Foreign political reaction: 29, 31, 32, 35, 39, 44, 48, 55–57, 62, 82, 83, 97, 98, 100, 102, 104, 108, 113, 117.

Internal political developments in the Arab countries and Israel: 4, 6, 7, 9, 46, 47, 77, 78, 80, 96, 106, 107, 127–129.

Meetings between leaders to discuss the war: 19, 40, 48, 92–94, 101, 103, 108, 116, 131.

Supply of arms or troops to countries involved in fighting: 5, 12, 13, 26, 95, 141.

Refugees, civilian aid, and other humanitarian aid: 30, 38, 91, 109, 114, 133, 139.

Background

1966

- 1 12 November An Israeli patrol near Jordan's border is hit by a land mine; three soldiers are killed and six injured.
- 2 12 November Israeli troops battle with Jordanian soldiers three miles inside Jordan near Es Samu; at least 125 houses, one clinic and one school are destroyed. Israeli and Jordanian jet planes also clash. The Israelis declare that they attacked to retaliate for terrorist activities launched from Jordan's Hebron area.
- 3 15 November Premier Levi Eshkol charges that Syria is responsible for the Israeli attack on Jordan.
- 4 23 November In Jordanian Jersualem, Palestinian Arab students demonstrate against Jordan's King Hussain.
- 5 Jordan accepts Saudi Arabian King Faisal's offer of 20,000 Saudi Arabian troops to help defend the Jordan-Israel border.
- 6 25 November Police and soldiers fire on Palestinian Arabs demonstrating against King Hussain in the Old City of Jerusalem. The demonstrators demand better protection against Israel; they support the outlawed Palestinian Liberation Organization (PLO) under Chairman Ahmad Shukairy, which has called for a show of force against the Jordanian Government.
- 7 26 November King Hussain decrees that all men between 18 and 40 years old are eligible to be drafted.
- 8 27 November Israeli Premier Eshkol criticizes the United Nations vote censuring Israel for the attack on Jordan's Hebron area and says that Israel will continue to defend itself.
- 9 28 November Premier Wasfi al-Tal of Jordan charges that "two outside Arab sources" incited the anti-government riots and demonstrations.
- 10 29 November An Israeli Mirage jet shoots down two UAR MiG-19's that had penetrated two to four miles inside the Israeli frontier.
- 11 King Hussain accuses the USSR of fomenting tension in the Middle East.
- 12 30 November A US State Department spokesman discloses that Jordan will receive "refurbished" F-104 Starfighter jets from the USA.

- 13 7-11 December The Arab League's Defence Council holds an emergency conference. Chief of the unified military command, General Aly Amer, says that the command is too weak to shoulder "its responsibilities" against Israel. The Council reportedly decides unanimously that Iraqi and Saudi Arabian troops should enter Jordan within two months to repel any Israeli attack. Before Jordan will permit entry of these troops, the UAR would have to replace United Nations troops in the Gaza strip and the Sinai Peninsula. No Syrian troops will be admitted to Jordan.
- 14 12 December Unofficial reports indicate that UAR officials are indignant because of Jordanian resistance to the Arab League resolution. The Jordanian Minister of Information is also said to have called the resolution on entry of Arab League troops into Jordan an agreement "in principle" only.

1967

Before the War

- 15 **7** April Israeli Mirage fighters are reported to have downed six Syrian Air Force MiG-21's in a series of air duels; fighting started with border shooting between Israelis and Syrians.
- 16 8 May Reports say that border terrorists, apparently from Syria, have entered Israel and set off an explosion on a major highway about nine kilometers inside the Israeli border.
- 17 15 May The UAR has alerted its armed forces apparently because of increased tension along the Syria-Israel border.
- 18 17 May Syria announces that its armed forces and militia have prepared for action because of the Israeli build-up along the Syrian border, threats of retaliation made by Israeli officials after the explosion of 9 May, and other incidents.
- 19 18 May In Tel Aviv, Israeli Foreign Minister Abba Eban meets with US, UK, and French Ambassadors to discuss Israeli-Arab tensions.
- 20 UN Secretary-General Thant announces that, in response to a UAR request, he is ordering the withdrawal of the United Nations Emergency Force (UNEF) from the Israeli-UAR armistice line. Secretary-General Thant asserts that the UNEF was sent to the Middle East with the consent of the UAR and that it cannot remain if "that consent [is] withdrawn".
- 21 The UAR announces that its armed forces have taken over posts formerly held by the UNEF.
- 22 19 May The UNEF ends its 10-year old responsibility for keeping peace between Israel and the UAR. All UNEF patrols in the Sinai

Peninsula and in the Gaza Strip on the UAR side are halted. (Israel has never permitted the stationing of UNEF on its side.)

- 23 20 May The UAR declares a state of emergency in the Gaza Strip. At an Arab League Council meeting, a joint declaration by Ambassadors of the 12 Arab states warns that an attack against any Arab state would be considered as an attack against all. Only Tunisia disapproves the resolution.
- 24 UN Secretary-General Thant announces that he will fly to Cairo on 22 May to try to ease the Israeli-Arab tension. He also reports to the Security Council on the situation in the Middle East.
- 25 22 May UAR President Gamal Abdul Nasser announces a blockade of Israeli ships using the Straits of Tiran at the mouth of the Gulf of Aqaba (Israel's only exit to the south and east). Nasser asserts that "the Israeli flag will not pass through the Gulf of Aqaba and our sovereignty over the Gulf's entrance is not negotiable"; nor will other ships carrying strategic cargoes to Israel be permitted to pass.
- 26 It is reported that the UAR has ordered total mobilization of its 100,000 man Army Reserve; Iraqi Army and Air Force units will be sent to the UAR.
- 27 Israel is said to have mobilized its military reserves, estimated at 230,000 men.
- 28 Israeli Premier Eshkol warns that a blockade of the Straits of Tiran, entry to the Gulf of Aqaba, will be regarded as "an act of aggression against Israel".
- 29 US President Johnson tells the UAR to avoid an "illegal" blockade of the Gulf of Aqaba, and warns that the USA supports the territorial integrity of all Middle East states. The USA supports "free, innocent passage" of all ships through the international waterways, including the Gulf of Aqaba.
- 30 The US State Department urges US tourists to avoid visiting Israel, the UAR, Syria, and Jordan because of the Middle East situation.
- 31 Supporting vessels of the US Sixth Fleet are ordered toward the eastern Mediterranean.
- 32 The USSR criticizes Israel for "aggravating" tension in the Middle East and warns that any aggression in the Middle East will be met by "not only the united strength of Arab countries, but also resolute resistance to aggression on the part of the Soviet Union . . ."
- 33 23 May The Jordanian government orders the Syrian Ambassador to close the Syrian Embassy in Amman and leave the country; the Jordanian border with Syria is reported closed. The Jordanian-Syrian dispute arose over the explosion at a Jordanian border post of a mine

planted in a Syrian car driven by a Syrian. Amman radio reports that the Jordanian Parliament has approved a resolution condemning the incident.

- 34 24 May Unofficial sources in Cairo report that the UAR has mined the Straits of Tiran and the Gulf of Aqaba.
- 35 Reports from Cairo indicate that US Ambassador Richard Nolte has informed the UAR that the USA considers Egyptian blockade of the Gulf of Aqaba an "act of aggression".
- 36 King Hussain declares that Jordan will join the Arab world in resisting Israeli aggression.
- 37 The UN Security Council meets in emergency session on the crisis in the Middle East.
- 38 25 May The US State Department orders US dependents in the UAR and Israel to return to the USA.
- 39 26 May The Soviet government asserts that "the source of tension [in the Middle East] is Israel" and that the USA, UK, and France should make Israel "stop its provocations".
- 40 Israeli Foreign Minister Eban meets with President Johnson in Washington. En route to this meeting he has conferred with President de Gaulle in Paris and Prime Minister Wilson in London.
- 41 President Nasser declares that any Israeli military action will lead to full-scale war and that the UAR will fight to destroy Israel.
- 42 27 May UN Secretary-General Thant reports on the Middle East situation to the members of the Security Council; he reiterates that conditions are "... more menacing, than any time since the fall of 1956".¹
- 43 29 May The Israeli High Command reports that UAR soldiers have opened fire in the Gaza Strip and that Israeli troops have responded.
- 44 30 May Turkey reportedly has granted the USSR permission to send ten warships from the Black Sea through the Turkish Straits to the eastern Mediterranean.
- 45 Officials in Paris report that the USSR has rejected France's proposal for a four-power conference on the Middle East crisis.
- 46 UAR President Nasser and Jordanian King Hussain sign a mutual defence pact in Cairo.
- 47 1 June Major General Moshe Dayan takes over the portfolio of Israeli Defence Minister, held until then by Premier Eshkol.
- 48 2 June UK Prime Minister Wilson meets with President Johnson in Washington. Wilson tells reporters that unless the Gulf of Aqaba is

¹ In October 1956, France and the UK invaded the Suez Canal zone. Israel invaded the Gaza strip and the Sinai peninsula.

opened for ships carrying cargoes to the Israeli port of Elath, "a very very dangerous situation" will prevail.

- 49 The Israeli Army reports that an Israeli patrol has intercepted four Syrian commandoes in Israeli territory; two Israelis and one Syrian are killed.
- 50 3 June In a note to Soviet Premier Kosygin, Israeli Premier Eshkol appeals for Soviet assistance in easing the present crisis.

The Six-Day War

- 51 5 June Fighting between Arab and Israeli forces breaks out at the Sinai Peninsula, on UAR soil, and in Jerusalem. In early morning surprise attacks, Israeli Air Force planes strike repeatedly and destroy UAR, Jordanian, and Syrian airfields and the Iraqi air base of Habbaniyah, destroying a large part of the Arab air forces on the ground within a few hours and gaining absolute command of the air from Sinai to Galilee.
- 52 At the end of the first day of war, the Israeli Chief of Air Staff, Brigadier Mordecai Hod, claims the destruction of 280 aircraft on the ground and another 20 in the air in the UAR, 52 in Syria, 20 in Jordan, and an unknown number in Iraq. This claim is subsequently amended to over 400 Arab aircraft destroyed on the first day of the War.
- 53 Israeli Defence Minister Dayan declares that Israel has "no aim of territorial conquest".
- 54 The UN Security Council recesses after an unsuccessful 12-hour effort to draft a cease-fire resolution.
- 55 Algeria, Iraq, Kuwait, the Sudan, and Yemen all declare war on Israel. A conference of Arab oil-producing states, convened on 4 June, decides to cut off oil supplies to any state committing aggression against any Arab country or giving aid to Israel.
- 56 The immediate reaction of US and UK leaders to the outbreak of the War is to declare their neutrality and state their intention of working towards a peaceful solution of Middle East problems.
- 57 The Soviet Government issues a statement condemning Israel's "aggression" and says that it reserves the right "to take all steps that may be necessitated by the situation".
- 58 6 June After a 36-hour battle, Israeli forces take over the Jordanian sector of Jerusalem; Israeli troops also penetrate deep into the Sinai Peninsula. The UAR High Command admits that "fierce fighting" is taking place on Egyptian territory. The Israeli Air Force flies non-stop sorties throughout the day, taking heavy toll of Egyptian armour,

while at the same time giving close support to the Israeli ground forces. After a fierce tank battle, Gaza falls and the whole Gaza Strip comes under Israeli control.

- 59 During the battle for Gaza, 14 Indian soldiers of the disbanded UNEF, which had been concentrated in the area awaiting repatriation, are killed, and 25 wounded; a Brazilian soldier is killed when Israeli artillery fire and air strafing strikes UN Headquarters.
- 60 On the Syrian border, Israeli artillery and aircraft are in action against gun emplacements in Syrian hill positions, where the Syrians are shelling Israeli frontier *kibbutzim*. No significant troop movements occur on either side, but shooting continues throughout the day from the vicinity of the Israeli frontier village of Dan to the southern tip of the Sea of Galilee.
- 61 The UAR announces the closing of the Suez Canal to all shipping and breaks diplomatic relations with the USA and UK, charging that US and UK planes are assisting the Israeli forces.
- 62 This allegation is immediately denied in Washington and London. The USA rejects it as "wholly false". Prime Minister Wilson describes it as "a malicious and mischievous invention".
- 63 The Arab oil-producing states—Algeria, Iraq, Kuwait, Lebanon, Libya, the Persian Gulf Sheikdoms, and Saudi Arabia—place an embargo on export of oil and natural gas to the USA and UK. Several Arab countries follow the UAR and break diplomatic relations with the USA and UK.
- 64 At the Unied Nations, the Security Council unanimously adopts a resolution calling for a cease-fire by Israel and the Arab states, "and for the cessation of all military activities".
- 65 7 June Swift air and ground assault by Israeli armed forces causes complete collapse of the UAR positions in the Sinai Peninsula, where the armed forces of the UAR retreat and abandon large quantities of equipment. By the end of the day, Israel controls the three natural routes to the Suez Canal—Qantara in the north, Ismailia in the centre, and Port Tewfik, opposite Suez, in the south—and practically all the remaining UAR armour in Sinai has been outflanked, with its escape route cut off by the Israeli forces approaching the Suez Canal.
- 66 Israeli forces also capture Sharm el Sheikh, at the entrance of the Gulf of Aqaba. The 22 May blockade is broken and the Straits of Tiran are opened to international shipping.
- 67 On the Jordanian front, Israeli forces seize the Old City of Jerusalem and are in full control of the area, including Mount Scopus.

- 68 In Tel Aviv, Major General Rabin announces that Israel has achieved "total victory in the war against Egypt"
- 69 The UN Security Council unanimously adopts a Soviet resolution calling for an immediate cease-fire in the Middle East.
- 70 Israel announces that it will accept the cease-fire order if its enemies do. Jordan accepts the cease-fire.
- 71 8 June The UAR and Syria announce compliance with the UN ceasefire order.
- 72 Israeli planes attack a US naval vessel in the east Mediterranean. Ten US sailors are reported killed and 100 wounded. Israel apologizes to the USA for this accident.
- 73 A Soviet freighter, headed for the Jordanian port of Aqaba, passes through the Straits of Tiran, the first ship to do so since Israel opened the waterway on 7 June.
- 74 9 June Israeli forces invade Syria, charging Syrian violation of the cease-fire along the northern frontier.
- 75 Israeli troops reach the east bank of the Suez Canal and now completely control the Sinai Peninsula.
- 76 The UN Security Council unanimously asks Israel and Syria to halt forthwith all hostilities; the cease-fire resolution thereby comes into force.
- 77 UAR President Nasser announces his resignation and asks Mr. Zakaria Mohieddin to assume his post as the President of the Republic; Nasser announces his intention to give up all official and political functions and to become a private citizen. He assumes the "entire responsibility" for the UAR defeat.
- 78 Later in the day, the National Assembly votes to reject Nasser's resignation.
- 79 Israeli sources report a major victory over Syria, including penetration 12 miles into the high ground on the Syrian border and capture of Kuneitra.
- 80 **10 June** Sixteen hours after his initial broadcast, Nasser announces that he has decided to remain in office "in view of the people's determination to refuse my resignation".
- 81 Israeli Information Minister Yisrael Gailille declares that Israel's victory over the Arabs has liquidated previous armistice agreements; Israel will not "return to the *status quo*".
- 82 Leaders of seven East European states and the USSR pledge assistance to the Arab countries if Israel refuses to withdraw from the conquered territory.

- 83 The USSR also breaks diplomatic relations with Israel and threatens sanctions if Israel violates the cease-fire.
- 84 Secretary-General Thant declares that Syria and Israel have accepted arrangements made by the United Nations for a cease-fire.
- 85 By the end of the Six-Day War the Israeli armed forces occupy an area four times greater than the area of Israel before the outbreak of fighting. The Israeli victory includes the complete rout and destruction of the UAR Army in Sinai, amounting to seven divisions totalling 80,000 to 100,000 men, and the loss of nearly all the UAR's armoured formations on the Sinai front.
- 86 11 June The chairman of the UAR's Suez Canal Authority, Mashour Ahmed Mashour, reports that the Suez Canal was blocked on 9 June by Israeli air raids which sank several vessels. Israel had earlier claimed that the UAR sank several vessels in the Canal in order to block passage through it.
- 87 Israel and Syria sign a cease-fire agreement under the auspices of UN military representatives.

Aftermath

- 88 12 June Israeli Premier Eshkol declares that Israel will not give up all the land it has occupied or gained control of during the Six-Day War: "The land of Israel shall no longer be a no man's land, wide open to acts of sabotage and murder." Israeli territorial gains include the entire Sinai Peninsula from the east bank of the Suez Canal to the Gaza Strip, Jordanian territory on the western bank of the Jordan River and the Old City of Jerusalem, and the south-western corner of Syria.
- 89 At the United Nations, Arab spokesmen reject Premier Eshkol's proposal for bilateral Arab-Israeli peace negotiations outside the framework of the United Nations.
- 90 13 June In a letter to Secretary-General Thant, the USSR requests an immediate emergency session of the UN General Assembly to effect "the immediate withdrawal of Israeli forces behind the armistice lines".
- 91 14 June The UN Security Council votes down a Soviet draft resolution condemning Israeli aggression and demanding the withdrawal of Israeli troops from occupied territory. It approves a resolution calling on Israel to "facilitate the return" of Arab refugees who have fled from Israeli-occupied territory in Jordan, Syria and the Gaza Strip.
- 92 16 June Soviet Premier Kosygin, en route to a special emergency session of the UN General Assembly, confers in Paris with French President de Gaulle.

- 93 In Cairo, President Nasser meets with visiting President Nureddin el-Attassi of Syria.
- 94 17 June In Kuwait, the foreign ministers of 13 Arab countries begin talks on the removal of Israeli forces from territories seized during the War.
- 95 The USSR is reported to have sent approximately 100 MiG planes to the UAR to help replace destroyed aircraft.
- 96 **19 June** President Nasser names himself Premier of the UAR, appoints a 28-man cabinet and takes control of the ruling Arab Socialist Union, the UAR's only political party.
- 97 President Johnson sets forth five principles for establishing peace and stability in the Middle East: (1) the right of each country to national life; (2) justice for Arab refugees; (3) the right of innocent maritime passage; (4) limitation of the arms build-up; and (5) guarantee of territorial integrity of all Middle East states.
- 98 Premier Kosygin, addressing the General Assembly, proposes a draft resolution calling for condemnation of Israel as an aggressor, the withdrawal of all Israeli troops from Arab territory, and Israeli compensation to Syria, Jordan and the UAR for war damages.
- 99 20 June US Ambassador Goldberg presents to the UN General Assembly a draft resolution of a five-point Middle East peace plan, (incorporating the five principles of President Johnson) to be arranged during negotiations with the aid of a third party and/or the United Nations.
- 100 **21 June** At the UN General Assembly, UK Foreign Minister George Brown urges that a special envoy of "unchallenged" standing be sent to the Middle East to advise the United Nations on future peacekeeping operations there.
- 101 Soviet President Podgorny and Chief of the Army, Marshal Sakarov, confer with President Nasser in Cairo.
- 102 22 June French Foreign Minister Couve de Murville tells the UN General Assembly that Israel must withdraw its troops from occupied Arab territory.
- 103 23-25 June President Johnson and Premier Kosygin confer in Glassboro, New Jersey, on the Middle East and other international questions, but do not achieve any agreement.
- 104 Returning to New York, Premier Kosygin reiterates that Israeli troops must withdraw to positions behind the 1949 armistice line as the first step toward creating peace in the Middle East.
- 105 26 June King Hussain of Jordan addresses the UN General Assembly, and appeals for "peace with justice" for the Middle East.

- 106 **27 June** The Israeli Knesset (Parliament) passes a law enabling the Minister of the Interior to declare Jerusalem a single city under Israeli administration.
- 107 28 June Israeli Minister of Interior, Moshe Shapiro, proclaims the unification of Jerusalem, including the Jordanian sector.
- 108 In Washington, President Johnson confers with King Hussain of Jordan. The US State Department declares that Israel's absorption of the Jordanian sector of Jerusalem "cannot be regarded as determining the future of the Holy places or the status of Jerusalem in relation to them". An earlier US declaration asserted that the USA did not recognize Israel's unification of Jerusalem as valid.
- 109 2 July The Israeli government announces that refugees from the West Bank of the Jordan River will be permitted to return to their homes if they do so by 10 August. Jordan calls the Israeli offer "an empty propaganda gesture".
- 110 **4 July** An emergency session of the UN General Assembly decides against (53 to 46, with 20 abstentions) a Yugoslav resolution, backed by the USSR, calling for unconditional Israeli withdrawal from territory conquered from the Arab states. (A two-thirds majority, 82 votes, was needed for the passage of the resolution.)
- 111 The UN General Assembly, by a vote of 99 to 0, with 20 abstentions, asks Israel to rescind its decision to annex the Old City, or Jordanian sector, of Jerusalem.
- 112 UN Secretary-General Thant proposes to Israel and the UAR that the United Nations supervise the cease-fire in the Suez Canal zone.
- 113 Soviet President Podgorny ends an official visit to Iraq. A joint communiqué stresses Arab-Soviet friendship and says the talks dealt with "steps to be taken to liquidate the consequences of Israeli aggression".
- 114 6 July Secretary-General Thant appoints Nils-Göran Gussing of Sweden to investigate the status of war prisoners and refugees of the Six-Day War.
- 115 **10 July** The UAR accepts the proposal to station UN observers on both sides of the cease-fire line along the Suez Canal.
- 116 King Hussain of Jordan and President Houari Boumedienne of Algeria meet in Cairo with President Nasser.
- 117 Twelve Soviet naval vessels arrive in Alexandria and Port Said for a week-long friendship visit to the UAR.
- 118 **11 July** Israel agrees to the stationing of UN observers along the Suez Canal cease-fire line. However it rejects a UN General Assembly resolution asking for annulment of the unification of Jerusalem.

- 119 14 July The UN General Assembly (99 to 0, with 18 abstentions) adopts a Pakistani resolution requesting Israel to "desist forthwith" from altering the status of Jerusalem.
- 120 Secretary-General Thant charges Israeli troops with "looting and the removal of property" from UNEF headquarters in Gaza. Israel claims that all those involved in the looting have been court-martialed.
- 121 16 July The leaders of UAR, Algeria, the Sudan, Syria, and Iraq announce in Cairo that they have agreed on steps to eliminate the consequences of Israeli "aggression" during the Six-Day War.
- 122 **17 July** Israel tells the UN General Assembly that a condition for peace talks with the Arabs is the recognition of Israel's "statehood, sovereignty and international rights".
- 123 UN military observers begin supervising the UAR-Israeli cease-fire line along the Suez Canal zone.
- 124 Mid-July Secretary-General Thant reports to the General Assembly on implementation of the Pakistani resolution of 14 July. The report consists entirely of a letter to Secretary-General Thant from Israeli Foreign Minister Eban, in which he makes it clear that his government does not intend to rescind the measures which have been taken to incorporate the Old City of Jerusalem into a single municipality under direct control of the Israeli Minister of Interior.
- 125 The question of Jerusalem's international status is returned to the Security Council.
- 126 **19 July** Israel tells the UN General Assembly that it will not withdraw its forces from Arab territory until the Arab states establish normal relations with Israel.
- 127 **21 July** President Nasser names Amin Howeidi as the new UAR Minister of War.
- 128 23 July President Nasser tells the UAR that he is re-organizing the armed forces to continue the struggle against Israel; he warns the nation of economic hardships but says there will be no surrender to Israel or the West.
- 129 **24-25 July** Leading Moslems and members of the Municipal Council of the fomer Jordanian sector of Jerusalem refuse to recognize the incorporation of the Old City in the enlarged municipality of Jerusalem and decline to serve on the enlarged City Council.
- 130 **26 July** UN Truce Supervisory Forces Chief, General Odd Bull informs Israeli officials that the UAR rejects the suggestion that both countries refrain from navigation on the Suez Canal. UAR officials also refuse to agree on the exact delineation of the cease-fire line.
- 131 1-6 August Foreign Ministers of Algeria, Iraq, Jordan, Kuwait, Le-

banon, Libya, Morocco, Saudi Arabia, Sudan, Syria, Tunisia, UAR and Yemen meet in Khartoum, Sudan. No official details of the meeting are published, but the press reports that the ministers reject any form of peace negotiations with Israel.

- 132 **3 August** Israel and the UAR agree to a temporary ban on navigation in the Suez Canal.
- 133 6 August Israel and Jordan reach agreement on procedure for the return of Palestinian refugees to the West Bank of the Jordan River. During the period covered by the agreement, 18-31 August, only 14,000 of the roughly 200,000 Arab refugees make the return journey to the West Bank, which is now under Israeli control.
- 134 **14 August** Foreign Minister Eban states that the only alternative to the cease-fire line of June 1967 is freely-negotiated new frontiers assuring peace and security in the area. Israel is "prepared to meet at any time with the Governments of Egypt, Syria, Lebanon, and Jordan".
- 135 26 August The ban on navigation in the Suez Canal is extended indefinitely; Israel and UAR reach no agreement on the demarcation of the cease-fire line in the Canal waters. UN spokesmen finally indicate that the entire Canal zone constitutes the cease-fire line.
- 136 **28** August A summit conference of Arab nations (Syria not present) held in Khartoum, Sudan, decides *inter alia*, to take "any necessary steps" towards consolidating Arab military strength to face any possible aggression. It also decides to enfore "the principle of non-recognition and non-negotiation, and to make no peace with Israel for the sake of the rights of the Palestinian people in their homeland".
- 137 August-September Despite the presence of the UN Supervisory Forces UAR and Israeli forces along the Suez Canal frequently exchange artillery duels. Local cease-fires are arranged by the UN command under General Bull.
- 138 August October Israeli and Jordan forces exchange fire across the Jordan River, but casualties remain light.
- 139 **3 September** Israel lifts the time limit, which had been the end of August, for the repatriation of refugees, principally because 6,200 refugees who received the permit to return to the West Bank did not do so.
- 140 25 September-1 October Al Fatah, the Palestinian Liberation Movement, continues its guerrilla and other sabotage activities behind the Israeli line in the Jordanian sector. They kill two Israeli civilians, leading to strong military reprisals by the Israeli defence forces.
- 141 11 October Israeli Premier Eshkol claims that the USSR has replaced 80 per cent of the aircraft, tanks, and artillery which the UAR lost

in the Six-Day War. Similar replacements have also been made for the Syrian matériel losses.

- 142 **21 October** The Israeli destroyer *Eilath* (1,710 tons) is sunk off the Sinai coast by the Egyptian Navy using Soviet-built missile boats equipped with Komar rockets. Of the 202 officers and cadets aboard the *Eilath*, 47 are reported killed and 91 wounded. Israel claims the destroyer was outside the territorial waters of the UAR when attacked; UAR claims that the *Eilath* was well within the 12-mile limit recognized by the UAR.
- 143 **24 October** Israeli and UAR forces exchange artillery fire at the southern end of the Suez Canal; two large oil refineries at Suez are set ablaze by Israeli fire. UAR authorities regard the shelling of the refineries as a reprisal for sinking the *Eilath*.
- 144 24-25 October The UN Security Council, meeting to consider the incidents in the Suez Canal zone, adopts a resolution which condemns the violations of the cease-fire in the Middle East; expresses regret at the subsequent loss of lives and property, reaffirms the necessity for strict compliance with the earlier cease-fire resolutions, and calls for full and prompt cooperation, by all parties concerned, with the UN Truce Supervision Organization.
- 145 Secretary-General Thant proposes strengthening the UN peacekeeping machinery in the Middle East, including increasing the number of UN observers from 32 to 90, and doubling the number of UN observation posts on each side of the Canal zone.
- 146 30 October Premier Eshkol repeats that Israel will not allow the situation which prevailed before 5 June to be restored. In the face of the Arab position of not recognizing Israel, Israel will "maintain in full the situation as it was established in the cease-fire agreements . . ."
- 147 21 November Israeli jets cross the Jordan River, for the first time since the Six-Day War, and attack Jordanian tanks which have been firing on Israeli positions on the West Bank. Each side blames the other for the incident.
- 148 22 November The UN Security Council unanimously adopts a UK resolution which lists the following principles for the establishment of peace in the Middle East: (1) the withdrawal of Israeli forces from occupied territories; (2) the termination of all claims or states of belligerency; (3) the mutual acknowledgement of the sovereignty, territorial integrity, and political independence of every state in the area, and of their right to peace within secure and recognized boundaries; and (4) a just settlement of the refugee problem. The resolution also recommends that the Secretary-General should designate a Special Represen-

tative to "establish and maintain contacts with the States concerned" in the Middle East.

- 149 23 November Secretary-General Thant designates Dr. Gunnar Jarring, Swedish Ambassador in Moscow, as his Special Representative to visit the Middle East under the terms of the Security Council resolution.
- 150 President Nasser says that the UAR will not recognize Israel, will not permit Israeli navigation on the Suez Canal, and will "not forego the rights of the people of Palestine". He claims that the UAR Army is stronger now than it was before the Six-Day War, and states unequivocally that UAR is ready to reopen the war if necessary, at a time favourable to the Arabs.
- 151 November–December Al Fatah carries out several mining and sabotage attacks, including blowing up a water pump at the Israeli Dead Sea works near Sodom on 30 November and blowing up part of the railway line to Jerusalem on 3 December.
- 152 1 December Premier Eshkol enumerates Israel's five-point policy:

(1) permanent peace between Israel and its neighbours; (2) the achievement of peace by direct negotiations and the conclusion of a peace treaty between Israel and its neighbours; (3) free passage of Israeli ships through the Suez Canal and the Straits of Tiran; (4) agreed and secure borders between Israel and its neighbours; and (5) a settlement of the refugee problem "within a regional and international context", following the establishment of peace in the Middle East.

153 **21 December** Israeli military authorities announce that 300 "marauders" have been captured and 50 killed since the end of the Six-Day War.

4D. List of United Nations resolutions on conflicts, 1967-68

1. Security Council resolutions

Resolution no.	Subject	Date of adoption
I Middle East		
233 (1967)	Calls upon the Governments concerned for an immediate ceasefire and for a cessation of all military activities in the area.	6 June 1967
234 (1967)	Demands that the Governments concerned should cease fire and discontinue all military activities at 20.00 GMT on 7 June 1967.	7 June 1967
235 (1967)	Confirming its previous resolutions demands that hostilities should cease forthwith, and requests the Secretary-General to make immediate contacts with the Governments of Israel and Syria to arrange immediate compliance with these resolutions.	9 June 1967
236 (1967)	Inter alia calls for the prompt return to the cease-fire positions of any troops which may have moved forward after 16.30 GMT on 10 June 1967.	11 June 1967
237 (1967)	Calls upon the Government of Israel to ensure safety, welfare and security of the inhabitants of the areas where military operations have taken place and to facilitate the return of those inhabitants who have fled the areas since the outbreak of hostilities; it also recommends to the Governments concerned scrupulous respect for humanitarian principles in their treatment of prisoners of war and civilian persons.	14 June 1967
240 (1967)	Inter alia requires the Member States concerned to cease immediately all prohibited military activities in the area, and to co-operate fully and promptly with the UN Truce Supervision Organization.	25 October 1967
242 (1967)	Proclaims the principles and measures by which a just and lasting peace in the Middle East should be established, and requests the Secretary-General to designate a special representative to establish and maintain contacts with States concerned. (The full text of the resolution is given on page 432.)	22 November 1967
248 (1968)	Deplores the loss of life and heavy damage to property; condemns the military action launched by Israel; deplores all violent incidents in violation of the cease-fire and declares that such actions cannot be tolerated and that the Security Council would have to consider further and more effective steps as envisaged in the Charter to ensure against repetition of such acts; and calls upon Israel to desist from acts or activities in contravention of resolution 237 (1967).	24 March 1968

429

Resolution no.	Subject	Date of adoption	
250 (1968)	Calls upon Israel to refrain from holding the military parade in Jerusalem which is contemplated for 2 May 1968.	27 April 1968	
251 (1968)	Deeply deplores the holding by Israel of the military parade in Jerusalem on 2 May 1968.	2 May 1968	
252 (1968)	Deplores the failure of Israel to comply with the General Assembly resolutions 2253(ES-V) and 2254(ES-V); considers that all legislative and administrative measures and actions taken by Israel in respect to the legal status of Jerusalem are invalid and cannot change that status; and urgently calls upon Israel to desist forthwith from taking any further action which tends to change the status of Jerusalem.	21 May 1968	
256 (1968)	Reaffirms its resolution 248 (1968) and condemns the further military attacks launched by Israel in flagrant violation of the UN Charter and resolution 248 (1968).	16 August 1968	
258 (1968)	Reaffirms its resolution 242 of 22 November 1967, and urges all the parties to extend their fullest co-operation to the Special Representative of the Secretary-General.	18 September 1968	
259 (1968)	Requests the Government of Israel to receive the Special Representative of the Secretary-General, who will urgently be dispatched to the Arab territories under military occupation by Israel to report on the implementation of resolution 237 (1967), and to co-operate with him and to facilitate his work.	27 September 1968	
262 (1968)	Condemns Israel for its premeditated military action against the civil International Airport of Beirut and issues a solemn warning to Israel that if such acts were to be repeated, the Council would have to consider further steps to give effect to its decisions.	31 December 1968	
II Cyprus			
238 (1967)	Extends once more the stationing in Cyprus of the UN Peace-keeping Force for a further period of six months ending on 26 December 1967.	19 June 1967	
244 (1967)	Extends the stationing in Cyprus of the UN Peace-keeping Force for a period of three months ending on 26 March 1968 and calls upon all the parties concerned first to refrain from any act which might aggravate the situation and secondly to undertake a new determined effort to achieve a permanent settlement of the problem.	22 December 1967	
	247 (1968)	Extends once more the stationing in Cyprus of the UN Peace-keeping Force for a further period of three months ending on 26 June 1968.	18 March 1968
-----	----------------	---	------------------
	254 (1968)	Extends once more the stationing in Cyprus of the UN Peace-keeping Force for a period ending on 15 December 1968.	18 June 1968
	261 (1968)	Extends once more the stationing in Cyprus of the UN Peace-keeping Force for a further period ending on 15 June 1969.	10 December 1968
	III Congo		
	239 (1967)	Condemns any state which persists in permitting or tolerating the recruit- ment of mercenaries, and the provision of facilities to them, with the objective of overthrowing the Government of states members of the UN; and calls upon Governments to ensure that their territory and other territories under their control, as well as their nationals, are not used for the planning of subversion and the recruitment, training and transit of mercenaries designed to overthrow the Government of the Democratic Republic of the Congo.	6 July 1967
	241 (1967)	Condemns any act of interference in the internal affairs of the Republic of Congo and, in particular, the failure of Portugal to prevent the mercenaries from using the territory of Angola as a base of operations for armed attacks against the Republic of Congo. It also calls upon Portugal to put an end immediately to the provision to the mercenaries of any assistance whatsoever, and calls upon all countries receiving mercenaries who have participated in the armed attacks against the Republic of Congo to take appropriate measures to prevent them from renewing these activities against any state.	15 November 1967
	IV South Afric	ca	
	245 (1968)	Condemning the refusal of the Government of South Africa to comply with the provisions of General Assembly resolution 2324 (XXII), calls upon it to discontinue illegal trials and release and repatriate the South West Africans concerned. It also invites all States to exert their influence in order to induce the Government of South Africa to comply with the provisions of this resolution	25 January 1968
431	246 (1968)	Censures the Government of South Africa for its flagrant defiance of the resolution 245 (1968) as well as of the authority of the United Nations, and demands that it forthwith release and repatriate the South West Africans concerned. It also calls upon members of the UN to co-operate with the Security Council in order to obtain compliance by the Government of South Africa with the provisions of this resolution, and decides that in the event of failure of the Government of South Africa to comply with the resolution, the Security Council will meet immediately to determine upon effective steps or measures in conformity with the relevant provisions of the UN Charter.	-14 March 1968

Resolution

no. Subject

V Southern Rhodesia

253 (1968) Condemns all measures of political repression which violate fundamental freedoms and rights of the people of Southern Rhodesia, and calls upon the Government of the United Kingdom to take all possible measures to put an end to such actions and to the rebellion in Southern Rhodesia. It also inter alia decides, in furtherance of the objective of ending the rebellion, to impose economic sanctions on Southern Rhodesia and calls upon all the States Members of the specialized organizations and other international organizations in the UN system to extend their full co-operation in achieving this end.

Full text of Resolution 242 (1967) adopted at the 1382nd meeting (22 November 1967)

"The Security Council,

"Expressing its continuing concern with the grave situation in the Middle East,

"Emphasizing the inadmissibility of the acquisition of territory by war and the need to work for a just and lasting peace in which every State in the area can live in security,

"*Emphasizing further* that all Member States in their acceptance of the Charter of the United Nations have undertaken a commitment to act in accordance with Article 2 of the Charter,

"1. Affirms that the fulfillment of Charter principles requires the establishment of a just and lasting peace in the Middle East which should include the application of both the following principles:

- (i) Withdrawal of Israeli armed forces from territories occupied in the recent conflict;
- (ii) Termination of all claims or states of belligerency and respect for the acknowledgement of the sovereignty, territorial integrity and political independence of every State in the area and their right to live in peace within secure and recognized boundaries free from threats or acts of force;

29 May 1968

Date of adoption

"2. Affirms further the necessity

- (a) For guaranteeing freedom of navigation through international waterways in the area;
- (b) For achieving a just settlement of the refugee problem;
- (c) For guaranteeing the territorial inviolability and political independence of every State in the area, through measures including the establishment of demilitarized zones;

"3. Requests the Secretary-General to designate a Special Representative to proceed to the Middle East to establish and maintain contacts with the States concerned in order to promote agreement and assist efforts to achieve a peaceful and accepted settlement in accordance with the provisions and principles in this resolution;

"4. Requests the Secretary-General to report to the Security Council on the progress of the efforts of the Special Representative as soon as possible." (S/PV.1382, page 36, and document S/RES/242)

432

2. General Assembly resolutions

Resolution no.	Subject	Date of adoption	Voting result	s				
I Peace-keeping operations								
2249 (S-V) ¹	Comprehensive review of the whole question of peace-keeping operations in all their aspects Renews its appeal to all Member States, and in particular to the highly developed countries to make voluntary contributions to overcome the continuing financial difficulties of the Organization, and requests the Special Committee ² to continue the review of the whole question of peace-keeping operations in all its aspects, in particular those relating to (a) methods of financing future operations and (b) facilities, services and personnel which Member States might voluntarily provide for these operations.	23 May 1967	In favour Against Abstentions	90 0 11	(France, USA, USSR) (UK)			
2308 (XXII)	Comprehensive review of the whole question of peace-keeping operations in all their aspects Considering that the preparation of a study on matters related to facilities, services and personnel which Member States might provide for UN peace- keeping operations would be appropriate, requests the Special Committee to prepare by 1 July 1968 its report on the progress made.	13 December 1967	In favour Against Abstentions	96 1 5	(France, USA, UK, USSR)			
2451 (XXIII)	Comprehensive review of the whole question of peace-keeping operations in all their aspects Requests the Special Committee inter alia to submit to the General Assembly as soon as possible, and no later than its twenty-fourth session, a comprehensive report on the UN militaty observers established or authorized by the Security Council for observation purposes pursuant to Security Council resolutions, as well as a progress report on such work as the Special Committee may be able to undertake on any other models of peace-keeping operations.	19 December 1968 e	In favour Against Abstentions	101 2 3	(France, UK, USA, USSR)			
II Korea								
2269 (XXII)	The Korean question Inter alia reaffirms that the objectives of the UN in Korea are to bring about the establishment of a unified and democratic Korea under a representative form of government, and requests the UN Commission for the Unification and Rehabilitation of Korea to intensify its efforts to achieve these objectives. It also notes that the UN forces which were sent to Korea have in greater part already been withdrawn, and that the Governments concerned are prepared to withdraw the remaining forces from Korea whenever such action is requested by the Republic of Korea or whenever the conditions for a lasting settlement formulated by the General Assembly have been fulfilled.	16 November 1967	In favour Against Abstentions	68 23 26	(France, UK, USA) (USSR)			

433

2. Continued

Resolution no.	Subject	Date of adoption	Voting resul	ts	
2466 (XXIII)	The Korean question Reaffirms all the provisions contained in the resolution 2269 (XXII) and requests the UN Commission for the Unification and Rehabilitation of Korea to keep members of the Assembly informed on the situation in the area through regular reports submitted to the Secretary-General and to the Assembly, the first report to be submitted no later than four months after the adoption of the present resolution.	20 December 1968	In favour Against Abstentions	71 25 20	(France, UK, USA) (USSR)
III Middle Ea	ist				
2252 (ES-V) ³	³ Humanitarian assistance 4 Inter alia welcomes with great satisfaction Security Council resolution 237 (1967), and calls upon all the Member States concerned to facilitate the transport of supplies to all the areas in which assistance is being rendered, and appeals to all Governments, as well as organizations and individuals, to make special contributions to the UN Relief and Work Agency for Palestine Refugees in the Near East and also to the other intergovernmental and non-govern- mental organizations concerned.	4 July 1967	In favour	116	(Arab States, France, Israel, UK, USA, USSR)
			Against	0	
		S	Abstentions	2	(Syria)
2253 (ES-V)	Measures taken by Israel to change the status of the city of Jerusalem Considers that these measures are invalid and calls upon Israel to rescind all	4 July 1967	In favour	99	(Arab States, France, UK, USSR)
	measures already taken and to desist forthwith from taking any action which would alter the status of Jerusalem.		Against Abstentions (Not present	0 20	(USA) Israel)
2254 (ES-V)	Measures taken by Israel to change the status of the city of Jerusalem Deplores the failure of Israel to implement General Assembly resolution	14 July 1967	In favour	99	(Arab States, France, UK, USSR)
	2253 (ES-V), and reiterates its call to Israel in that respect.		Against Abstentions (Not present	0 18	(USA) Israel)
2256 (ES-V)	The situation in the Middle East Requests the Secretary-General to forward the records of the fifth emergency special session of the General Assembly to the Security Council in order to facilitate the resumption of its considerations of the tense situation in the Middle East, and decides to adjourn the session temporarily.	21 July 1967	In favour Against Abstentions	63 26 27	(UK, USA, USSR) (Arab States) (France, Israel)
2257 (ES-V)	The situation in the Middle East Decides to place on the agenda of its twenty-second regular session, as matter of high priority, the question of the Middle East.	18 September 1967	In favour	93	(Arab States, France, UK, USA, USSR)
			Against	0	
			Abstentions	3	(Israel)

434

IV Southern R	nodesia				
2262 (XXII)	Question of Southern Rhodesia Inter alia reaffirms the legitimacy of the struggle of the people of Zimbabwe for the restoration of their inalienable right to freedom and independence; condemns the failure and the refusal of the United Kingdom as the Administering Power to take effective measures to bring down the illegal racist minority régime and to transfer the power to the people of Zimbabwe; reaffirms that the only effective and speedy way for the administering power to put down the rebellion is through the use of force; condemns all those States which are still trading with the illegal racist minority régime and calls upon them to sever all economic and other relations; and strongly condemns the Governments of South Africa and Portugal for their continued support and in particular for the presence of South African armed forces in Southern Rhodesia and the arms aid extended to the illegal régime.	3 November 1967	In favour Against Abstentions	92 2 18	(USSR) (Portugal, South Africa) (France, UK, USA)
2379 (XXIII)	Question of Southern Rhodesia Calls upon the Government of the United Kingdom not to grant independence to Southern Rhodesia unless it is preceded by the establishment of a govern- ment based on free elections by universal suffrage and on majority rule, and calls upon all the States not to recognize any form of independence in Southern Rhodesia prior to fulfillment of the above request.	25 October 1968	In favour Against Abstentions	92 2 17	(USSR) (Portugal, South Africa) (France, UK, USA)
2383 (XXIII)	Question of Southern Rhodesia Inter alia, calls upon the Government of the United Kingdom to use force in order to put an immediate end to the illegal régime in Southern Rhodesia; condemns the policies of the Governments of South Africa and Portugal and all other Governments which continue to have political, economic, financial and other relations with Southern Rhodesia; and suggests to the Security Council that it should, in implementation of the provisions of Chapter VII of the Charter, widen the scope of the sanctions to include all the measures laid down in Article 41 of the Charter and impose sanctions on South Africa and Portugal, the Governments which have blatantly refused to carry out all the mandatory decisions of the Security Council.	7 November 1968	In favour Against Abstentions	86 9 19	(USSR) (Portugal, South Africa, UK, USA) (France)
V South Afric	a				
2307 (XXII)	The policies of apartheid of the Government of the Republic of South Africa Inter alia strongly reiterates its conviction that the situation in South Africa constitutes a threat to international peace and security, that action under Chapter VII of the UN Charter is essential in order to solve the problem of apartheid and that universally applied mandatory economic sanctions are the only means of achieving a peaceful solution, and requests all States to comply fully with the respective resolutions of the Security Council, and to provide appropriate moral, political and material assitance to the people of South Africi in their legitimate struggle for their rights recognized in the Charter. It also requests the Special Committee on the Policies of Apartheid of the Governmen	13 December 1967 a	In favour Against Abstentions	89 2 12	(USSR) (South Africa, Portugal) (France, UK, USA)

. .

430	2. C	Continued
5		

Resolution no.	Subject	Date of adoption	Voting results	
	of the Republic of South Africa to intensify its efforts to promote an international campaign against apartheid.			
2396 (XXIII)	The policies of apartheid of the Government of the Republic of South Africa Inter alia condemns the Government of the Republic of South Africa for its illegal occupation of Namibia and its military intervention and for its assistance to the racist minority régime in Southern Rhodesia in violation of UN resolutions, and requests the Security Council to resume urgently the consideration of the question of apartheid with a view of adopting, under Chapter VII of the UN Charter, effective measures to ensure the full implementation of comprehensive mandatory sanctions against South Africa. It also expresses grave concern over the ruthless persecution of opponents of apartheid under arbitrary laws and the treatment of freedom fighters who were taken prisoner during the legitimate struggle for liberation.	2 December 1968	In favour 8 Against 2 Abstentions 14	 15 (USSR) 2 (Portugal, South Africa) 4 (France, UK, USA)
2397 (XXII)	United Nations Trust Fund for South Africa Inter alia decides to revise the purposes of the fund to provide: legal assistance to persons persecuted under the repressive and discriminatory legislation of South Africa; relief to such persons and their dependants; education of such persons and their dependants; and relief for refugees from South Africa.	2 December 1968	In favour 10 Against 2 Abstentions 6	 (France, UK, USA, USSR) (Portugal, South Africa) 0
VI South Wes	st Africa			
2248 (S-V)	Question of South West Africa Decides to establish a UN Council for South West Africa to administer it until independence. The Council comprises eleven Member States and is entrusted with such powers and functions as will help to bring South West Africa to complete independence. It also decides to appoint a UN Commissione for South West Africa, who shall in the performance of its tasks, be responsible to the Council, and calls upon the Government of South Africa to facilitate without delay the transfer of the administration of the territory of South West Africa to the Council. It decides that South West Africa shall become independent on a date to be fixed in accordance to the wishes of the people and that the Council shall do all in its power to enable independence to be attained by June 1968.	19 May 1967 er	In favour 8. Against 3 Abstentions 3	15 2 (Portugal, South Africa) 0 (France, UK, USA, USSR)
2324 (XXII)	Question of South West Africa Condemns the illegal arrest, deportation and trial at Pretoria of the thirty-seven South West Africans, and calls upon the Government of South Africa to discontinue this trial and to release and repatriate the South West Africans concerned.	16 December 1967	In favour 110 Against 2 Abstentions 2	0 (France, UK, USA, USSR) 2 (Portugal, South Africa) 1

2325 (XXII)	Question of South West Africa Requests the UN Council for South West Africa to fulfill by every available means the mandate entrusted to it by the General Assembly, and condemns the refusal of the Government of South Africa to comply with General Assembly resolutions 2145 (XXII) and 2248 (S-V). It also calls upon South Africa to withdraw from the Territory of South West Africa all its military and police forces and its administration, and urgently appeals to all Member States to take effective economic and other measures designed to ensure the immediate withdrawal of the South African administration.	16 December 1967	In favour Against Abstentions	93 2 18	(USSR) (Portugal, South Africa) (France, UK, USA)
2372 (XXII)	Question of South West Africa Proclaims that in accordance with the desire of its people, South West Africa shall henceforth be known as "Namibia". It also designates the functions which the UN Council for Namibia shall perform as matter of priority and again condemns the Government of South Africa for the persistent refusal to comply with the resolutions of the General Assembly and the Security Council.	12 June 1968 n	In favour Against Abstentions	96 2 18	(USSR) (Portugal, South Africa) (France, UK, USA)
2403 (XXIII)	Question of Namibia Inter alia, recommends to the Security Council urgently to take all effective measures, in accordance with the relevant provisions of the Charter of the UN, to ensure the immediate withdrawal of the South African authorities from Namibia so as to enable Namibia to attain independence in accordance with provisions of resolutions 1514 (XV) and 2145 (XXI).	16 December 1968	In favour Against Abstentions	96 2 16	(USSR) (Portugal, South Africa) (France, UK, USA)
2404 (XXIII)	Question of Namibia Notes that the Special Committee on the Situation with regard to the Imple- mentation of the Declaration on the Granting of Independence to Colonial Countries and Peoples has taken into account the petitions concerning Namibia (received during 1967 and 1968) in its deliberation of the situation in Namibia; and notes further that these petitions have been brought to the attention of the UN Council for Namibia.	16 December 1968	Adopted without objection		

¹ General Assembly Fifth Special Session, 21 April-13 June 1967.

² The Special Committee on Peace-keeping Operations was established in accordance with the General Assembly resolution 2006 (XIX) of 18 February 1965 with the task "to undertake as soon as possible a comprehensive review of the whole question of peace-keeping operations in all their aspects, including the present financial difficulties of the Organization". ³ General Assembly Fifth Emergency Special Session, 17 June-18 September 1967.

Sources

Resolutions:

SCOR-Resolution and decisions of the Security Council 1967, S/INF/22/Rev. 2.

-Decisions taken and resolutions adopted by the Security Council during the year 1968, S/INF/23 (mimeographed).

GAOR-Fifth Special Session, Supplement No. 1 (A/6657)

-Fifth Emergency Special Session, Supplement No. 1 (A/6798)

-Twenty-second Session, Supplement No. 16 (A/6716) and No. 16A (A/6716/Add. 1)

-Twenty-third Session, Supplement No. 18 (A/7218)

Voting results:

Aktstycken utgivna av Kungl. Utrikesdepartementet, Ny serie 1:A:17, Stockholm, 1968. 437

Aktstycken utgivna av Kungl. Utrikesdepartementet, Ny serie 1:A:18, Stockholm, 1969.

GLOSSARY OF MODERN WARFARE

Advanced Manned Strategic Aircraft (AMSA) US bomber, proposed to replace the B-52. It would carry sophisticated penetration aids and be designed to penetrate a defensive system at low altitudes. Some money has been spent on development.

Anti-ballistic missile (ABM) Surface-to-air missile intended to intercept and destroy incoming ballistic missiles.

Assured destruction capability Ability to inflict a certain—usually very high level of damage on an adversary's population and industry (not, however, on his armed forces).

Ballistic missiles Missile which follows a ballistic trajectory—that is, the trajectory of something that is thrown.

B-52 Large US intercontinental subsonic bomber, carrying conventional and nuclear weapons. 600 are in the United States operational inventory.

B-70 Large US intercontinental supersonic bomber; only two B-70 bombers were built.

CEP (circular probable error) A measure of the accuracy of a missile: the radius of the circle within which half of any group of incoming warheads are expected to land.

Counterforce capability Ability to destroy opponent's strategic offensive forces.

Damage denial Ability to prevent damage from a nuclear attack, for example, by launching a preemptive first strike against the opponent's forces, or by active or passive defence measures.

Damage limiting Adjective used to describe measures taken to reduce the amount of damage from a nuclear attack. These include attacks on the adversary's offensive forces, or active or passive defence.

First strike capability Ability to destroy sufficient of the opponent's offensive weapons to prevent a successful counter-attack.

Fractional orbital bombardment system (FOBS) Method of delivering nuclear weapons from low altitude orbital trajectories. It is more difficult to detect FOBS than an ICBM, using long-range radar. However, they can deliver a smaller payload, and with less accuracy, than an ICBM.

Galosh NATO code-name for Soviet anti-ballistic missile.

Guidance system The system which moves a weapon in a desired direction; control may be exercised by an automatic regulating device or by a component which reacts to outside signals.

Hardening The protecting of military facilities to make them resistant to the blast of a nuclear weapon. Hardened missile launch sites consist of underground silos with protective covering.

Hard-point defence Defensive system for protecting a hardened site from nuclear attack.

Initial operating capacity (IOC) Date on which a weapon or weapon system becomes operational.

Intercontinental ballistic missile (ICBM) Missile with a range between 5500 and 8000 nautical miles.

Intermediate range ballistic missile (IRBM) Missile with a range between 2000 and 4000 nautical miles.

Kiloton The explosive power of 1000 tons of TNT.

Megaton The explosive power of 1,000,000 tons of TNT.

Minuteman Class of solid fueled ICBMs. Two versions of this missile have been deployed, Minuteman I and II. The third version—Minuteman III—will carry MIRVs, and is due to come into the United States missile forces next year.

Multiple individually targetable reentry vehicle (MIRV) System which can carry in one missile several warheads which can be individually delivered on separate targets. MIRVs will be incorporated in Minuteman III and Poseidon missiles.

Multiple reentry vehicles (MRV) System which can carry several warheads in one missile: these warheads, however, cannot be individually targeted.

Medium range ballistic missile (MRBM) Missile with a range of approximately 1500 nautical miles.

Penetration aids Devices aboard missiles and aircraft which aid passage through enemy defence systems. These aids may include decoys, chaff, and electronic jammers to interfere with radar.

Polaris US nuclear powered submarine, capable of launching 16 missiles; the term is also used to describe the missiles.

Poseidon United States missile which, it is planned, will replace most Polaris missiles in the next five years. It will carry MIRVs.

Reentry vehicle Portion of a missile or space craft which is designed to survive the frictional heat of entering the earth's atmosphere from space.

Second strike capability Ability to retaliate and destroy a large proportion of an adversary's industry and population, after the adversary had first launched a nuclear attack.

Silo A missile shelter including a vertical hole in the ground with facilities either for launching the missile directly or for lifting it to a launch position.

Glossary

Spartan Missile which is part of the United States anti-ballistic missile system: designed for intercepting incoming missiles outside the atmosphere.

Sprint Missile which is part of the United States anti-ballistic missile system: designed for intercepting incoming missiles after reentry into the atmosphere.

Strategic forces Generally used now of forces capable of delivering nuclear weapons against adversary's industry, population, or missile sites; or forces designed to defend against these attacks.

SS-9, SS-11 and **SS-13** United States designation of certain Soviet intercontinental ballistic missiles.

Tallinn defence Defence system deployed by the Soviet Union; some installations located near Tallinn, Estonia. Originally thought to be an anti-ballistic missile system, it is now considered to be an anti-aircraft system.

Titan United States liquid fueled ICBM with a warhead of several megatons.

Warhead Section of a missile which contains the explosive charge (either conventional or nuclear).

Weapon system A combat instrument, including both the weapon (such as missile or bomber) and its related equipment and support service and facilities.

SIPRI Publications

Stockholm Papers (short reports in paperback format)

- Communication satellites, Ingemar Dörfer, Stockholm. A report on problems of a new and powerful means of communication.
- 2. Seismic methods for monitoring underground explosions. Leading seismologists from 10 countries outline the current state of the art in a report from a symposium with agreed conclusions. Rapporteur David Davies, Cambridge, England.
- 3. The ENDC and the press, Loyal Gould, the Ohio State University. A study of the press arrangements for the Eighteen Nations Disarmament Conference in Geneva, and a comparative analysis of ENDC coverage in 16 newspapers from various countries.

SIPRI Monographs

Towards a better use of the ocean. Results of a symposium, including a major paper on the legal problems by William Burke, the Ohio State University, and comments by international lawyers and scholars from seven countries, together with agreed conclusions.

The arms trade with the third world In preparation Chemical and biological warfare—developments, dangers and disarmament possibilities In preparation

SIPRI Yearbook of

World Armaments and Disarmament

The purpose of this Yearbook is to bring together in one place material for the past year on world military expenditure, on the technological arms race, and on the progress or absence of progress in disarmament negotiations. It has extensive reference material on such matters as conflicts, nuclear tests, and the trade in arms.

SIPRI Yearbook of World Armaments and Disarmament 1968/69

This 440-page Yearbook breaks new ground. Yearbooks already exist on such subjects as world agriculture and the world economy; but there is no yearbook on world armaments and disarmament. Before the Second World War the League of Nations did publish two yearbooks in this field: after the War the United Nations did not resume the practice. The purpose of the SIPRI Yearbook is to fill this obvious gap.

The SIPRI Yearbook brings together an account of what has been happening in world military expenditure and in the technological arms race, and an account of recent negotiations on arms limitation and disarmament. World concern about these matters is growing. In a number of countries there is increasing criticism of the size of the military budget. With the opening of the Strategic Arms Limitation Talks in Helsinki, questions of arms control may well return to the centre of the stage of world affairs. For all those concerned with these questions, the SIPRI Yearbook provides invaluable material.

The Yearbook is in two parts. The first, an account of recent developments, begins with the trends in world military expenditure. It then concentrates on the strategic competition between the two great powers and the arms trade with developing countries. Next it turns to the technological arms race, with detailed studies of submarine-launched missiles, chemical and biological warfare, helicopters, and some night-fighting devices. Finally it gives an account of recent disarmament negotiations, analysing in particular the Non-Proliferation Treaty, and giving some background to the Strategic Arms Limitation Talks.

The second part of the book contains reference material on armaments and disarmament: the material has not hitherto been available in one place, and a good deal has not previously been published. For example, there are twenty-year series for the military expenditure of a large number of countries, at both current and constant prices; estimates for the value of trade in major weapons with developing countries; a 1968 Arms Trade Register, citing 260 major weapon transfers to third world countries; a detailed statistical account of all nuclear weapons testing programmes; a chronology of major disarmament efforts since 1945; maps of world boundary disputes; a list of post-World War II armed conflicts; and chronologies of two wars, the Nigerian civil war and the Arab-Israeli conflict.

The SIPRI Yearbook has been prepared in Stockholm by an expert international staff. There is no doubt that it will become a standard work.