

CSIS

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Military Developments in the Maghreb:

Military Spending, Arms Imports, and Military Forces

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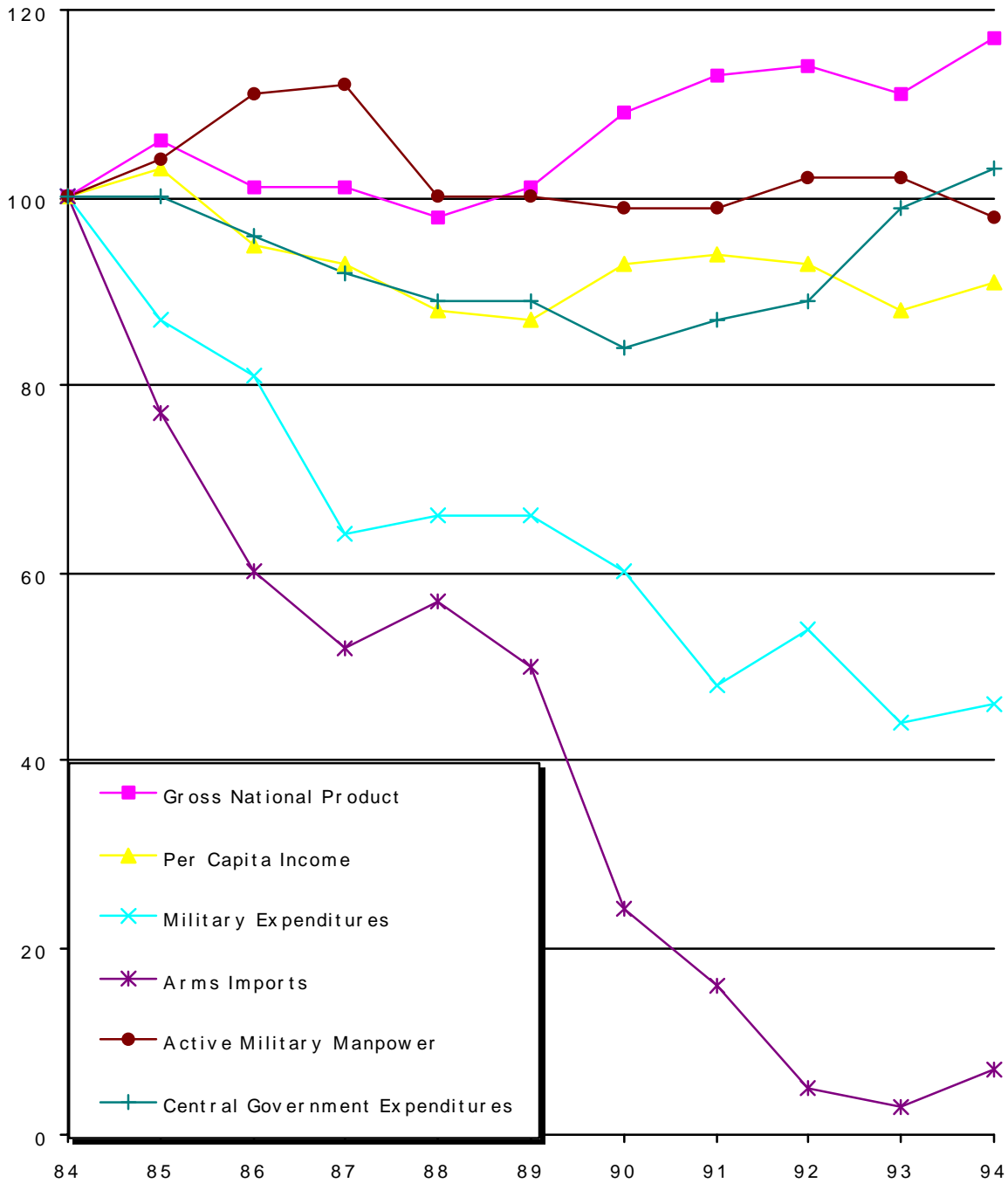
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Part One:

Trends in Total Military Spending

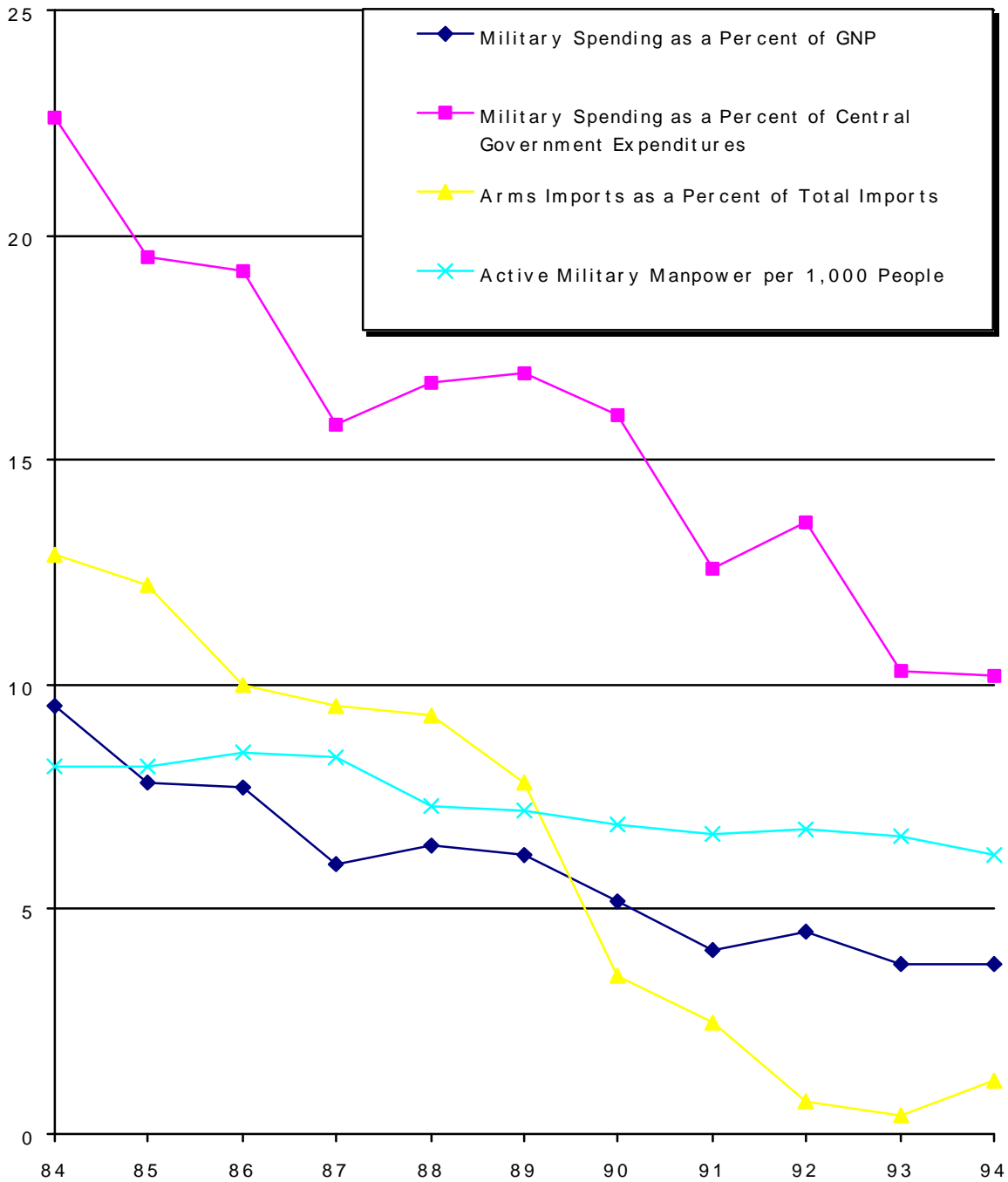
North African Military Expenditures and Arms Imports Also Dropped Sharply Relative to Economic Growth and Government Spending During 1984-1994

(1984=100, and all following years are percentages of 1984 as base year. All expenditure totals are measured in constant 1984 US dollars.)



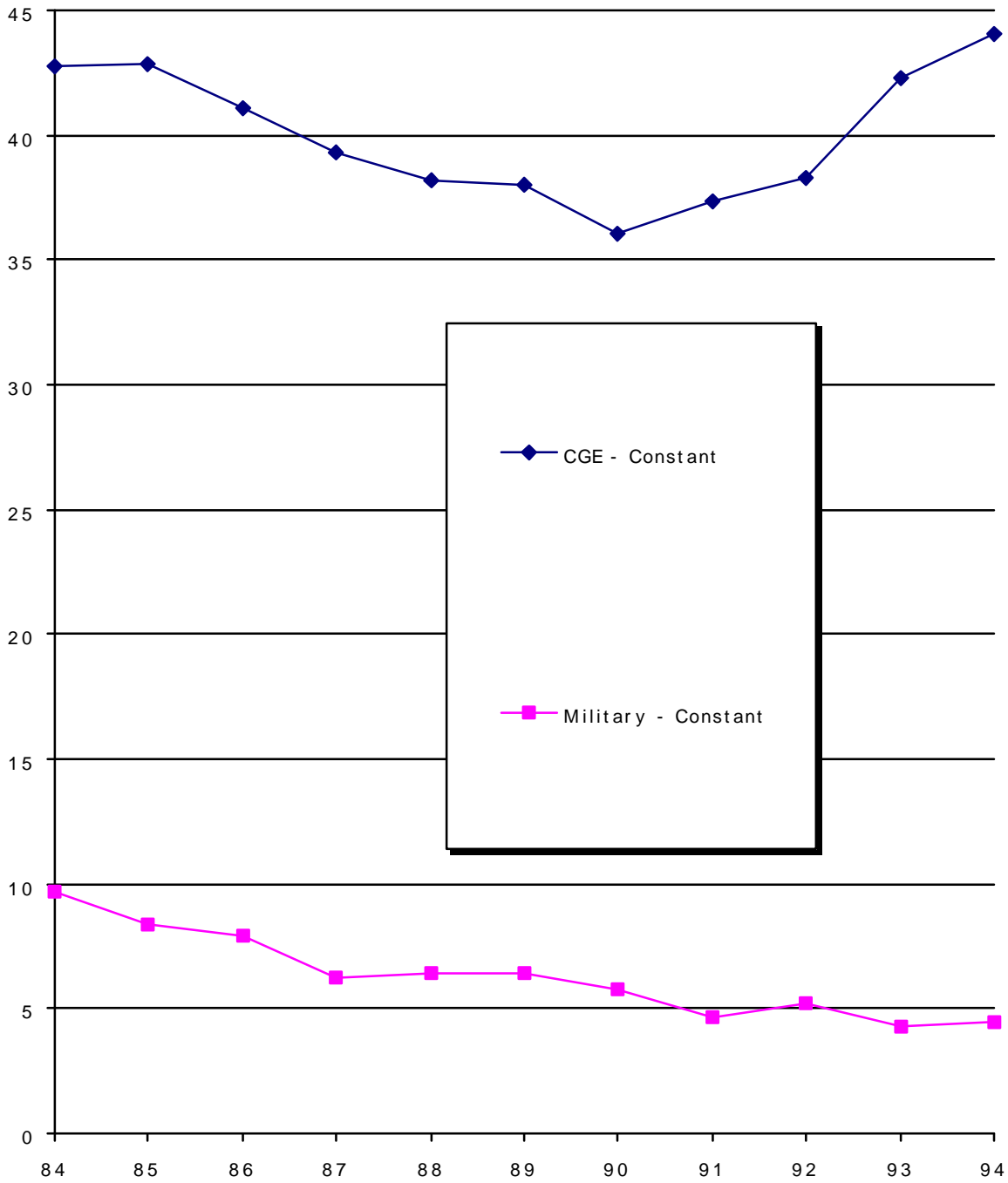
Adapted by Anthony H. Cordesman from ACDA, WMEAT, various editions.

Further, North African Military Efforts Declined Sharply as a Percent of GNP, Government Expenditures, Imports and Total Population: 1984-1994
 (All percentages are measured in absolute manpower and constant 1984 US dollars.)



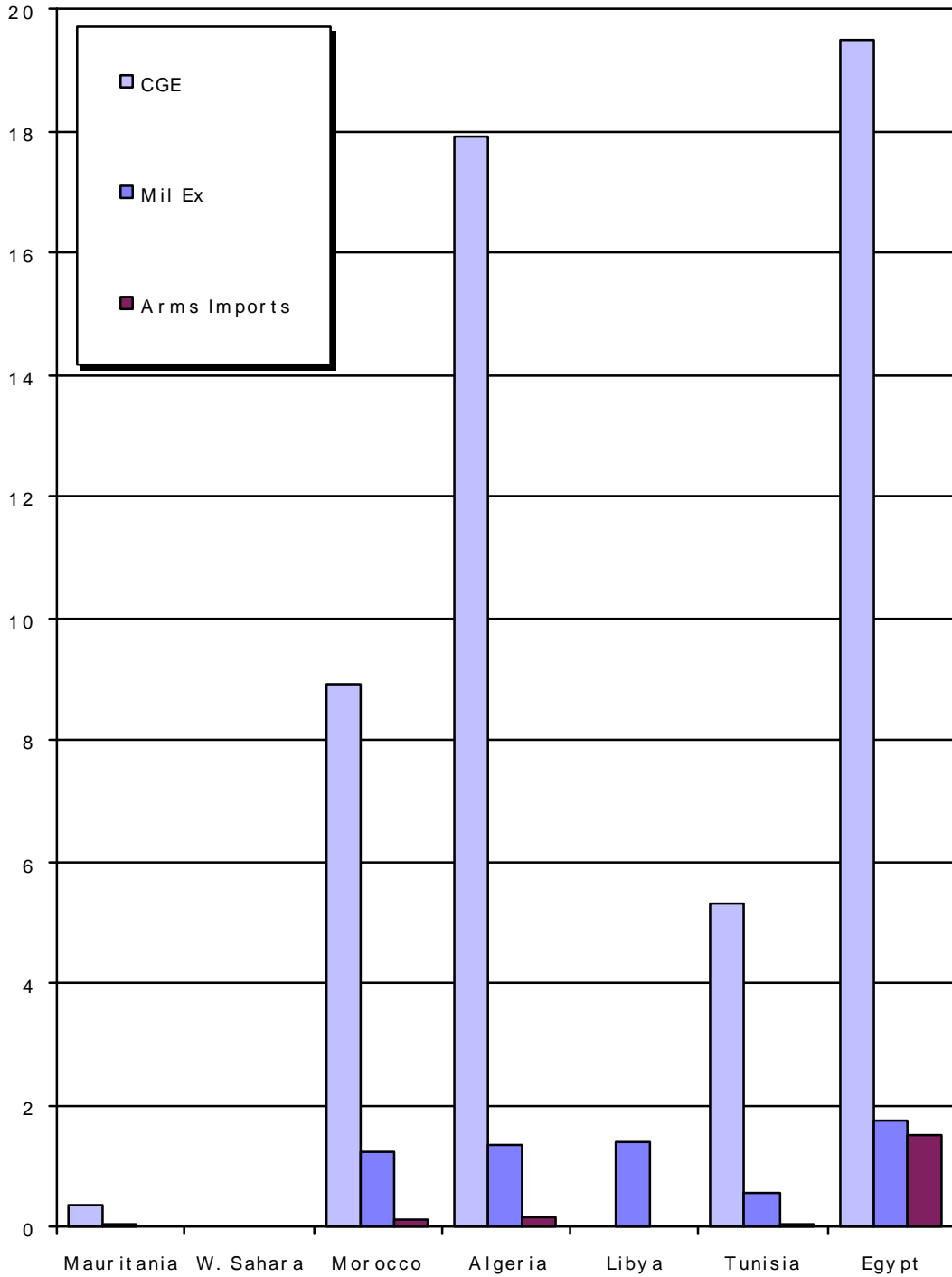
Adapted by Anthony H. Cordesman from ACDA, WMEAT, various editions. Middle East does not include North African states other than Egypt.

North African Central Government Versus Military Expenditures (\$US Constant billions)



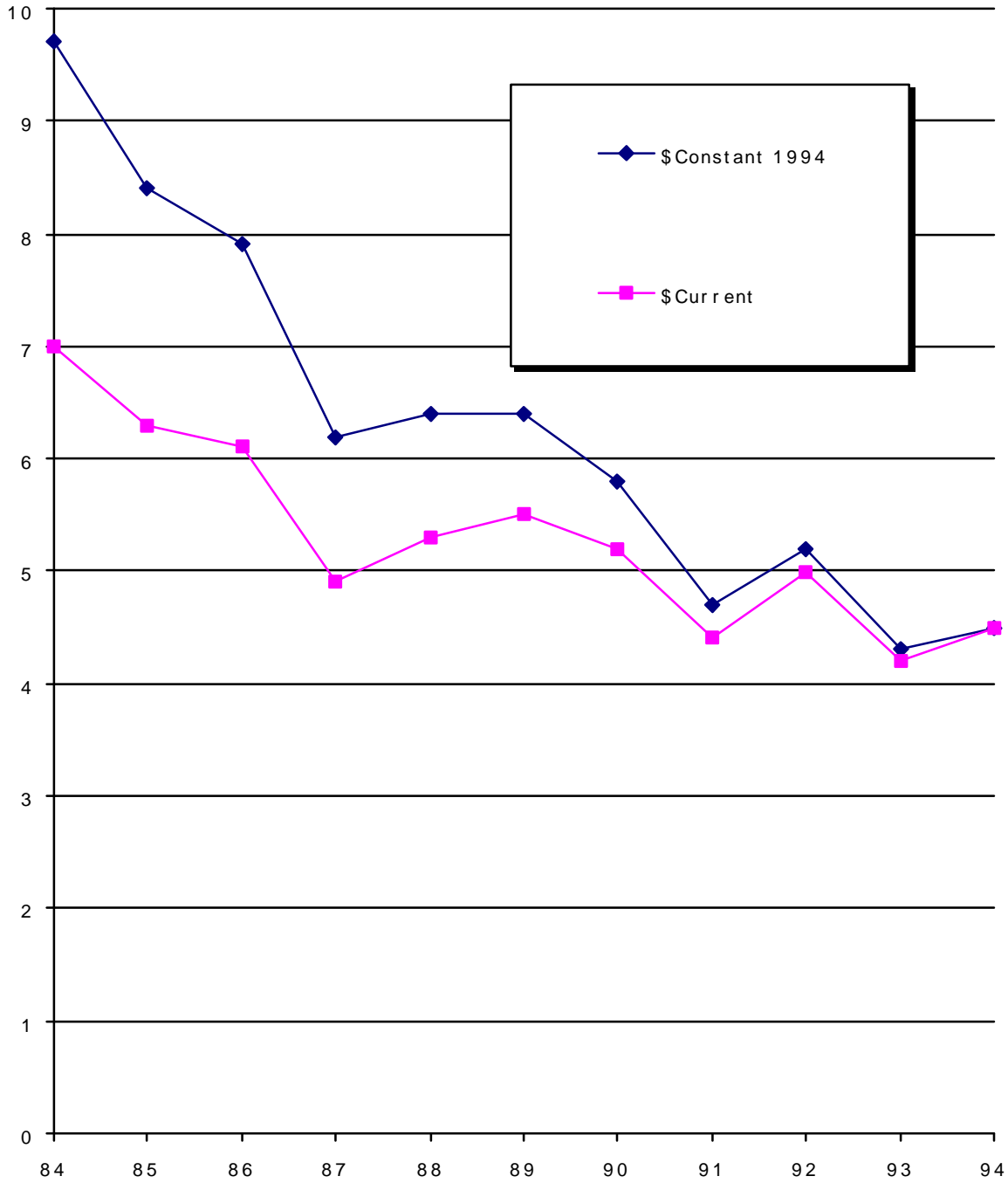
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

**Comparative Central Government, Military, and Arms Import Expenditures
in the Maghreb: 1994**
(Billions of Current \$US)



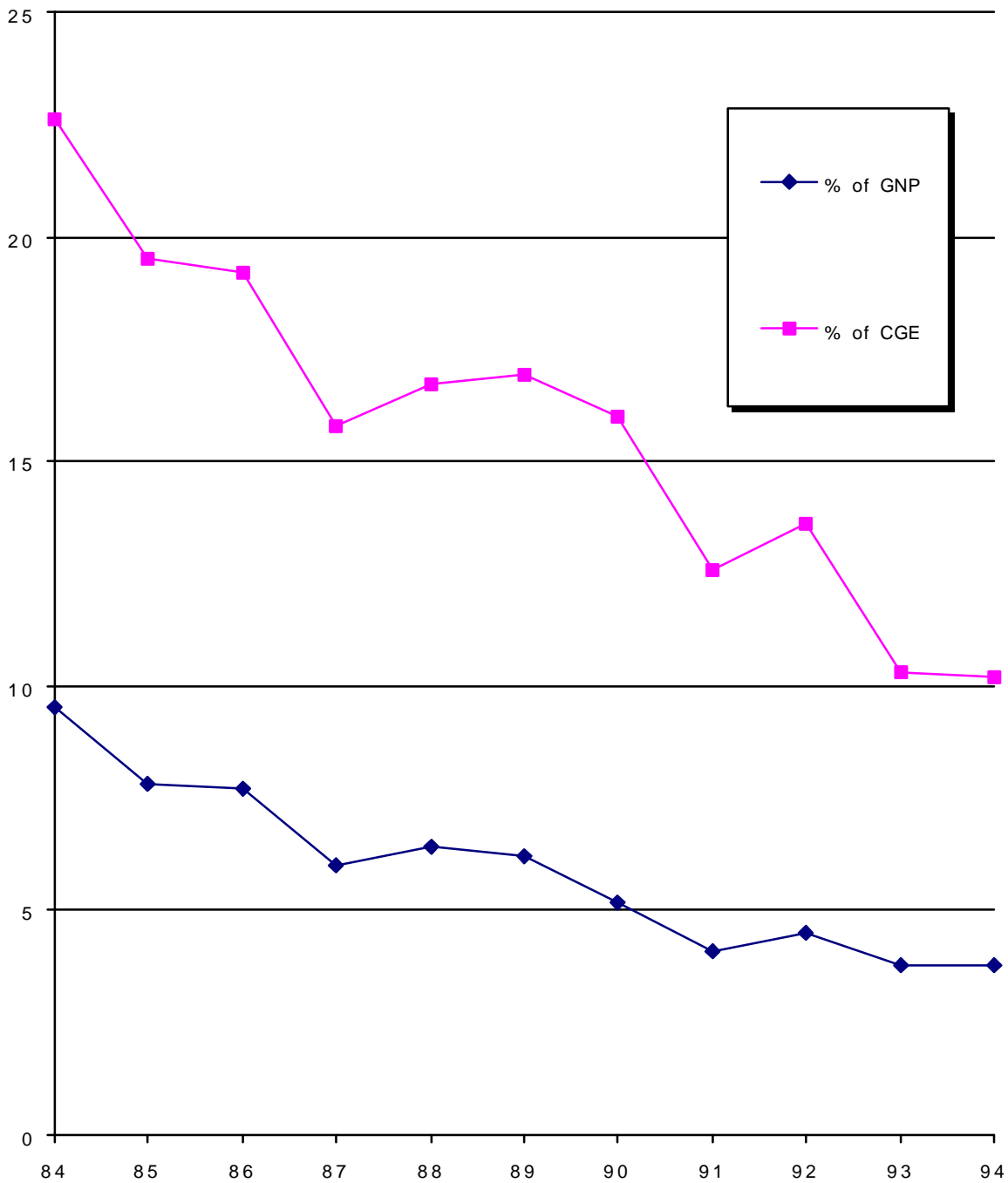
Source: World Bank, *The World Bank Atlas*, 1996; CIA, *World Factbook*, 1995; ACDA, *World Military Expenditures & Arms Transfers*

North African Military Expenditures (\$US billions)



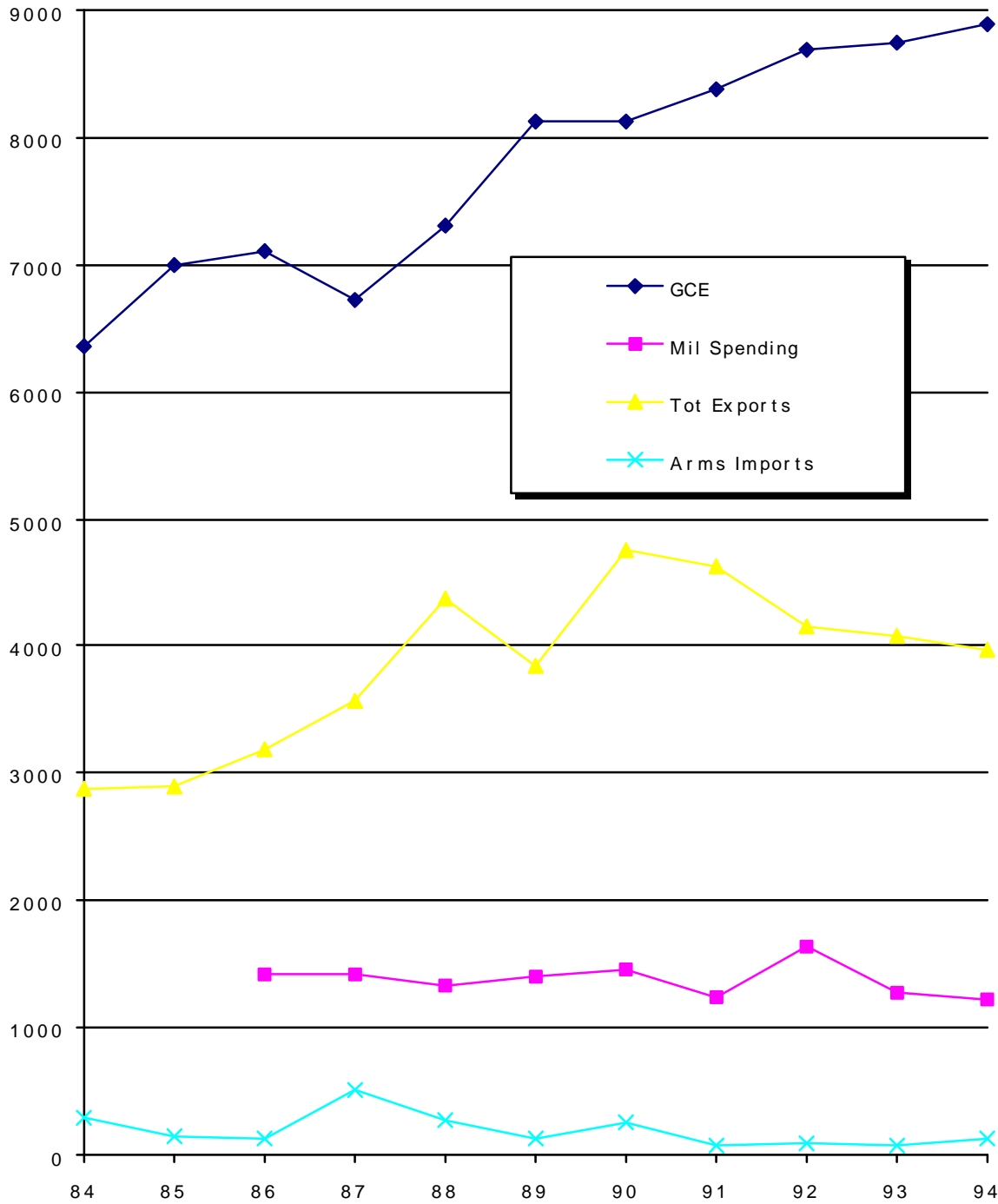
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

North African Military Expenditures as a Percent of GNP and Central Government Expenditures



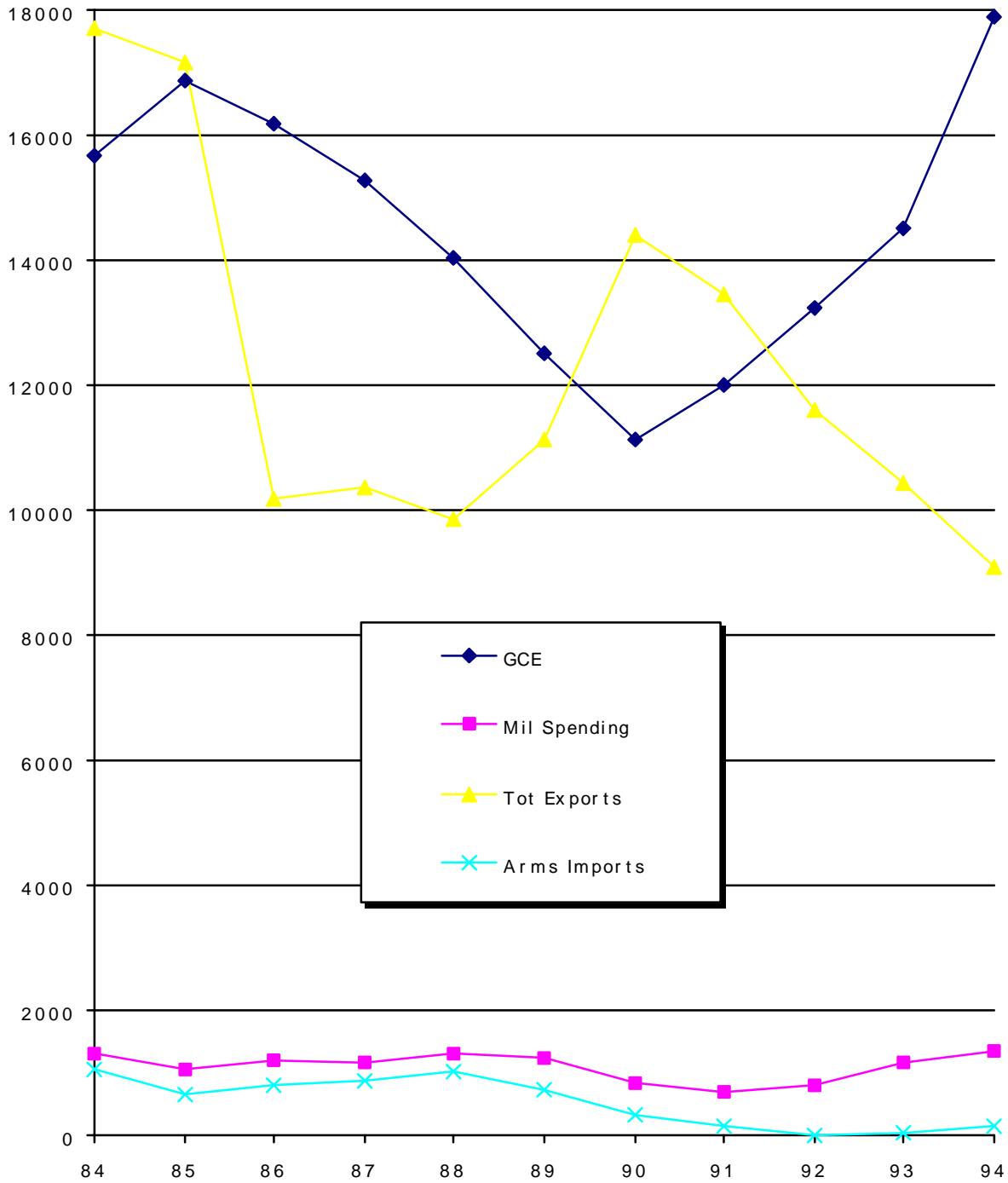
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

Military Spending and Arms Imports vs. CGE and Total Exports in Morocco: 1984-1994 (Constant Millions 1994 \$US)



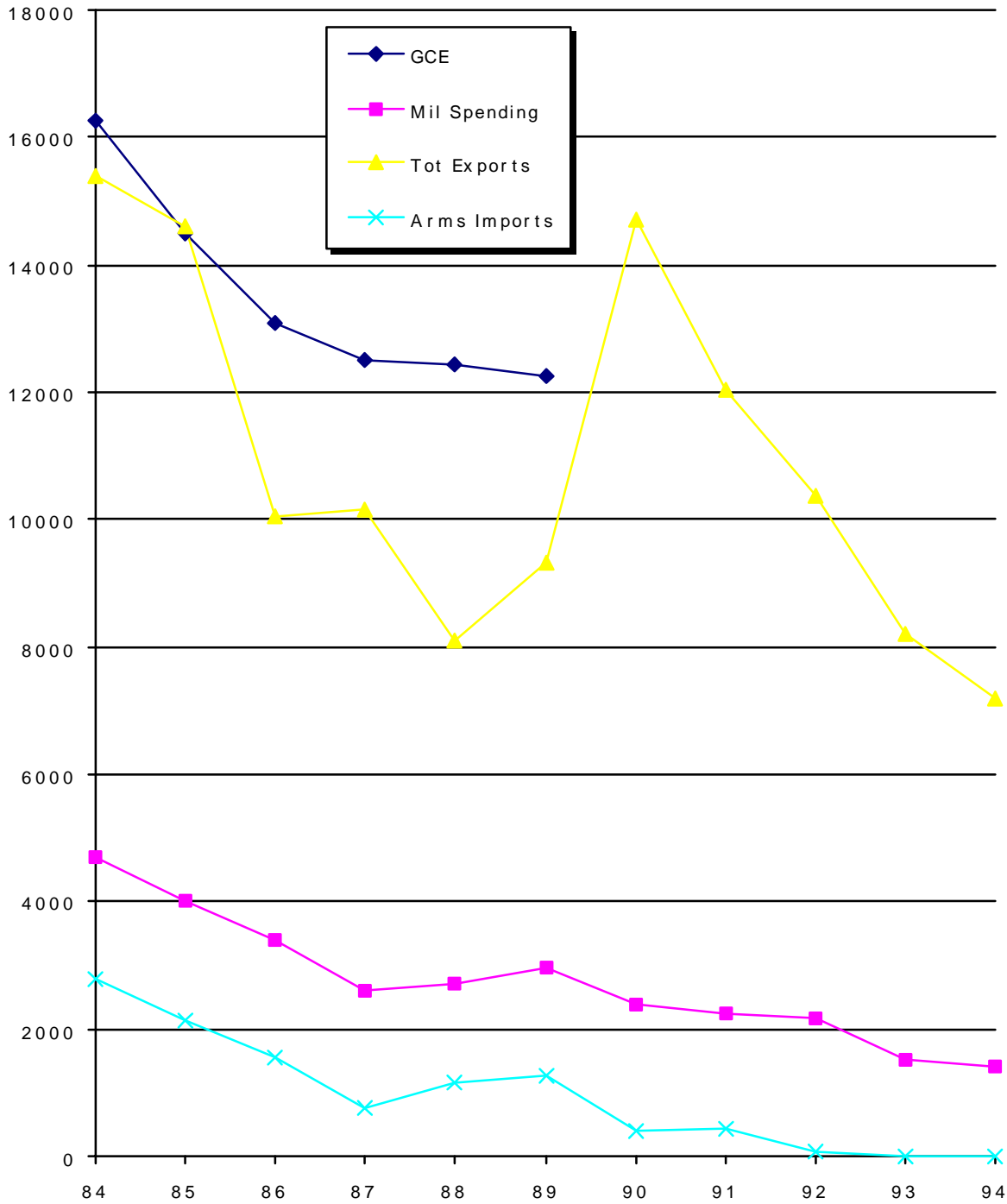
Source: Adapted by Anthony H. Cordesman, ACDA, World Military Expenditures and Arms Transfers, 1993-1994, Washington, ACDA, 1995 and material provided by the CIA.

**Military Spending and Arms Imports vs.
CGE and Total Exports in Algeria: 1984-1994**
(Constant Millions 1994 \$US)



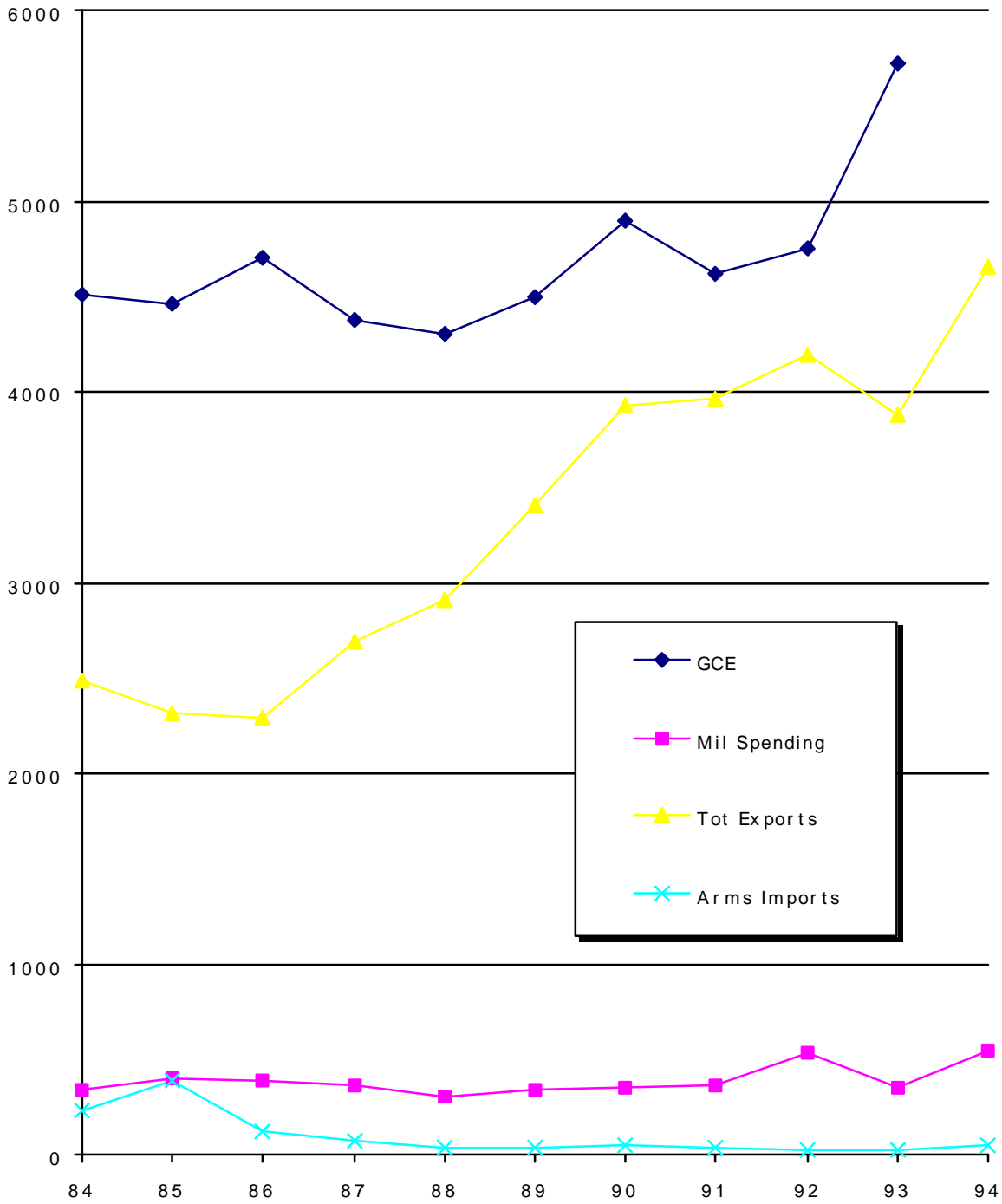
Source: Adapted by Anthony H. Cordesman, ACDA, World Military Expenditures and Arms Transfers, 1993-1994, Washington, ACDA, 1995 and material provided by the CIA.

Military Spending and Arms Imports vs. CGE and Total Exports in Libya: 1984-1994 (Constant Millions 1994 \$US)



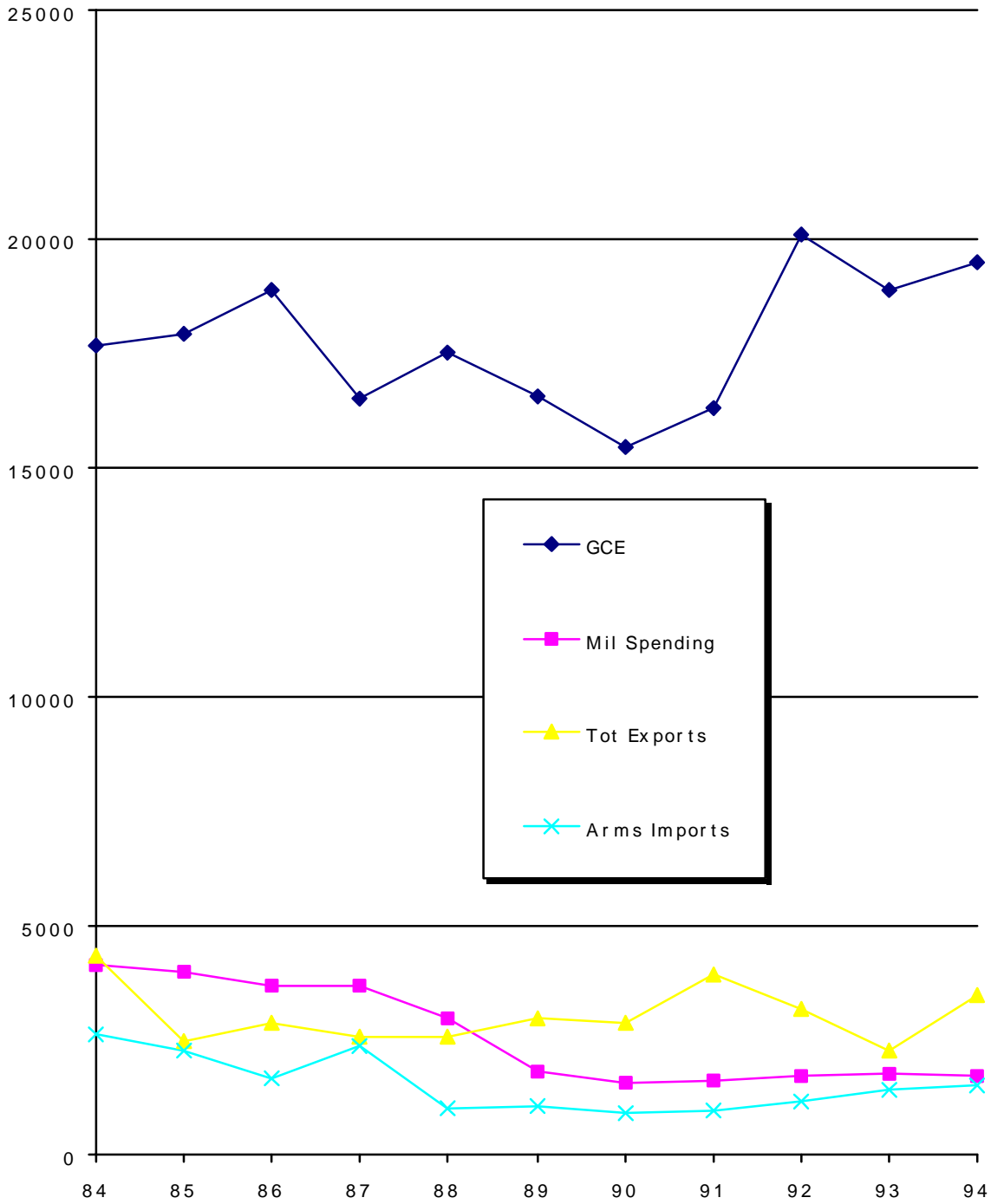
Source: Adapted by Anthony H. Cordesman, ACDA, *World Military Expenditures and Arms Transfers, 1995*, Washington, ACDA, 1996 and material provided by the CIA.

**Military Spending and Arms Imports vs.
CGE and Total Exports in Tunisia: 1984-1994**
(Constant Millions 1994 \$US)



Source: Adapted by Anthony H. Cordesman, ACDA, World Military Expenditures and Arms Transfers, 1995, Washington, ACDA, 1996 and material provided by the CIA.

**Military Spending and Arms Imports vs. CGE
and Total Exports in Egypt: 1984-1994**
(Constant Millions 1994 \$US)



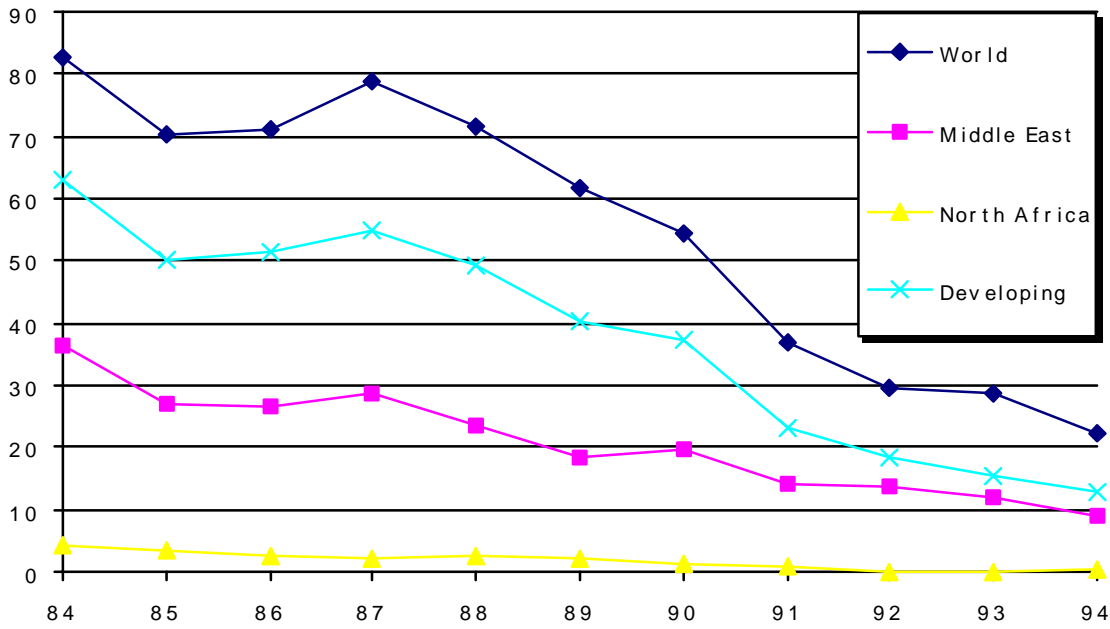
Source: Adapted by Anthony H. Cordesman, ACDA, World Military Expenditures and Arms Transfers, 1995, Washington, ACDA, 1996 and material provided by the CIA.

Part Two:

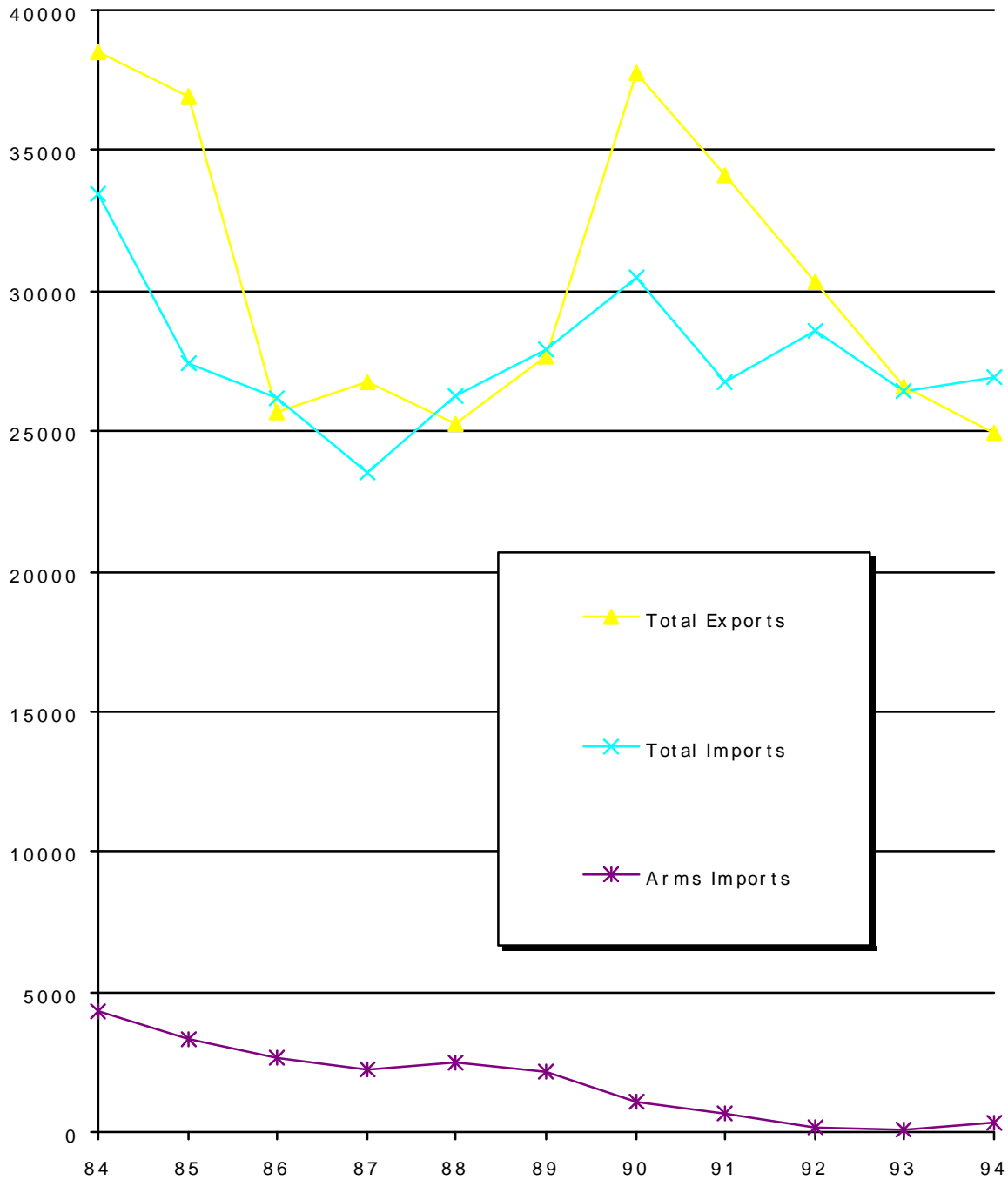
Trends in Arms Imports

Middle East Arms Sales Are Declining, But Are Still a Major Portion of World Market (Arms Exports in Constant \$94 Billions)

<u>Year</u>	<u>World</u>	<u>Middle East</u>	<u>North Africa</u>
1984	82.9	36.5	4.3
1985	70.2	27.0	3.3
1986	71.1	26.4	2.6
1987	78.8	28.6	2.2
1988	71.5	23.7	2.5
1989	61.8	18.4	2.2
1990	54.3	19.6	1.1
1991	37.0	14.0	0.7
1992	29.7	13.5	0.2
1993	28.6	12.2	0.1
1994	22.1	9.1	0.3

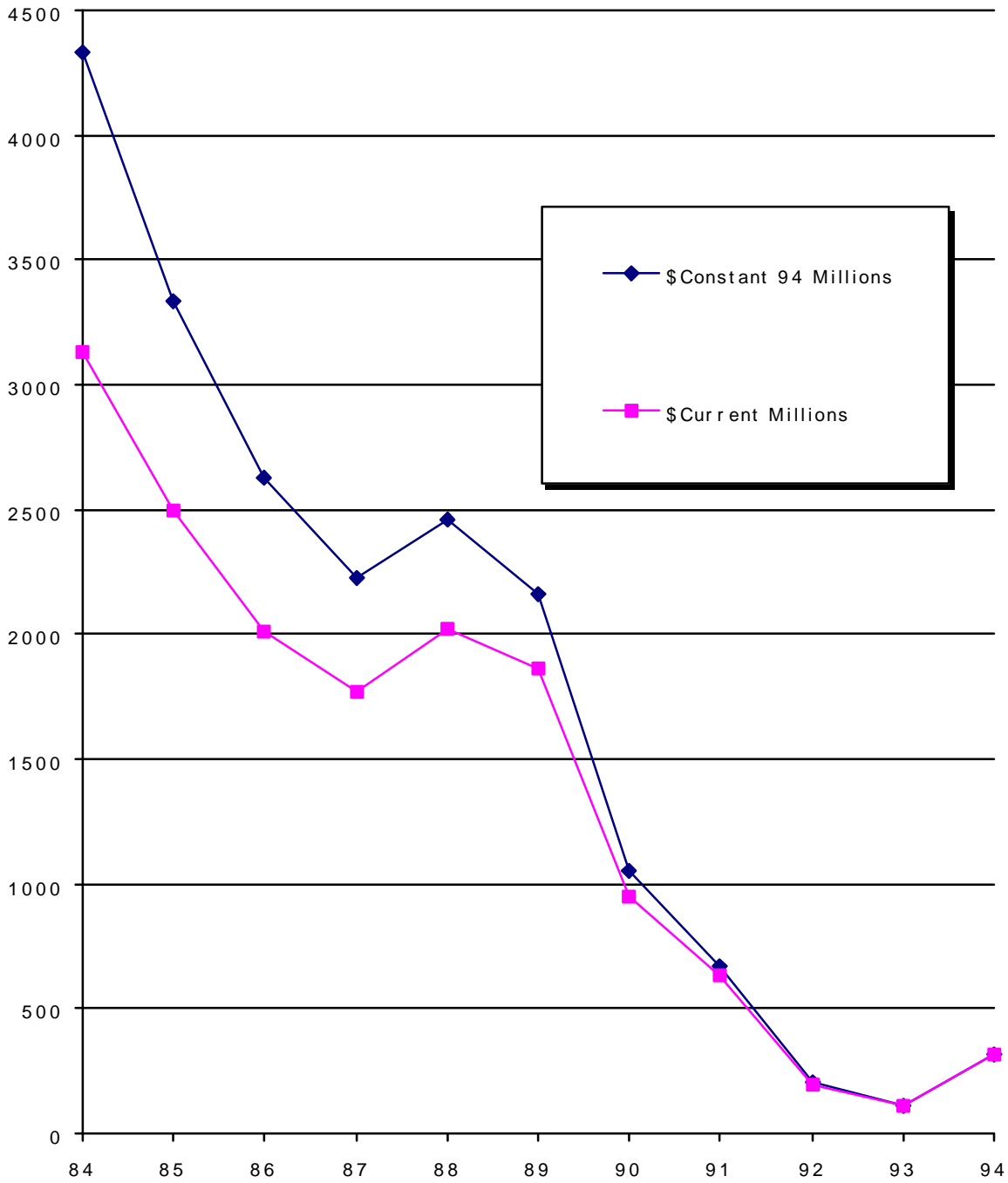


North African Total Trade Relative to Arms Imports (\$Constant 1994 in Millions)



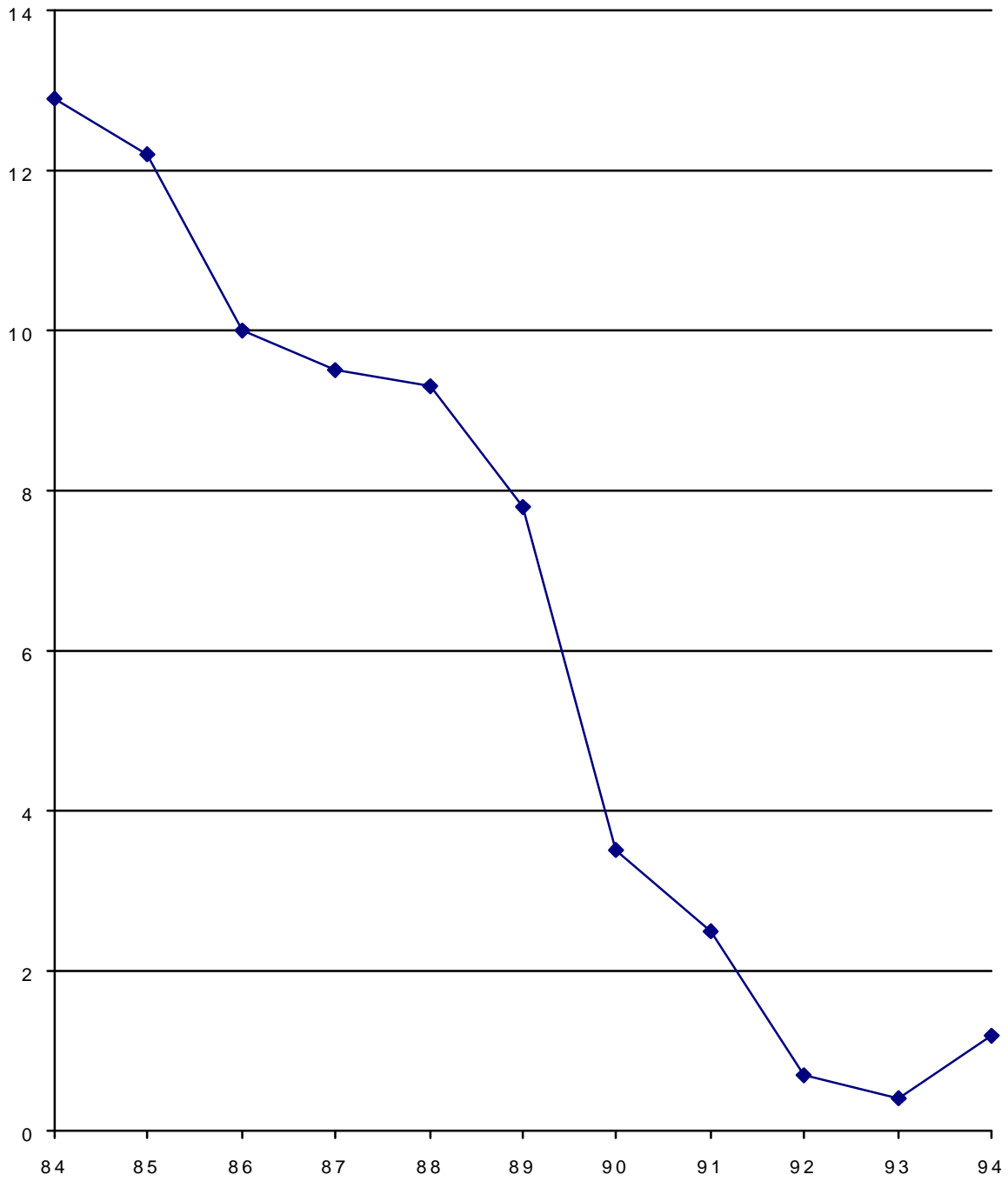
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

North African Arms Imports (\$Millions)



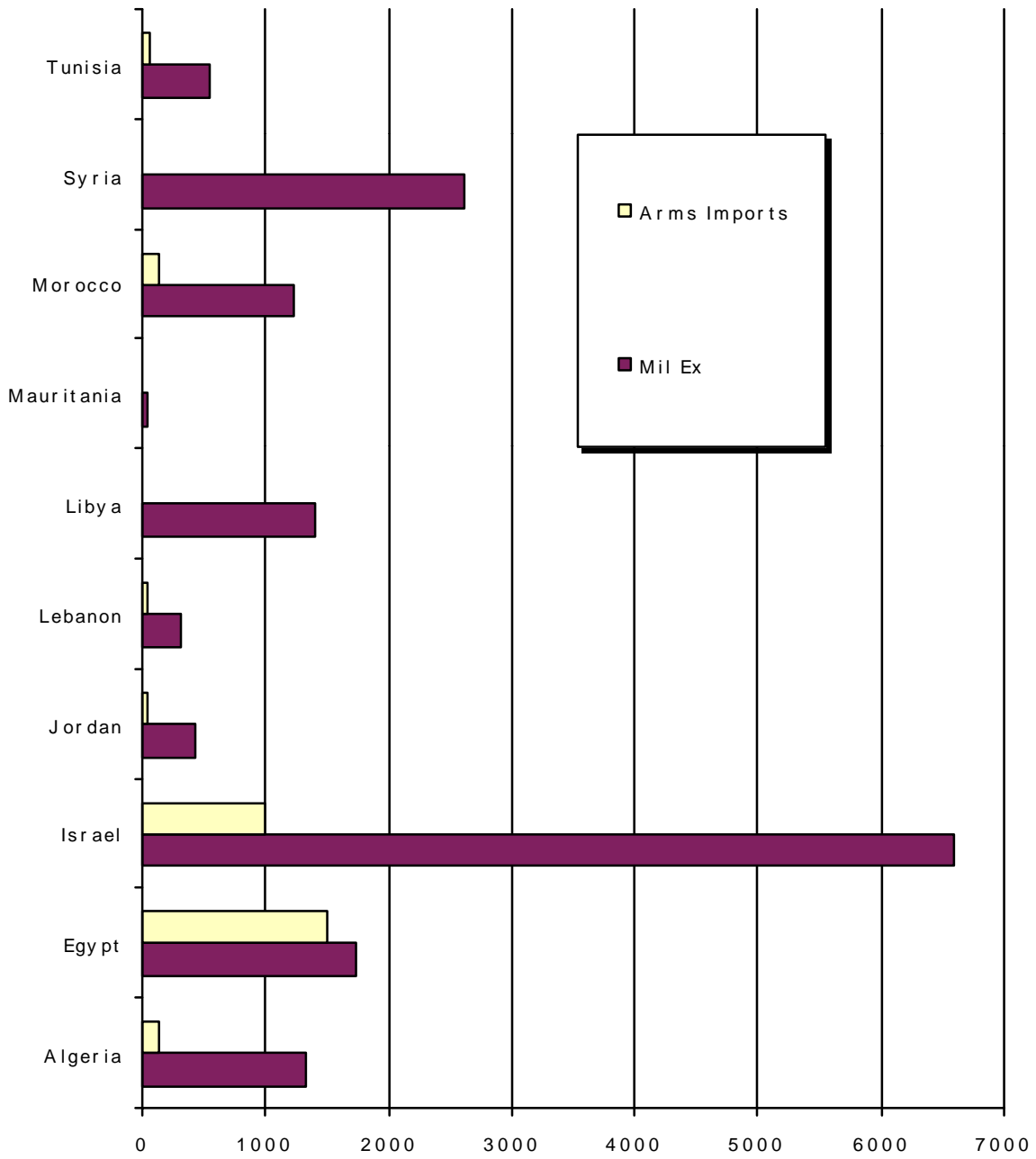
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

North African Arms Imports as a Percent of Total Imports



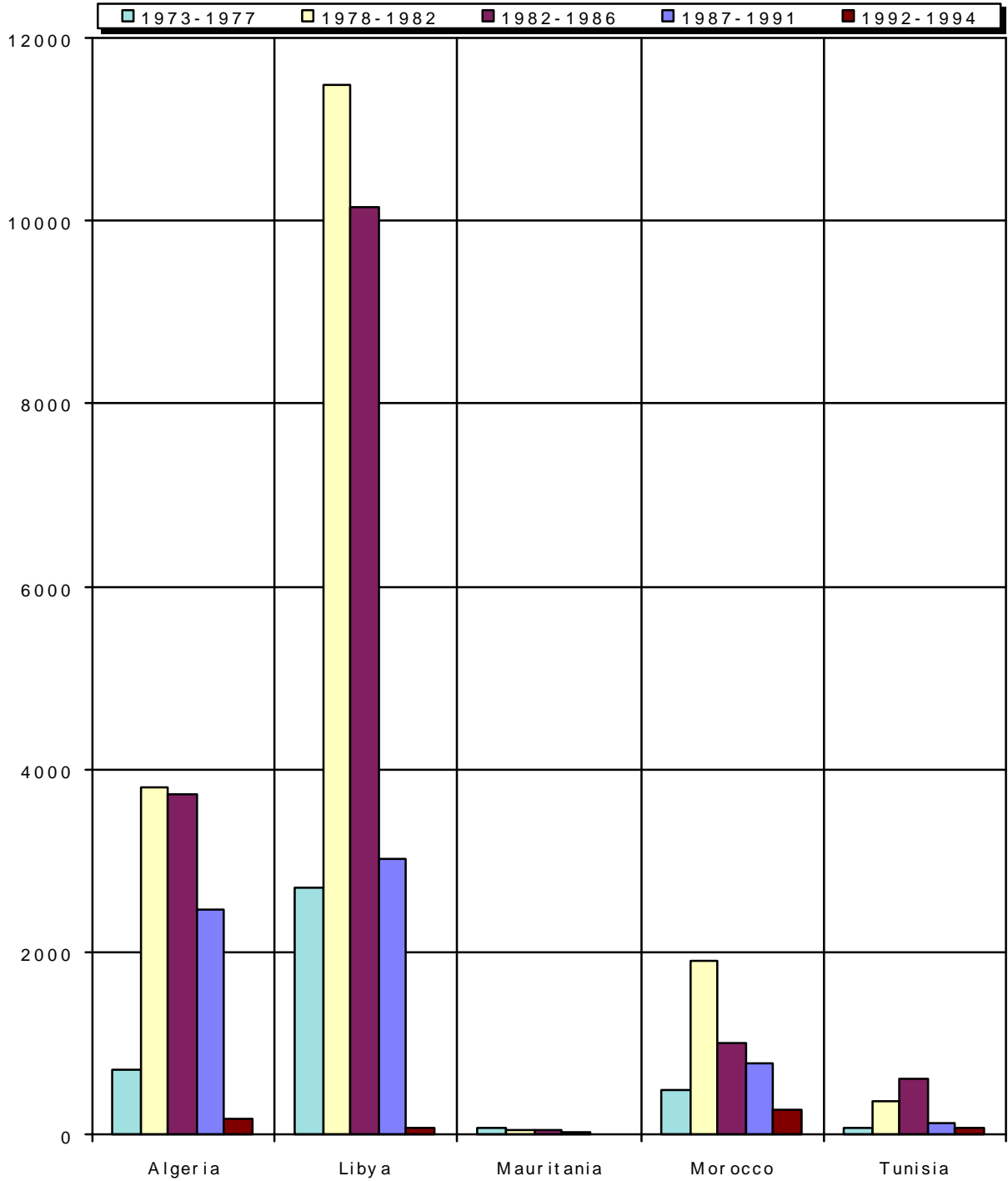
Adapted by Anthony H. Cordesman from ACDA, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS, various editions. North Africa does not include Egypt.

Arms Imports Relative to Military Expenditures in 1994 (Current \$Billions)



Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, 1995, Washington, GPO, 1995

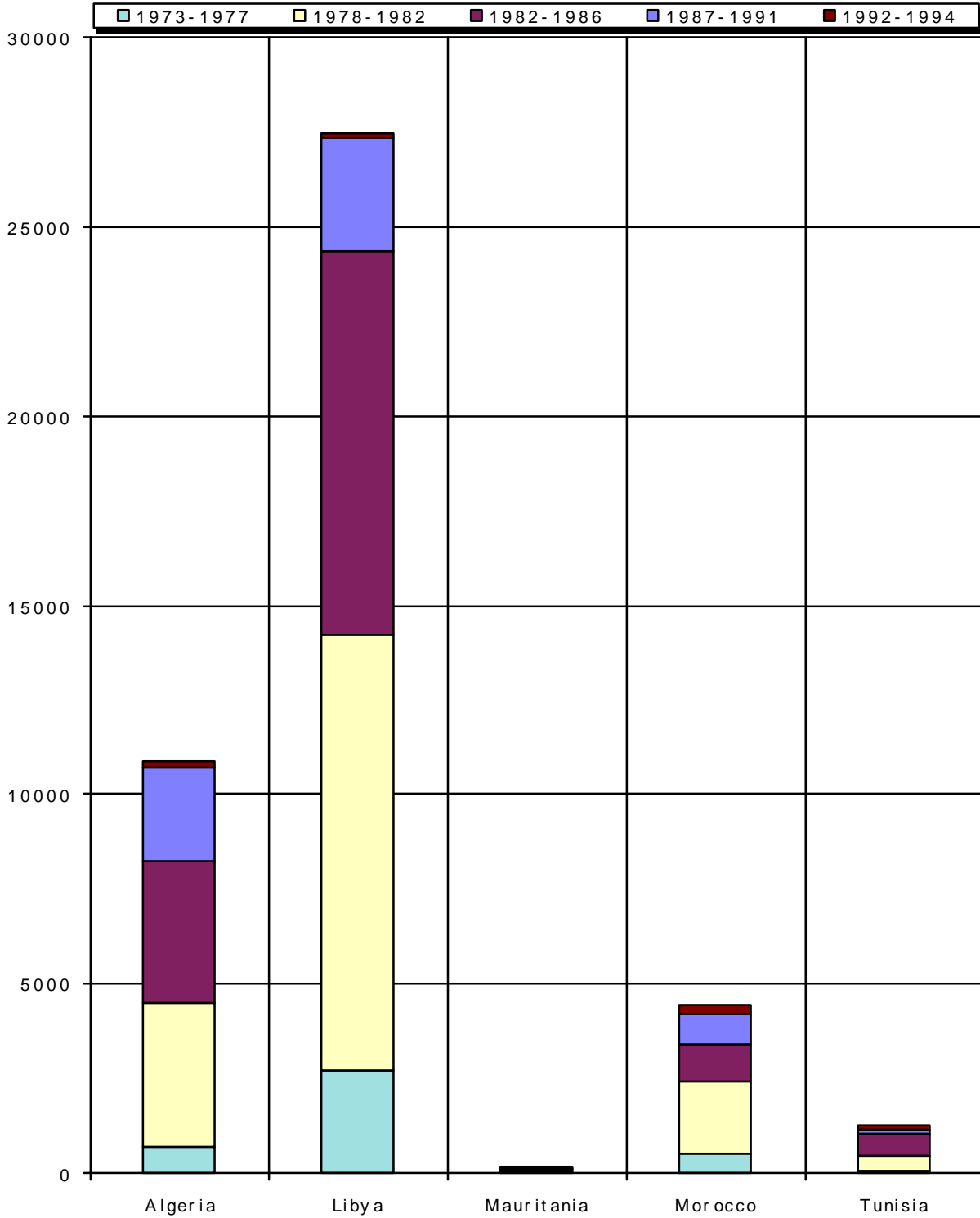
North African Arms Deliveries by Country: 1973-1994 (In \$US Current Millions)



1973-1977	710	2,694	65	494	85
1978-1982	3,800	11,500	60	1,900	360
1982-1986	3,730	10,160	40	1,000	600
1987-1991	2,460	3,010	30	790	130
1992-1994	165	80	5	275	80

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

Cumulative North African Arms Deliveries by Country: 1973-1994 (In \$US Current Millions)



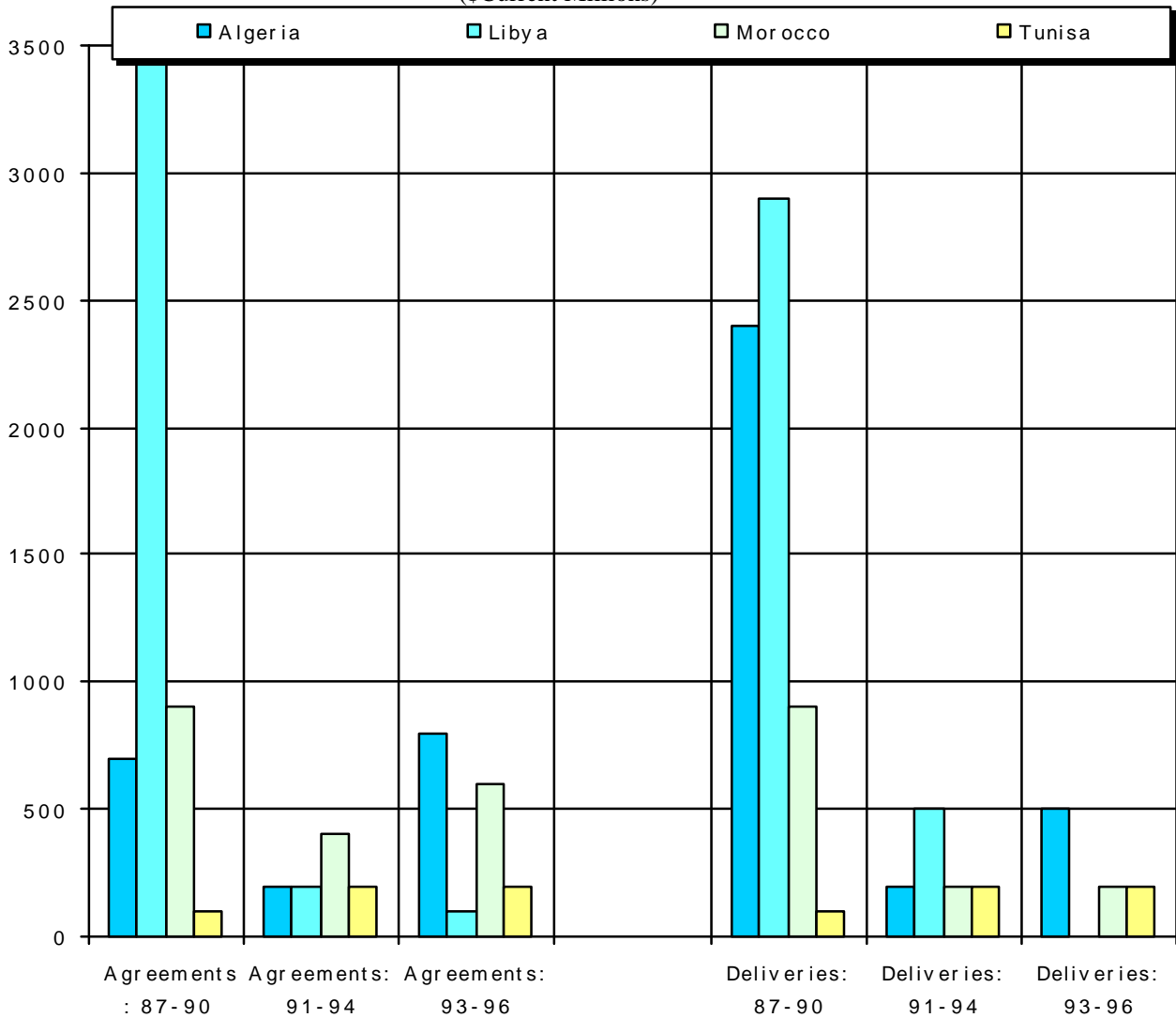
Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

Maghreb Arms Imports by Source
(Current \$Millions)

<u>Recipient Country</u>	<u>US</u>	<u>Russia</u>	<u>China</u>	<u>Major West European</u>	<u>Other European</u>	<u>All Other</u>	<u>Total</u>
<u>Morocco</u>							
Agreements 1988-1991	100	0	0	100	300	0	500
Deliveries 1988-1991	200	0	0	100	300	0	600
Agreements 1992-1995	100	0	0	400	0	0	500
Deliveries 1992-1995	100	0	0	100	0	0	200
<u>Algeria</u>							
Agreements 1988-1991	0	600	0	0	100	0	700
Deliveries 1988-1991	0	1,400	0	0	400	0	1,800
Agreements 1992-1995	0	300	0	0	100	0	400
Deliveries 1992-1995	0	300	0	0	100	0	400
<u>Tunisia</u>							
Agreements 1988-1991	100	0	0	0	0	0	100
Deliveries 1988-1991	100	0	0	0	0	0	100
Agreements 1992-1995	100	0	0	0	0	0	100
Deliveries 1992-1995	100	0	0	0	0	100	200
<u>Libya</u>							
Agreements 1988-1991	0	2,100	0	0	400	400	2,900
Deliveries 1988-1991	0	1,500	100	0	200	200	2,000
Agreements 1992-1995	0	0	0	0	0	0	0
Deliveries 1992-1995	0	0	0	0	0	0	0
<u>Egypt</u>							
Agreements 1988-1991	6,500	200	0	0	100	200	7,000
Deliveries 1988-1991	1,900	500	100	100	100	200	2,900
Agreements 1992-1995	2,600	300	0	100	200	0	3,200
Deliveries 1992-1995	5,400	0	0	100	0	200	5,700

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmett, Conventional Arms Transfers to Developing Nations, 1988-1995, CRS 96-677F. Transfers less than \$50 million are shown as zero; all data are rounded to nearest \$100 million.

North African Agreements and Deliveries: 1987-1996*
(\$Current Millions)

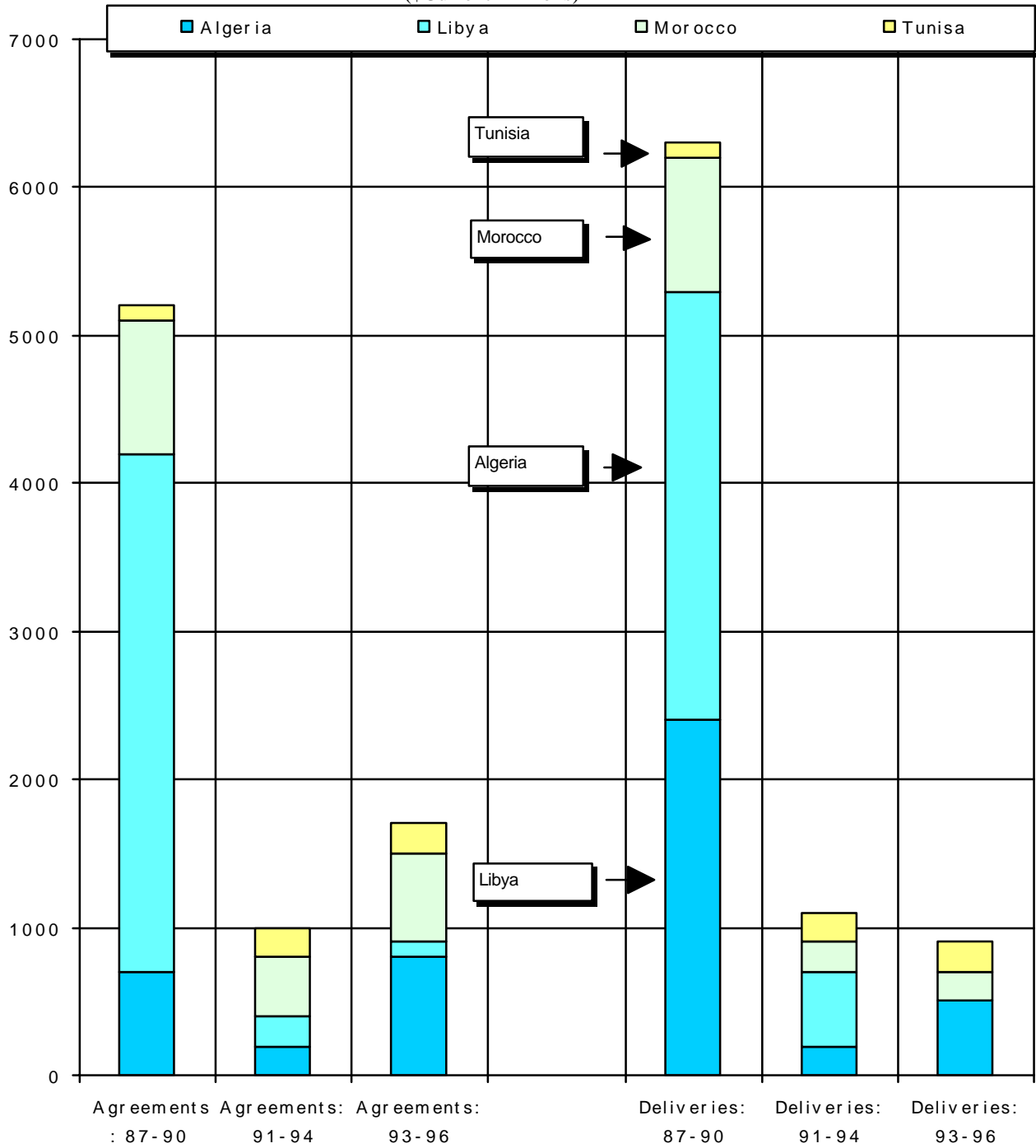


Total	5,200	1,000	1,700	6,300	1,100	900
Algeria	700	200	800	2400	200	500
Libya	3500	200	100	2900	500	0
Morocco	900	400	600	900	200	200
Tunisia	100	200	200	100	200	200

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million.

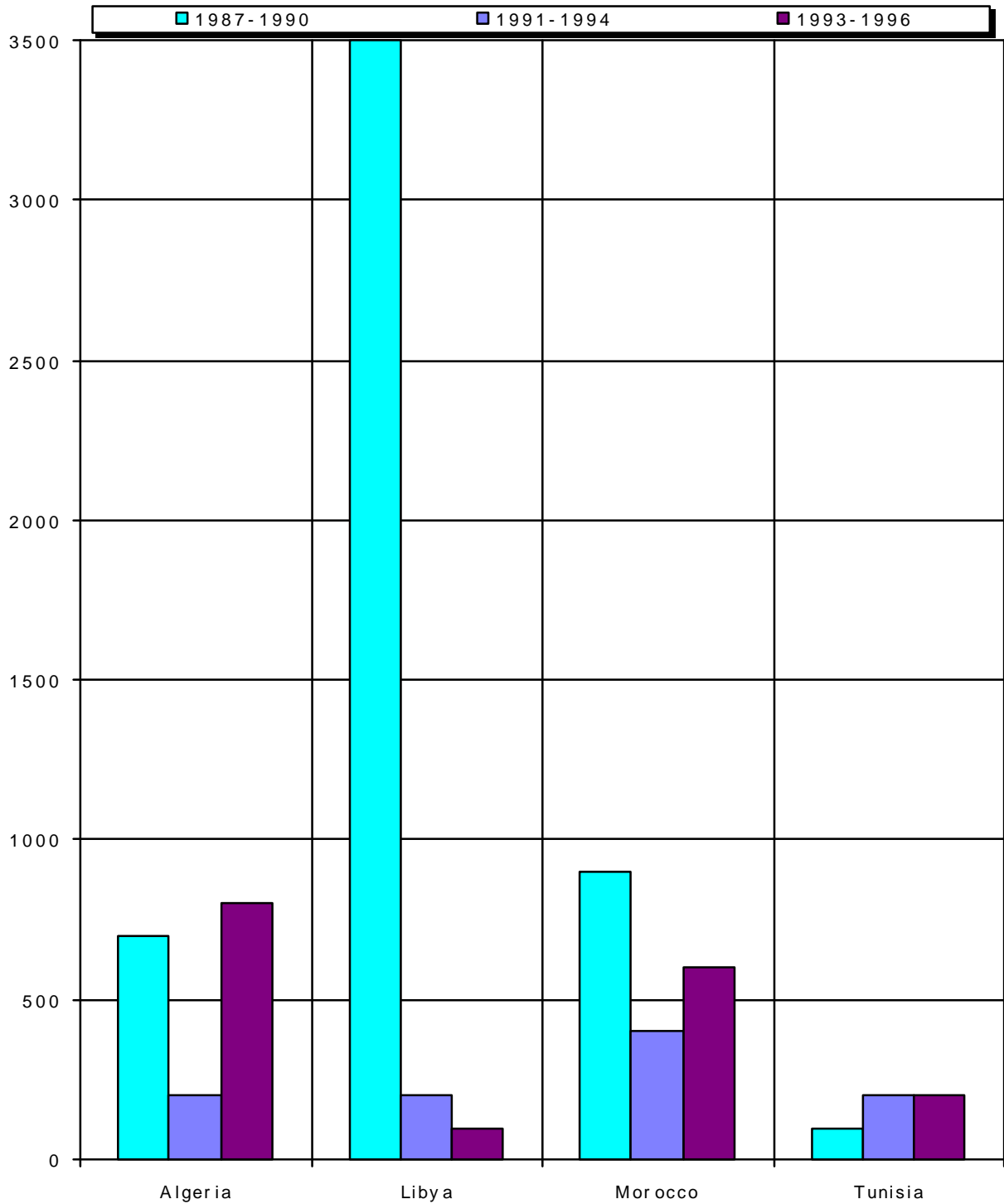
Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

North African Agreements and Deliveries By Major Country: 1987-1996*
 (\$Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million.
 Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

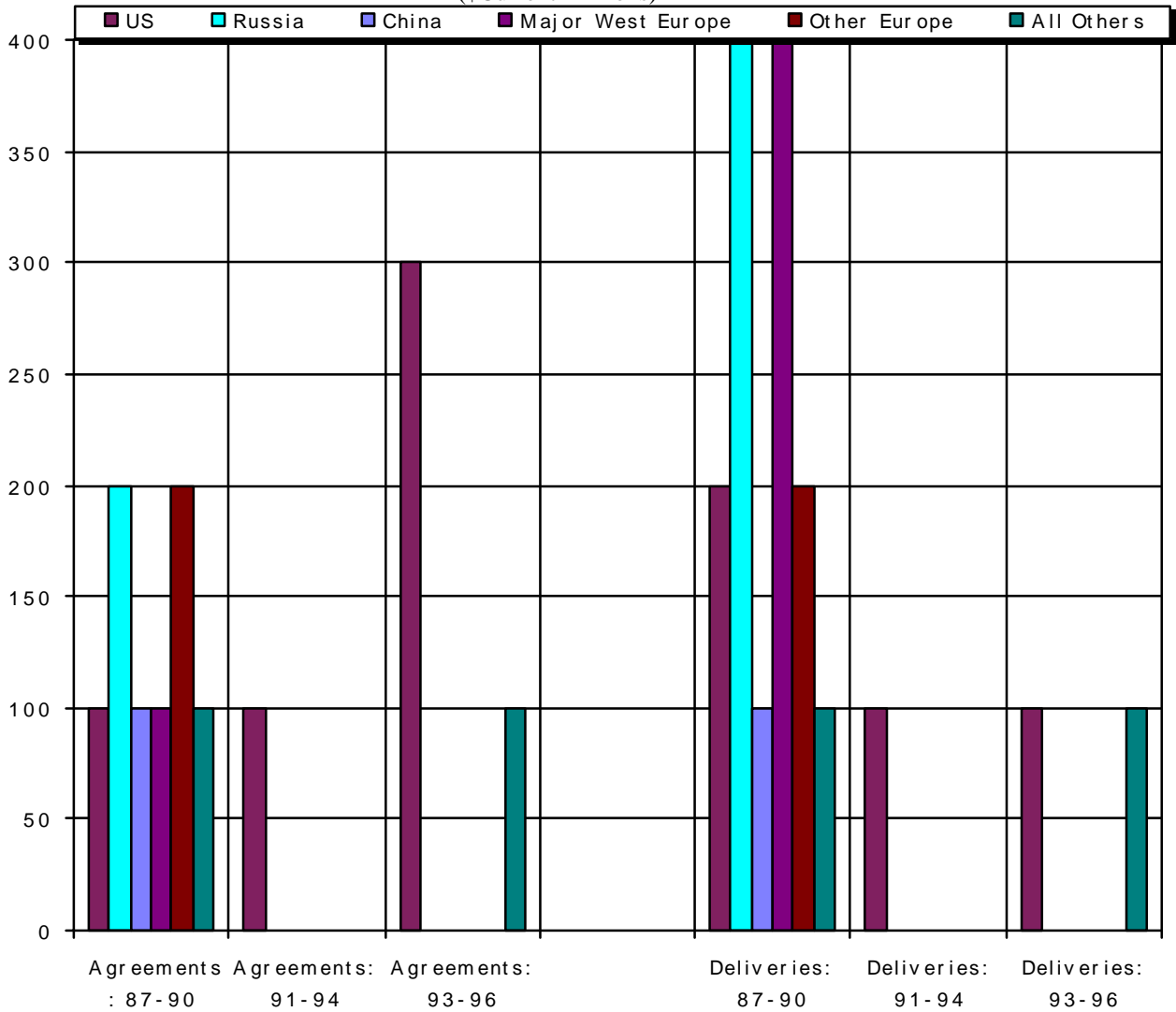
Trend in New Agreements By North African Buyer: Before and After the Gulf War
 (New Agreements in \$Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million.

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Algerian Arms Agreements and Deliveries By Major Supplier: 1987-1996*
(\$Current Millions)



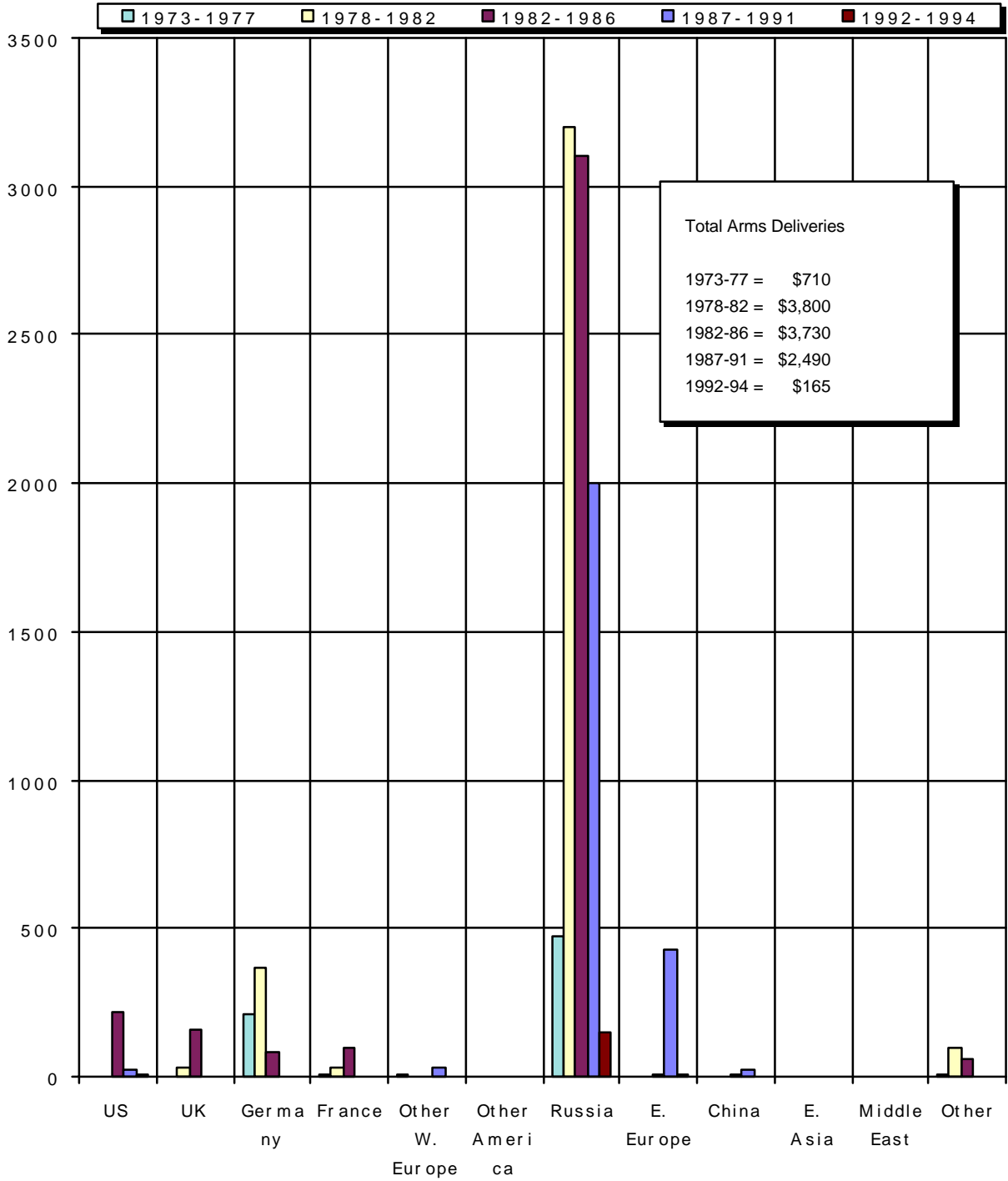
Total	700	200	800	2,400	200	500
US	0	0	00	00	0	0
Russia	600	200	500	2,000	200	300
China	0	0	0	0	0	0
Major W. Europe	0	0	0	0	0	0
Other Europe	100	0	200	400	0	100
Others	0	0	100	0	0	100

Includes Gulf states, Arab-Israeli states, North Africa, and Yemen

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

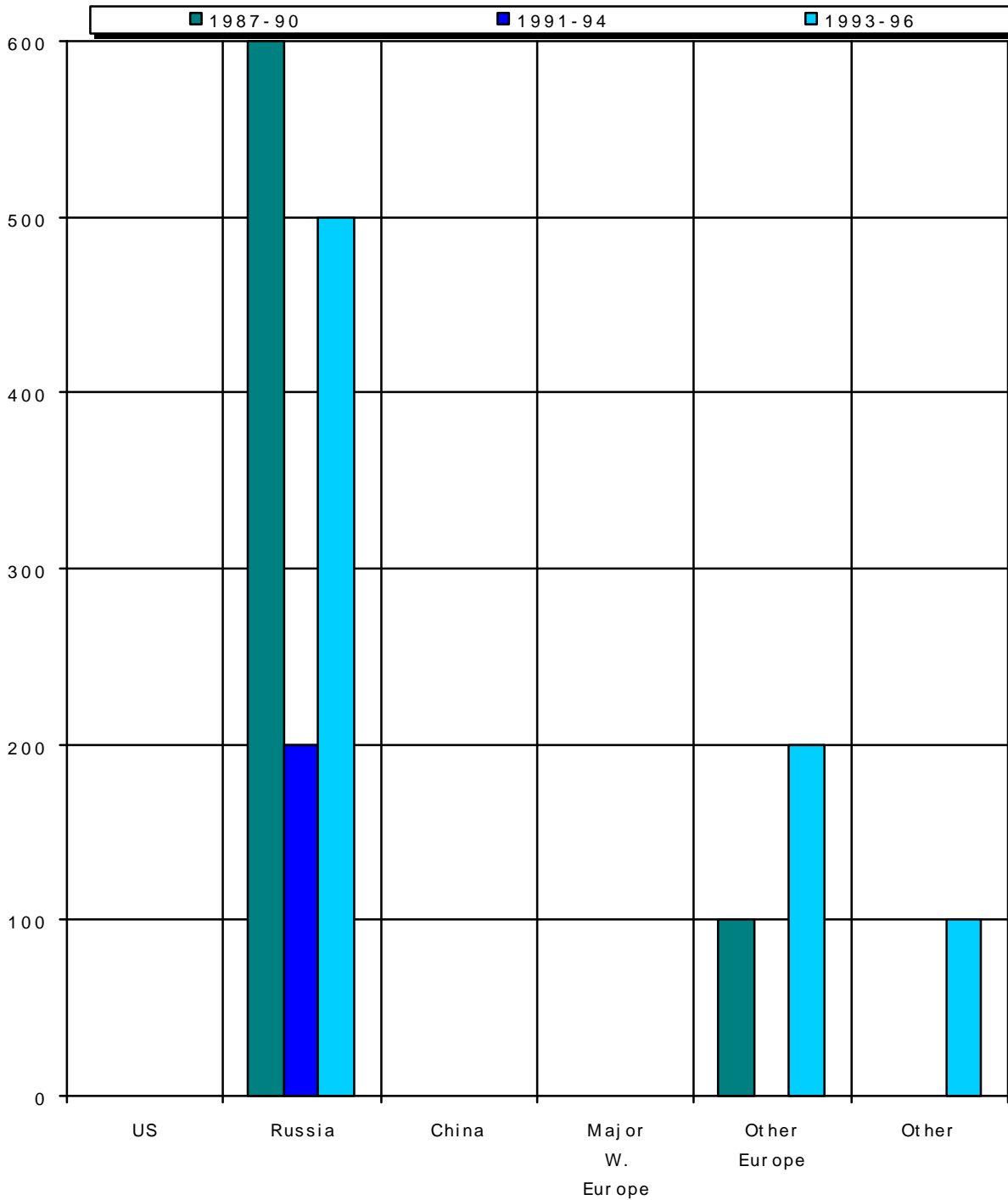
Trend in Deliveries to Algeria: 1973-1994
(In \$US Current Millions)



1973-1977	0	0	210	10	10	0	470	0	0	0	0	10
1978-1982	0	30	370	30	0	0	3,200	0	0	0	0	100
1982-1986	220	160	80	100	0	0	3,100	10	10	0	0	60
1987-1991	20	0	0	0	30	0	2,000	430	20	0	0	0
1992-1994	5	0	0	0	0	0	150	10	0	0	0	0

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

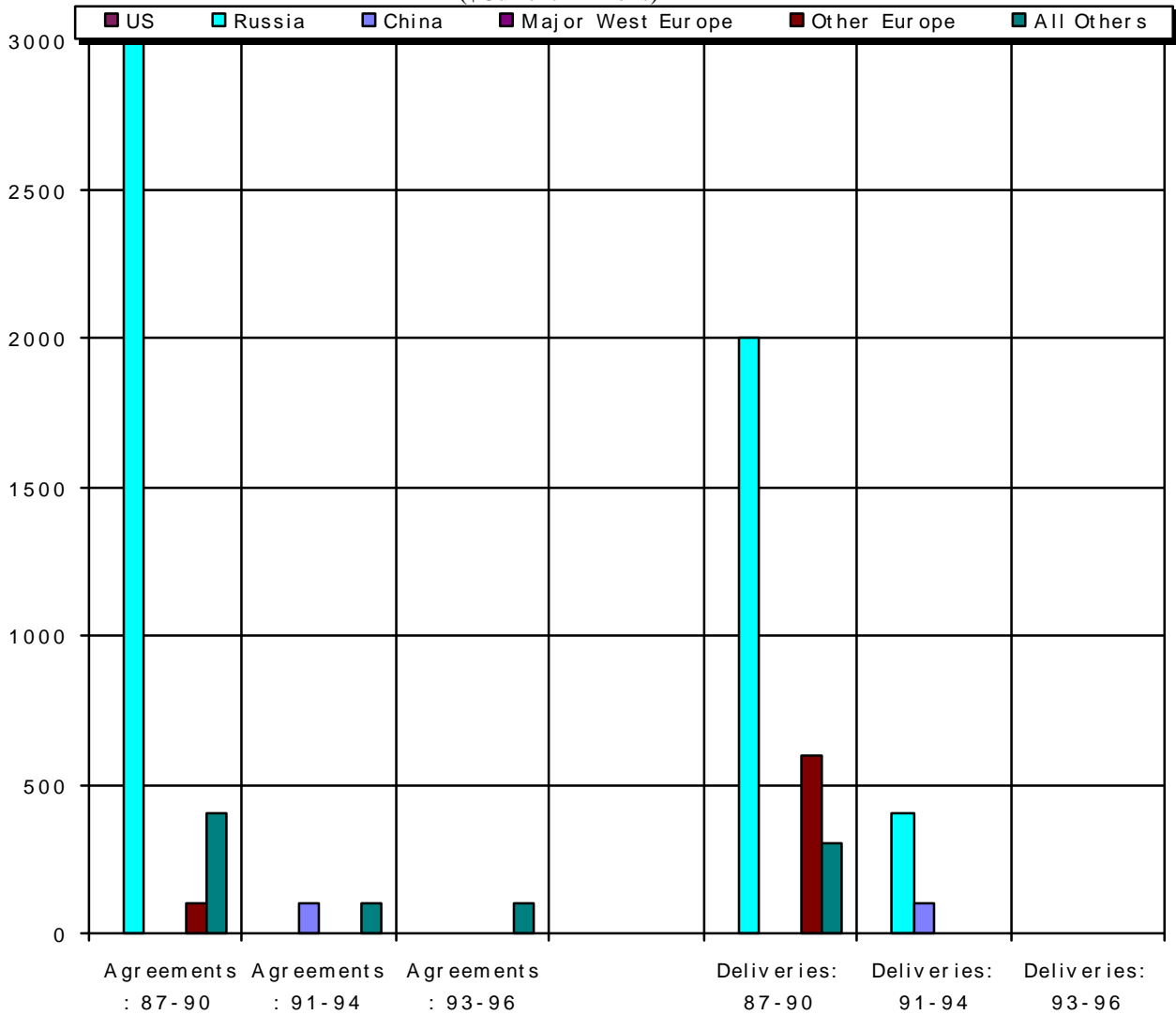
Trend in Supplier's Share of Algeria's Arms Market Before and After Gulf War
 (New Arms Sales Agreements in \$US Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Libyan Arms Agreements and Deliveries By Major Supplier: 1987-1996*
(\$Current Millions)



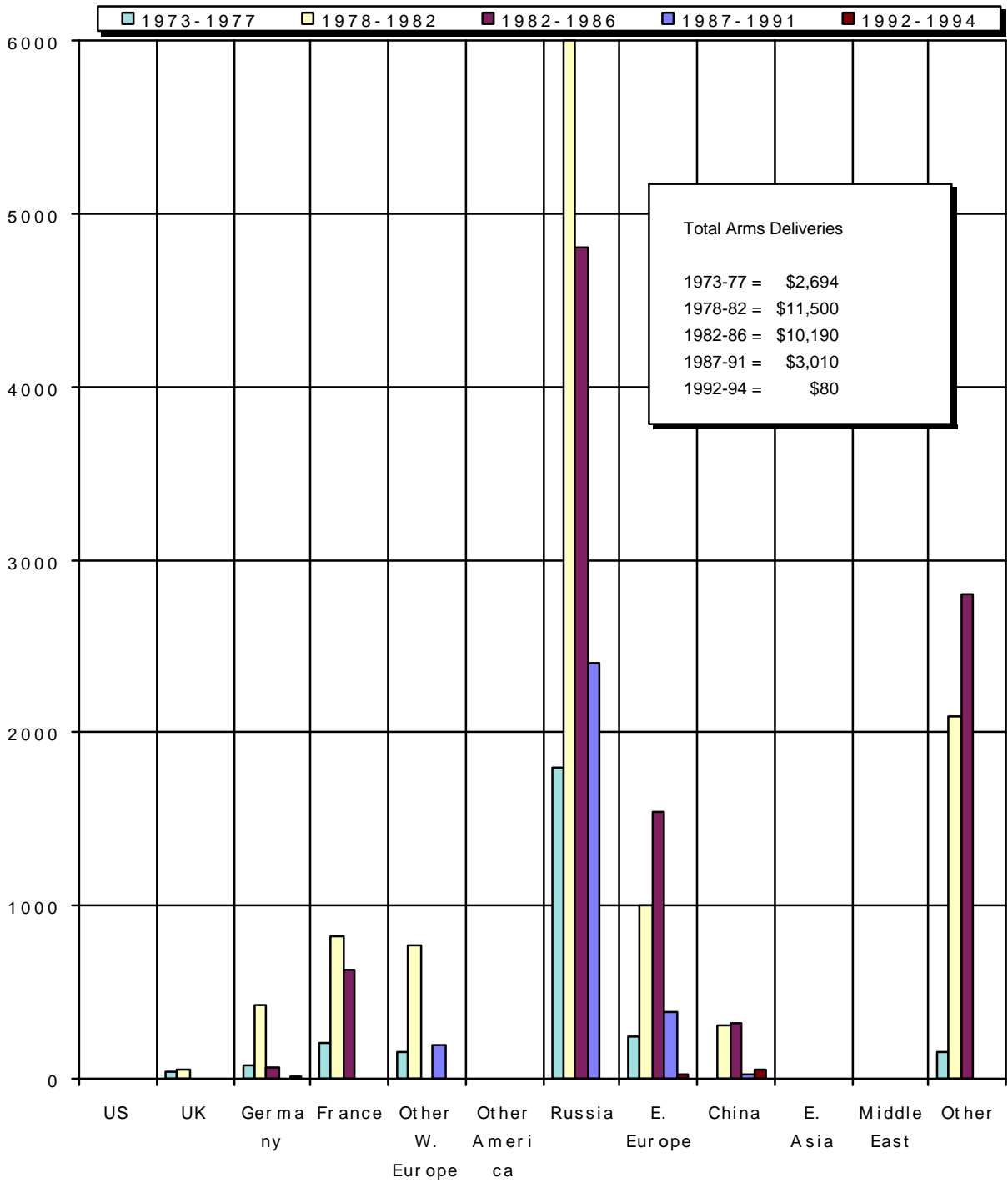
Total	3,500	200	100	2,900	500	0
US	0	0	0	0	0	0
Russia	3,000	0	0	2,000	400	0
China	0	100	0	0	100	0
Major W. Europe	0	0	0	0	0	0
Other Europe	100	0	0	600	0	0
Others	400	100	100	300	0	0

Includes Gulf states, Arab-Israeli states, North Africa, and Yemen

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

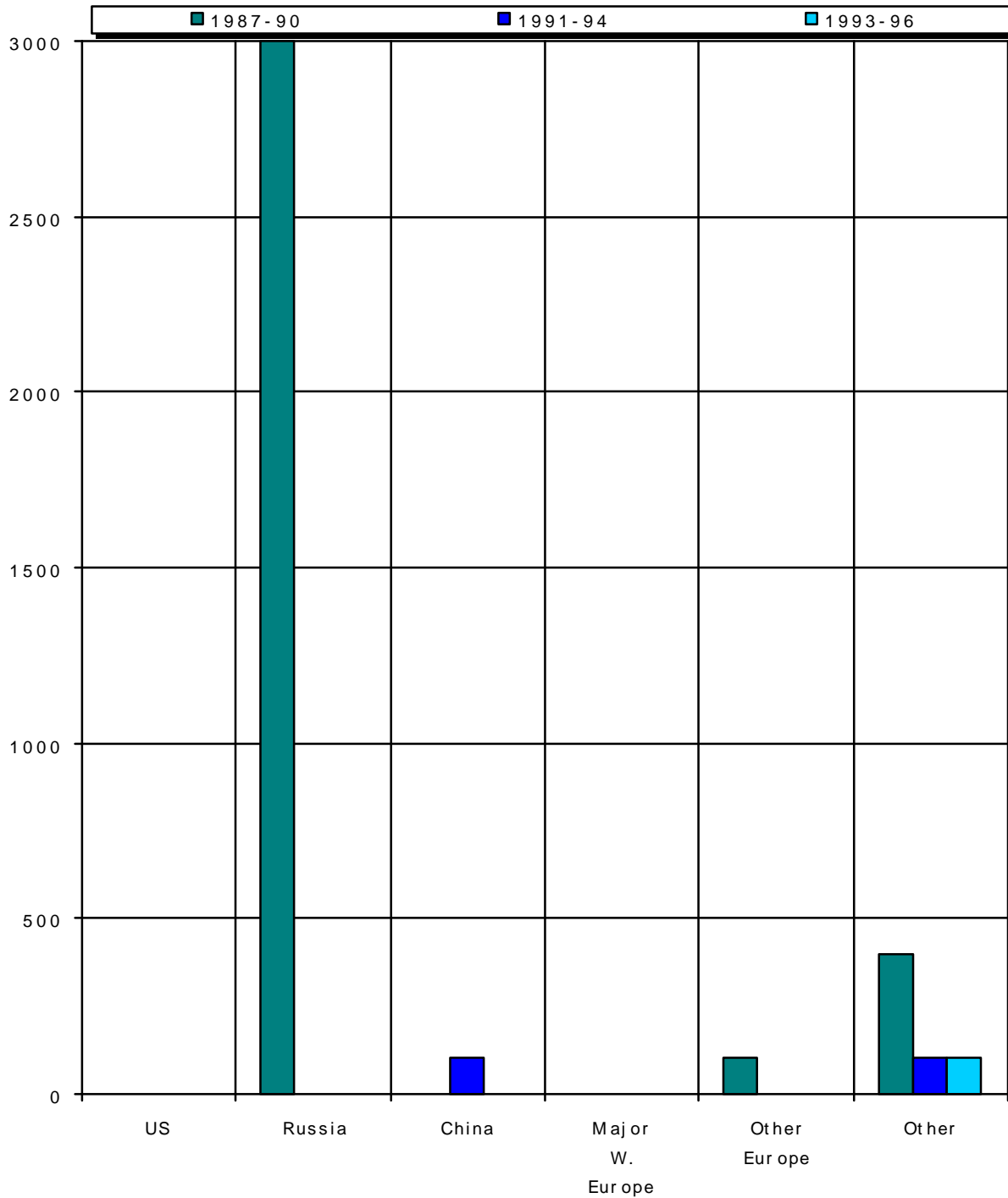
Trend in Deliveries to Libya: 1973-1994 (In \$US Current Millions)



	US	UK	Germany	France	Other W. Europe	Other America	Russia	E. Europe	China	E. Asia	Middle East	Other
1973-1977	4	40	80	210	160	0	1,800	250	0	0	0	150
1978-1982	0	50	430	825	775	0	6,000	1,000	310	0	0	2,100
1982-1986	220	160	80	100	0	0	3,100	10	10	0	0	60
1987-1991	20	0	0	0	30	0	2,000	430	20	0	0	0
1992-1994	5	0	0	0	0	0	150	10	0	0	0	0

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

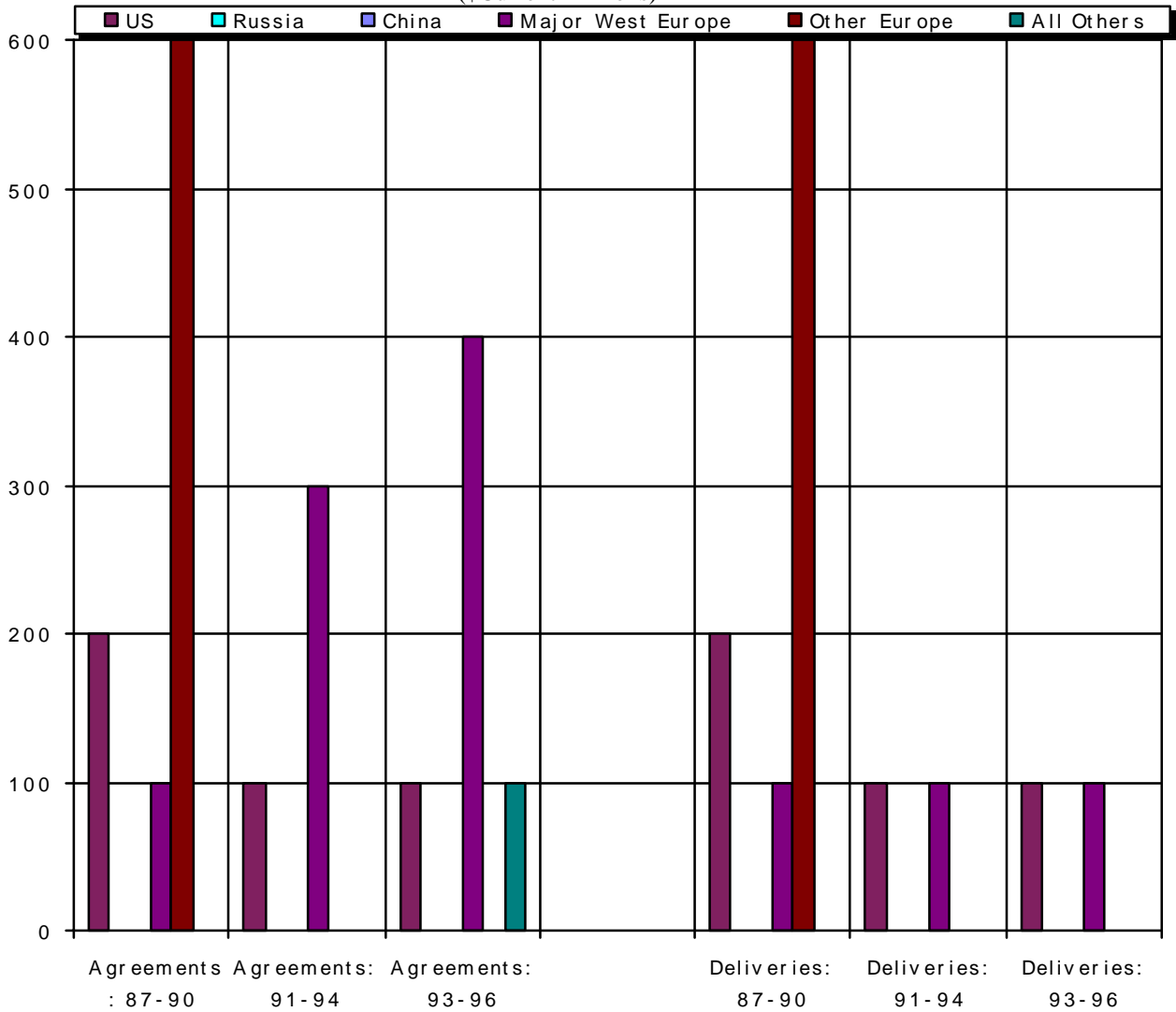
Trend in Supplier's Share of Libya's Arms Market Before and After Gulf War
 (New Arms Sales Agreements in \$US Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Moroccan Arms Agreements and Deliveries By Major Supplier: 1987-1996*
(\$Current Millions)



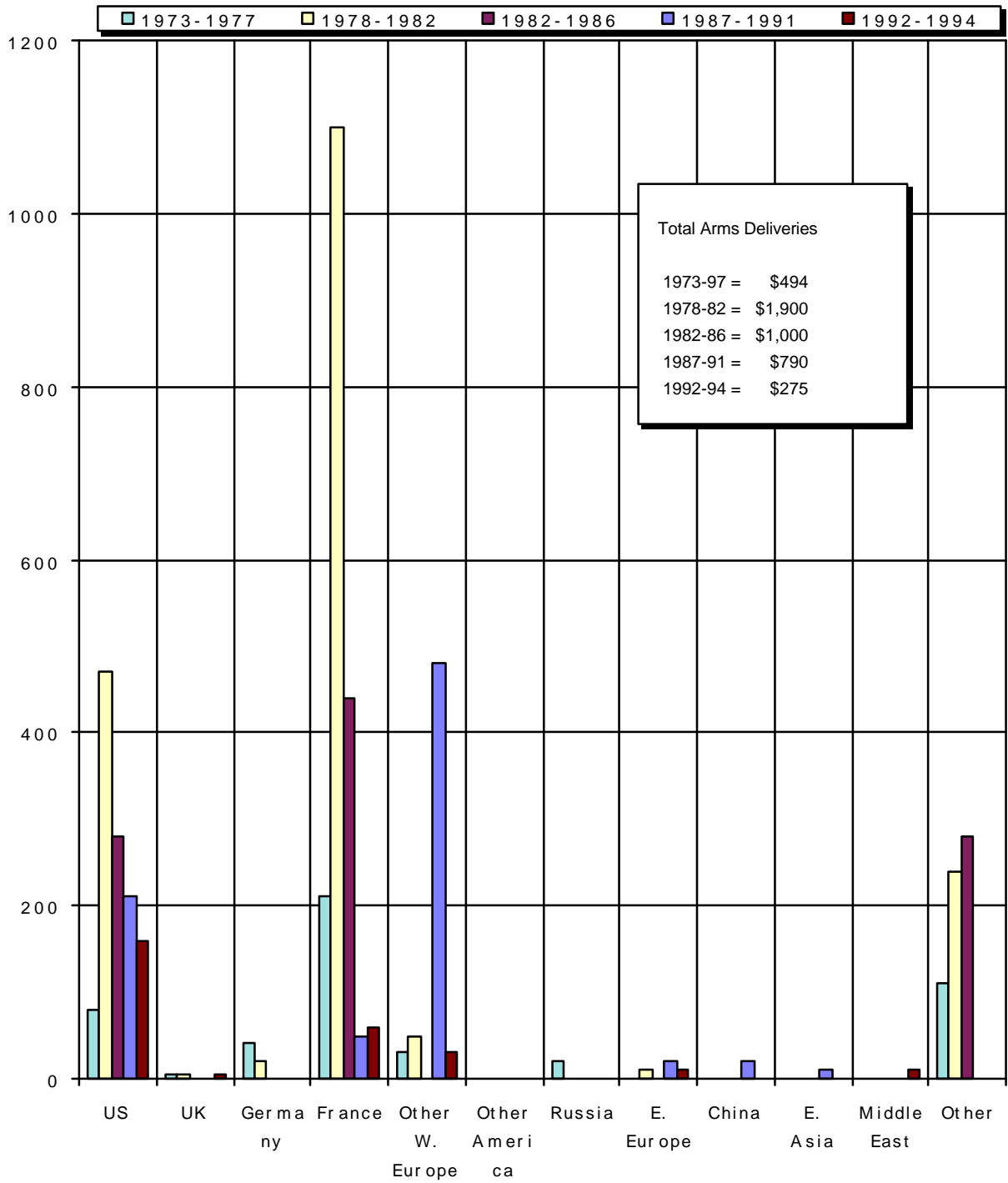
Total	900	400	600	900	200	200
US	200	100	100	200	100	100
Russia	0	0	0	0	0	0
China	0	0	0	0	0	0
Major West Europe	100	300	400	100	100	100
Other Europe	600	0	0	600	0	0
All Others	0	0	100	0	0	0

Includes Gulf states, Arab-Israeli states, North Africa, and Yemen

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

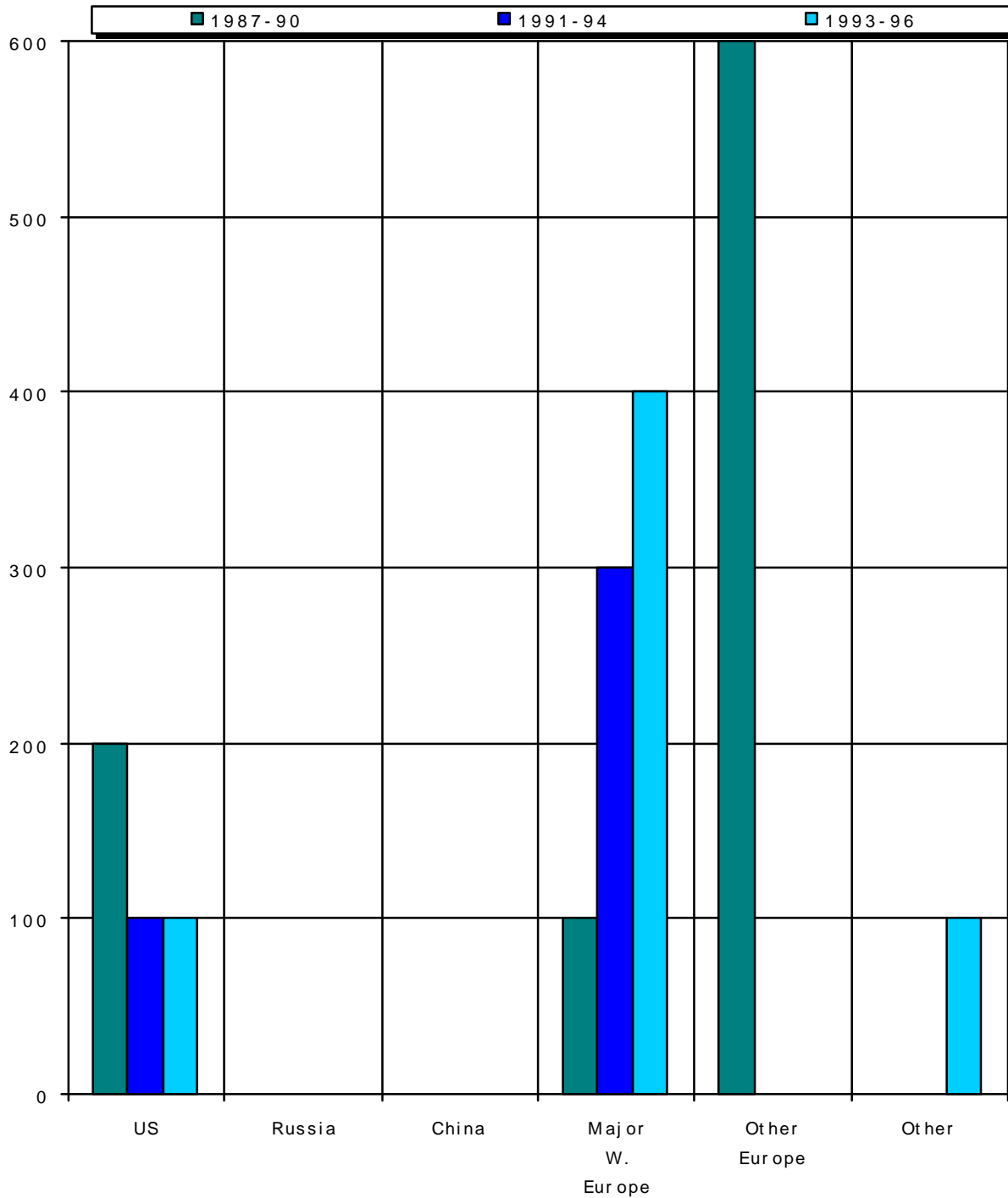
Trend in Deliveries to Morocco: 1973-1994 (In \$US Current Millions)



1973-1977	79	5	40	210	30	0	20	0	0	0	0	110
1978-1982	470	5	20	1,100	50	0	0	10	0	0	0	240
1982-1986	280	0	0	440	0	0	0	0	0	0	0	280
1987-1991	210	0	0	50	480	0	0	20	20	10	0	0
1992-1994	160	5	0	60	30	0	0	10	0	0	10	0

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

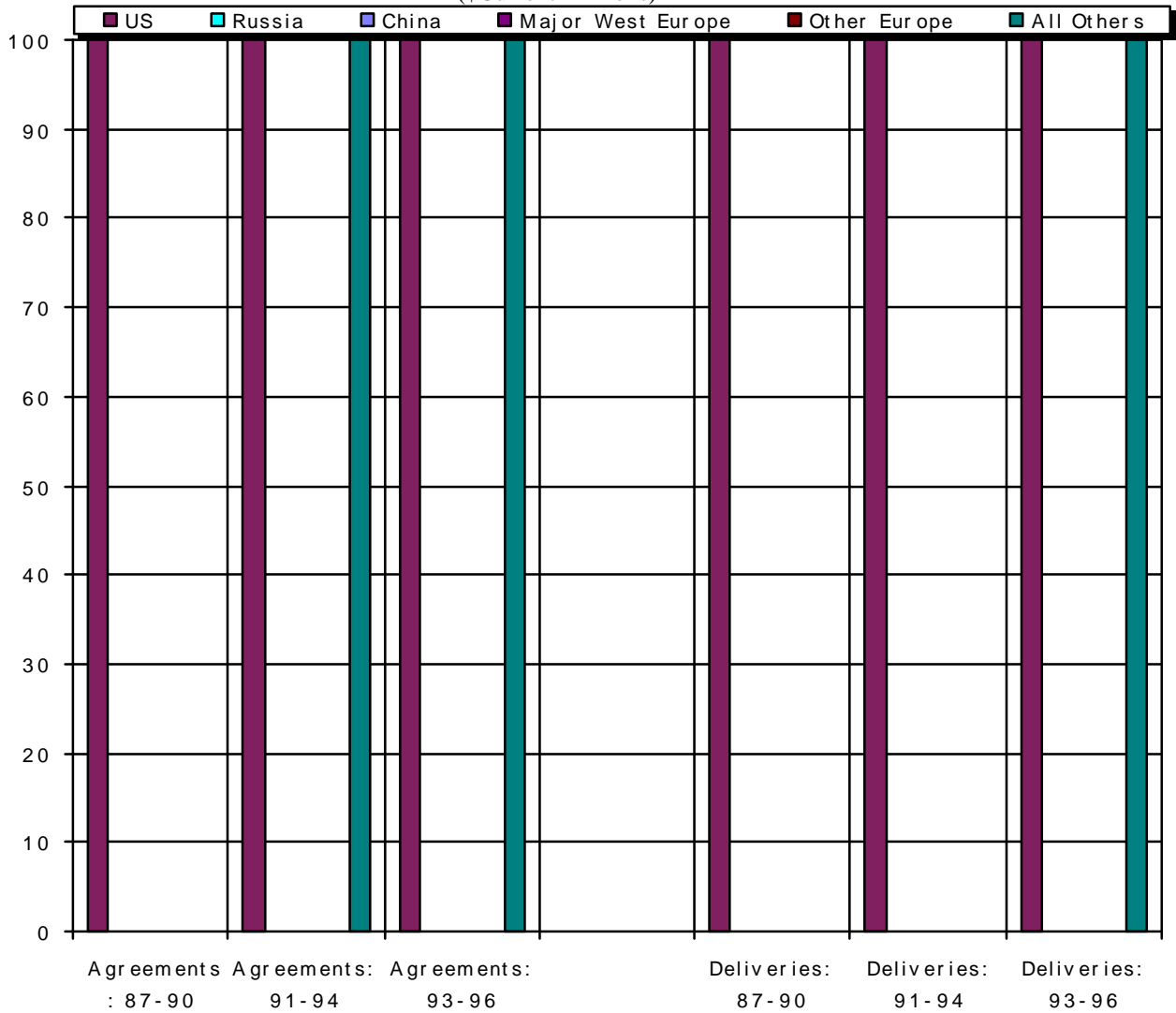
Trend in Supplier's Share of Morocco's Arms Market Before and After Gulf War
 (New Arms Sales Agreements in \$US Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Tunisian Arms Agreements and Deliveries By Major Supplier: 1987-1996*
(\$Current Millions)



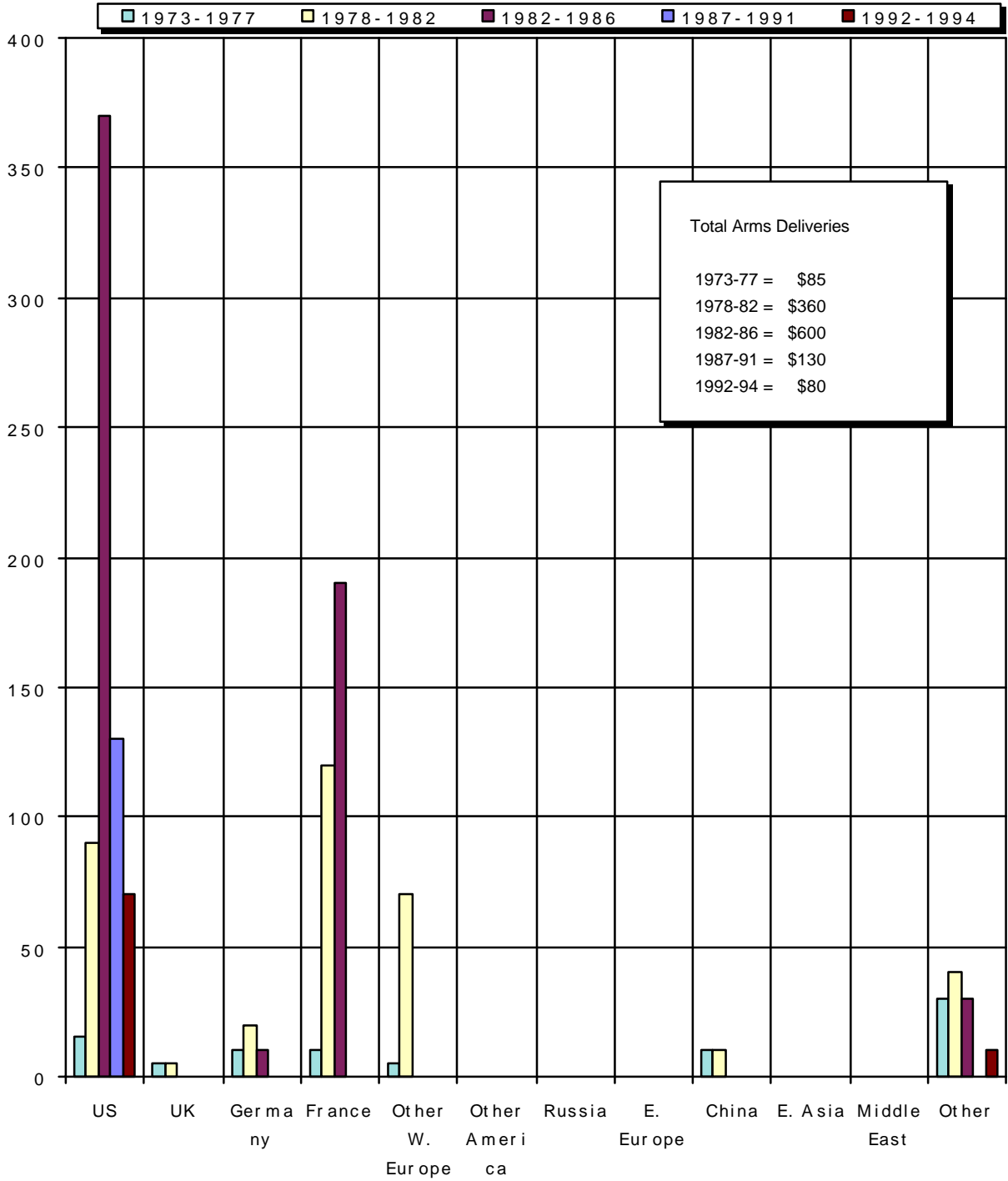
Total	100	200	200	100	100	200
US	100	100	100	100	100	100
Russia	0	0	0	0	0	0
China	0	0	0	0	0	0
Major West Europe	0	0	0	0	0	0
Other Europe	0	0	0	0	0	0
All Others	0	100	100	0	0	100

Includes Gulf states, Arab-Israeli states, North Africa, and Yemen

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

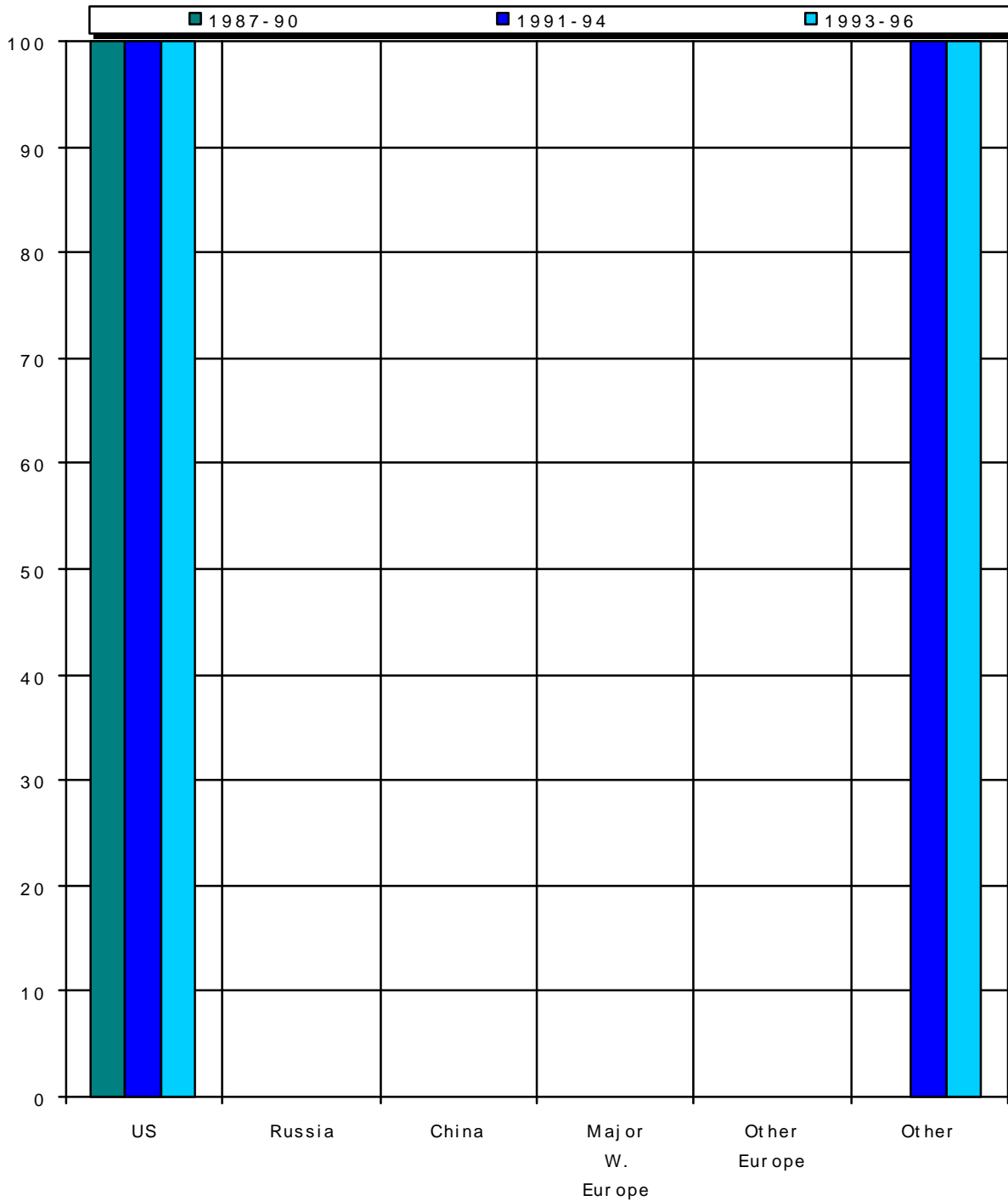
Trend in Deliveries to Tunisia: 1973-1994 (In \$US Current Millions)



Period	US	UK	Germany	France	Other W. Europe	Other America	Russia	E. Europe	China	E. Asia	Middle East	Other
1973-1977	15	5	10	10	5	0	0	0	10	0	0	30
1978-1982	90	5	20	120	70	0	0	0	10	0	0	40
1982-1986	370	0	10	190	0	0	0	0	0	0	0	30
1987-1991	130	0	0	0	0	0	0	0	0	0	0	0
1992-1994	70	0	0	0	0	0	0	0	0	0	0	10

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

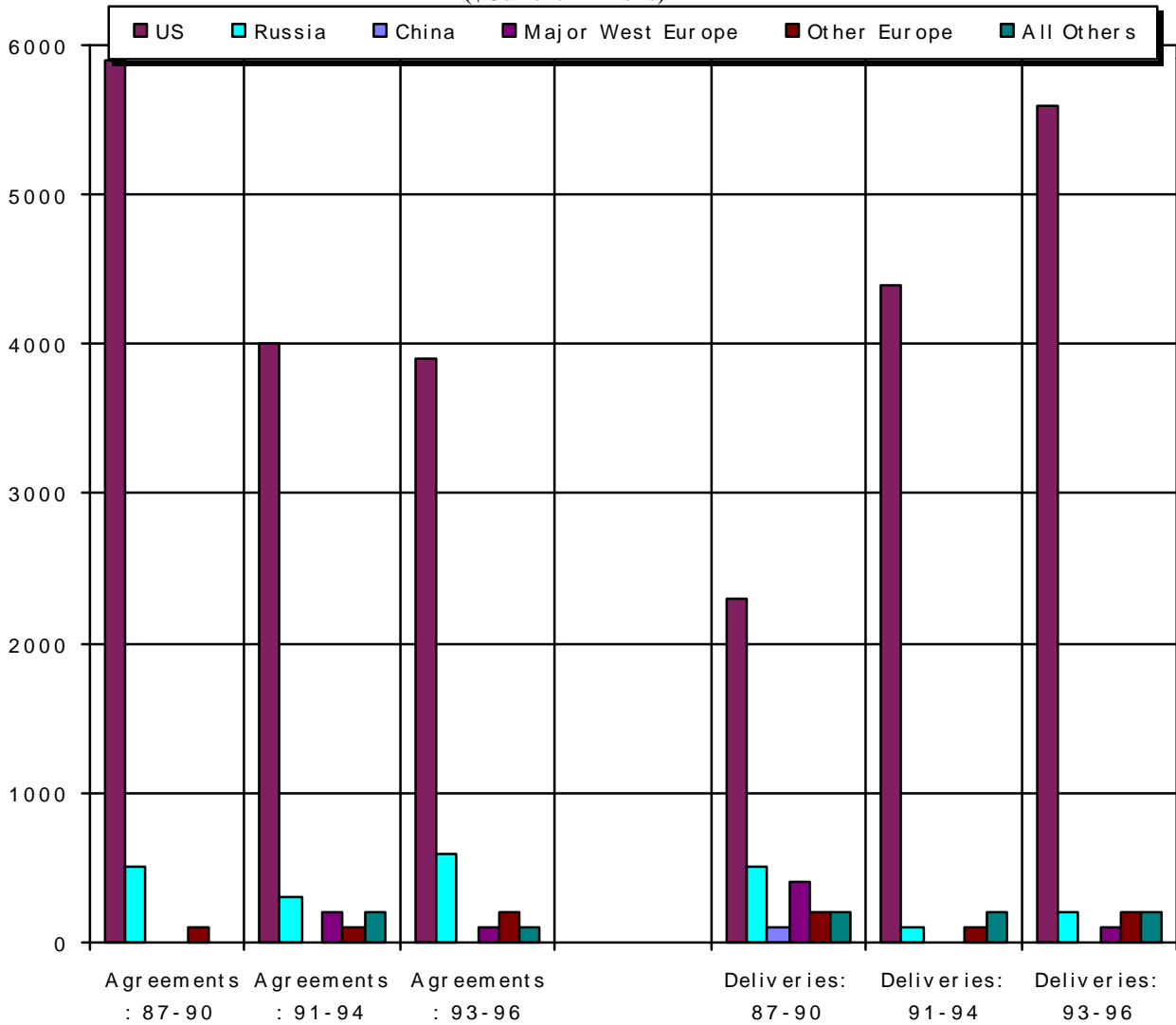
Trend in Supplier's Share of Tunisia's Arms Market Before and After Gulf War
 (New Arms Sales Agreements in \$US Current Millions)



0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Adapted by Anthony H. Cordesman from Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Egyptian Arms Agreements and Deliveries By Major Supplier: 1987-1996*
(\$Current Millions)



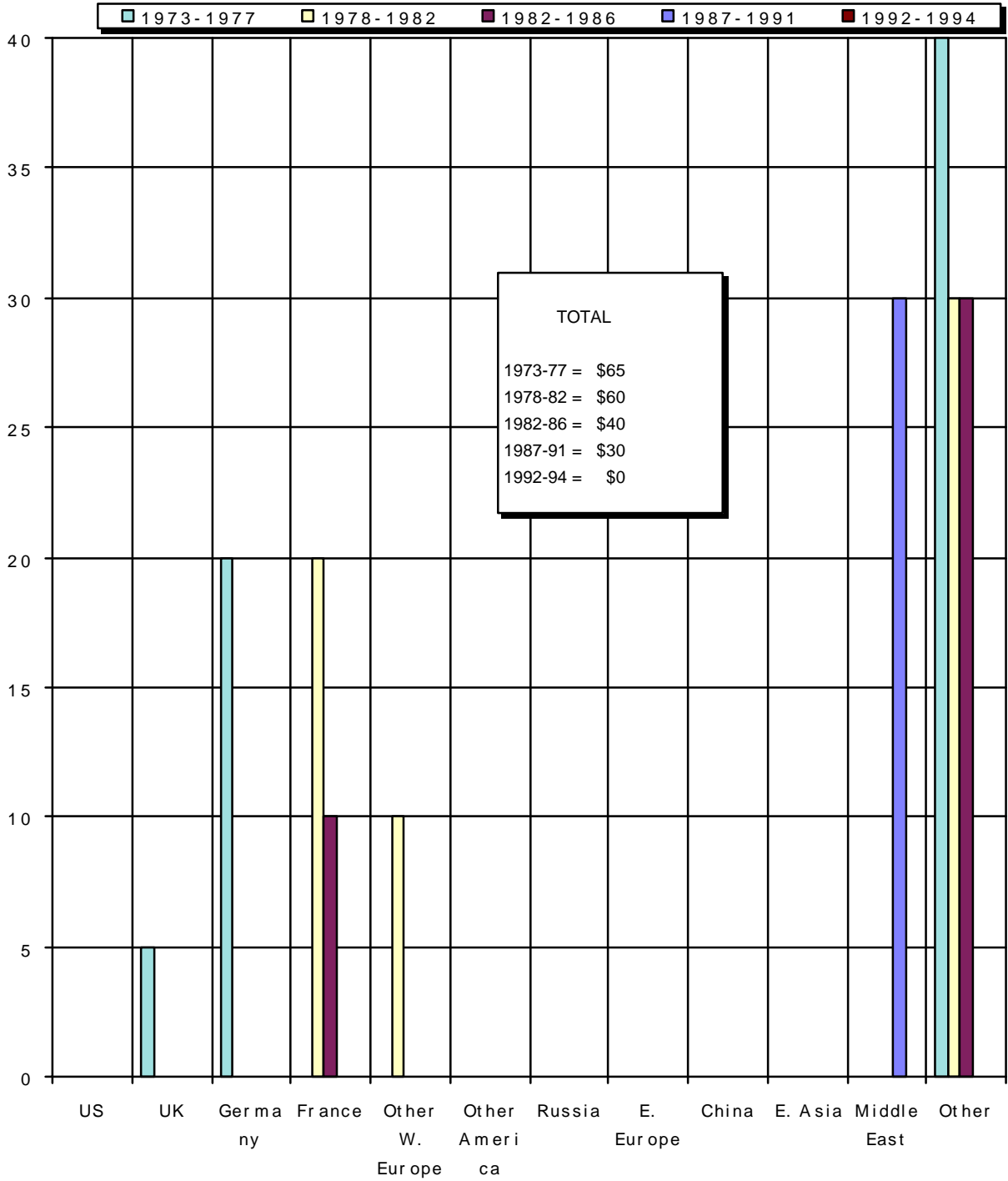
Total	6,500	4,800	4,900	3,700	4,800	6,300
US	5,900	4,000	3,900	2,300	4,400	5,600
Russia	500	300	600	500	100	200
China	0	0	0	100	0	0
Major W. Europe	0	200	100	400	0	100
Other Europe	100	100	200	200	100	200
Others	0	200	100	200	200	200

Includes Gulf states, Arab-Israeli states, North Africa, and Yemen

0 = less than \$50 million or nil, and all data rounded to the nearest \$100 million

Source: Richard F. Grimmet, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Trend in Deliveries to Mauritania: 1978-1994
(In \$US Current Millions)



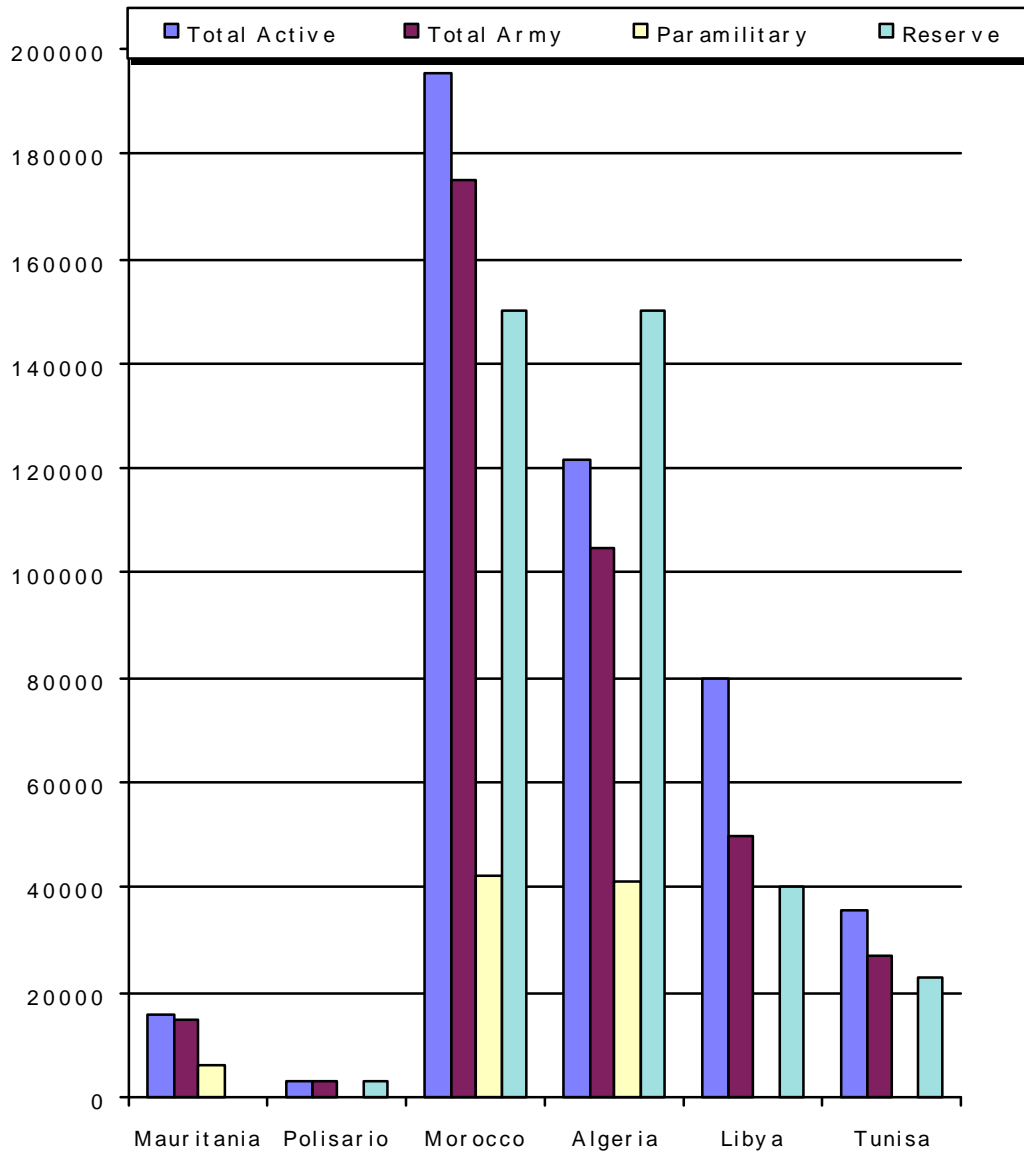
1973-1977	0	5	20	0	0	0	0	0	0	0	0	40
1978-1982	0	0	0	20	10	0	0	0	0	0	0	30
1982-1986	0	0	0	10	0	0	0	0	0	0	0	30
1987-1991	0	0	0	0	0	0	0	0	0	0	30	0
1992-1994	0	0	0	0	0	0	0	0	0	0	0	0

Source: Adapted by Anthony H. Cordesman from ACDA, World Military Expenditures and Arms Transfers, various editions.

Part Three:

Comparative Military Forces

Total Manpower in Maghreb Military Forces in 1996/1997



Maghreb Military Demographics and Forces in 1996/1997MILITARY DEMOGRAPHY

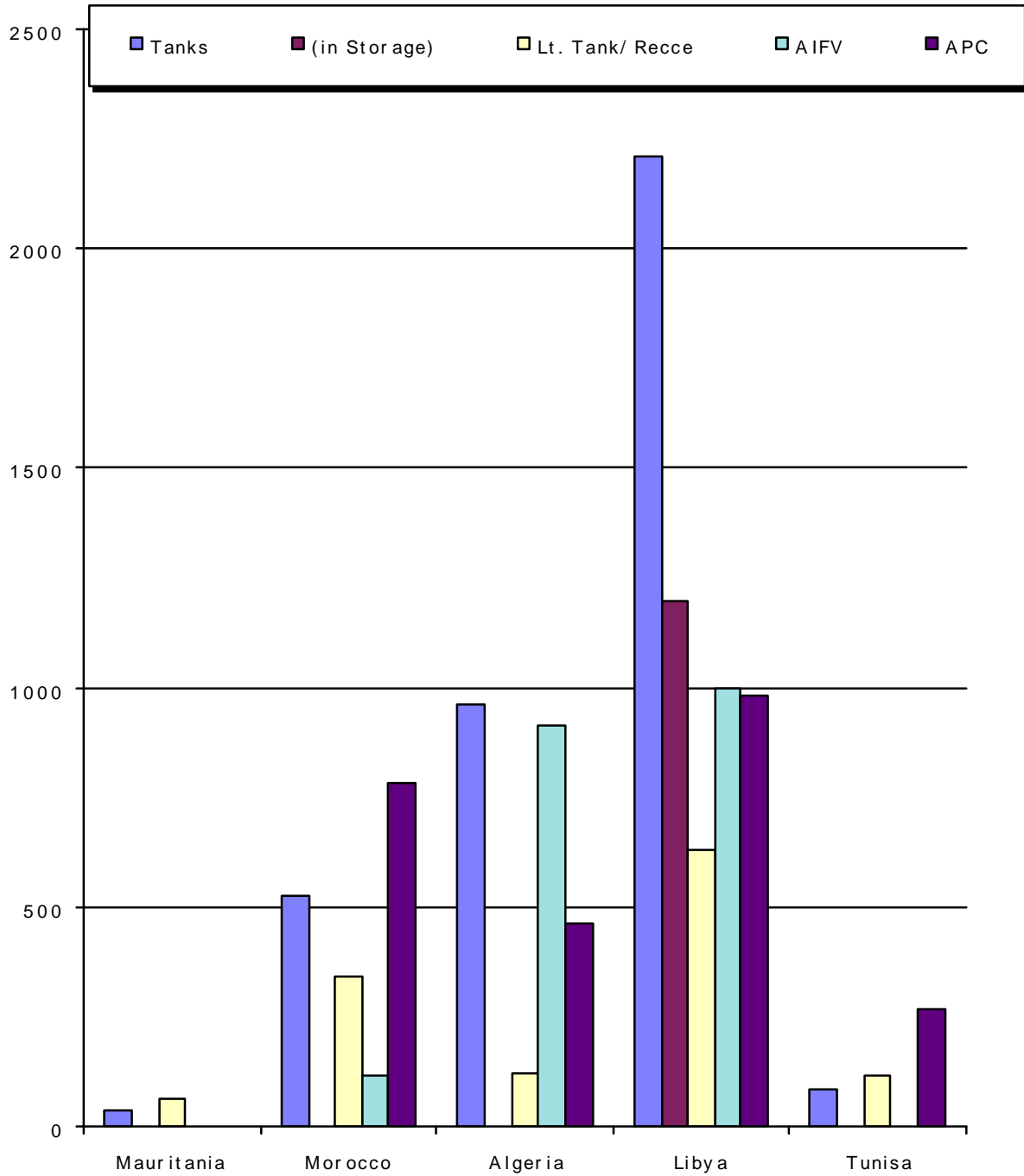
<u>Country</u>	<u>Total Population</u>	<u>Males Reaching Military Age Each Year</u>	<u>Males Between the Ages of</u>			<u>Males Between 15 and 49</u>	
			<u>13 and 17</u>	<u>18 and 22</u>	<u>23 and 32</u>	<u>Total</u>	<u>Medically Fit</u>
Algeria	29,183,032	326,229	1,828,000	1,598,000	2,507,000	7,391,946	4,534,267
Libya	5,445,436	56,834	325,000	272,000	406,000	1,170,100	696,288
Mauritania	2,336,048	-	127,000	110,000	167,000	500,765	244,546
Morocco	29,779,156	330,334	1,630,000	1,468,000	2,383,000	7,541,745	4,782,028
Tunisia	9,019,687	91,986	504,000	460,000	800,000	2,354,513	1,349,728
Sub-Total	75,763,359	-	4,414,000	3,980,000	6,263,000	18,959,069	11,606,857
Chad	6,976,845	-	346,000	291,000	456,000	1,562,052	809,210
Egypt	63,360,000	660,453	3,338,000	2,835,000	4,734,000	16,530,460	10,723,011

MILITARY FORCES

<u>Country</u>	<u>Total Active Manning</u>	<u>Total Active Army Manning</u>	<u>Tanks</u>	<u>OAFVs</u>	<u>Artillery</u>	<u>Combat Aircraft</u>	<u>Armed Helicopters</u>
Algeria	121,700	105,000	960	1,495	716	170	60
Libya	80,000	50,000	2,210	2,620	1,170	417	52
Mauritania	15,560	15,000	35	105	75	7	0
Morocco	195,500	175,000	524	1,344	370	99	24
Tunisia	35,500	27,000	84	382	117	32	7
Chad	30,350	25,000	60	63	7	4	0
Egypt	450,000	320,000	3,450	4,870	1,640	564	99

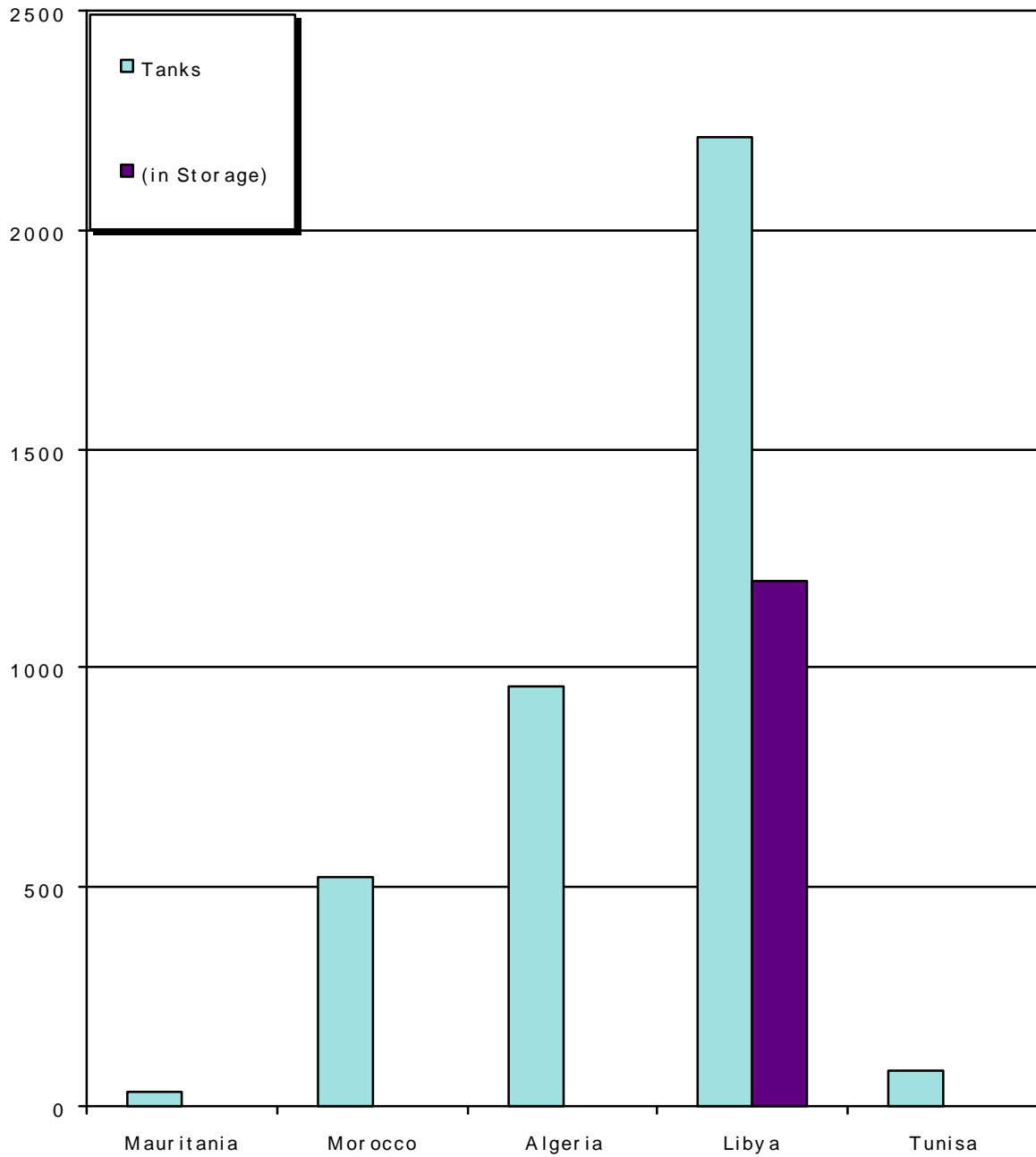
Source: Adapted by Anthony H. Cordesman, CIA World Factbook, 1997 and IISS, Military Balance, 1996-1997.

Total Maghreb Armor in 1996/67

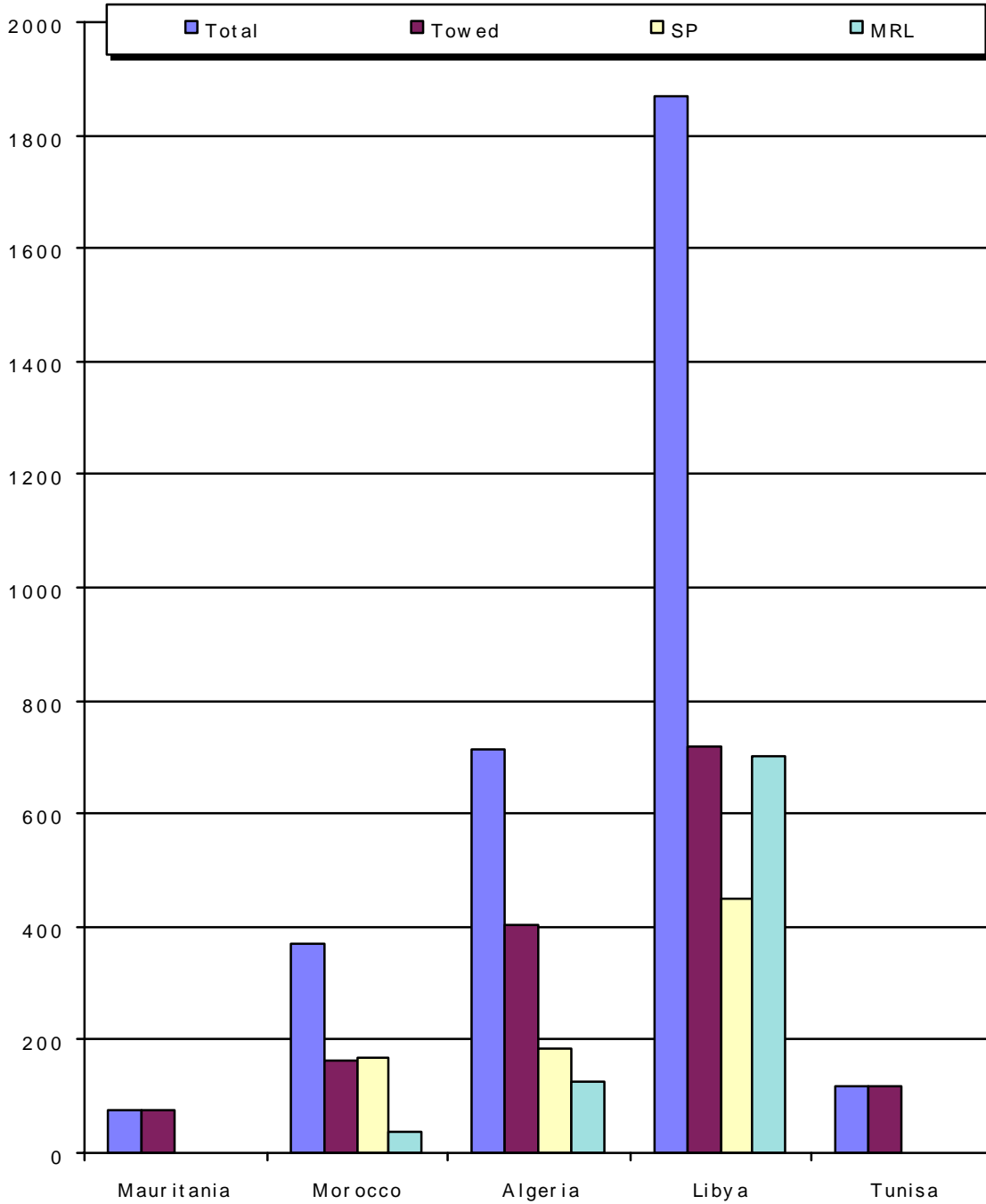


Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1996-1997, and JCSS, Military Balance in the Middle East, 1993-1994

Total Tanks in Maghreb Forces in 1996/1997

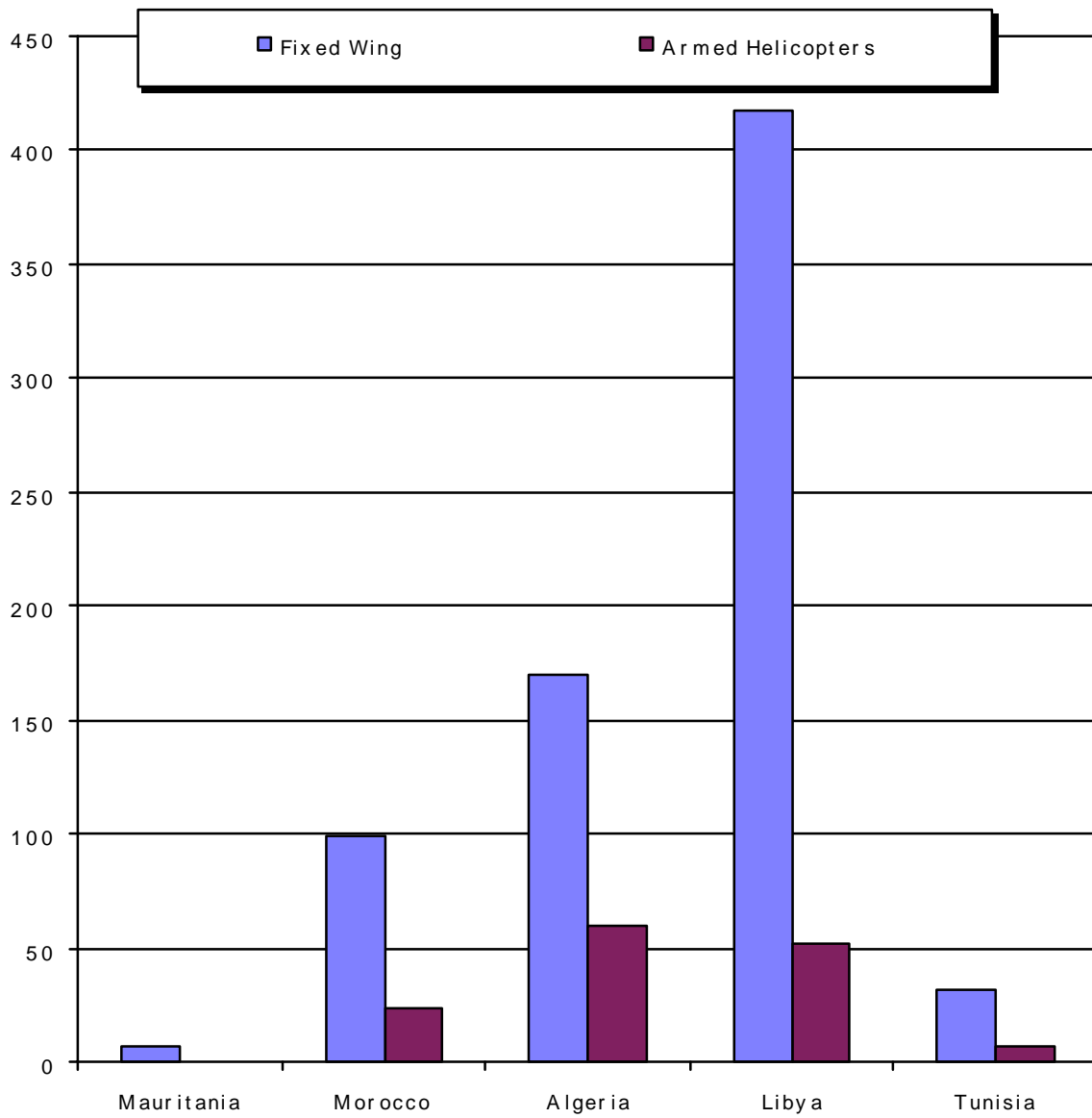


Total Maghreb Artillery in 1996/1997

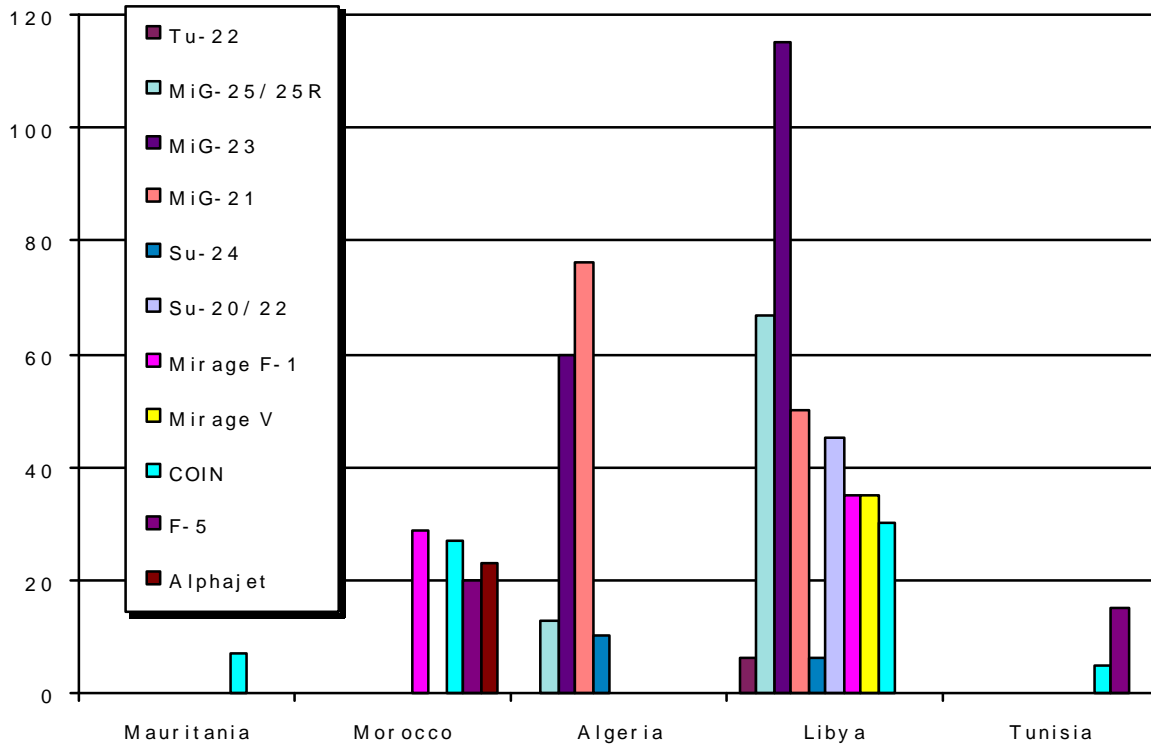


Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1994-1995, and JCSS, Military Balance in the Middle East, 1993-1994

Maghreb: Total Fixed Combat Aircraft and Armed Helicopters in 1996/1997



Maghreb Active Combat Aircraft By Type in 1996/1997
 (Does not include Combat Capable Trainers and Aircraft in Storage)



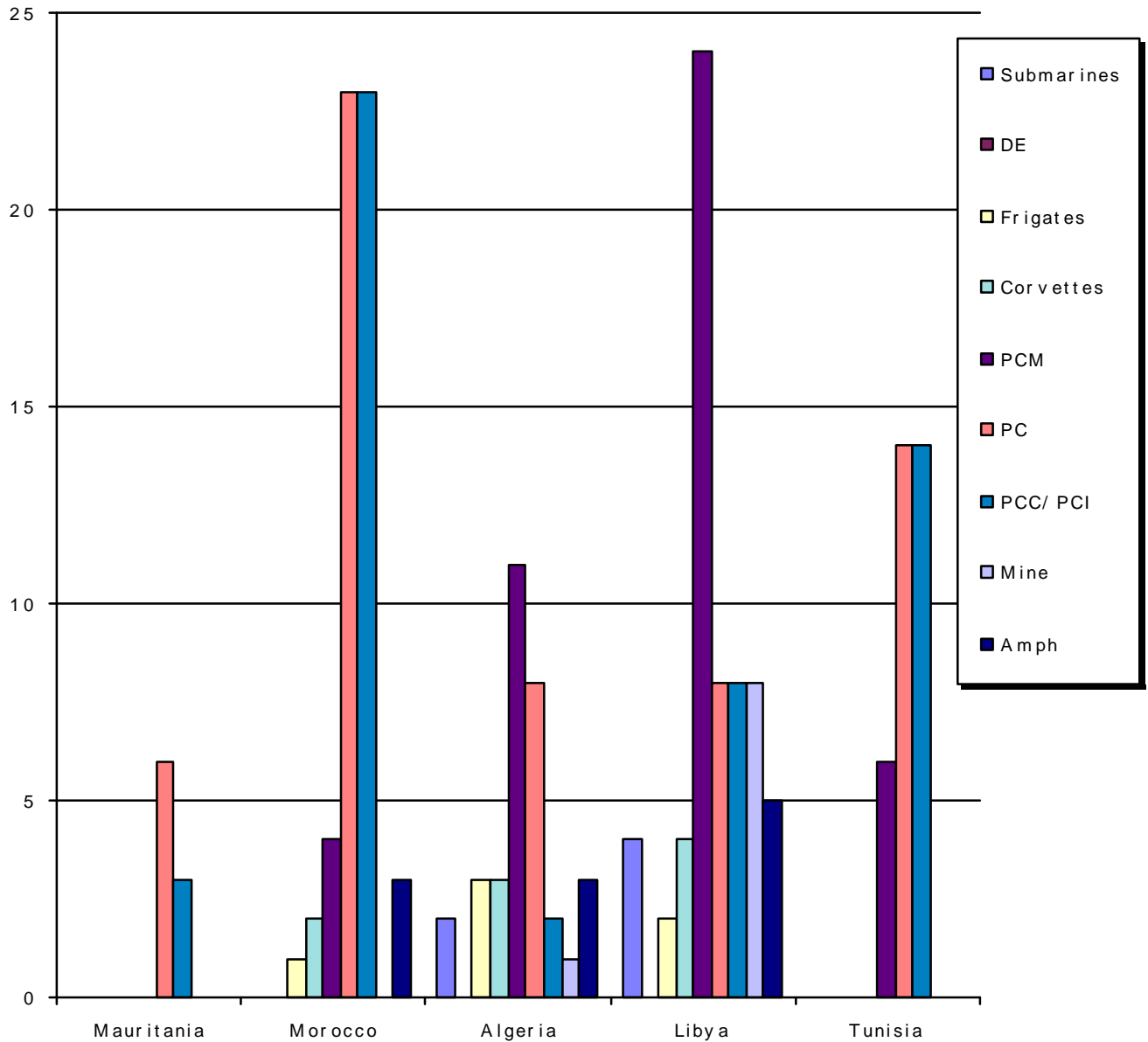
	<u>Mauritania</u>	<u>Morocco</u>	<u>Algeria</u>	<u>Libya</u>	<u>Tunisia</u>
Tu-16	-	-	-	-	-
Tu-22	-	-	-	6	-
MiG-29	-	-	-	-	-
MiG-25/25R	-	-	13	67	-
MiG-23	-	-	60	115	-
MiG-21/21R	-	-	76	50	-
Su-24	-	-	10	6	-
Su-20/22	-	-	-	45	-
Su-17	-	-	-	-	-
Mirage F-1	-	29	-	35	-
Mirage 5/5DR	-	-	-	35	-
F-5	-	20	-	-	15
Alphajet	-	23	-	-	-
JASTRTEB-J-1 (COIN)	-	-	-	30	-
FTB-337 (COIN)	2	-	-	-	-
BN-Defender (COIN)	5	-	-	-	-
MB-326 (COIN)	-	-	-	-	5
CM-170 (COIN)	-	23	-	-	-
OV-10 (COIN)	-	4	-	-	-
C-130H(R)	-	2	-	-	-
C-130 ELINT	-	2	-	-	-
Cheyenne II MR	2	-	-	-	-
Falcon 20 ELINT	-	1	-	-	-
Super King MR	-	-	2	-	-

Maghreb Land-Based Air Defense Systems 1996-1997

<u>Country</u>	<u>Major SAM</u>	<u>Light SAM</u>	<u>AA Guns</u>
<u>Mauritania</u>	None	SA-7	20 ZU-23-2 23mm 15 M-1939 37mm S-60 57mm 12 KS-19 100mm
<u>Polisario</u>	SA-6?	SA-7 SA-8 SA-9	50 ZSU-23-2 ZSU-23-4 SP 23mm
<u>Morocco</u>	None	70 SA-7 37 M-54 Chaparral	200 ZPU-2 14.5mm 20 ZPU-4 14.5mm 40 M-167 Vulcan 20mm 60 M-163 Vulcan SP 90 ZU-23-2 15 KS-19 100mm
<u>Algeria</u>	1 SA-6 1 SA-3	SA-7 SA-8 <u>SA-8</u> 1 SA-8	895 guns 80 ZPU-2/4 14.5mm 100 20mm 100 ZU-23 210 ZSU-23-4 SP 150 M-1939 37mm 75 S-60 57mm 20 KS-12 85mm 150 KS-19 100mm <u>10 KS-30 130mm</u> 1 85mm regt 1 100mm regt 1 130mm regt
<u>Libya</u>	4/8/48 SA-5A 5/90-108 SA-2 3/24-36 Twin SA-3 2/48 SA-6	SA-7 SA-9 SA-13 <u>24 Quad Crotale</u> 1/20 SA-8	600 guns ZU-23, ZSU-23-4, M-53/59 30mm, S-60 57mm
<u>Tunisia</u>	None	48 RBS-70 25 M-48 Chaparral	100 M-55 20mm 15 T-55/56 37mm

Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1994-1995

Maghreb Naval Ships by Category in 1996/1997



	<u>Mauritania</u>	<u>Morocco</u>	<u>Algeria</u>	<u>Libya</u>	<u>Tunisia</u>
Submarines			2	4	
DE					
Frigates		1	3	2	
Corvettes		2	3	4	
PCM		4	11	24	6
PC	6	23	8		14
PCC/PCI	3	23	2	8	14
Mine			1	8	
Amph		3	3	5	

Source: Adapted by Anthony H. Cordesman from the IISS, Military Balance, 1996-1997.

Part Four:

Weapons of Mass Destruction

The Race for Weapons of Mass Destruction

Algeria

Delivery Systems

- 10 Su-24 long range strike aircraft.
- 40 MiG-23BN fighter ground attack aircraft.
- Tube artillery and multiple rocket launchers.

Chemical Weapons

- Possible development. No evidence of deployed systems.

Biological Weapons

- Some early research activity.
- No evidence of production capability.

Nuclear Weapons

- Deliberately sought to create a covert nuclear research program under military control with Chinese support.
- Secretly built a research reactor (Es Salam) at the Ain Oussera nuclear research facility. This was announced to be a 10-15 megawatt reactor using heavy water and low enriched uranium. The size of its cooling towers, however, indicated it might be as large as 60 megawatts. It was also located far from population centers, had no visible electric generating facilities and was defended by SA-5s. There were also indications Algeria might be constructing a facility to separate out weapons grade plutonium.
- Exposure led to Algeria's agreement to place the facility under IAEA inspection in May 1991, and adhered to the NPT in May 1993. It formally acceded to the NPT on January 12, 1995.
- Exposure to public opinion and Western objections and economic/political crisis seems to have largely halted further progress.
- Algeria does, however, have uranium deposits west of Tamanrasset in southeast Algeria, has a 1 megawatt reactor (Nur) at Draria on the coast east of Algiers, and has hot cells for the production of radioactive isotopes at Draria.

Libya

Delivery Systems

- Has developed a liquid-fueled missile with a range of 200 kilometers.
- Al-Fatih solid-fueled missile with 300-450 mile range reported to have been under development with aid of German technical experts, but no signs of successful development.
- FROG-7 rocket launchers with 40 kilometer range.
- Deployed 80 Scud B launchers with 190 mile range in 1976, but could not successfully operate system. Many of the launchers and missiles sold to Iran.
- Purchased SS-N-2C and SSC-3 cruise missiles. Little operational capability.
- Pursued other missile development programs with little success.
- Tu-22 bombers with minimal operational capability.
- Su-24 long range strike fighters. These are operational and have with limited refueling capability using C-130s.
- operational Mirage 5D/DE and 10 Mirage 5DD fighter ground attack aircraft.
- Mirage F-1AD fighter ground attack aircraft.
- MiG-23BM Flogger F and 14 MiG-23U fighter ground attack.
- Su-20 and Su-22 Fitter E, J, F fighter ground attack aircraft.
- Tube artillery and multiple rocket launchers.

- Fired Scud missiles against the Italian island of Lampedusa in 1987.

Chemical Weapons

- Claims will not sign CWC as long as other states have nuclear weapons.
- May have used mustard gas delivered in bombs by AN-26 aircraft in final phases of war against Chad in September, 1987.
- Nerve and mustard gas production facilities in an industrial park at chemical weapons plant at Rabta. This plant can produce both the poison gas and the bombs, shells, and warheads to contain it. Are probably two other research/batch production facilities.
- Rabta Plant seems to have started test runs in mid-1988. It is a 30 building facility defended by SAM batteries and special troops. Has sheltered underground areas.
 - Libya has acquired large stocks of feedstocks for mustard gas like thiodiglycol, and precursors for nerve gas, and extensive amounts have been sent to Rabta.
 - At least 100 metric tons of blister and nerve agents have been produced at Rabta since the late 1980s, but production rate has been very low and plant is either not successful or is not being utilized because of fear of attack.
 - Some of production seems to be
 - The plant would have a capacity of 100 metric tons per year if operated at full capacity.
 - Fabricated fire at Rabta in 1990 to try to disguise the function of plant and fact was operating.
 - German courts have convicted a German national in October 1996, for selling Libya a computer designed for use in chemical weapons programs and helping Libya to import equipment to clean the waste emissions from poison gas production from India using an Irish dummy corporation.
- Additional major chemical weapons plant in construction in extensive underground site near Tarhunah, a mountainous area 60 kilometers south of Tripoli.
- Tarhunah has been designed to minimize its vulnerability to air attack and has twin tunnels 200-450 feet long, protected by 100 feet of sandstone above the tunnels and a lining of reinforced concrete. This is far beyond the penetration capabilities of the US GBU-27B and GBU-28 penetration bombs. The GBU-28 can penetrate a maximum of 25-30 meters of earth or 6 meters of concrete.
- Libya rejected the proposal of President Mubarak that it open the Tarhuna facility to third country inspection to prove it was not a chemical weapons facility in April 1996.
- Reports of construction of another sheltered major facility near Sabha, 460 miles south of Tripoli.
- Reports of Chinese, North Korean, German, Swiss, and other European technical support and advisors.
- Very low quality weapons designs with poor fusing and lethality.
- Unconfirmed reports of shipments of chemical weapons to Syria and Iran do not seem valid.

Biological Weapons

- Some early research activity.
- No evidence of production capability.

Nuclear Weapons

- Has sought to create a development and production capability, but no evidence of any real progress or success.
- Small nuclear research reactor at Tajura acquired from the USSR in 1970s.
- Ratified NPT in 1975. Declares all facilities under IAEA safeguards.
- Continues to train nuclear scientists and technicians abroad.
- Unsuccessfully attempted to buy nuclear weapons from China in the 1970s.
- Qaddafi called for Libyan production of nuclear weapons on April 29, 1990.
- Has explored for uranium, but no active mines or uranium mills.
- 10 megawatt, Soviet-supplied nuclear research reactor at Tajura acquired from the USSR in 1970s. Operates under IAEA safeguards.
- Had plan to build at 440 megawatt, Soviet-supplied reactor near the Gulf of Sidra in the 1970s, but canceled project.

- Ratified NPT in 1975. Declares all facilities under IAEA safeguards.

Egypt

Delivery Systems

- Cooperation with Iraq in paying for development and production of "Badar 2000" missile with a 750-1,000 kilometer range. This missile is reported to be a version of the Argentine Condor II or Vector missile. Ranges were reported from 820-980 kilometers, with the possible use of an FAE warhead.
 - Egyptian officers were arrested for trying to smuggle carbon materials for a missile out of the US. in June 1988.
 - Covert US efforts seem to have blocked this development effort.
- Has Scud B TELs and missiles with approximately 100 missiles with 300 kilometers range.
- Reports has developed plant to produce an improved version of the Scud B, and possibly Scud C, with North Korean cooperation.
- North Korean transfers include equipment for building Scud body, special gyroscope measuring equipment and pulse-code modulation equipment for missile assembly and testing.
- Reports in June, 1996 that has made major missile purchase from North Korea, and will soon be able to assemble such missiles in Egypt. Seven shipments from North Korea reported in March and April.
- Media reports that US satellites detected shipments of Scud C missile parts to Egypt in February-May, 1996 -- including rocket motors and guidance devices -- do not seem correct. The Scud C has a range of roughly 480 kilometers.
- The CIA reported in June 1997, however, that Egypt had acquired Scud B parts from Russia and North Korea during 1996.
- US suspects Egypt is developing a liquid-fueled missile called the Vector with an estimated range of 600-1200 kilometers.
- Another liquid-fueled missile under development known as 'Project T' has an estimated range of 450 kilometers.
- FROG 7 rocket launch units with 40 kilometers range.
- Cooperation with Iraq and North Korea in developing the Saqr 80 missile This rocket is 6.5 meters long and 210 mm in diameter, and weighs 660 kilograms. It has a maximum range of 50 miles (80 kilometers) and a 440 pound (200 kilogram) warhead. Longer range versions may be available.
- AS-15, SS-N-2, and CSS-N-1 cruise missiles.
- F-4E fighter ground attack aircraft.
- Mirage 5E2 fighter ground attack.
- Mirage 2000EM fighters.
- F-16A and 80 F-16C fighters
- Multiple rocket launcher weapons.
- Tube artillery

Chemical Weapons

- Produced and used mustard gas in Yemeni civil war in 1960s, but agents may have been stocks British abandoned in Egypt after World War II. Effort was tightly controlled by Nasser and was unknown to many Egyptian military serving in Yemen.
- Completed research and designs for production of nerve and cyanide gas before 1973.
- Former Egyptian Minister of War, General Abdel Ranny Gamassay stated in 1975, that, "if Israel should decide to use a nuclear weapon in the battlefield, we shall use the weapons of mass destruction that are at our disposal."ⁱ
- Seems to have several production facilities for mustard and nerve gas. May have limited stocks of bombs, rockets, and shells.
- Unconfirmed reports of recent efforts to acquire feed stocks for nerve gas. Some efforts to obtain feed stocks from Canada. May now be building feed stock plants in Egypt.
- Industrial infrastructure present for rapid production of cyanide gas.

Biological Weapons

- Research and technical base.
- No evidence of major organized research activity.

Nuclear Weapons

- Low level research effort. No evidence of more than basic research since the 1960s.

IsraelDelivery Systems

- New IRBM/ICBM range high payload booster developed with South Africa.
- Up to 50 "Jericho I" missiles deployed in shelters on mobile launchers with up to 400 miles range with a 2,200 pound payload, and with possible nuclear warhead storage nearby.
- Unverified claims that up to 100 missiles are deployed west of Jerusalem.
- A missile bases does seem to exist at Zachariah, several miles southeast of Tel Aviv.
 - Limestone region with caves, to shelter missiles, TELs, and vehicles.
 - Transport-Erector-Launchers (TELs) have been seen at this base on vehicles 16 meters long, 4 meters wide, and 3 meters high. May be road mobile for dispersal.
 - They carry missiles 14 meters long and 1.5 meters wide.
 - There seem to be 50 missiles deployed at the base.
 - Each TEL has three support vehicles. One is a guidance programmer and power vehicle. Another seems to be a firing control vehicle, and the third seems to be a communications vehicle.
 - The base is not hardened against nuclear attack, and would be vulnerable to chemical and biological attack.
- Jericho II missiles now deployed, and some were brought to readiness for firing during the Gulf War.
- These missiles seem to include a single stage follow-on to the Jericho I and a multistage longer range missile.
 - The missile seems to have a range of up to 900 miles with a 2,200 pound payload, and may be a cooperative development with South Africa. (Extensive reporting of such cooperation in press during October 25 and 26, 1989).
 - Commercial satellite imaging indicates the missile may be 14 meters long and 1.5 meters wide. Its deployment configuration hints that it may have radar area guidance similar to the terminal guidance in the Pershing II.
- Jericho II missile production facility at Be'er Yakov.
- A major missile test took place on September 14, 1989. It was either a missile test or failure of Ofeq-2 satellite.
- Work on development of TERCOM type smart warheads. Possible cruise missile guidance developments using GPS navigation systems.
- F-15, F-16, F-4E, and Phantom 2000 fighter-bombers capable of long range refueling and of carrying nuclear and chemical bombs.
- Tel Nof may be the air base used to arm aircraft with nuclear weapons. Storage facilities may exist at Zachariah
- Lance missile launchers and 160 Lance missiles with 130 kilometers range.
- Variant of the Popeye air-to-surface missile believed to have nuclear warhead.
- MAR-290 rocket with 30 kilometers range believed to be deployed
- MAR-350 surface-to-surface missile with range of 56 miles and 735 lb. payload believed to have completed development or to be in early deployment.
- Israel seeking super computers for Technion Institute (designing ballistic missile RVs), Hebrew University (may be engaged in hydrogen bomb research), and Israeli Military Industries (maker of "Jericho II" and Shavit booster).

Chemical Weapons

- Reports of mustard and nerve gas production facility established in 1982 in the restricted area in the Sinai near Dimona seem incorrect. May have additional facilities. May have capacity to produce other gases. Probable stocks of bombs, rockets, and artillery.
- Extensive laboratory research into gas warfare and defense.
- Development of defensive systems includes Shalon Chemical Industries protection gear, Elbit Computer gas detectors, and Bezal R&D air crew protection system.
- Extensive field exercises in chemical defense.
- Gas masks stockpiled, and distributed to population with other civil defense instructions during Gulf War.
- Warhead delivery capability for bombs, rockets, and missiles, but none now believed to be equipped with chemical agents.

Biological Weapons

- Extensive research into weapons and defense.
- Ready to quickly produce biological weapons, but no reports of active production effort.

Nuclear Weapons

- Director of CIA indicated in May 1989, that Israel may be seeking to construct a thermonuclear weapon.
- Has two significant reactor projects: the 5 megawatt HEU light-water IRR I reactor at Nahal Soreq; and the 40-150 megawatt heavy water, IRR-2 natural uranium reactor used for the production of fissile material at Dimona. Only the IRR-1 is under IAEA safeguards.
- Dimona has conducted experiments in pilot scale laser and centrifuge enrichment, purifies UO₂, converts UF₆, and fabricates fuel for weapons purpose.
- Uranium phosphate mining in Negev, near Beersheba, and yellow cake is produced at two plants in the Haifa area and one in southern Israel.
- Pilot-scale heavy water plant operating at Rehovot.
- Estimates of numbers and types of weapons differ sharply.
 - Stockpile of at least 60-80 plutonium weapons.
 - May have well over 100 nuclear weapons assemblies, with some weapons with yields over 100 Kilotons.
 - US experts believe Israel has highly advanced implosion weapons. Known to have produced Lithium-6, allowing production of both tritium and lithium deuteride at Dimona. Facility no longer believed to be operating.
 - Some weapons may be ER variants or have variable yields.
 - Stockpile of up to 200-300 weapons is possible.
- Major weapons facilities include production of weapons grade Plutonium at Dimona, nuclear weapons design facility at Nahal Soreq (south of Tel Aviv), missile test facility at Palmikim, nuclear armed missile storage facility at Kefar Zekharya, nuclear weapons assembly facility at Yodefah, and tactical nuclear weapons storage facility at Eilabun in eastern Galilee.

Missile Defenses

- Patriot missiles with future PAC-3 upgrade to reflect lessons of the Gulf War.
- Arrow 2 two-stage ATBM with slant intercept ranges at altitudes of 8-10 and 50 kilometers speeds of up to Mach 9, plus possible development of the Rafale AB-10 close in defense missile with ranges of 10-20 kilometers and speeds of up to Mach 4.5. Taas rocket motor, Rafael warhead, and Tadiran BM/C4I system and "Music" phased array radar. Israel plans to deploy two batteries of the Arrow to cover Israel, each with four launchers, to protect up to 85% of its population.
- Undergoing phase two tests with successful flights on August 20, 1996 and March 11, 1997. Development costs is \$330 million with Israel paying 28% and the US paying 72%. Deployment will be jointly funded under a 1996 accord, as a part of a \$556 million six-year program. Israel will pay 64% and the US 36%.
- Will be deployed in batteries as a wide area defense system with intercepts normally at reentry or exoatmospheric altitudes. Capable of multi-target tracking and multiple intercepts.

Advanced Intelligence Systems

- The Shavit I launched Israel's satellite payload on September 19, 1989. It used a three stage booster system capable of launching a 4,000 pound payload over 1,200 miles or a 2,000 pound payload over 1,800 miles. It is doubtful that it had a payload capable of intelligence missions and seems to have been launched, in part, to offset the psychological impact of Iraq's missile launches.
- Ofeq 2 launched in April, 1990 -- one day after Saddam Hussein threatens to destroy Israel with chemical weapons if it should attack Baghdad.
- Launched first intelligence satellite on April 5, 1995, covering Syria, Iran, and Iraq in orbit every 90 minutes. The Ofeq 3 satellite is a 495 pound system launched using the Shavit launch rocket, and is believed to carry an imagery system. Its orbit pass over or near Damascus, Tehran, and Baghdad.ⁱⁱ

Syria

Delivery Systems

- Four SSM brigades: 1 with FROG, 1 with Scud Bs, 1 with Scud Cs, and 1 with SS-21s.
- New long range North Korean Scud Cs deployed
 - Ranges of up to 600 kilometers.
 - Seems to have 6-12 launchers deployed and 60 missiles.
 - Possible nerve gas warheads
 - CEP of 1,000-2,600 meters.
- May be converting some long range surface-to-air and naval cruise missiles to use chemical warheads.
- 18 SS-21 launchers and at least 36 SS-21 missiles with 80-100 kilometers range. May be developing chemical warheads.
- Up to 12 Scud B launchers and 200 Scud B missiles with 310 kilometers range. Believed to have chemical warheads. Scud B warhead weighs 985 kilograms.
- Reports of PRC deliveries of missile components by China Precision Machinery Company, maker of the M-11, in July, 1996. The M-11 has a 186 mile range with a warhead of 1,100 pounds.
- Some sources believe M-9 missile components, or M-9-like components delivered to Syria. Missile is reported to have a CEP as low as 300 meters.
- Sheltered or underground missile production/assembly facilities at Aleppo and Hamas built with aid from Chinese, Iranian, and North Korean technicians. Possibly some Russian technical aid.
- Short range M-1B missiles (up to 60 miles range) seem to be in delivery from PRC.
- SS-N-3, and SSC-1b cruise missiles.
- 20 Su-24 long range strike fighters.
- 30-60 operational MiG-23BM Flogger F fighter ground attack aircraft.
- 20 Su-20 fighter ground attack aircraft.
- 60-70 Su-22 fighter ground attack aircraft.
- 18 FROG-7 launchers and rockets.
- Negotiations for PRC-made M-9 missile (185-375 mile range).
- Multiple rocket launchers and tube artillery.

Chemical Weapons

- Major nerve gas, and possible other chemical agent production facilities north of Damascus. Two to three plants.
- Building new major plant near Aleppo.
- First acquired small amounts of chemical weapons from Egypt in 1973.
- Began production of non-persistent nerve gas in 1984. may have had chemical warheads for missiles as early as 1985.
- Believed to have begun deploying VX in late 1996, early 1997. Tested Scuds in manner indicating possible chemical warheads in 1996.
- May have VX and Sarin in modified Soviet ZAB-incendiary bombs and PTAB-500 cluster bombs.

- Acquired design for Soviet Scud warhead using VX in 1970s. Extensive testing of chemical warheads for Scud Bs. May have tested chemical warheads for Scud Cs.
- CIA reported in June 1997 that Syria had acquired new chemical weapons technology from Russia and Eastern Europe in 1996.
- Unconfirmed reports of sheltered Scud missiles with unitary Sarin or Tabun nerve gas warheads deployed in caves and shelters near Damascus.
- Reports that a facility co-located with the Center d'Etdues et de Recherche Scientifique (CERS) is developing a warhead with chemical bomblets for the Scud C.
- Shells, bombs, and nerve gas warheads for multiple rocket launchers.
- FROG warheads under development.
- Reports of SS-21 capability to deliver chemical weapons are not believed by US or Israeli experts.
- Israeli sources believe Syria has binary weapons and cluster bomb technology suitable for delivering chemical weapons.
- Experts believe has stockpiled 500 to 1,000 metric tons of chemical agents.

Biological Weapons

- Signed, but not ratified the 1972 Biological and Toxin Weapons Convention. Extensive research effort.
- ACDA report in August 1996 indicated that, "it is highly probably that Syria is developing an offensive biological capability."
- Extensive research effort. Reports of one underground facility and one near the coast.
- Probable production capability for anthrax and botulism, and possibly other agents.
- Israeli sources claim Syria weaponized botulin and ricin toxin in early 1990s, and probably anthrax.
- Limited indications may be developing or testing biological variations on ZAB-incendiary bombs and PTAB-500 cluster bombs and Scud warheads.

Nuclear Weapons

- Ongoing research effort.
- No evidence of major progress in development effort.
- Announced nuclear reactor purchase plans including 10 megawatt research reactor and six power reactors in 1980s, but never implemented.
- Has miniature 30 kilowatt neutron-source reactor, but unsuitable for weapons production.

Source: Prepared by Anthony H. Cordesman, Co-Director, Middle East Program, CSIS.

ⁱ Al-Ahram, July 25, 1975; Al-Akhbar, July 25, 1975.

ⁱⁱ Washington Post, April 6, 1995, p. 1.