

https://dspace.org/

The transfer of United States technology to the Soviet Union: 1966-1986

Davies-Webb, Warwick Gun-Cuninghame

2015-01-19
http://hdl.handle.net/10539/16596

Downloaded from a DSpace repository. https://dspace.org/

THE TRANSFER OF UNITED STATES TECHNOLOGY TO THE SOVIET UNION : 1966-1986

Warwick Gun-Cuninghame Davies-Webb

A Dissertation Submitted to the Faculty of Arts
University of the Witwatersrand, Johannesburg
for the Degree of Master of Arts

Johannesburg 1987

ABSTRACT

In writing this thesis I set out to clarify and determine various aspects relating to the topic.

Firstly, collating data from a variety of primary and secondary sources, I analyse the nature and extent of US technology transfers to the Soviet Union and determine that its impact on the development of the Soviet Unions military industrial complex has been substantial.

Secondly, I question the conventional tenets underlying US trade policy with the Soviet Union as understood in terms of overall detente policy, and contend that technology transfers do not contribute to a more co-operative behaviour on the part of the Soviet leadership in its relations with the US. This observation is reinforced in a subsequent analysis of Soviet global strategy as manifested in key doctrinal statements as articulated by authoritative Soviet spokesmen. These ideologically rooted concepts have immediate and far reaching implications for the Soviet approach to, and perception of, the East/West trade issue.

Finally, I address the question, as to why this transfer of US technology has taken place and after examining several arguments conclude that it may be part of a larger global policy aiming at the convergence of two diametrically opposed ideological systems into a synthesis of a "New World Order".

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

N. O—-Cull.

31 day of MARCH 1987.

PREFACE

The first major research work on United States (US) technology transfers to the Soviet Union was undertaken by Professor Antony Sutton during his tenure at the Hoover Institute on War, Peace and Revolution in the late 1960's. His three-volume series, covering the period 1917-1965, was a detailed economic analysis of US technology transfers including type of equipment, US companies involved and the impact these transfers had on Soviet economic development.

Following Sutton's early research work, a number of books, publications and articles have been written covering various facets of US technology transfers to the Soviet Union. However, most studies on this topic ignore its military and strategic dimensions. For example, studies by Philip Hanson "Western Technology in the Soviet Economy", Problems of Communism, November/December 1978 and Joseph Finder "Red Carpet"; Holt, Rinehart and Winston, New York, 1983, tend to focus narrowly on the economic issue of US-Soviet trade.

On the other hand, reports produced by the Central Intelligence Agency (CIA) and the US Office of Technology Assessment, which carefully analyse the impact that US technology transfers have had on Soviet military capability, ignore the involvement of US banks and corporations that have played a key role in developing the Soviet military/industrial complex.

Other researchers tend to study US-Soviet trade from a Western perspective, which ignores or excludes the motivation and desire underlying Soviet acceptance of technology through the rubric of detente, from the US.

These deficiencies often tend to result in an incomplete and misleading picture of US technology transfers to the Soviet Union, which this research project will help clarify, by assimilating the various themes usually studied in isolation, into a coherent whole.

The two core issues that this research project will focus on will be the essential perceptual differences that exist between US and Soviet trade policy, and the impact that US technology has had on the development of the Soviet Union's military/industrial complex since 1965.

It will be hypothesised and proved by analysing Soviet literature, that economic detente represents for the Soviet Union an effective way of using the world economy to compensate for its own economic and technological inadequacies.

This will be followed by an examination of the extent of US technology transfers to the Soviet Union and its impact on the development of the Soviet Union's military/industrial complex. Special attention will be paid to the use of US technology to expand the military capability of the Soviet Union.

Secondary themes that will be interwoven into this research paper will include a study of (a) the Soviet acquisition programme of US technology; (b) the Soviet-Bloc's foreign debt crises and the use of US and European financial loans to not only maintain its economic development, but also to facilitate the expansion of Soviet global ambitions worldwide; and (c) US export control policies towards the Soviet Union to ultimately assess whether sanctions imposed on technology transfers and trade between states will prejudice military and industrial development.

Finally this paper will discuss the hypothesis that there exists an agenda to merge two opposing economic and political systems (the US and the Soviet Union) through trade and technology transfer into a synthesis from which will emerge a "New World Order". The last chapter in this paper, entitled "Towards global convergence" will analyse the movement towards a New World Order being postulated and promoted by certain academic, financial and political circles centred around the United States' foreign policy Establishment, and suggest that technology transfers provide the operational vehicle for the creation of such a world order synthesis.

Footnote

Although the topic of this research paper focusses on the US and the Soviet Union, references will also be made to the West (incorporating the US, Western Europe and Japan) and the Soviet-Bloc (incorporating the Soviet Union and its Eastern Satellites, but excluding Yugoslavia). US technology transfers to the Soviet Union cannot be studied in isolation without mentioning their respective allies in several areas of discussion including export controls, foreign debt and the Soviet Union acquisition programme.

* Monetary figures quoted in this paper are in US dollars.

* One billion = 1000 million or 1 milliard.

Finally this paper will discuss the hypothesis that there exists an agenda to merge two opposing economic and political systems (the US and the Soviet Union) through trade and technology transfer into a synthesis from which will emerge a "New World Order". The last chapter in this paper, entitled "Towards global convergence" will analyse the movement towards a New World Order being postulated and promoted by certain academic, financial and political circles centred around the United States' foreign policy Establishment, and suggest that technology transfers provide the operational vehicle for the creation of such a world order synthesis.

Footnote

Although the topic of this research paper focusses on the US and the Soviet Union, references will also be made to the West (incorporating the US, Western Europe and Japan) and the Soviet-Bloc (incorporating the Soviet Union and its Eastern Satellites, but excluding Yugoslavia). US technology transfers to the Soviet Union cannot be studied in isolation without mentioning their respective allies in several areas of discussion including export controls, foreign debt and the Soviet Union acquisition programme.

* Monetary figures quoted in this paper are in US dollars.

* One billion = 1000 million or 1 milliard.

LIST OF ABBREVIATIONS

ALCM	Air Launched Cruise Missile
ACEWA	American Committee on East-West Accord
ABM	Anti-Ballistic Missile
ATP	Array Transform Processors
AWAC	Airborne Warning and Control System
CIA	Central Intelligence Agency
CPSU	Communist Party of the Soviet Union
CDC	Control Data Corporation
CFR	Council on Foreign Relations
COCOM	Coordinating Committee for Multilateral Export Controls
COMEX	Committee on Exchanges
DIA	Defence Intelligence Agency
DGI	Cuban Intelligence Service
DOSAAF	Voluntary Society for Cooperation with the Army, Aviation and Fleet
DST	Direction de la Surveillance du Territoire (French Intelligence)
ECAT	Emergency Committee for American Trade
EEC	European Economic Community
ELINT	Electronic Intelligence
EXIM	Export-Import Bank
FBI	Federal Bureau of Investigation
FORDTIS	Foreign Disclosure and Technical Information Service
GRU	Chief Intelligence Directorate of the Soviet General Staff
GITU	Engineering and Technical Administration
GPM Corp	Gesellschaft fur Fertigung Technik und Maschinen Bau
GKES	State Committee for External Economic Affairs
GNP	Gross National Product
GKNT	State Committee for Science and Technology
GOSPLAN	USSR State Planning Committee
IBM	International Business Machines
ICBM	Inter-Continental Ballistic Missile
IMF	International Monetary Fund
ILO	International Labour Organization
IREX	International Research and Exchange Board
JCC	Joint Commercial Commission
KGB	Soviet Committee for State Security
MCTL	Militarily Critical Technologies List
MFN	Most Favoured Nation
MFT	Ministry of Foreign Trade
MIRV	Multiple Independently Retargetable Warhead
MIT	Massachussets Institute for Technology
MNB	Moscow Narodny Bank
MNC	Multi-National Corporation
MRBM	Medium Range Ballistic Missile
NASA	National Aeronautical and Space Agency
NATO	North Atlantic Treaty Organisation
NSC	National Security Council
NTIS	National Technical Information Service

OECD	Organisation for Economic Development
OPS	Operations per Second
OPEC	Organisation of Petroleum Exporting Countries
RIIA	Royal Institute of International Affairs
SALT	Strategic Arms Limitation Talks
SIGINT	Signals Intelligence
SLCM	Sea-Launched Cruise Missile
SB	Sluzba Bezpieczenstwa (Polish Intelligence)
SOCRATES	Foreign Availability Assessment System
STS	Special Services Committee
SDI	Strategic Defence Initiative
TC	Trilateral Commission
TEC	US/USSR Trade and Economic Council
TSOSTS	Central Organisation of Special Technical Services
US	United States
USSR	Union of Soviet Socialist Republics

TABLE OF CONTENTS

		Page
1.	UNITED STATES TRADE POLICY TOWARDS THE SOVIET UNION: MELLOWING OR ENTRENCHING TOTALITARIANISM?	1
2.	ECONOMIC DETENTE IN SOVIET GLOBAL STRATEGY.	24
3.	UNITED STATES TECHNOLOGY TRANSFERS AND ITS IMPACT ON SOVIET ECONOMIC DEVELOPMENT.	44
	* Historical overview of technology transfers to the Soviet Union: 1917-1965.	45
	* Impact of United States technology transfers on Soviet economy: 1966-86.	50
	* Economic development of the Soviet motor vehicle industry.	51
	* The Soviet chemical industry.	54
	* The Soviet oil and natural gas industry.	59
	* The Yamal pipeline.	61
	* Soviet computer technology.	68
	* Other industrial sectors.	73
	* Measuring the impact of technology transfers.	76
	* Mechanisms of technology transfer.	81
	* The role of slave labour in US-Soviet trade.	84
	* US Government censorship of US-Soviet technology transfers.	87
4.	UNITED STATES TECHNOLOGY = SOVIET MILITARY POWER.	98
	* The Soviet war economy.	99
	* Brief historical overview.	100
	* Dual use technology.	102
	* Military application of US motor vehicle technology.	103
	* Military application of US oil and natural gas technology.	106

* Military application of US chemical technology. 109

* Military application of US computer technology. 111

* US Government knowledge of military end uses. 117

* Scientific and technical agreements. 121

* Soviet acquisition of US military technology. 125

* Closing the technology gap. 136

* Future acquisition trends. 141

5. SOVIET ACQUISITION PROGRAMME OF US TECHNOLOGY. 153

* The acquisition structure. 153

* The international Soviet espionage network. 165

* Soviet technology acquisition targets. 168

* Soviet commercial front operations. 172

* The technobandits. 175

* The case of Richard Mueller. 179

6. WESTERN CREDIT TRANSFERS - SUBSIDIZING SOCIALISM? 188

7. CONTROLLING US TECHNOLOGY TRANSFERS. 208

* Operation Exodus. 209

* The Office of Strategic Trade. 210

* Technology databases. 212

* The military critical technologies list. 214

* Strengthening COCOM. 216

* Improving US counter intelligence capabilities. 220

* Taxing Multi-national corporations. 221

* The Reagan years. 222

* Military application of US chemical technology. 109

* Military application of US computer technology. 111

* US Government knowledge of military end uses. 117

* Scientific and technical agreements. 121

* Soviet acquisition of US military technology. 125

* Closing the technology gap. 136

* Future acquisition trends. 141

5. SOVIET ACQUISITION PROGRAMME OF US TECHNOLOGY. 153

* The acquisition structure. 153

* The international Soviet espionage network. 165

* Soviet technology acquisition targets. 168

* Soviet commercial front operations. 172

* The technobandits. 175

* The case of Richard Mueller. 179

6. WESTERN CREDIT TRANSFERS - SUBSIDIZING SOCIALISM? 188

7. CONTROLLING US TECHNOLOGY TRANSFERS. 208

* Operation Exodus. 209

* The Office of Strategic Trade. 210

* Technology databases. 212

* The military critical technologies list. 214

* Strengthening COCOM. 216

* Improving US counter intelligence capabilities. 220

* Taxing Multi-national corporations. 221

* The Reagan years. 222

* Sanctions - How effective? 226

8. TOWARDS GLOBAL CONVERGENCE. 233

* Wall Street and the Bolshevik Revolution. 236

* The network. 240

* The use of Hegelian dialectics in world politics. 251

9. CONCLUSION 256

APPENDICES 259

BIBLIOGRAPHY 290

CHAPTER 1 : UNITED STATES TRADE POLICY TOWARDS THE SOVIET UNION - MELLOWING OR ENTRENCHING TOTALITARIANISM?

The debate surrounding the benefits accrued from trade between nations has always been a key issue in the formulation of a country's foreign policy objectives.

The notion that trade encourages peace and is the ally of personal freedom was the traditional conviction of 19th Century liberalism. It was believed that more economic interdependence between nations, other things being equal, tends to foster mutual cooperation and understanding, as well as to raise the potential cost of economic war. Consequently the belief in the essentially civilising role of international commerce has always had respectable advocates - especially in the case of trade between the United States and the Soviet Union.

This view was clearly supported by former Prime Minister of England, Lloyd George, when he declared in 1922 that trade with the Soviet Union would "bring an end to the ferocity, the rapine and the crudity of Bolshevism surer than any other method".1

However, this view was not shared by Winston Churchill in 1924 when attacking Ramsay MacDonald's proposed Anglo-Soviet treaty, he declared: "I object to subsidising tyranny. Judged by every standard which history has applied to Government, the Soviet Government is one of the worst tyrannies that has existed in the world."2

Nevertheless, it is the former view which has effectively influenced and shaped US foreign policy objectives towards the Soviet Union over the past two decades. Lloyd George's sentiments on trade was the essence of Lyndon Johnson's concept of "peaceful coexistence" with the Soviet Union in

the mid-sixties which was later refined by Henry Kissinger's and Richard Nixon's detente policies in the seventies.

Even before the liberalising of the US trade policy towards the Soviet Union took place in the sixties, conservatives in the US were criticising the effectiveness of US trade policy towards the Soviets during the height of the Cold War. For example, while the Export Control Act of 1949 authorised the US president to compile a comprehensive list of controlled commodities, including items of both economic and military significance, the Commerce Department was given responsibility to administer the export control provisions. This was regarded as a highly questionable move, as the Commerce Department's function is to promote, not restrict trade.

The move was questioned by the Special House Committee on Export controls in 1961 which concluded: "The traditional concern of the Department of Commerce is the facilitation and expansion of trade rather than any policy of restriction. The administration of the Export Control Act of 1949 by that Department since its adoption has created a paradoxical situation - control of trade on the one hand and expansion on the other. The Select Committee is not convinced that the desire to promote trade did not influence the Department of Commerce to be more liberal in borderline transactions."3

However, despite these criticisms, trade between the two countries remained minimal during the 1950's. In 1962, the US Congress strengthened the 1949 Act by directing the executive branch to deny licenses for any export that would make a "significant contribution to the military or economic potential" of countries threatening U.S. national security.4

It was under the Johnson Administration that trade barriers between the Soviet Union and the US began to be removed, ironically at the time that both US and Soviet involvement in the Vietnam War was increasing. The idea of using trade to promote detente with the Soviet Union originated when President Johnson expressed the desire to "build bridges" to the Communist world through trade.5

In December 1964 President Johnson made his seminal statement when he said that the US wished to "build new bridges of trade and ideas of understanding and humanitarian aid to countries of Eastern Europe".6

It has been argued in some quarters (see "Vodka-Cola" by Charles Levinson and "Red Carpet" by Joseph Finder), that it was more American business interests centred around Wall Street, that pressured or encouraged the US Government to facilitate trade with the Soviets in the sixties, than administrations themselves. The Export Administration had initially listed over one thousand items that w considered strategic and therefore prohibited for export by US industry to the Soviet Union and its Communist allies. This embargo of commodities effectively hampered US-Soviet trade prospects.

According to Joseph Finder in his book Red Carpet, it was the visit of David Rockefeller (one of America's foremost banking and establishment leaders) to Moscow in 1964 where he met with the Soviet Premier, Nikita Khrushchev, that laid the foundations for President Johnson's "building bridges" policy towards the Soviet Union.

At the meeting, David Rockefeller conveyed a message from the White House that was apparently a vague offer of conciliation. He added : "I suspect - and I am speaking with confidence - that this is also in President Johnson's

wishes."7 However, with the memories of the Cuban and U2 crises still fresh in Kruschev's mind, he was not in a conciliatory mood, but later warmed to David Rockefeller's ideas of increased trade between the US and the Soviet Union.

After the Kruschev meeting, Rockefeller met with Lyndon Johnson, and managed to convince the President with the backing of several White House aides, that trade might induce the Soviets to stop backing the North Vietnamese.8

A special Trade Committee that Johnson appointed concluded that trade could be "one of our most powerful tools of national policy", since it would enable (the US) to "influence the internal development and the external policies of European Communist societies along paths more favourable to our purpose."9 The Committee was composed primarily of top level corporate executives and members of the US banking community.10

In 1966 when both US and Soviet intervention was increasing in Vietnam, on October 7 Johnson announced a shift from "the narrow concept of co-existence to the broader vision of peaceful engagement." A week later, he lifted controls on more than 400 "non-strategic" items, from grain and fertilizers to gas and petroleum. In his State of the Union address in 1967, Johnson urged Congress to pass a Bill extending Most Favoured Nation (MFN) trading status to Soviet-Bloc countries. The relaxation of US trade controls against the Soviet Union during the sixties facilitated the transfer of US chemical and other industrial equipment to modernise the Soviet Union's antiquated industrial base that had not been updated since the technological infusions of the US lend-lease programme two decades earlier.

Lobbying for the Administration's proposed East-West Trade

Relations Act of 1966, Secretary of State, Dean Rusk, stated that "We cannot expect trade alone to change the basic nature of the Communist system in any Eastern European country, nor to settle fundamental differences between us. We can however, expect that the many close relationships normally growing out of trade will provide opportunities for influencing the development of their societies toward more internal reform and peaceful relations with the Free World."11

While the Act was not passed, trade restrictions between the two super powers were dismantled and not even the Soviet invasion of Czechoslovakia in 1968 dampened the US Administration's enthusiasm to expand East-West trade prospects.

So much did sentiment change within official circles of the US Government, that the US State Department began to claim (absurdly in many respects) that Americans opposed to increased East-West trade were "acting against the interest of the United States". In contrast "Any American businessman who chooses to engage in peaceful trade with the Soviet Union ... is following the policy of his Government."12 While it may have been the policy of the US Government, it certainly was not in the national interest of America, as will be discussed in chapters 3 and 4.

This attitude held by the US State Department also tended to coincide with a widespread Government and public ignorance concerning the extent of US technology transfers to the Soviet Union. Certain business and Government forces promoting trade with the Soviets also played down the contribution that US technology was making to Soviet economic and military development. Consequently Soviet achievements have been made to appear far more impressive than they really are.

When Lyndon Johnson left political office in 1969, nearly 500 000 US troops were fighting against the Soviet-backed Vietcong in Vietnam. The premise that increased US trade would induce the Soviets to stop backing the Vietcong and ameliorate their international behaviour seemed extremely remote.

Despite the hardline pre-election rhetoric of Richard Nixon who promised to get tough with the Soviets and end the war in Vietnam, US foreign policy under him increased rather than decreased US-Soviet economic cooperation.

It was his Secretary of State, Henry Kissinger, who crystalised the policy of US-Soviet economic cooperation with his concept of "linkage", according to which increased US-Soviet trade would help to establish "a web of constructive relationships" that would give the Soviet Union a stake in peace by making it "more conscious of what it would lose by a return to confrontation.13

Furthermore, increased trade in Kissinger's view would also "leaven the autarchic tendencies of the Soviet-Union" and lead to the integration of the Soviet Union into the world economic system and thus lead to a gradual liberalisation of Soviet society.

The policy of detente was officially consecrated when the Nixon Administration signed a trade agreement with Moscow on October 18 1972, which provided for the financing of Soviet purchases of US goods through long-term loans provided by the US Export Import Bank (EXIM). President Nixon also requested the US Congress to grant Most Favoured Nation (MFN) status to the Soviet Union for the importation of Soviet products.

The US Congress, however, was not prepared to back the US Administration completely on these new trade policies, due primarily to the Yom Kippur War in 1973 and Soviet emigration policies. Conservative forces in Congress, led by Democrat Henry "Scoop" Jackson, passed legislation limiting EXIM credit loans to a ceiling of $300 million, after which Congressional approval was needed to authorise the further extension of loans to the Soviet Union. In 1974 the Jackson/Vanik Amendment was imposed to make emigration freer from the Soviet Union, in return for lower import tariffs on Soviet goods.14

While these restrictions annoyed the Nixon Administration and American businessmen, in real terms they had and continue to have little impact on US-Soviet economic cooperation. These restrictions did not cover the extension of US loans to the Soviet Union via Government Agencies, such as the Commodity Credit Corporation and private banks whose loans to the Soviet-Bloc are often guaranteed by the US Government.

The 1969 Export Administration Act was a radical departure from the 1949 Act, in favour of liberalising trade with the Soviet Union. The Act declared that US policy was to "encourage trade with all countries with which we have diplomatic or trading relations" (including Communist countries). One thousand strategic items were struck off the export control list and were allowed to be sold to the Soviet-Bloc countries.15

During the Nixon Administration, strategic and security considerations were brushed aside or ignored altogether when trade agreements between the US and the Soviet Union were sealed. Two pertinent examples of this (discussed in greater detail in chapters 3 and 4), was the sale of the Bryant Chucking ball bearing grinders in 1972 and the

construction of the Kama River truck plant in the Soviet Union. Despite opposition from the US Defence Department, President Nixon, upon his return from Moscow in 1972, made the Kama River truck plant the linchpin of detente. This industrial complex, the world's largest, symbolised the magnitude of US/Soviet economic cooperation, which reached its height in 1979.

President Nixon also encouraged top US firms to sign "technological exchange" agreements with Moscow. These firms usually had nothing to gain in technological terms from such agreements, but went along with them in the hope that "exchanges" of this nature might eventually lead to large commercial contracts. The promise of contracts invariably never materialised, while the Soviets were able to receive valuable technology in the form of technical data.16

Running concurrently with the determined drive by the US Administration to encourage trade with the Soviet Union, was the vision propagated by the pro-trade lobby in the US of a huge Soviet consumer market just ready to be tapped by American businessmen. Harold B. Scott, former President of the influential US-USSR Trade and Economic Council, supported this view when he stated that "the USSR will one day be the largest market in the world. The systems put in place there will determine the patterns of trade. Now is the time to put our technology there."17

As a result, under the banner of detente and in their enthusiasm to exploit the last great frontier in the world, the US and Western Europe embarked on a massive foreign aid programme of Government credits and guaranteed private bank loans to the Soviet-Bloc, which in real terms according to prominent New York banker, Felix Rohatyn, far exceeded US economic aid to Europe under the Marshal Plan.18

Another rationale for increased US trade with the Soviets was the European willingness to eagerly trade with the Soviet-Bloc. It was argued (and still is) by pro-trade forces in America that whatever the Soviets could not get from the US, they could obtain with little difficulty from Europe and Japan. Though many restrictions had been lifted on the sale of US commodities during the early seventies, strict export controls still existed over the supply of certain critical high-technology items, such as advanced computers and electronic equipment, to the Soviet Union. In response to these restrictions, many US firms quietly established subsidiaries in Western Europe and entered into joint ventures, licensing arrangements and other forms of cooperation with European companies to take advantage of Eastern markets.19

In neutral Austria, for example, US firms which had operated in Vienna before Nixon's launch of detente in 1972 included Dow Chemical, Honeywell Controls, Rockwell Manufacturing, Black and Decker, General Electric, Burroughs and Control Data Corporation - many of which have had a long history of economic ties with the Soviet Union.

US banks with branches in Vienna included the big giants, i.e. Bank of America, Chase Manhattan, First National City, Chemical, Continental Illinois and the Philadelphia National Bank. The New York Times, summing up this convenient arrangement in Vienna, observed: "This is a neutral capital farther east in fact than Prague (Czechoslovakia) where Eastern and Western businessmen (sic) can mingle easily and anonymously".20

Often ignored by experts studying the East/West trade issue is the important, often concealed, role that Western bankers and businessmen have played in expanding trade with

the Soviet Union. In the United States, US banks and corporations have, through powerful private groups and government agencies that guard their interests, notably the US State and Commerce Department. been eager to influence US foreign policy in a direction hat promotes their own financial and sometimes political interests.

This private power elite group has, since 1917, consistently advocated closer economic and political relations with the Soviet Union. During the height of the Cold War in the 1950's, this group of bankers and businessmen laid the foundation for what was to become the US Government's fully-blown policy of detente during the sixties and seventies.

Two important private lobbying groups were set up to explore the prospects of closer US and Soviet cooperation. The first of these became known as the Pugwash Conferences, which were set up by Russell Bertrand and sponsored initially by Cyrus Eaton, a businessman and prominent advocate of East/West trade, in July 1957. Delegates at the Pugwash Conferences were mainly scientists from both the US and the Soviet Union, who discussed prospects for trade and disarmament between the two super powers.

A second and more powerful business lobby was established in 1960 by Norman Cousins, then editor of Saturday Review. Known as the Dartmouth Conferences they were, and continue to be, held alternately every year in the United States and the Soviet Union. These conferences enabled delegates to discuss problems of Soviet-American relations in an informal setting. Sponsored initially by the Ford Foundation, the Dartmouth Conferences received approval from President Johnson and the US State Department. Participants included high-ranking US businessmen, bankers, writers, scholars and Congressmen, while the Soviet

delegations were closely linked with the Soviet Government. All Dartmouth Conferences are held in secret and under extreme security precautions. Both the US and the Soviet Governments used delegates at the Dartmouth Conferences to raise certain topics discreetly and to take note of the other side's reaction.21

These groups became the policy incubation chambers for the promotion and rationalisation of greater US-Soviet economic and political cooperation.

To accelerate the momentum of detente during the sixties and seventies, a whole range of pro-detente groups mushroomed in the US to foster greater trade with the Soviet Union. In 1967 David Rockefeller founded one of the nation's most powerful lobbying groups for multi-national corporations (MNC's), called the Emergency Committee for American Trade (ECAT), to combat US protectionist policies with one eye on the Soviet-Bloc countries.

On October 1, 1973, the US-USSR Economic and Trade Council was formally launched at a dinner at the Kremlin's Granavitovaya Palace in Moscow. Its founding members included Armand Hammer of Occidental Petroleum, David Rockefeller and Don Kendall, Chairmen of Pepsi-Co. George Shultz, then US Treasury Secretary, played a key role in formalising the launching of the Trade Council.

Other influential groups that were established in the 1970's included the American Committee on East-West accord, Business International and the Trilateral Commission that went on to dominate the economic and foreign policies of the Carter Administration.

These groups have espoused a complex internationalist ideology in support of their economic arguments22 for

greater trade with the Soviet Union, which goes far beyond the conventional premises underlying detente. This internationalist ideology rests on the two pillars of "global management" and "global interdependence" which it is hoped will ultimately lead to the convergence of East and West into a new international economic order (discussed in ch. 8).

During the Carter Administration, trade with the Soviet Union continued to accelerate, especially in the field of high technology items. Some of America's most powerful computers were shipped to the Soviet Union. Other technologies included semi-conductors, micro processors and silicon chips which have had a major impact on the qualitative improvement of the Soviet Union's military/industrial complex.

However, it was during the last years of the Carter Administration that the political pendulum began to swing away from the pro-detente lobby in the US. Conservatives in the US began increasingly to question the success of detente with the Soviet Union, in the light of their massive military build-up during the 1970's and its increasing belligerence in international affairs.

When the Soviet Union cracked down on prominent dissidents, including Sakharov and Shcharansky in 1978, President Carter retaliated by withholding the sale of a Univac-Sperry computer to the Soviets, ostensibly for use in a new tyre-making factory. However, Carter later reversed his decision in 1979 after he was pressured by the US Commerce Department to go ahead with the sale. Nevertheless the US did pull out of the Joint Commercial Commission (JCC), an official structure that had been established in 1972 for the purpose of reviewing Soviet-American Trade issues.

Detente officially collapsed in December 1979 when the Soviets invaded Afghanistan. The Brezhnev doctrine first enunciated in 1968 was now clearly contradicting the fundamental tenets of detente.

A new hardline attitude towards detente swept the US Congress and the White House. In January 1980, President Carter imposed an embargo on US grain exports and the sale of high technology items to the Soviet Union. The US Senate rejected the SALT II Arms Agreement signed between Carter and Brezhnev in 1979. In November 1980, the US electorate replaced Carter with President Ronald Reagan who had severely criticised the former appeasement policies towards the Soviet Union. For the next two to three years, the pro-detente lobby were put on the defensive. US banks and corporations kept a low profile when mooting East-West trade deals for fear of being labelled "unpatriotic" by an American public which had grown hostile towards the Soviet Union. Between 1980 and 1983, US exports to the Soviet Union dropped by almost one half to just over $2 billion.

History has repeatedly contradicted the fundamental argument propounded by the supporters of detente that trade will have a "civilising" effect on the internal and external behaviour mechanisms of the Soviet Union.

Ironically, surges of US trade with the Soviets have always coincided with increased repression by the Soviet Union. When western companies scrambled to obtain economic concessions from Lenin in the early twenties, he was ruthlessly purging the remaining Tzar supporters, who were opposed to his Socialist utopia.

Again in the early thirties when US and European corporations were building and financing the major units of GOSPLAN, the USSR State Planning Commission, (see chs. 3 and 6), Stalin's massive purges reached an all-time high.

During World War II the large infusions of US economic and military aid in the form of lend-lease, helped to entrench Soviet domination over 150 million Eastern Europeans.

During the heady days of detente in the seventies, the Soviets undertook the largest peacetime military build-up witnessed in modern times, while Communist repression continued and spread in South-East Asia, Afghanistan, Ethiopia, Central America and Southern Africa.

Despite these historical observations, supporters of detente contend that fears based on past experiences are groundless because the Soviet Union "is a vastly different country today - more stable and more committed to consumerism than it was after the devastations of World War II."23

However, the Soviet Union has not changed fundamentally at all since 1917. Liberalising policies which briefly appeared in Soviet economic policy in the mid-sixties were shortlived. Those supporting the (perhaps) not illogical view that Soviet exposure to the West through trade will encourage the development of western norms and values do not consider the extraordinary steps that are taken by the Soviet ruling elite to shut out western cultural influences. The Soviet Union hermetically seals itself off from these outside influences, using methods ranging from jamming western television and radio broadcasts, to control over the movement of Westerners in the Soviet Union.

Business lobbies may assert that trade promotes peace. Unfortunately history shows otherwise. The US traded with Imperial Japan and Hitler's Germany during the thirties, both of which declared war against the US in 1941.

Business groups may further assert that "free trade" with the Soviet Union makes economic sense. It does not, because they demand Government-backed EXIM bank credits to subsidise their trade transactions. How many firms and banks would trade with the Soviet-Bloc in the absence of support from their respective governments? This collusion with government is not free trade, but a form of economic subsidisation. In effect, US businessmen are asking the US Government (indirectly the US taxpayer) to guarantee them against any losses which they might incur in their business dealings with the Soviet Union.

Furthermore, US firms insist on the apparent profitability of trading with the Soviet Union despite that country's theft of blueprints and specifications, and their duplication of these firms' equipment without permission or the payment of royalties.24

The vision of a vast market of 260 million people ready to be tapped with large infusions of US technology and credit loans has simply not materialised. In 1978 the total volume of US trade with the Soviet Union was a paltry $2,8 billion, which amounted to only one third of the trade carried out with Taiwan in the same year. In 1984, two-way trade between the US and the Soviet Union was only $2,9 billion.25

Another negative aspect of increased US trade with the Soviet Union was the impact that US and Western technology was having on the development of the Soviet's military/industrial complex, a subject that was ignored or suppressed during the early 1970's. However, after this subject became the focus of congressional hearings and Central Intelligence Agency (CIA) reports during the late seventies and early eighties, pro-trade proponents have admitted that the Soviet Union has a vested interest in maintaining good economic relations with the West because

of the need to maintain and upgrade their industrial complex. This is what the opponents of detente have been saying for years, with the obvious intention of curtailing this economic aid to the Soviet Union.

In 1982, even Henry Kissinger himself, one of the original proponents of detente, questioned the wisdom of trade with the Soviet Union. "In these circumstances, it is easy for the Kremlin to play Western countries and even industries against each other, obtaining benefits not justified by the economic balance of advantage, much less by political circumstances."26

Henry Kissinger even rejected the notion of a "web of interests". He described the theory of the automatic mellowing effect of trade as "fallacious". "Soviet behaviour in recent years has given the lie to the argument that trade and credits by themselves will bring about a benign evolution of the Soviet system. Soviet-Cuban intervention in Angola, in Ethiopia and in South Yemen, the invasion of Afghanistan, the suppression of Solidarity in Poland, and use of toxic chemical and biological warfare in Afghanistan and South-East Asia have all occurred in precisely the period of expanding East-West economic cooperation."27

Kissinger could have mentioned the Soviet's role in international terrorism as well. All indications point to the fact that trade with the Soviet Union does not promote freedom, but instead sustains and entrenches a totalitarian dictatorship.

The strategic as well as moral implications of this fact have essentially been ignored, even by the current Reagan Administration. The idea that trade promotes East-West peace, central to the thinking of those who shaped the

policy of detente, remains basically unchallenged among US policy makers today, despite a brief hardening of official attitudes towards trade with the Soviet Union in the early eighties.

The supporters of detente still maintain it is the only viable policy in dealing with the Soviet Union. After President Carter imposed sanctions on the Soviet Union in 1980, Mr Guido, the then European Economic Community's Commissioner for Energy, wheeled out the same old detentist arguments when he condemned the use of economic sanctions as "doomed to failure ... The Soviet Union can only be conquered by (its) involvement in a web of economic ties with the rest of the world."28

When Don Kendall, Chairman of Pepsi-Cola, was asked what might abandon his support for trade with the Soviets, he replied that he would "never" abandon it because "the alternatives are God-awful. I don't want to see the world blown up. I think regardless of how long it takes, we have to try to find a way to communicate with the Soviets, and I happen to think trade is a very good way to do that."29

Consequently, since 1984 the pro-detente faction within the White House, led by the State and Commerce Departments, are spearheading another revival of US-Soviet trade relations. This is a turnaround from the early years of the Reagan Administration when the Department of Defence, led by Caspar Weinberger and the National Security Council (NSC), headed by Richard V. Allen and later William Clarke, was largely responsible for Reagan's hardline anti-trade policy towards the Soviet Union. Even though Alexander Haig, the former Secretary of State, tended to clash with Richard Allen over foreign policy objectives, he took a more conservative view on US-Soviet trade relations than does his current successor, George Shultz. After a series of

Cabinet reshuffles which downgraded the status of the NSC and saw a number of conservatives replaced by liberals, the US State and Commerce departments have increasingly *reasserted* their influence in the sphere of US-Soviet relations.

As a result, President Reagan's hardline anti-Soviet policy began to crack. On October 15 1982, Reagan pledged the delivery of 23 million tons of grain to the Soviet Union, an amount larger than any prior commitment by an American president.

In 1984, the Reagan Administration quietly extended for an additional ten years a detente era economic agreement with the Soviet Union which had lain dormant since the Soviets invaded Afghanistan in 1979. The accord, entitled the Long Term Agreement to Facilitate Economic, Industrial and Technical cooperation, was originally signed during the Moscow Summit of 1972 between Nixon and Brezhnev.

The six article accord, which encourages economic, industrial and technical cooperation between the super powers allows for, among other things, "purchases, sales and licensing of patent rights and proprietary industrial know-how, designs, and processes, and the training of *technicians and exchange* of specialists".30 According to the Washington Times, the State and Commerce departments pressured Reagan into rejuvenating this accord, especially the European Bureau within the State Department.

Article III of this agreement provides for a meeting of a Working Group of Experts, which, if successful, would see a meeting of the Joint Commercial Commission (JCC), last held in 1978.31

In May 1985, the US Secretary of Commerce, Malcolm Baldridge, went to Moscow to revive the JCC which was created for purposes specifically including negotiating "an overall trade agreement including reciprocal MFN treatment".32 The members of the JCC include Malcolm Baldridge and Soviet Foreign Trade Minister, Boris I. Aristov.

Some analysts believe that in the light of the recent revival of the JCC and the Geneva Summit in 1985, State Department and White House documents in the public record support the contention that the Reagan Administration is considering the possibility of granting the Soviet Union MFN status.33

At the Summit meeting between President Reagan and the Soviet Premier, Mikhail Gorbachev in November 1985, a statement released afterwards stated that the two sides intend "to develop trade and economic ties".34 Gorbachev restated the old detente arguments when he told reporters: "We should appreciate the importance of economics in ar relationship. If we trade with each other more, we will depend on each other more".35

In December 1985 some 350 US business executives attended the US-USSR Trade and Economic Council three-day meeting in Moscow, optimistic that the Geneva Summit would help facilitate greater trade opportunities between the two countries. Malcolm Baldridge, who led the delegation, was the first high-ranking US official to attend a Council meeting since the Soviet invasion of Afghanistan in 1979.

The groundwork for the Council meeting was laid when James H. Griffen, President of the US-USSR Trade and Economic Council and Dwayne O. Andrews, Co-Chairman, met with Gorbachev eleven months before he became General Secretary of the Soviet Union.36

The leading member of the US business delegation who attended the Economic Council meeting in Moscow was the Soviet's long-standing "capitalist" friend, Armand Hammer, Head of Occidental Petroleum. Other delegates included executives from Coca-Cola, Kodak, Dow Chemicals, Pepsi-Co., Union Carbide, American Express and Chase Manhattan Bank.

Addressing the assembled American delegates at the Economic Council meeting, Gorbachev welcomed the interdependence of the current world economy, adding "it can become a powerful incentive in building stable and normal, and I would even venture to say friendly, relations".37 As with Kruschev and Brezhnev, Gorbachev dangled the prospect of a vast market before the American businessmen, inviting their participation in Soviet energy development, machine tool building, chemical and food production projects.38

Are the *failures of detente* about to be repeated? The almost pathological desire of certain sectors of the *American Establishment* to determinedly lobby for greater trade with the Soviets, despite its failures to ameliorate Soviet behaviour, must be seriously challenged and questioned (see ch. 8). On the other hand, the frustration of President Carter and Henry Kissinger over Soviet behaviour which contradicted their contention that detente would help "mellow" a totalitarian regime, can only be understood by examining the Soviet view of detente within the parameters of overall Soviet global strategy. It is this area of research where supporters of detente have failed to understand the use of detente by the Soviets to strengthen their military/industrial complex and facilitate the global expansion of international Communism.

CHAPTER 1 : NOTES

1. ULLMAN, R. H. The Anglo-Soviet Accord : Anglo-Soviet Relations, 1917-21, Princeton University Press, 1973, p.37.
2. CHURCHILL, W. Vol. V : 1922-39, Heineman, London, 1976, p.48.
3. LEE, R. W. Trading with the Communists, Review of the news, July 6 1983, p.53.
4. Ibid, p.53
5. GERSHMAN, C. Selling them the Rope, Commentary, April 1979, p.35.
6. BRYAN, P., SULLIVAN, S. and PASTORE, S. Capitalists and Commissars, Policy Review, Fall 1982, p.47.
7. FINDER, J. Red Carpet, Holt, Rine and Winston, New York, 1983, p.183.
8. Ibid, p.238
9. GERSHMAN, C. op.cit., p.35
10. BRYAN, P. et al., op.cit., p.47.
11. Letter from Secretary of State, Dean Rusk, to House Speaker John W. McCormack and President of the Senate, Vice-President Hubert Humphrey, May 11 1966, in 112 Congressional Record, 10779-10780, May 24 1966.
12. Private Boycotts vs. The National Interests, State Department Publication 8117, August 1966, in Lee, R.W., op.cit., p.53.
13. GERSHMAN, C. op.cit., p.35.
14. Ibid, p.35.
15. LEE, R.W. op.cit., pp 53-54.
16. GERSHMAN, C. op.cit., p.39.
17. Ibid, p.40.
18. ROHATYN, F.C. We cannot create a Municipal Assistance Corporation for Poland, let it go Bankrupt, New York Times, April 7, 1982.
19. BRYAN, P. et al., op.cit., p.46.

20. New York Times, April 5 1970.
21. FINDER, J. ibid., p.177.
22. BRYAN, P. et al., op.cit., p.50.
23. GERSHMAN, C. op.cit., p.39.
24. SUTTON, A.C. Western Technology and Soviet Economic Development : 1930-1945, Vol II, Hoover Institution Press, 1971, p.971 and pp 263-267.
25. FARNSWORTH, C.H. US finds Russians favour trade but it is unlikely to relax curbs, New York Times, February 3 1985, p.7.
26. KISSINGER, H. Trading with the Russians, The New Republic, June 2 1982, p.14.
27. Ibid, p.15.
28. The Times (Br.), January 22, 1980.
29. WILL, G.F. Greedy Businessmen, Gullible Politicians won't face reality of Soviets, The Wanderer, p.5 (date unknown).
30. FONTAINE, R. Administration extends economic accord with Russia, The Washington Times, July 6 1984, p.1 A.
31. White House Fact Sheet, June 27 1984, cited in Department of State Bulletin, September 1984, p.43.
32. US-USSR Communique, May 26 1972, cited in Department of State Bulletin, June 26 1972, p.898.
33. Memorandum Re: Policy Consequences of Granting USSR MFN Trade Status, January 14 1985, updated on April 5 1985 (author unknown).
34. SHELTON, J. Reagan signals business as usual, The Wall Street Journal, December 26 1985.
35. Ibid.
36. GWERTZMAN, B. 300 US executives to visit Moscow, International Herald Tribune, Wednesday, November 20 1985.
37. US rope-sellers visit Moscow, Human Events, December 21 1985, p.4.

38. PISAR, S. Gorbachev's pragmatic generation, The Wall Street Journal, December 26 1985.

CHAPTER 2 : ECONOMIC DETENTE IN SOVIET GLOBAL STRATEGY

One of the initial objectives that led to the Soviet Union adopting the strategy of detente with the US, was the need to rationalise and modernise its economy with liberal infusions of credit and technology from the West. This imperative not only emerged from repeated economic shortfalls in the Soviet-planned economy, but also reflected entrenched ideological tenets and the perceived necessity of maintaining political and social control over the Soviet people.1

This policy decision totally contradicts the thesis put forward by the pro-detente lobby in the US that trade would manifestly help in "mellowing" and "ameliorating" Soviet internal repression and international actions.

In order to explain the Soviet's acceptance of detente with the US, it is necessary to study the Soviet view of economic detente in the context of first understanding the ideological tenets of Marxism/Leninism and the Soviet notion of "peaceful coexistence".

Marxism/Leninism dictates that the Soviet leadership is unable, for sound ideological, political and economic reasons to "promote a stable international environment".2 By its very nature it is a militant doctrine - which views history as the record of uninterrupted class warfare - and advocates the continuation of the class war until the last vestiges of Capitalism are destroyed. By definition then, there can only be peace after Communism has finally triumphed over Capitalism.

It is only in this context that Soviet economic, military and political policy can be understood in terms of overall Soviet global strategy, which since 1917 has been based in

the framework of a militant, international and universalistic ideology, which has as its aim "the destruction of Western Capitalism and the economic levelling of all the nations of the world."3

Such is the mandate used by the Soviet Politburo to legitimise its position in the Soviet Union and perpetuate the notion that it "represents the vanguard of the majestic forces of progress whose mission it is to accomplish the final revolution in human history".4

The Soviet Politburo must be seen at least to appear to win continuous victories against Capitalism, otherwise it loses hold of its legitimacy in the eyes of the Soviet people.

Bearing in mind then the need for Socialism to triumph over Capitalism, the Soviet view of "peaceful coexistence" or detente, is merely a tactical adaptation of long-range Soviet global strategy* to destroy the class enemy by other means. "... In its *Leninist interpretation*, peaceful coexistence signifies neither the preservation of the social or political status quo (Capitalism) nor the moderation of the ideological struggle. In fact, it has *facilitated and still facilitates* the development of the class struggle against Imperialism inside individual countries, as well as on a worldwide scale."5
This is achieved by the "application of strategies based upon an essentially military assessment of what is known as the correlation of forces".6

---

* According to Prof Richard E. Pipes: "Grand strategy should not be seen in terms of some master plan or timetable, but knowing what one wants and what it takes to get it". Survival is not Enough, Simon and Schuster, 1984, p.55.

The Soviet term "correlation of forces" denotes world balance of power in all its aspects. It embraces economic capability, technology breakthroughs, social stability, public opinion, propaganda warfare - those elements other than military that have a considerable bearing on a nation's ability to wage war. It incorporates a far broader interpretation of the Western concept of the balance of power, which narrowly focuses on military power.

Thus Soviet global strategy is based on the systematic assessment of the correlation of forces vis-a-vis the West. If it lies against the Soviets, then confrontation with the West is to be avoided. When it is in favour of the Soviet Union, then the waging of the class war is once again resumed. It was Lenin who best elucidated this strategy when he stated that "... Revolutionary experience has taught us that it is essential to employ the tactics of merciless attack when objective conditions permit ... but we have to resort to temporising tactics, to a slow gathering of forces when objective circumstances do not favour a general merciless repulse."7

Peaceful coexistence is therefore a temporising tactic to alter the correlation of forces in favour of the Soviet Union. It is a policy which must be seen as geared towards a means to an end. That is, to help tilt the correlation of forces on the economic, political and military level in the Soviet's favour, to enable it to continue the revolutionary war against Capitalism.

"Peaceful coexistence" has been the basic tactical foreign policy tool used ever since the formation of the Soviet States - refined and adopted by succeeding generations of Soviet leaders. Lenin used it to save the Bolshevik Revolution by suing for peace with Germany in 1917/18 and turning to Western companies for economic assistance.

Stalin used it in 1939, first with Hitler's Germany and then with the Western Democracies, to ensure the survival of the Russian motherland during World War II. Under Khruschev, at the Soviet Union's 22nd Party Congress in 1961, the concept of peaceful coexistence was fully formulated in the Party's programme as a long term Soviet global strategy,9 and was used to restore Soviet military prestige after the humiliation of the Cuban missile crisis in 1962.
During the Brezhnev era, peaceful coexistence was used to rectify the deficiencies of the Soviet economic system and to facilitate the greatest peace-time military expansion of the Soviet armed forces ever undertaken by a single nation this century.

Peaceful coexistence does not mean an injunction against all forms of conflict. According to Soviet doctrine, peaceful coexistence "promotes the intensification of all currents of the revolutionary process"10, which includes support for wars of "national liberation" and international terrorism.

Furthermore, few Western notions arouse greater Soviet ire than the theory concerning the possible convergence of differing ideological systems and the belief in the waning of the Soviet ideology. The Soviet Union has flatly ruled out any possibility of convergence between Capitalism and Communism because it is dialectically impossible. This view has persisted since the Moscow Summit meeting of May 1972.

In April 1973, at the Plenum of the Central Committee, Brezhnev delivered a secret speech in which it was later learnt, he gave a pledge that improved relations with the West would not be pursued at the expense of the security of the Soviet Union or its allies.11 Later a whole network of

bilateral "ideological" treaties among the WARSAW Pact countries were signed under the sedulously repeated assertion that peaceful coexistence could never mean ideological coexistence.12

The theoretical journal of the Communist Party of the Soviet Union, Kommunist, notes: "In the West they have not given up, for example, attempts to prove that international detente is impossible supposedly without the convergence of the two systems. It is impossible not to see the ill intention and lies of this assertion, which is being portrayed as a sign of the times, and obviously is aimed at the naive, the politically unsophisticated people. No, Communists will never give up their ideas and principles; they have always struggled and in the future will energetically struggle for worldwide triumph."13

For the Soviet Union, peaceful coexistence has nothing to do with the prospects of peaceful convergence between two systems, but is an instrument to shift the "correlation of forces" back in its favour.

Having analysed the Soviet Union's concept of peaceful coexistence as a means to manipulate the "correlation of forces", Soviet acceptance of economic detente (i.e. greater trade with the West), must be seen in relation to the importance that the Soviets attach to the "scientific technological revolution" and the inability of the Soviet economy to meet the demands of this revolution.

Since Lenin, the Soviet leadership has consistently underscored the critical importance it attaches to the attainment of pre-eminence in science and technology as an essential condition for the final victory of Socialism over Capitalism. The Soviets have always related economic or military superiority to the development and use of science

and technology.14 This has been stressed particularly by the Soviet military establishment. "In our time science becomes one of the most important factors of the struggle for supremacy in the correlation of forces in the world arena. An all-round consideration of fact has tremendous significance for increasing our state's military might and for reliably defending the achievements of Socialism and Communism from Imperialist aggressors."15

Army General, A.A. Yepishev, former Chief of the Main Political Administration of the Soviet Army and Navy, was more frank: "Science is today becoming one of the most important elements of the combat might of the armed forces ...".16

According to the Soviet Journal, Krasnaya Zvezda: "In our time science becomes one of the most important factors of the struggle for supremacy in the correlation of forces."17 This statement is supported in a study completed by Hoffman, Laird and Robin in 1982 which emphasized the importance that science and technology play in the Soviet Union's national and foreign policy decision making process.18

The Soviets realise that without a high level of development in the economy through the "scientific-technological revolution", it is impossible to achieve superiority in the military field. Without technology then, the economic and military factors of the "correlation of forces" become irrelevant.

It is only due to the deficiencies of the Soviet economic system that Soviet leaders have periodically sought after Western technology through trade to continue altering the "correlation of forces" in favour of Socialism. Economic detente with the West is merely a temporising tactic to

strengthen the economic and military might of the Soviet Union. This assertion is borne out by Lenin's explanation for his New Economic Policy, which was designed to attract Western technical expertise, to a meeting of the CPSU in 1920. "...Concessions do not mean peace with Capitalism, but war on a new plane."19 Lenin further stated that "this is a new sort of war, an economic struggle between two systems, the Communist and Capitalist. And as soon as we are strong enough to overthrow Capitalism, we shall immediately seize it by the throat."20

The underlying reason why the Soviet Union turns to the West for its technology needs, despite having one of the largest economies in the world, is that the system manifestly lacks those internal dynamics that make for technological progress. In short, Soviet industry remains extremely inefficient and structurally backward because of the inability of Socialist or closed societies to innovate to higher levels of technological development.

The causes of this economic stagnation are essentially political. Soviet society demands an increasingly sophisticated and intensive economy to alter the "correlation of forces" in its favour. However, this imperative clashes with the ideological needs of the Party, which insists on absolute political control - a doctrine which demands the centralisation of power, whereas the economy demands diffusion of power, individual responsibility, incentives and initiatives.21

This apparent contradiction is solved by turning to Western economies (when it suits the Soviets) for technology infusions which discards the need for innovation within the Soviet system, thereby neutralising those economic factors that may threaten the political stability and power-base of the ruling Soviet elite, if these economic demands were

allowed to be met. One example of this is the Soviet failure of collectivism and the need to import food from the West, which postpones the inevitable need for radical economic reforms in the Soviet farming sector to boost food production.

These economic realities facing the elite, ruling Soviet minority were the driving force behind peaceful coexistence. "Western cooperation was not only to serve to make the Soviet economy viable, it was also devised as a substitute for internal reform."22 Western economic aid helps to reinforce rather than soften the totalitarian nature of the Soviet system.

In the early twenties Lenin, through his New Economic Policy, obtained Western technical assistance to help activate Soviet industry which had lain dormant since 1917. Over 350 concessions were handed out to Western companies. US companies that received these concessions included General Electric, Westinghouse, International Harvester, Radio Corporation of America, Singer, Dupont, Ford and Standard Oil. In accordance with original Leninist objectives, all foreign concessions granted in the 1920's were expropriated by Stalin in the 1930's. The policy of autarky was undertaken by the Soviets after it was felt that the Soviet economy had absorbed sufficient infusions of Western technology - and so economic detente - was discarded.

As Carl Gershman has noted: "Some of the concessions were closed down by force, but the more common methods were punitive taxation, breach of contract, legal harassment and disruption by Soviet workers. The largest concession of all, the British Mining Company, Lena Goldfield Ltd., which had invested $80 million in equipment, was attacked as a weed in the Socialist system."23 The dreaded OGPU

(forerunner of the Committee for State Security (KGB)) raided its units, threw out its technicians on charges of "industrial espionage." Many US and European companies received no compensation for the expropriation of their concessions. For some firms it was the second time their holdings had been expropriated, the first having occurred in 1917.

Ironically, many of the same firms that had suffered under Stalin led the pro-detente forces in the US to open trade links with the Soviets during the sixties and seventies.

After having enjoyed economic growth in the 1950's and early sixties, serious economic problems began to manifest themselves in the Soviet system. These problems included the following :

(a) the Soviets had used up all its available labour reserves;
(b) natural population growth in the Soviet Union did not compensate for the increasing demand for more labour;
(c) labour productivity was stagnating;
(d) investment resources to compensate for low productivity were no longer available in sufficient quantities;
(e) the Soviet economy had effectively assimilated the technological infusions of the American land-lease programme provided to them during the World War.

Following on from these problems, the Soviet economy had to meet three principal commitments :

(a) the expansion of its industrial and technological base;
(b) the improvement of living standards; and

(c) support for the armed forces and the country's imperial commitments.24

Brezhnev grasped the essence of the problem in a speech he delivered at the end of 1972, when he asserted that a turnabout in economic efficiency was necessary to solve the "enormous task" of meeting the competing demands of consumption, investment and defence.25 The problem was the need for greater technological efficiency and more investment, two economic inputs which the Soviet system could not create.

The decision to turn to the West was made after the Soviets briefly experimented with economic reforms in the mid-sixties. However, they were quickly jettisoned after the Czechoslovak crisis in 1968, which demonstrated how easily economic reforms could lead to the collapse of Communist control.

Prof Gregory Grossman, a specialist in Soviet Affairs at the University of California, pointed out in the mid-seventies that the Soviets had made a critical decision in the 1960's to accept interdependence with the West precisely as a way of avoiding internal reforms.26

Detente or peaceful coexistence then was a carefully calculated strategy that evolved gradually and received its official recognition at the 24th Party Congress in 1971. It was a strategy that reflected the Soviet need to: cope with confronting the US (and its allies and Red China simultaneously; legitimize its position in Eastern Europe; and (most importantly) resolve the problems of economic growth and technological innovation.27

Turning to the West for economic assistance was legitimised in that it furthered the aims of Soviet global strategy and

the forces of Socialism.

In a speech to the AFL-CIO, the largest trade union in the US in 1975, Solzhenitsyn emphasized the role played by technology transfers in rescuing the Soviet economy from its inherent deficiencies : "The Soviet economy has an extremely low level of efficiency. ...It cannot deal with every problem at once : war, space, heavy industry, light industry and at the same time the necessity to feed its own population. The forces of the entire Soviet economy are concentrated on war ... everything which is lacking ... they get from you. So indirectly you are helping them to rearm. You are helping the Soviet Police State."28

The Soviets have therefore effectively used economic detente to resolve the inner contradictions of Soviet Communism. This is perhaps the most important point that the proponents of US-Soviet trade have consistently ignored.

Economic detente has not only helped in resolving the internal economic problems of the Soviet economy, it has also been utilised to wage a form of economic warfare through the use of economic leverages against the West. This type of economic warfare is discernable in a number of areas and holds potentially serious policy implications for the United States.

While the Soviets cannot match the economic might of the world's advanced industrial nations, it has had some success in seeking economic leverage over its adversaries, as part of its strategy to shift the economic "correlation of forces" in its favour. As a result, one of the most important Soviet economic objectives has been to pull Western Europe into the Soviet orbit through the integration of the economies of the European Economic Community (EEC) and the Council for Mutual Economic Assistance (COMECON). Prof Richard Pipes, a former member

of the National Security Council under the Reagan Administration, and Head of Russian Studies at Harvard University, stresses the global significance of the future of Europe in terms of Soviet global strategy. "It seems probable that the long term objective of Soviet foreign policy is to detach Western Europe from its dependence on the US, especially where defence is concerned, and to make it dependent on the Union of Soviet Socialist Republics (USSR). This dramatic shift in the correlation of forces, allowing Soviet military power to rest on an (advanced) West European economic base, would give the USSR indisputable world hegemony."29

Prof Pipes goes on to warn that the Soviet Union is seeking to make the West European countries maximally dependent on the Eastern Bloc, without, however, losing its own freedom of choice. This one-sided form of economic interdependence is being achieved on a number of levels.

The most important is the Soviet objective to gain maximum control of West European energy supplies (including oil, gas and uranium) by seeking to establish itself as a major fuel supplier to these countries. The Soviet Union already furnishes respectable amounts of oil and natural gas to West Germany and Italy, at prices below those of the Organisation of Petroleum Exporting Countries (OPEC). These supplies of fuel will increase substantially with the recent completion of the $15 billion Yamul Pipeline Project in 1985, which will ferry natural gas from the frozen wastelands of Northern Siberia to Western Europe. Some West European Countries will import more than 30% of their natural gas requirements from the Soviet Union. Already the Soviet Union supplies 5% of Western Europe's total oil requirements, and Eastern Europe 15% of Western Europe's coal imports.30 Western European energy dependence is shifting dramatically from OPEC to COMECON. As a result of this increased dependency, analysts warn that European

leaders will be at least passive towards, or perhaps even inclined to support, Soviet foreign policy initiatives if faced with the prospect of a fuel supply cut-off.

In 1981, Major General Richard Clarke, then Deputy Director of the US Defence Intelligence Agency (DIA), stated that Soviet foreign exchange earnings from oil and natural gas exports could top $25 billion by 1985. While Soviet earnings were lower in real terms due to the drop in the price of oil, he went on to warn that, "in addition to providing solid economic benefits for the USSR, Soviet energy self-sufficiency is also likely to result in greater political influence by Russia over certain decisions of its West European customers, and to a lesser extent that of Japan."31

The use of energy supplies as an economic weapon became apparent during the October 1973 Middle East War when the Soviet Union abruptly suspended natural gas deliveries to Vetba, West Germany's largest energy company, apparently in order to pressure that country not to support Washington's pro-Israeli policies.32

The Soviet Union is also muscling its way into the uranium market by making bids to furnish enriched uranium to West European nuclear power stations.

Another form of economic leverage the Soviet Union holds over the West, especially Western Europe, is the threat of default on its foreign debt. Since 1970, the COMECON Countries have aggressively sought foreign loans from the West, which now stand at over $100 billion. This large financial debt has made Western bankers beholden to detente, regardless of its political costs. It could be argued that this is one of several factors that have made the American and European financial establishments such

firm supporters of detente, in the realisation that a Soviet-Bloc default would bring the banking system down on its knees.

The Soviet policy of counter-trade, i.e. barter, has become yet another integral factor in Soviet economic global strategy. Through this arrangemment, the Soviets are dumping a variety of cheaply manufactured goods in Western Europe. The Fiat-like "Lada" motor car, produced at the Western-built Togliatti motor car assembly plant, is sold in Europe at prices well below European manufactured motor cars. Chemical and rubber products are also being dumped in Western Europe, which is beginning to threaten the viability of Europe's chemical industry. Western technology transferred to the Soviet Union is in turn being used to undermine the economic manufacturing base of Western Europe, thereby forcing the region to become more reliant on the COMECON for a host of economic requirements.

Another problem for the West is that the Soviet payback agreements to Western companies run in some cases for up to twenty years. What is not considered, is the threat that East-West relations could sour dramatically and Western businessmen with their "collateral" buried in oil pipelines under the Siberian wastelands, could well become fervent proponents of appeasement, based not on strategic or political considerations, but on their own selfish economic interests.

Another component of the Soviet Union's economic warfare strategy is their massive merchant fleet which is now the largest in the world. Due to their ability - being a state monolopy - to undercut Western shipping freight charges, they are forcing more and more Western shipping companies into bankruptcy, thereby compelling Western nations to increasingly rely on Soviet ships to carry their foreign trade.

Finally, through trade, Soviet leadership perhaps sensed a foreign policy opportunity to undermine US post-war containment policies. Its economic strategies might accomplish what Soviet military might could not - the gradual neutralisation of US influence in Europe and the disintegration of the North Atlantic Treaty Organisation. The Soviet Union also hoped to pit European businessmen against their American counterparts for market opportunities,33 and thereby drive a wedge between the US and West European Governments. This latter policy of "divide et impera" (divide and rule) has been a cornerstone of Soviet foreign policy.

Lenin used this strategy when he outlined the rationale for economic concessions, declaring: "We must exploit the mutual oppositions and contradictions between the two imperialisms, between the two groups of Capitalist states, setting them one against the other."34 This policy was seen in action during the Yamul Pipeline Controversy in the early 1980's, when the US tried to apply sanctions on pipeline construction technology and foreign loans to the Soviet Union, which Western Europe refused to support.

In the final analysis, through the use of various economic leverages, the Soviet Union hopes to fragment the NATO Alliance and secure the military, economic and political isolation of the United States. By detaching Europe and Japan from the US orbit, the "correlation of forces" would be dramatically altered in the latter's favour. It would shift the economic forces in gross national product terms from a five to one advantage currently enjoyed by the West, to a four to one advantage in favour of the Soviets, giving them undisputed world economic, military and political hegemony.

To conclude on two levels. Firstly, the concept of linkage has not resulted in changes taking place internally in the Soviet Union, nor has it drawn the Soviets into "the disciplines of international economic life" Western policy makers had hoped linkage would achieve. Instead, the Soviets are content with the economic detente relationship with the US, because (according to the Soviet Journal Foreign Trade) it has enabled the Soviets to "effectively use the benefits of the international division of labour and import technically advanced plants and the latest licences and know-how."35

While it may be more difficult for the Soviet Union to revert back to autarky, the Soviets are quite satisfied with its current interaction with the West's economies, because it poses no threat to the political stability of the regime while providing for the modernisation of the Soviet military/industrial complex.

Secondly, the policy of detente or "peaceful coexistence" with the US has enabled the Soviet Union to extract *more* than they have had to concede in the international environment. On a military and political level, "peaceful coexistence" has enabled the Soviets to embark on the most sustained military build-up *ever witnessed in modern* history, while successfully freezing US strategic nuclear forces through the one-sided Strategic Arms Limitation Talks (SALT). It has immeasurably enhanced the international position of the Soviet Union and enlarged its room for manoeuvre, while it has legitimised its control over Eastern Europe and its global conquests elsewhere.

On an *economic* level, "peaceful coexistence" has strengthened its economic and military base through massive *infusions of US and Western economic aid*, and helped

perpetuate the status quo of the Soviet regime. On this basis, the Soviets' continued profession of peaceful intent must be viewed with considerable scepticism. As the Chinese strategist Sun Tzu warned in the 4th century B.C., "when the enemy's envoys speak in humble terms, but he continues his preparations, he will advance."

CHAPTER 2 : NOTES

1. JOSHUA, W. Detente in Soviet Strategy, Defence Intelligence Agency Publication, 1975, p.6.
2. PIPES, R. Soviet Global Strategy, Commentary, April 1980. p.31.
3. Ibid, p.31.
4. Ibid, p.32.
5. Kommunist, no. 14, September 1970, p.8 in Harvey, M., Goure, L. and Prokofieff, V., Science and Technology as an Instrument of Soviet Policy. Monographs in International Affairs, Centre for Advanced International Studies, University of Miami, 1972, p.3.
6. PIPES, R. op.cit., p.32.
7. LENIN, V.I. Collected Works (London n.d.), XXVII, pp.373,377, in Pipes, R., op.cit., p.32.
8. WOLYNSKI, A. Western Economic Aid to the USSR, Conflict Studies Position Paper no. 72, June 1976, p.3.
9. GEHLEN, M.P. The Politics of Coexistence : Soviet Methods and Motives, Indian University Press, Bloomington and London, 1967, passim.
10. JOSHUA, W. op.cit., p.5.
11. McNEILL, T.P.A Review of some Political Developments in the USSR, The University of Hull, April 1974, in Alexander Wolynski, op.cit., p.4.
12. WOLYNSKI, A. op.cit., p.4.
13. Kommunist, no. 9, June 1972, p.79 in Harvey, M. et al. op. cit., p.3.
14. HARVEY, M., GOURE, L. and PROKOFIEFF, V. op. cit, p.10.
15. BONARENKO, V. Scientific Potential and the Defence of the Country, Krasnaya Zvezda, August 20 1971, in Science and Technology as an Instrument of Soviet Policy, op.cit., p.15.
16. Pravda, March 25 1971, in Science and Technology as an Instrument of Soviet Policy, op. cit., p.11.
17. Krasnaya Zvezda, August 20 197., (I-25) in Harvey, M. et al., op.cit., p. 11.

18. HOFFMAN, E.P. and LAIRD, R.F. The Scientific-Technological Revolution and Soviet Foreign Policy, Pergman Press, 1982, passim.
19. VAN DER ELST, P. Capitalist Technology for Soviet Survival, The Institute of Economic Affairs, 1981, p.32.
20. KELLER, W. Are the Russians Ten Feet Tall?, Thames and Hudson, London 1961, p.214.
21. WOLYNSKI, A. op.cit., p.2.
22. Ibid, p.4.
23. GERSHMAN, C. Selling them th. Rope, Commentary, Aj [illegible]9, p.37.
24. PIPES. [illegible]val is not Enough, Simon and Sc[illegible] 1984, p.112.
25. LENINSKIM KURSOM (Moscow: Politizdat, 1974), Vol. 4, p.90, in MILLER, M.E. The Role of Western Technology in Soviet Strategy, Orbis, Fall 1976, p.542.
26. US Trade and Investment in the Soviet Union and Eastern Europe, A staff report to the Senate Foreign Relations Sub-Committee on Multi-National Corporations, December 1974, p.4.
27. JOSHUA, W. op. cit., p.4.
28. VAN DER ELST, P. op.cit., p.53.
29. The Inter-Relationship between Soviet Military Power and Soviet Intentions towards Europe, Foreign Affairs Research Institute, Occasional Paper, no. 18, 1978, p.1.
30. Technology and Soviet Energy Availability, Congress of the United States, Office of Technology Assessment, Washington D.C., 1981, pp 354, 367.
31. GRODES, J.S. Russian economy "sinking" - US reports, The Sunday Times (South Africa), August 13 1981.
32. PIPES, R. op. cit., p.34.
33. BRYAN, P., SULLIVAN, S. and PASTORE, S. Capitalists and Commissars, Policy Review, Fall 1982, p.23.

34. *Speech on Concessions*, in Polonoye Sobroniye Sochineniya (Moscow : Politizdat 1963), Vol. 42, p.56, in Miller, M. op. cit., p. 565.

35. GERSHMAN, C. *op.cit., p.39.*

CHAPTER 3 : UNITED STATES TECHNOLOGY TRANSFERS AND ITS IMPACT ON SOVIET ECONOMIC DEVELOPMENT

How can Soviet poverty, backwardness and inefficiency be reconciled with the apparent evidence of Soviet military power? How can economic stagnation co-exist with the latest Soviet military and rocket technology?

This riddle is partly solved by one aspect, the ability of any large, centrally-controlled state to channel their resources in a few selected strategic sectors. But, more importantly, the riddle is solved by the massive transfers of Western technology to the Soviet Union that have taken place since 1917.

One of the most established myths in the US and the West in general, is the belief that the Soviet economy is self-sufficient and that, for Moscow, commercial relations with the US is an option it can accept or reject. This assumption makes possible the argument that there is no point in resorting to sanctions and embargoes against the Soviet-Bloc because this will only push the Soviets towards autarky, deprive Western companies of business and worsen the climate of international relations.

This view is fallacious. The previous chapter has already documented that due to the importance the Soviet leadership attaches to the "scientific-technological revolution", which is a crucial pillar in the Soviet concept of the "correlation of forces", and due to the stagnating nature of the Soviet system, the Soviet Government has had no choice but to turn to the West for economic aid. The Soviet economy has never been self-sufficient and since the mid-Sixties has been less so than ever before.

The following two chapters will document the extent to which the Soviet Union is reliant on Western (specifically US) technology to keep its giant military/industrial complex running efficiently. For the Soviets, trade is not a choice but a necessity based on the harsh realities of the inability of the Soviet economic system to cater for the political and military needs of the Politburo.

Historical overview of technology transfers to the Soviet Union 1917-1965

In his exhaustive three-volume study on Western technology and Soviet economic development, Prof Antony Sutton reveals that indigenous Soviet innovation has been practically zero since 1917. Examining 75 major technological processes in such crucial and diverse sectors as mining, oil, chemicals, machine building, aircraft, communications, agricultural equipment, etc., and estimating the percentage that originated in the Soviet Union, he found that between 1917 and 1930 Soviet innovation equalled zero; 1930-1945, 10%; and between 1945-1965, 11%.1 Virtually all Soviet advances were based on foreign technology.

US and European companies have been active in building up the socialist Soviet economy since 1917. Immediately after the Bolshevik revolution, Russian industry was not destroyed, it was idle. It was, as Prof Sutton explains, in a state of "technical preservation". Lenin invited foreign companies - mainly American and German - to take out economic concessions from the Bolshevik Government. Some 300 to 400 concessions were handed out, which by the early twenties, had got the wheels of Russian industry turning again.2

Throughout the twenties, economic aid accelerated to the Soviet Union through Western private banks and corporations. In 1925, the US Chase National Bank (the forerunner of Chase Manhattan) and the German Prom Bank helped map out a complete programme for financing Soviet raw material exports of machinery to and from the US.3 In 1926, Chase National advanced $30 million in revolving credit to the Soviet Union,4 in contravention of US State Department policy at a time when any form of financial assistance to the Bolshevik Government was prohibited.

Standard Oil of New York in 1926 concluded a deal with the Soviet Government to market Soviet oil in Europe. Part of the deal, it was reported at the time, was a $75 million loan to the Soviet Government.5 In 1927, Standard Oil constructed the first oil refinery in the Soviet Union, which helped in further putting Soviet industry back on its feet. Between 1922 and 1926, Ford Motor Company sold 22000 tractors to the Soviet Union, each with its own set of replacement parts.6

American banks and companies played an all-important part in Stalin's now famous five year plans. The first, implemented in 1930, was entirely financed by four US banks, which included Chase National and Kuhn Loeb and Co.7 The leading industrial/architectural firm in the US at the time, the Albert Kahn Company, was contracted to design and supervise the major units (industrial projects) of GOSPLAN.8

These industrial plants, built by US firms in the Soviet Union in the early thirties, were far larger and technically more advanced than those built anywhere else in the world. For example, McKee Corporation built the world's largest iron and steel plant at Magnitogorsk, which was an exact copy of the US steel plant at Gary, Indiana.9 Ford Motor Company, with the assistance of the Austin Company, constructed the world's largest automobile plant at Gorki,

with a production capacity of 100 000 vehicles a year.10 Three gigantic tractor plants were built by International Harvester and Caterpillar International. The Stalingrad tractor plant, the largest outside the US, was a packaged factory assembled in the US, dismantled, then shipped to the Soviet Union and reconstructed with the aid of Western firms11, while General Electric designed and built the KHBMZ plant at Kharkov, which had a turbine manufacturing capacity two and a half times greater than General Electric's main plant at Schenectady in the US.12 The glorious "achievements" of the Bolshevik revolution, which the Western Establishment Press proclaimed in the 1930's, were in fact the product of US and European technology and know-how.

The second five year plan (1935-1939) was bringing on stream the massive plants that had been constructed by Western firms during the first five year plan.

Stalin himself admitted to the role that US companies had played in Soviet economic development in 1944 when he told Eric Johnson, the President of the US Chamber of Commerce, that two thirds of the largest industrial projects in the Soviet Union had been built with American assistance.13 He might have mentioned that the remaining third had been built by European companies.

During World War II, the US effectively saved the Soviet Union from defeat against Germany in the form of its lend-lease programme. Under lend-lease, the Soviets received $11 billion in military and non-military goods from the US between 1941 and 1946. This included aircraft, tanks, self-propelled guns, locomotives, ships, jeeps, sub-machine guns, explosives and foodstuffs (see Appendix I, Major Categories of Lend-Lease Equipment, p. 259). These supplies received priority over Allied Forces fighting against

with a production capacity of 100 000 vehicles a year.10 Three gigantic tractor plants were built by International Harvester and Caterpillar International. The Stalingrad tractor plant, the largest outside the US, was a packaged factory assembled in the US, dismantled, then shipped to the Soviet Union and reconstructed with the aid of Western firms11, while General Electric designed and built the KHEMZ plant at Kharkov, which had a turbine manufacturing capacity two and a half times greater than General Electric's main plant at Schenectady in the US.12 The glorious "achievements" of the Bolshevik revolution, which the Western Establishment Press proclaimed in the 1930's, were in fact the product of US and European technology and know-how.

The second five year plan (1935-1939) was bringing on stream the massive plants that had been constructed by Western firms during the first five year plan.

Stalin himself admitted to the role that US companies had played in Soviet economic development in 1944 when he told Eric Johnson, the President of the US Chamber of Commerce, that two thirds of the largest industrial projects in the Soviet Union had been built with American assistance.13 He might have mentioned that the remaining third had been built by European companies.

During World War II, the US effectively saved the Soviet Union from defeat against Germany in the form of its lend-lease programme. Under lend-lease, the Soviets received $11 billion in military and non-military goods from the US between 1941 and 1946. This included aircraft, tanks, self-propelled guns, locomotives, ships, jeeps, sub-machine guns, explosives and foodstuffs (see Appendix I, Major Categories of Lend-Lease Equipment, p. 259). These supplies received priority over Allied Forces fighting against

Germany on the Western Front. What is significant is that lend-lease injected about $1,25 billion* of the very latest American industrial equipment into the Soviet economy.14 This equipment was well in advance of the Soviet's military capability, so was of significant value to the development of the Soviet Union's military/industrial complex.

Apart from land-lease, the Soviets obtained over $10 billion worth of industrial equipment from occupied areas after World War II15, which represented one of the greatest plunders by one nation in all time. The Soviets acquired 41% of Germany's 1943 industrial capacity, which included the removal of several thousand plants from the Soviet-controlled German zone which were relocated in the Soviet Union. In addition, the Soviets were allowed to remove 25% of all industrial plants from the Western Allied zones16, which included 95% of all plants that were dismantled in the US zone, including such famous plants as Daimler Benz and the Karl Zeiss factory at Jena which manufactured precision optical instruments.

Altogether at least two thirds of Germany's aircraft industry, probably two thirds of her electrical industry, and the major part of her rocket production which included the large underground V2 rocket plant at Nordhausen and the rocket stations of Blizna and Peenemunde, were removed and relocated in the Soviet Union. Germany's rocket industry later paved the way for the Soviet's Sputnik rocket and nuclear weapons programme.

---

* This figure excluded the value of foodstuffs, semi-fabricated materials, industrial supplies and vehicles of indirect benefit.

The cream of Germany's rocket specialists were also sent to the Soviet Union. In one night alone on the 22/23 October 1945, 92 train-loads of 6000 German rocket specialists and their families, totalling 20 000, were deported to the Soviet Union.17

It has also been estimated that the Soviets uprooted $895 million worth of Japanese industrial equipment from Manchuria,18 $400 million from the Soviet zone in Austria and $600 million from Finland.19

The lend-lease transfers and the acquisition of German industry boosted the Soviet economy on to a fundamentally new technological horizon. Lend-lease alone is estimated to have increased Soviet industrial potential by one third.20 This infusion of new technology was partly responsible for another period of autarky undertaken by the Soviet Government during the 1950's, as the Soviets assimilated the technology into their military/industrial complex.

By the late fifties and early sixties, the Soviet Union began to lag significantly behind the West in key areas of industrial development. One notable area was the chemical industry, which was behind in all areas of chemical production outside the basic chemical technology that had been absorbed from the West during the 1930's and 1940's. This concerned Soviet leaders considerably, as their country's economic and military programme was contingent on an expanding and sophisticated chemical industry. In 1957, Kruschev made the decision to seek Western chemical technology.21 By 1963, the Soviets had started a massive fertilizer and chemical acquisition programme from the West. In 1966, when the US dropped restrictions on 400 strategic items that were formally on the export control list of embargoed commodities to Communist countries, the

US Commerce Department approved the sale of technical data for at least 15 fertiliser plants. By the mid-sixties, the technological floodgates were opened in the US to the Soviet Union, which witnessed the start of the greatest transfer of US technology to post-revolutionary Russia.

Impact of US Technology Transfers on the Soviet Economy : 1966-1986

Since 1966, the level of US and indeed Western technology flows to the Soviet Union has been significant, and has had an appreciable impact on the economic and technological development of virtually every single industrial sector in the Soviet economy. The sectors that have been most affected by these technology transfers include the automobile, chemical, oil and gas and computer industries. Other sectors include iron and steel, nuclear power, machine tools, mining, rocketry and micro-electronics. Perhaps the most significant impact has been on the military development of the Soviet armed forces, which will be discussed in detail in the following chapter.

Overall, the infusion of US and Western technology has helped to transform what was an essentially backward and antiquated Soviet economy into an industrial base, which has successfully closed the technological gap from 10 to 15 years to a mere two to three years vis-a-vis the West in critical areas of technology.

The transfers have also contributed towards building the largest military establishment in the world, which today is comparable (and superior in certain areas) to those of its Western counterparts.

Economic Development of the Soviet Motor Vehicle Industry

The greatest concentration of Western technical equipment (mainly American) is in the Soviet motor vehicle industry. The entire Soviet motor vehicle production capacity was originally established some 50 years ago by the Ford Motor Company at Gorki. While the Soviets' entire truck making capability was similarly established by the Arthur J. Brandt company of Detroit, which in 1930 rebuilt the old Tsars Amo plant, (itself built with US technology in 1917).22

It was only in 1966 when Fiat of Italy began construction of a large motor vehicle plant on the banks of the Volga River that the Soviet motor industry was fundamentally upgraded. Since 1966, Western investment in this areas has been well over $3 billion. Even a deputy minister of the Soviet Union's motor vehicle industry admitted that "it would have been hard to create such a large, modern enterprise with high performance indicators within such a short time without technical cooperation, which draws on all the best available in the country and abroad".23

The Fiat-built Togliatti or Volgograd Motor Vehicle Plant has a production capacity of 600 000 vehicles per annum,24 which represents over 50% of the Soviet Union's total car manufacturing capability. Built between 1968 and 1971 at a cost of $1,5 billion,25 the Togliatti plant produces three times more vehicles than the Ford-built Gorki plant, which until 1968 was the largest motor car plant in the Soviet Union.

Although the giant Togliatti car plant was designed by the Italian Fiat Company and built by 1000 Italian technicians, over 75% of the plant's equipment came from US companies, namely Gleason Works, TRW Inc. of Cleveland, US Industries

Inc., and New Britain Machine Co.26 The reason for this is that the US has the world's most advanced automated technology in the world, which is used throughout Fiat-built factories in Italy.

On October 6 1966, President Lyndon Johnson announced that the US would supply the precision machinery worth $50 million to equip the huge automative plant which Fiat of Italy was selling to the Soviet Union (at a time when US and Soviet involvement in Vietnam was rapidly increasing) and that the US EXIM bank would finance the sales. The machinery included automated stamping machine presses, gear cutting and heat treatment equipment, automatic lathes and others.27

The contribution of US technology to the Togliatti plant was openly acknowledged by the respected business magazine, Forbes, when it stated in an article on October 1 1966 that "three quarters of the machinery that Fiat installs for the Russians will come from the US, either directly or indirectly, through European subsidiaries and licensees of American firms. It will really be the US that puts the Russians on wheels". Built under the name "Lada", the Soviet-built Fiat 124 model is sold in large numbers to West European countries.

Another important vehicle plant in the Soviet Union is the US-built ZIL truck factory. Known as the Amo Plant, it was expanded in 1936 by the Budd Company (US) and Hamilton Foundry (US) and renamed the ZIS truck plant. During World War II, the original equipment was removed to establish the Urals truck plant, while the ZIS plant was re-established with US lend-lease equipment, and became known as the ZIL truck factory.28 Since World War II, the ZIL truck factory has continued to be expanded and supplemented with imports of foreign equipment, including US computer technology,

which controls the plant's assembly lines. Today the ZIL plant has a total production capacity of 200 000 trucks per annum, which makes it one of the largest truck factories in the world.29

Yet it is the recently completed *Kama River* truck plant which represents one of the largest single US investments ever in the Soviet economy. After taking nearly ten years to construct, the Kama truck plant is the largest industrial complex in the world. Built at a cost of $5 billion, the factory covers [illegible] sq km and employs 90 000 people.30

During the construction period, Fortune magazine commented at the time on the type of imported technology which would be flowing to the construction site. "US companies are supplying not only the foundry design, but much of the foundry equipment, including electric arc furnaces, holding vats, moulding lines and gear making machinery. West Germany is providing forge presses and machinery for making transmissions. From France come welding lines, paint lines, the design for the engine plant and part of its equipment. The conveyer systems are Italian and the transfer presses and press lines are Japanese."31

US companies that came in to build the plant included IBM, Mack Trucks, Swindell-Dresser of Pittsburgh and Ingersoll-Rand of Rockford.32 A total of $1,5 billion worth of Western machine tool equipment was pumped into the Soviet truck plant, of which 30% consisted of US equipment.33 Financing for the plant came from the US EXIM bank and Chase Manhattan Bank, which lent $225 million and $150 million respectively towards this project.

Originally the Soviets had approached the Ford Motor Car Company to build the plant in 1969, but Ford backed down

when Melvin Laird, the US Secretary of Defence, denounced the Kama Project, arguing that the Kama trucks could be used for military purposes, such as transporting arms in North Vietnam. Nevertheless, as detente crystalised, the Pentagon's opposition to Kama was overruled by Henry Kissinger in 1971, when he gave the green light for US participation in the project.

The Kama River truck plant represents a significant technological development in the Soviets' automobile industry, which since 1917 has depended almost entirely on Western (primarily US) technology. The plant, producing over 150 000 ten-ton, multi-axle trucks and a further 250 000 diesel engines every year,34 has effectively doubled total Soviet truck production. The Kama and Togliatti plants account for over 50% of the total Soviet output of cars and trucks.35 Altogether the Gorki, ZIL, Togliatti and Kama plants produce over 80% of the Soviet's total vehicle output.

Recent reports indicate that the Soviets are again about to upgrade their motor car industry significantly. Volkswagen of West Germany has signed a deal, worth $2 billion, to build an engine production plant in the Soviet Union which will produce 300 000 car engines annually.36

There is no indigenous Soviet technology in its motor vehicle industry, and this industrial sector represents the best example of just how dependent the Soviet Union is on the US and Western Europe to keep its wheels of transport moving.

The Soviet Chemical Industry

Since 1917, the Soviet chemical indust[illegible] been one of

the Soviet Union's industrial sectors most reliant on Western technology and technical expertise.

Prior to 1966, the major US chemical companies that had helped in building up the Soviet chemical industry included the Hercules Powder Company, Nitrogen Engineering Corp., Du Pont, Joy Manufacturing Company and Occidental Petroleum.37 The US was the Soviet Union's major supplier of chemical technology until after 1966, when the Soviets diversified their importation of chemical plants to Western Europe and Japan.

A Western study in the mid-seventies revealed that the industry which recorded the greatest rate of technical progress from 1955 to 1971 was also the industry which relied most heavily on Western machinery - the chemical industry.38

The most comprehensive report on the purchases of Soviet chemical equipment from the West was released by the CIA in October 1978. The CIA reported that during the Soviet Union's ninth five year plan (1971-1975), the Soviets purchased $3.5 billion worth of Western chemical equipment. While during the tenth five year plan (1976-80), Soviet importation of Western chemical equipment increased to $7 billion.39

The CIA report states that the contribution of Western equipment and technology (both directly and indirectly through Eastern European countries) has been substantial in boosting the output of key chemical products in the Soviet chemical industry. This is reflected in figures showing the contribution that Western equipment has made to overall Soviet production output. These include :

* 40% of all multi-nutrient (complex) fertilizers produced in 1975;
* 60% of polythene production in 1975;
* 75% - 85% of polyester fibres in 1975; and
* 72% of new ammonia production capacity (3,25 million tons) in 1971-75, increasing to 85% in 1976-80.40

The CIA report stresses the fact that Soviet chemical technology is essentially obsolete. "The heavy reliance on Western chemical technology partly reflects Soviet inadequacies in the development of many chemical processes and products and partly the difficulties in converting promising scientific discoveries into commercial scale production."41

The Soviets have benefitted in a number of ways from purchasing chemical technology. Firstly, the commissioning period of Western supplied plants is only between three to five years, compared with the average construction period of a Soviet chemical plant, which is eight years.

Secondly, Soviet publications suggest that unit production costs and capital investment at chemical plants using Western ammonia technology is 30-50% below the costs of Soviet ammonia plants.42 Western technology is therefore more efficient.

Thirdly, Western-equipped ammonia plants use only 10-30% as many workers as compared to Soviet designed plants.

Furthermore, the Soviets have also benefitted from obtaining manufacturing rights to duplicate Western designs for their chemical plants at a reasonable cost. Soviet duplication has reached a stage where they can produce spare parts for Western-equipped chemical plants. However, not even the CIA has details concerning which US and Western companies are involved in these arrangements.43

The Soviets do have certain problems in absorbing Western technology. These include Soviet inexperience in the installation, operation and maintenance of co plex chemical equipment (though this is partly offset by Western firms installing the plants themselves and training Soviet technicians); poor management, poor workmanship and inefficient transport and storage facilities.

Despite these problems, the West has, through the large-scale transfer of chemical technology, built a potentially dangerous competitor capable of undermining the West's chemical industry in the world market. In 1976, the Soviet Union become the world's fourth largest exporter of methanol, amounting to 215 000 tons annually. In 1977, the Soviets ordered two methanol plants from the West, which would boost exports to over 500 000 tons annually.44 The Soviets have also become major exporters in ammonia, polyethylene, polystyrene, urea and potash.

What especially concerns Western strategists is that through a combination of buy-back agreements (where Western companies receive Soviet chemical products in return for chemical technology transfers) and Soviet chemical exports, many chemical industries in Western Europe are being threatened with closure. Many Western firms are accusing the Soviets of dumping their chemical products in Europe at prices far below the European cost of production.45 Analysts are concerned at what is perceived to be a deliberate Soviet policy to increase West European dependency on Soviet chemical products - a vital component of any nation's military/industrial complex. The CIA report concludes with the prediction that the Soviet Union will be disrupting world trade patterns through the sale of low-priced chemicals by the mid 1980's. This has been interpreted as part of Soviet strategy to "disorder" the capitalist system, without bringing it to the point of war.46

The US has played a key role in upgrading sectors of the Soviet's chemical industry. Already the Soviets produce more ammonia than any other country, courtesy of US technology. The US ranked fourth when, during the 1971-75 ninth year plan, the Soviets purchased US chemical equipment worth $519 million. Most of these purchases involved EXIM bank credits. The single largest US/Soviet chemical trade agreement was sealed in Moscow on April 12 1973, when a chemical fertilizer barter deal was signed between Armand Hammer of Occidental Petroleum and Nikolai Komarov, the Soviet Deputy Minister of Foreign Trade. The deal was assessed at $8 billion, which represented the largest US/Soviet agreement ever.47 Occidental Petroleum would construct several fertilizer complexes on the Volga River to produce ammonia, urea and potash. By 1980, Occidental Petroleum would be sending one million tons of super phosphoric acid a year for twenty years to the Soviet Union, in return for 2,1 million tons of ammonia manufactured by US technology in the Soviet Union. The Occidental-built chemical plants would also produce one million tons of urea and potash annually. A report by the US Bureau of Mines a year later warned that if the deal went through, US supplies of phosphates would be depleted within a few decades, forcing the country to become dependent on nations in North Africa.48 In May 1974, the US EXIM bank approved a loan of $180 million to the Soviet Union at 6% interest to help finance Hammer's fertilizer project. William Casey, then Head of the US EXIM bank, made the strange assertion that it was in "America's interest" to exchange phosphate for ammonia and urea from the Soviets.49 The loan raised the ire of the US Congress, because the interest rate charged on the loan was far lower than most Government loans to Americans.

Between 1975 and 1980, 26 ammonia plants utilizing mainly US technology, and with a total output of some 13,2 million tons annually, came into operation in the Soviet Union. Occidental Petroleum enabled the Soviet Union in a space of a few years to become the largest exporter of ammonia in the world, with exports amounting to over 3 million tons annually and representing over half of the world's total exports.50 Western benefits accrued from the sale of chemical equipment to the Soviet Union is minimal. Instead, the West has served not only to build a vital industrial component in the Soviet economy, but also to strengthen a potentially dangerous competitor in the international chemical markets.

Despite this, the flow of chemical technology to the Soviet Union continues undiminished. Recently the British company, Imperial Chemical Industries, signed a contract with the Soviet Union to build a $1,2 billion chemical plant near Moscow.51

Soviet Oil and Natural Gas Industry

Since 1917, the Soviet Union has also been dependent on US and Western technology to extract and move its oil and natural gas reserves, which are the largest in the world. This has become increasingly evident since the 1970's, when the US became the largest supplier of prospecting and extraction equipment for oil and natural gas to the Soviet Union, worth some 35,6 million roubles ($88 million) in 1975 alone. Soviet reliance on US technology is especially pronounced in areas of high-capacity submersible pumps and off-shore drilling rigs.52

In 1974, Armand Hammer announced a massive pipeline project to be built by Occidental Petroleum and the Bechtel

Corporation of San Fransisco to bring natural gas from the Yakutsk fields in Siberia, to the East coast of the Soviet Union. Running some 2000 miles to the Pacific Ocean near Japan and estimated to cost $4 billion, it was to be financed by Bank of America and the US and Japanese governments.53 However, the pipeline project was scrapped when in 1978 the US Commerce Department felt that it was too large an undertaking for two governments (the US and the Soviets) to agree on.

In 1978, President Carter, against the advice of his National Security Council advisor, Zbigniew Brzezinski, and his Energy Secretary, James Schlesinger, approved the sale of a $144 million plant to manufacture hardened oil drill bits in the Soviet Union. Part of the deal included a sophisticated $1 million electron beam welding machine.54

The plant, built by the US Dresser Company, will help the Soviets produce high quality drill bits, which they were unable to produce themselves, that are essential for their energy development programme. The Dresser Kuibyshev plant has the capacity to produce 100 000 drill bit units per annum, far in excess of Soviet domestic needs for the 1980's and equivalent to one third of the entire US output of drill bits.55

Three important economic considerations have emerged from the Dresser sale : (a) the US has created a direct competitor; (b) the project will increase Soviet influence in the oil-producing areas of the world; and (c) the plant will boost Soviet energy production, which is critical to Soviet economic growth to sustain the Soviet military build-up. The military implications of the Dresser sale will be discussed in the following chapter.

Corporation of San Fransisco to bring natural gas from the Yakutsk fields in Siberia, to the East coast of the Soviet Union. Running some 2000 miles to the Pacific Ocean near Japan and estimated to cost $4 billion, it was to be financed by Bank of America and the US and Japanese governments.53 However, the pipeline project was scrapped when in 1978 the US Commerce Department felt that it was too large an undertaking for two governments (the US and the Soviets) to agree on.

In 1978, President Carter, against the advice of his National Security Council advisor, Zbigniew Brzezinski, and his Energy Secretary, James Schlesinger, approved the sale of a $144 million plant to manufacture hardened oil drill bits in the Soviet Union. Part of the deal included a sophisticated $1 million electron beam welding machine.54

The plant, built by the US Dresser Company, will help the Soviets produce high quality drill bits, which they were unable to produce themselves, that are essential for their energy development programme. The Dresser Kuibyshev plant has the capacity to produce 100 000 drill bit units per annum, far in excess of Soviet domestic needs for the 1980's and equivalent to one third of the entire US output of drill bits.55

Three important economic considerations have emerged from the Dresser sale : (a) the US has created a direct competitor; (b) the project will increase Soviet influence in the oil-producing areas of the world; and (c) the plant will boost Soviet energy production, which is critical to Soviet economic growth to sustain the Soviet military build-up. The military implications of the Dresser sale will be discussed in the following chapter.

Despite these negative factors, the sale was supported by Secretary of State, Cyrus Vance, and Commerce Secretary, Juanita M. Kreps. Dresser Industries defended the sale by pointing out that Japan had sold Moscow $6 million in drill bits in 1978. However, Fred Bucy, President of Texas Instruments Corp., who was appointed to head a panel to examine technology transfers to the Soviet Union, found that the US had a virtual monopoly in the production of premium oil drill bits of the type the Soviet Dresser plant would produce in Kuibyshev.56

Dresser Industries became concerned, not over the economic and military implications of the sale, but at the public backlash that was taking place. This was reflected by Dresser's Senior Vice-President, Edward R. Luter, when he stated "Dresser is keeping a low profile on the plant. We are not looking for any publicity, because we're afraid if our name comes up, and the project is called to the attention, they might remember that they wanted to do something to stop it. We hope we can let sleeping dogs lie, and let things continue to roll."57

This attitude, held by many Western companies, which ignores the strategic dimensions of critical technology transfers, is a serious problem for policy makers attempting to tighten technology transfers to the Soviet Union.

The Yamul Pipeline

In 1979 the Soviet Union approached the United States and Western Europe to participate in the construction of a 3600 mile twin pipeline to convey natural gas from the Yamul Peninsula in Siberia to the border of West Germany. This offer elicited a warm response from Europe, and especially from West Germany, France and Italy who would benefit most

from Soviet natural gas supplies. Here was a chance, it was felt by Western policy makers, to strengthen the concept of "linkage" with the Soviet Union. The response from the US was less receptive, especially after the Soviet invasion of Afghanistan in December 1979. Nevertheless, President Carter awarded a $80 million contract to Caterpillar International to supply 100 pipe-laying machines to the Soviet Union, and allowed General Electric to supply 41 compressor turbines worth $181 million towards the project.

However, US Government officials were concerned that the Yamul Pipeline Project would make Western Europe too dependent on the Soviet Union for natural gas supplies. A US Senate report concluded in December 1980 that the project is "likely to increase even further the present reluctance on the part of several nations to risk ... adopting measures that the Soviets find politically or militarily offensive".58

After the imposition of martial law in Poland in December 1981, President Reagan retaliated by imposing sanctions on the Soviet Union, which included the sale of US equipment for the Yamul Project. Western Europe refused to support Reagan, which caused a serious political rift between the US and its European Allies. This rift was further aggravated when the US attempted to force US companies with European subsidiaries to halt the sale of equipment to the Soviets, which was interpreted as unnecessary interference by the US in the internal affairs of European countries. Without the cooperation of Western Europe and Japan, US sanctions had little effect on the project. Japan replaced the Caterpillar order of 100 pipe-laying machines, while General Electric's compressor turbines were obtained from alternative European suppliers. After strong pressure from Europe, US business interests, and the Commerce and State

Departments within his own administration, Reagan eventually lifted the embargo on US equipment for the pipeline project in 1984.

The Yamul Pipeline Project was completed in 1985 at a cost of $15 billion. The major Western companies which participated in its construction included Mannesmann A.G. (W. Ger.) and a consortium composed of AEG Telefunken and the state-owned SalzGitter AG from West Germany; Creusot-Loire and Vallourec from France; and Finsider and Nuovo Pignone from Italy.59 Finance for the pipeline was made available by West European governments and banks. Between $5-10 billion was extended to the Soviet project, of which Deutsche Bank AG of West Germany provided one third of the project's long term credits. Private banks had their loans guaranteed by their respective governments. The pipeline has effectively tripled Soviet exports of natural gas, which will increase to some $7-10 billion annually in much needed foreign exchange, by the end of this decade.

Opponents of the pipeline project argue that it incorporated all the worst manifestations of East-West trade. Firstly, the Soviets enjoyed their usual commercial advantage of being a "monopsonist" (i.e. sole buyer) facing several competing Western traders. As a result, according to Mr Lebahn, who until recently was the Moscow representative of Deutsche Bank AG, Western exporters were forced to cut their prices by as much as 60% because of their weak position as independent bargainers against the Soviet Union.60

Secondly, West European governments subsidised the credit loans made to the Soviet Union. The French offered the Soviets 7,8% on their loans, totalling $1 billion at a time when French businesses faced interest rates of 16%.61 Bonn, London and Rome similarly extended credit facilities

at interest levels below the going market rates. Indirectly the European taxpayer was subsidizing the pipeline project.

Thirdly, the argument that jobs would be created in Europe was largely a myth, because the Soviet project crowded out investment opportunities in Europe, as capital that could have been invested in Europe was instead diverted to the Soviet Union. The Soviet project also made credit borrowing facilities more expensive in European countries, which stifled rather than encouraged economic development and job creation. The principle of Free Market economics was abandoned in favour of Government-subsidised and guaranteed loans, which may not have been extended if European governments had not backed private sector bank loans to the project.

Fourthly, the West ignored reports that thousands of slave labourers were involved in building the pipeline, reports that were greeted with a silence which "reflected a remarkable degree of moral atrophy and indifference."62

Fifthly, practically all the hard currency the Soviet Union spends on importing Western technology (excluding gold exports), is derived from oil and natural gas exports to West European countries. Because of its inability to manufacture high quality industrial goods, the Soviet Union has to turn to its natural energy resources to obtain vitally-needed foreign exchange reserves. The Yamul pipeline will add $8 billion annually to Soviet export earnings.

Lawrence J. Brady, former Assistant Secretary for Trade and Administration in the Commerce Department under the Reagan Administration, commented that "a steep decline in energy production would have serious implications for the Soviet

Union's hard currency earnings (60% of which is derived from fuel products) and would send economic shockwaves from Eastern Europe to Cuba and Vietnam. The financial burden of the empire might well become insurmountable if the Soviet-Bloc has its own energy crisis".63 Indirectly the Yamul pipeline venture will help to continue propping up Soviet satellite countries and so-called wars of "national liberation" in far-flung corners of the globe.

On a geo-strategic level, alternative sources of natural gas were available in Norway and the Netherlands, the North Sea and Africa, at lower economic and political costs. The obvious strategic danger ignored by Western Europe is that the supplies of gas could be completely cut off for political reasons by the Soviet Union.

In the past, the Soviets have already either terminated or threatened to terminate energy supplies to the following countries : Yugoslavia 1948, Israel and Hungary 1956, Albania 1961, Red China 1962, Czechoslovakia 1968, West Germany 1973 and Western Europe and Japan if they supported US sanctions against the Soviet Union after its invasion of Afghanistan in 1979.64 It seems that political intimidation is a regular feature of Soviet export policy.

An interesting question to be analysed on a separate level, is why did US banks and corporations have such a large interest in the Yamul pipeline? This question is partly answered by a study prepared by the Senate Governmental Affairs Committee, which found an interesting interlock of US banking and corporate interests with their West European counterparts involved in the Soviet pipeline project.

The West German subsidiaries of three US oil companies, EXXON, MOBIL and TEXACO, together own 25% of Ruhr Gas, the German utility that will import Siberian gas for distribution to the rest of Europe.

Four of the largest US bank holding companies, Chase Manhattan Corporation, J.P. Morgan and Company, Citicorp and Manufactures Hanover Trust are heavily interlocked with these oil companies.

The Chase bank, for example, is the number one voting shareholder in EXXON and the number three voting shareholder in MOBIL. The Morgan Guaranty Trust Company is the number one voting shareholder in MOBIL and General Electric (producer of the MS 5002 Gas turbine compressor that was to be used on the pipeline) and number two voting shareholder in Caterpillar International. While Citibank is the number one voting shareholder in Caterpillar International, number two in General Electric and number five in EXXON.65 The increased profits the US corporations obtained from their European subsidiaries could be recycled through the US banking system.

The COMECON foreign debt is another reason why Western banks favour the pipeline deal. Soviet natural gas deliveries, it is believed, could help service the debt. It is argued that total proceeds from the pipeline over a twenty year period could range between $200-300 billion, effectively cancelling out Soviet-Bloc foreign debt.66

Yet it is not altogether certain that the Soviets will use the revenue from its gas sales to bail out East European debt. The Soviets have already made it clear that they will not bail out Eastern Europe and instead, it seems more likely that the revenue will be used to purchase Western technology and maintain Soviet surrogate forces in the world's key trouble spots. A seemingly unlikely scenario has arisen where Western banks have a vested interest in securing Soviet economic growth to save themselves from the

threat of an East-Bloc default, at the expense of US and West European national security considerations.

In conclusion, the Yamul pipeline was in reality based on political rather than economic considerations. European governments were willing to sacrifice an economic loss in exchange for a perceived political gain, based on the major precept of detente that trade would mellow the Soviet Union. It remains to be seen just how soon this blind faith in detente will be broken by the Soviets who are governed by that keen assessment and use of the "correlation of forces" in so far as it suits their own global objectives.

Currently the Soviet Union is tempting US companies to help in the development of the Barents Sea Project - a new $25 billion oil and gas development that is larger even than the Yamul pipeline venture. The Soviet offer was made by Michail Gorbachev to US companies attending the recent US-USSR Trade and Economic Council meeting held in Moscow. Only US technology can provide the Soviets with ice-resistant oil platforms, marine pipelines and help solve the massive logistical problems involved in the transportation of oil and natural gas.

In November 1985, Caterpillar International signed an agreement to sell 200 heavy bulldozers and a number of pipe-laying machines to the Soviet Union, valued at $80 million,67 while the West German engineering company, Mannesmann is currently negotiating for contracts to build synthetic liquefaction fuel plants estimated to be worth some $16,5 billion in the Soviet Union.68

For the forseeable future, the Soviets will continue to rely on Western economic assistance o develop its energy resources, especially US technology, to develop its off-

shore energy reserves to compensate for stagnating oil production from its present land wells.

Soviet Computer Technology

Computers in the industrial world are the mainstay of all modern technologies, including military technology. As a result, computer sales to the Soviet Union have become one of the most controversial issues of East-West trade.

The Soviet Union lags significantly behind the US in the development of computer technology. This has been verified by research done by Prof Judy at the University of Toronto and by Prof A. Sutton in the late sixties and early seventies, and by the Heritage Foundation in the late seventies, which concludes that computer technology in the Soviet Union is entirely imported from the West and that literally all significant technological innovations in the computer field have occurred in the West.69

In the early 1930's, the Soviet Union imported unit record equipment that was manufactured by Powers and Hollerith. In 1932, the SAM business machine plant was established in Moscow with Western assistance, to produce copies of Western machines.70

During the late fifties and sixties, the standard Soviet computer, known as the Ural series, was less advanced than computers used by the US in World War II. The Ural I computer, which started production in 1955, had an average speed of 100 operations per second (OPS), compared to 2500 OPS for US World War II Machines and 15 000 OPS for US computers in the mid to late fifties.71 The Ural II and IV models incorporated only slightly improved characteristics over the Ural I. In 1967, the Soviets unveiled their BESM

- 7 computer series with a rated capacity of 1 million OPS, although its operational ability was nearer 500 000 OPS. However, US third generation computers coming off the assembly lines at the time, including the Control Data Corporation (CDC) 6600, IBM 360/370 and the giant CDC Cyber 76, had OPS capacities of 800 000, 5 million and 40 million respectively.72 The Soviet Ural and BESM computer series which incorporated Western technology were only first and second generation computers, lagging some 10 to 20 years behind US third and fourth generation computers which were being developed by the US in 1970.

By the late Sixties, the Soviets started to aggressively purchase computers from the West to compensate for their own antiquated indigenous computer systems. Computer sales worth $40 million were flowing to the Soviet-Bloc countries annually by the end of 1969.73

During the 1960's, the major suppliers of computer technology to the Soviet Union were International Computers Ltd (UK), English Electric (UK) and European subsidiaries of General Electric (US). Indirectly this was mainly US technology as most European computer technology is based on US patent rights.

When the stringent computer export controls were lifted in 1968 in the US, US companies spearheaded by International Business Machines (IBM), Control Data Corporation (CDC), Sperry-Rand and International Telephone and Telegraph Corp., became the major suppliers of computers to the Soviet Union, and remain so to this day.

The Soviet Ryad third generation computers, which came into production in the mid-Seventies, were based on IBM technology obtained by the KGB through covert means when they procured several IBM 360 series computers, their

manuals, blueprints and specifications from IBM facilities in West Germany.74 In fact, the Ryad computer series is merely a duplication of the IBM 360/370 series. Even IBM training manuals are used for the Ryad series. According to a CIA report, these computers, which make up virtually the total Soviet-Bloc effort in large, general purpose computers, have been and will continue to be used in a variety of civil and military applications.75 The Ryad III or ES-1060 model unveiled in the late seventies and capable of 1 million OPS, was patterned on the fourth generation IBM 370 E series.

Even with IBM technology, the Soviets have failed in their efforts to develop and mass produce reliable high speed third generation computer systems. Generally speaking, the Soviets have a number of problems with their computers. Many computers are obsolete and obsolescent (80% of all Soviet computers in 1976 still consisted of first and second generation machines).76 Furthermore, according to the Heritage Foundation, Soviet computer memory devices are inferior, peripheral equipment is poor, software technology is inadequate, time sharing is poorly organised, and parallelism and multi-processors are only in the developing stages.77

Soviet mini-computer technology is almost non-existent. During the 1970's, the Soviet-Bloc legally purchased more than 3000 mini-computers, some of which are now being used in military-related organisations. Furthermore, they are also developing mini-computers that are direct copies of Western models.78

Between 1975-79, US defence specialist, Sean Randolph, estimated that US computer and electronic firms had sold the Soviet Union $300 million worth of computer and related equipment. The real figure is probably considerably higher

if illegal Soviet aquisitions of computer technology is taken into consideration, which has saved the Soviets millions of dollars in computer research and development programmes. Despite these infusions of US computer technology, the most advanced Soviet computer is capable of only 1 million OPS, while the latest US computers are capable of over 400 million OPS.

Today, the Soviet Union is ten to twelve years behind the US in developing hardware computer technology, and ten to fifteen years behind in software technology, although this gap is slowly narrowing. The Soviets are currently determined to leapfrog ten years of research and development to acquire illegally, if necessary, the very latest US fourth generation computer technology and the requisite technology to build the "superchip" for the coming fifth generation computer systems currently under development in the West. This warning is highlighted in a CIA report published in 1982, which identified future Soviet acquisition trends, which included very dense random access memory chips, high capacity disk drives and packs, the so-called "super computer" and the latest in general purpose computer technology.79 These acquisitions, if successful, will go a long way to narrowing the computer technology gap with the West.

In the light of the evidence presented above, CDC's chairman and chief executive officer, Willian C. Norris, blatantly lied or was thoroughly misinformed, when he stated in 1975 that "many persons in Washington assume that the Socialist countries are far behind the US in computer technology, hence, they say, Soviet military capabilities would be significantly increased if the US sold them computers". He stated further that "restrictive US policies provided the incentive to Socialist countries to accelerate development of their own computer industry".80

What computer industry? Unfortunately, the facts contradict Norris's statements completely. Norris further proposed that the US Government and Industry undertake an aggressive programme of technology exchange with the Soviet Union over the next five years (1976-80) - at a level of $25 billion. The problem is that the Soviets have no computer technology of any significance to exchange with the US. CDC itself has played a key role in selling computers to the Soviet Union, including some of the world's largest machines.

In October 1973, the Soviet Ministry of Science and Technology concluded a ten year agreement with CDC, which included the "joint" development of a new super computer capable of 50 to 100 million OPS, a joint peripheral manufacturing venture and a nationwide time-sharing and software development in the Soviet Union.81 (See Appendix II, Agreement Signed between CDC and the Soviet Union, p. 260). It is not known what the current status of this programme is, but it would certainly entail giving the Soviets the most advanced computer technology CDC has to offer. During the 1970's, CDC also sold its advanced Cyber 172 and 7300 computers, which have wide-ranging military applications, to the Soviet Union. Commenting on the sale of the Cyber 7300 at the time, Miles Costick, who heads the Institute on Strategic Trade, stated that the computer was "a large scientific computer, ideal for military applications and about fifteen years ahead of current Soviet computer capability".82

IBM, which has been active in selling computer technology to the Soviets since the 1930's, has also played a key role in upgrading Soviet computer technology in the 1970's. IBM sold the Soviet Union the largest industrial computer in the world, an IBM 370 for use at the Kama River truck plant, and in 1974, sold Hungary the advanced 370-155

computer model.83 IBM technology is being utilised in all major sectors of Soviet industry and is the mainstay of the Soviet Union's military system.

The role that US computer technology plays in upgrading the Soviet's military capability will be discussed fully in the following chapter, suffice to say that most computers have what is known as a "dual use" capability, i.e. both a civilian and a military application, which holds potentially grave implications for Western national security.

In conclusion, computer technology of Soviet origin is non-existent and will remain so for many years to come. The reason for this being the inability of the Soviet Union to innovate in areas of high technology - which is symptomatic of the inherent failure of socialism as an engine of economic progress.

Other Industrial Sectors

The transfer of Western technology has not been solely limited to the four areas discussed above. Many other industrial sectors have also benefitted in varying degrees from these technology transfers.

Dr John F. Lehman, former Deputy Director of the Arms Control and Disarmament Agency and current Secretary of the US Navy, has stated that of the 49 marine diesel engines used by the Soviets today in their merchant fleet, 42 are of Western design.84

The Soviet Union's entire soft drink production is produced by Pepsi-Cola of the US. Pepsi-Cola currently has 14 bottling plants scattered in the Soviet Union and recently signed a $2 billion contract in 1985 with the Soviet

Government to double the production of Pepsi-Cola. Watched by the US Secretary of Commerce, Malcolm Baldridge, the deal was signed by Pepsi-Cola's chairman, Donald Kendall and the Soviet Export/Import Chief, Mr Yuri Zhishin.

Although little data is available on the Soviets' atomic energy programme, the early stages of nuclear power in the Soviet Union was based on US lend-lease equipment, German uranium and heavy water-processing equipment obtained after World War II, and technical blueprints stolen from the US Manhattan Project.85 The first Soviet PBR atomic reactor opened in 1954 was practically a carbon copy of the US Hanford reactor86 built by the US in the first phases of the Manhattan Project. Observers believe that the technical data for the Soviet reactor was probably obtained through espionage. In 1967, the Soviets signed an agreement with the European Centre for Nuclear Research (CERN) to build the world's largest 70-GeV proton synchroton research facility at Serpukhov. European countries provided critical equipment for the project which the Soviets were unable to produce themselves, including a fast-ejection system, a vast ejected proton beam, radio-frequency particle separators and bubble chamber technology.87

By 1969, the Soviets had only four nuclear reactors in operation,88 compared to the 13 in the US, with another 70 on order or under construction.89 During the 1970's, mainly West German and Japanese nuclear power plants were being built in the Soviet Union.90

At the recent US/Soviet Summit meeting between President Reagan and Mikhail Gorbachev, it was agreed that there would be mutual cooperation in the field of thermo-nuclear fusion for peaceful purposes.91 It seems that once again the agreement will favour the Soviet Union, as the US leads the world in fusion technology research.

Evidence gathered from the recent explosion at the Chernobyl nuclear power plant in the Soviet Union indicates that poor quality construction processes and inadequate safety measures were incorporated into the nuclear plant.

The foundation of Soviet space technology was laid by V1 and V2 rocket technology obtained from Germany after World War II. During the 1960's and 1970's, the Soviets were incapable of landing on the moon. The joint US/Soviet space mission in 1975, National Aeronautics and Space Administration (NASA) conceded, was a political, not a scientific mission, which benefitted only the Soviets.92 The US Government, at a cost of $100 million, had to construct the docking module for linking up to the two spacecraft. Commenting at the time on the technical ability of the Soviet craft, a US paper stated: "Compared with the Apollo spacecraft, Soyuz is really a piece of junk. It is tiny. It has no room for much advanced instrumentation. It cannot manoeuvre in space, and therefore in the tricky and dramatic linkup, everything was up to the Apollo. Apollo looked around for Soyuz, sided up to it, made the delicate adjustments, and completed the connection.93

The Soviets are even building a carbon copy of the US space shuttle. Retired Lt. Colonel Thomas Krebs, former Chief of the US Defence Intelligence Agency's (DIA) space systems branch, reported in 1984 that "we've seen the Soviet orbiter and it's identical to ours". The only difference between the shuttles is an additional set of engines below the fuel tank for increased payload capacity.94

Summarising the impact of Western technology transfers in monetary terms, Dr Miles Costick, President of the Institute of Strategic Trade, stated that "during the

1970's the Free World has been the source of much of the Soviet Union's electronic know-how. Further, the West has supplied the Soviet industrial sector with over $50 billion worth of efficient machine tools, transfer lines, chemical plants, precision instruments and associated technologies".95 The figure today is probably nearer $100 billion. In 1979 alone, the Soviet-Bloc imported over $10 billion96 in industrial equipment from the West, with over half going to the Soviet Union.

Western technology has also always played a key role in the Soviet Union's five year plans. During the course of their ninth and tenth year plans (1971-80), the preferred sectors of Western technology were motor vehicle production; natural gas; oil; timber; metal extraction; processing and distribution technology; chemical processes, encompassing fertiliser and petro-chemical production; computer assisted systems; agriculture and aluminium processes.97

The list of industrial sectors affected by Western technology could go on. However, enough evidence has been amassed to suggest that the impact of Western technology on the development of major industrial sectors of the Soviet Union has been substantial.

Measuring the Impact of Technology Transfers

Many economists who have made studies on the flow of Western technology to the Soviet Union, have tended to de-emphasise its impact on the performance of the Soviet Union's economy. This is due to the analysts focussing narrowly on East-West trade figures, which tend to ignore other important considerations.

For example, Donald Green and Herbert Levine, using an econometric model of the Soviet economy, concluded that between 1968-73, Western machinery added slightly more than 1% to overall Soviet economic growth and 2,5% to industrial growth.98 This conclusion was also confirmed by analysts at the Bureau of East-West Trade in the US, who contend that the flow of high technology from 15 industrialised Western countries was not large in volume, did not dominate imports of the Communist states during the 1972-76 period, and did not increase markedly in relative performance.99 Furthermore, Gary K. Bertsch quoting Roger Carrick in his monograph East-West Technology Transfers in Perspective concludes that because the share of Western machinery in total investment in the COMECON countries is very small, then such imports could not be of very great significance.100

Trade figures are not in themselves a very good yardstick to measure the impact of technology flows on the Soviet economy. It is the breakthroughs the technologies allow in various sectors of the Soviet economy, and the impact on Soviet productivity, total economic output, the technological gap and Soviet military performance that also have to be considered.

So while the share of Western machinery in total Soviet equipment investment does not amount to more than 6%, it is the type of technology being transferred by countries like the US which has transformed a broad sector of the Soviet economy that is so important.

Research has shown that Western technology has had a significant impact on output production in the Soviet Union, when compared to the output achieved by local indigenous stock of capital equipment. Donald W. Green and Herbert S. Levine, using the Sovmod macro-economic model of the Soviet economy developed at the University of Pennsylvania, estimate that the nett addition to output

resulting from a unit increase in the stock of imported Western machinery in Soviet industry, is 8 to 14 times the corresponding effect of a unit increase in the indigenous capital stock.101

Dr Miles Costick states that Soviet imports of Western technology since 1970 has increased dramatically as a percentage of producer durables allocated to investment. In 1970, the figure was between 15-20%. By 1978, the share of imports had risen to 20-47% and in the early 1980's Costick estimated that the figure could reach upwards to 55%. When imports are not included, domestic production of producer durables in the Soviet Union has remained more or less the same at 1976 levels.102

The importation of Western technology has also saved the Soviet Union billions of dollars in research and development. Economists have estimated that since 1970, US exports of high technology to the Soviet Union has saved that country over $100 billion in research and development costs,103 and helped close the technological gap with the West from 10-15 years to one to four years. One example of Soviet savings was clearly illustrated in the early 1970's when the US sold the Soviet Union an astronaut's space suit for $18 000, which cost $20 million to develop.104

Other facets of technology transfer often not considered include licenses and technical agreements. The acquisition of license rights from the West, often constitutes some of the most advanced technology available. In 1976, the Soviets purchased more than 13 000 separate licences from the West to manufacture industrial components and finished products.

It has been estimated that on average, such a transfer (of licences) enables an advance of seven to eight years in Soviet technology.105 While the Soviet Union does have a problem, mastering the acquired technical expertise, purchases of licences often includes Western technicians spending some time in the Soviet Union and training Soviet personnel to manufacture the licences successfully.

Gari Marchuk, Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Commission for Science and Technology, in an attempt to illustrate US benefits from East-West trade, stated that US firms had purchased 125 licences from the Soviet-Bloc between 1974-85.106 However, this figure is insignificant compared to the thousands that the Soviets have purchased and acquired illegally over a similar period.

The Soviets have also succeeded in acquiring the most advanced Western technology by using in part their scientific and technical agreements with the West to facilitate their access to new technologies that are emerging from the Free World's applied scientific research efforts.107

One example of these bilateral scientific exchanges is Gould Laboratories Materials Technologies, a division of Gould Inc., who trained 36 Soviet experts in areas of metallurgy, polymetric chemistry, electro chemistry, mechanical engineering and physics of fluid flow in Cleveland for a year.108

In 1980, there were ten bilateral agreements in existence with the US, comprising about 240 working groups in which Soviet and US personnel are working on such sub-topics as computers, metallurgy, micro-biology, chemical catalysts, physics, science policy, metereology, earth quake prediction, fast breeder reactors, controlled thermo-

nuclear research, magneto-hydrodynamics power generation, and so on109, while US scientists and students go to the Soviet Union to study ballet, Russian literature, anthropology, Russian law and culture (see Appendix III, Major Fields of Technology of Interest to Soviet-Bloc Visitors to the US, p. 266).

Soviet personnel are working in US companies that are "front runners" in technology development and in areas which the Soviets are most deficient in. The military gains that the Soviets have made through these agreements have been dramatic and will be discussed more fully in the following chapter.

To conclude, the economic benefits of Soviet-American trade has been highly asymetrical. It has enabled America's foremost global competitor to fulfil its most critical needs in high technology, capital goods and production processes, while technology transfers to the Soviet Union constitutes only a small fraction of America's total global exports. This is perhaps one of the greatest ironies of West to East technology transfers. The Soviet share of Western export is minimal. In 1976, machinery sales to the Soviet Union by the 14 major Organization for Economic Development (OECD) countries were only 1,7% of their total machinery sales worldwide. This would correspond to something in the order of a fifth of 1% of the gross national product (GNP), for a country like France or West Germany110. For the US, its trade with the Soviet-Bloc accounted for only 1,7% of its exports and 0,4% of its imports.111

It is therefore inaccurate to perceive the Soviet Union as a "large market for Western goods". It has simply not materialised. As a result, it would not be detrimental to the economies of countries like the US to withhold the sale of machinery to the Soviet Union, while the consequences for Soviet economic development would be potentially disastrous.

nuclear research, magneto-hydrodynamics power generation, and so on[109], while US scientists and students go to the Soviet Union to study ballet, Russian literature, anthropology, Russian law and culture (see Appendix III, Major Fields of Technology of Interest to Soviet-Bloc Visitors to the US, p. 266).

Soviet personnel are working in US companies that are "front runners" in technology development and in areas which the Soviets are most deficient in. The military gains that the Soviets have made through these agreements have been dramatic and will be discussed more fully in the following chapter.

To conclude, the economic benefits of Soviet-American trade has been highly asymetrical. It has enabled America's foremost global competitor to fulfil its most critical needs in high technology, capital goods and production processes, while technology transfers to the Soviet Union constitutes only a small fraction of America's total global exports. This is perhaps one of the greatest ironies of West to East technology transfers. The Soviet share of Western export is minimal. In 1976, machinery sales to the Soviet Union by the 14 major Organization for Economic Development (OECD) countries were only 1,7% of their total machinery sales worldwide. This would correspond to something in the order of a fifth of 1% of the gross national product (GNP), for a country like France or West Germany[110]. For the US, its trade with the Soviet-Bloc accounted for only 1,7% of its exports and 0,4% of its imports.[111]

It is therefore inaccurate to perceive the Soviet Union as a "large market for Western goods". It has simply not materialised. As a result, it would not be detrimental to the economies of countries like the US to withhold the sale of machinery to the Soviet Union, while the consequences for Soviet economic development would be potentially disastrous.

Mechanisms of Technology Transfer

Overseeing the purchase of Western technology in the Soviet Union is the USSR State Planning Commission (GOSPLAN), the State Committee for Science and Technology (GKNT) and the Ministry of Foreign Trade. The GKNT is the key department which oversees the legal purchase of Western high technology. The mechanics of the Soviet acquisition programme will be discussed fully in chapter 5.

Antony Sutton, in his exhaustive case study approach in assessing the impact of Western technology on the Soviet economy in the early 1970's, pointed out the tremendous role that prototype purchases played in raising the technological level of Soviet machinery during the fifties and sixties. However, during the seventies and eighties, Soviet policy has shifted to one of obtaining the manufacturing know-how in order to produce a wide range of industrial products themselves.

This is being achieved primarily through the numerous scientific agreements the Soviet Union has signed with the West, and through the purchase of thousands of licences. Under Kruschev, a specialist Foreign Trade Organisation called Litsenzintorg, was created in 1962 to handle the purchase and sale of licenses.112

Other mechanisms of technology transfer include: foreign travel by Soviet scientists and technologists, the collation of foreign technical literature, industrial espionage, direct foreign investment and purchases of foreign products.

The key mechanism for technology transfers still remains the "turnkey" plant, where the US sells a complete factory to the Soviet Union, trains its technicians and conveys to the Soviets other important manufacturing and design information.113

According to the findings of the panel of experts headed by Fred Bucy in 1976 to examine US technology transfers to the Soviet Union, there are four advantages to "turnkey" projects: (a) they rapidly expand output and create new production capacities; (b) they enhance labour productivity by assimilating the latest achievements of science and technology into the production process; (c) they thus improve the input (labour and capital)/output (production) ratio in the target industry; and (d) they produce high quality products which have an enhanced export potential and increase the influx of hard currency.114

Soviet economists themselves stress the importance of turnkey projects. Despite certain disadvantages, e.g. the initial outlay of hard currency for the plants, the Soviets still make considerable gains. The Western contractor is responsible for the installation of a whole complex production system, including the training of Soviet personnel. The cost of the project is normally financed by Western credits, with renumeration consisting of part of the output of the plant (usually 20-30%).115

The Soviets have often implemented some ingenious methods of obtaining technical data from the West. For example, the Soviets learned how to make wide-bodied jet aeroplanes without buying a single aeroplane. They did this by creating a bidding war between three Western firms. In their eagerness to win a lucrative contract, the companies handed over more and more details of their construction techniques to the Soviet Union. When the Soviets had

obtained all the information they needed, they then called off the contract negotiations with the Western companies.

On another occasion, the US Boeing Aircraft Corporation was taken in by Soviet intentions when they sent a group of prospective Boeing buyers to tour Boeing plants in the US. Their real intention was divulged by an intoxicated Soviet engineer late one night, when he told the US officer who was escorting the Soviet delegation: "Don't be fooled. We will never buy your planes. We don't have the money and besides, could we force the East Europeans to use our aircraft if we bought yours? No! We are here to learn your secrets."116

Later, when the President of Boeing went to the Soviet Union to try and clinch an aircraft deal, he was not even met at the airport. No room was reserved for him, he was merely told that they were not interested in the aeroplanes after all.

To circumvent some of the stricter high technology export controls appearing in the US, the Soviets are increasingly turning to US subsidiaries in Europe to satisfy many of their industrial needs. For example, the Soviets are buying spare parts for their IBM computers through an IBM branch in Austria. These purchases are steady and provide critically needed supplies for Soviet military installations, such as the ZIL truck plant, the Soviet Missile Design Bureau, and the Kama River truck plant.117

The mechanism of industrial espionage as a means of obtaining Western technology can be expected to increase as the US and its allies begin to close off the flow of high technology to the Soviet Union.

obtained all the information they needed, they then called off the contract negotiations with the Western companies.

On another occasion, the US Boeing Aircraft Corporation was taken in by Soviet intentions when they sent a group of prospective Boeing buyers to tour Boeing plants in the US. Their real intention was divulged by an intoxicated Soviet engineer late one night, when he told the US officer who was escorting the Soviet delegation: "Don't be fooled. We will never buy your planes. We don't have the money and besides, could we force the East Europeans to use our aircraft if we bought yours? No! We are here to learn your secrets."116

Later, when the President of Boeing went to the Soviet Union to try and clinch an aircraft deal, he was not even met at the airport. No room was reserved for him, he was merely told that they were not interested in the aeroplanes after all.

To circumvent some of the stricter high technology export controls appearing in the US, the Soviets are increasingly turning to US subsidiaries in Europe to satisfy many of their industrial needs. For example, the Soviets are buying spare parts for their IBM computers through an IBM branch in Austria. These purchases are steady and provide critically needed supplies for Soviet military installations, such as the ZIL truck plant, the Soviet Missile Design Bureau, and the Kama River truck plant.117

The mechanism of industrial espionage as a means of obtaining Western technology can be expected to increase as the US and its allies begin to close off the flow of high technology to the Soviet Union.

The Role of Slave Labour in US/Soviet Trade

A major moral dilemma that is emerging for Western countries trading with the Soviet Union, are recent reports that goods imported by US and European companies from the Soviet Union are made by slave labour living and working in the most appalling conditions.

A recent study of forced labour in the Soviet Union, produced by the US State Department, reported that there were 4 million Soviet citizens (including many women) forced to undertake labour in 1100 camps, 118 strung across the Soviet Union.

The US State Department was forced to release this document after US Senator, L. Armstrong, called to the attention of Congress, labour malpractices taking place. A letter accompanying the State Department report, written by the then Under Secretary of State, Lawrence S. Eagleburger, acknowledged that "forced labour, often under harsh and degrading conditions, is used to execute various Soviet development projects and to produce large amounts of primary and manufactured goods for both domestic and Western export markets".119

Historically, Gulag inmates have been involved in building many construction projects in the Soviet Union since 1917. Under Stalin thousands of slaves died building industry, harbours and towns in the Soviet Union. This has been thoroughly documented by the renowned Soviet dissident, Aleksander Solzhenitsyn, in his book The Gulag Archipelago.

At the end of Stalin's reign in 1953, there were an estimated 12-15 million slave labourers in the Soviet Union.120 These inmates did, and probably continue to, suffer under the most appalling conditions of internment

which includes torture, lack of food and exposure to the hostile Siberian weather.

It would appear that Soviet citizens are not the only inmates in these camps. Doan van Toai, a former official of the Vietcong Liberation Front, who was later an official in the new Communist Government's Ministry of Finance, testified to this before the US Senate in June 1982. He described a programme under which Hanoi had agreed to export 500 000 workers to the Soviet Union - including so-called "reactionary elements".121

In a Wall Street Journal acticle, titled "The system of forced labour in Russia", former Moscow correspondent David Sater observed: "Forced labour is by no means exceptional in the Soviet Union. It is an integral part of the economic system, and it is extremely doubtful whether the Soviet economy could function without it. Because of the wasteful utilization of manpower in the economy, artificial shortages that are created are made good through forced labour."122

It has been ascertained that timber, uranium and gold products sold to the US by the Soviet Union, are produced from forced labour. Other export products that originate from forced labour camps include wooden chairs, cut and polished glass for chandeliers, tinned crab, petroleum products and caviar. (See Appendix IV, CIA List of Slave-made Products, p268.) Even the thousands of little Olympic bear mascots sold during the 1980 Moscow Olympic Games, were made by women in slave camps, according to the Congressional testimony of a former Gulag inmate, Georgy Davydov.123

Ironically, even the Giant Kama truck plant and the Yamul pipeline were constructed by Soviet-forced labour - projects which Western companies were heavily involved in. The Soviet Union vacillated on efforts by an International Labour Organisation (ILO) team to investigate claims of forced labour on the Yamul pipeline, until September 1983, when the Soviets then announced that all the pipe had been laid, and so there was no need for the ILO to investigate labour abuses.124

Despite these indictments against the Soviet Union, US businessmen and pro-detente groups seem to conveniently ignore these human rights abuses. Furthermore, goods made by Soviet slave labour and imported by US companies are in violation of the Smoot-Hawley Tariff Act of 1930, which expressly prohibits the importation of "all goods, wares, articles and merchandise mined, produced or manufactured wholly or in part in any foreign country by convict labour and/or forced labour".125 Yet the Smoot-Hawley Tariff Bill has hardly ever been enforced and is largely ignored, except by certain officials in the Reagan Administration.

The issue of slave labour goods came to a head on 28 September 1983, when William Von Raab, the US Customs Commissioner, recommended to the US Treasury Department that 36 classes of merchandise from the Soviet Union be barred from entering the US, because according to a CIA report at the time, they were being made from forced labour.

However, the US Treasury Department refused to implement a ban on slave-made imports from the Soviet Union. A letter from Donald Regan (then Treasury Secretary) to William Von Raab stated: "...I find that the available evidence provides no reasonable basis in fact to establish a nexus between Soviet forced labour practices, and specific imports from the Soviet Union".126

Regan made this assertion, based on a somewhat remarkable letter written to him from CIA Director, William Casey, which stated: "Despite continued monitoring, we are unable to make a solid case that any particular good we receive from the USSR is produced by convict, forced or indentured labour".127 Casey amazingly contradicted a report brought out by his own department just two years earlier, which identified some three dozen products made by slave labour in the Soviet Union. (See Appendix V, Reprint of both letters in full, p. 269).

Two important issues emerge from the use of forced labour in Soviet industry: (a) why should the US import and compete with Soviet forced labour products produced at virtually zero cost; and (b) why are US companies allowed to continue importing these products? This has very little to do with free trade between free people. Instead, the US Government is keeping in bondage thousands of forced labourers to fulfill the Soviet Union's export demands.

US Government Censorship of US/Soviet Technology Transfers

Since 1917, successive US Governments have remained conspicuously silent or ignored the connection between Soviet economic development and Western technology. An example of this thinking is reflected in the US State Department's Battle Act Report, submitted to Congress in 1963, which stated that "trade with the West has made an obviously limited contribution to Soviet economic development".128

Ironically, according to Antony Sutton this statement was made when the Soviets were midway through the purchase of complex industrial sectors from the West, including

concentrated fertilizers, synthetic rubbers and fibres, engines, computers, electric locomotives and cars.129

This policy continued into the 1970's when the US Establishment ignored findings made by private researchers on the impact that Western technology transfers were having on the industrial base of the Soviet Union. Only a handful of US Congressmen managed to insert some of these findings into the Congressional record in an attempt to alert Americans about the problem of technology transfers to the Soviet Union.

In the 1980's, the Reagan Administration, spearheaded by the US Department of Defence and the CIA, admitted to the significance of US flows of technology to the Soviet Union and the implications this holds for US national security. However, it seems that US corporations are exempt from various efforts by the Reagan Administration to halt technology flows to the Soviet Union, because no-one but the US Commerce Department knows precise US trade figures with the Soviet Union. Data concerning firms trading with the Soviet Union and the technologies involved, is classified information which the Commerce Department will not release.

When an attempt was made in 1980 by the National Journalism Centre to obtain this information, the Commerce Department refused. The Centre then invoked the Freedom of Information Act to obtain this information, which was upheld by the courts. However, Congress came to the rescue when it passed a compromise Bill, which permitted access to only general trade data.130

So US firms hide behind a wall of obscurity, despite the enthusiasm of the Commerce Department to promote trade with the Soviets, and the brave assertions made by several US

administrations that there is no stigma attached to American businessmen trading with the Soviet Union.

Nevertheless, a list of US corporations trading with the Soviet Union may still be released if the recent efforts made by the *Young Conservative* Foundation, based in Washington, is successful. In early 1986, the Foundation found a loophole in the Export Administration Act, which states that the Commerce Department is under obligation to submit an annual report to Congress concerning US corporations trading with the Soviet Union. It remains to be seen what the reaction of the Commerce Department will be to this latest *development*.

The most comprehensive list to date of US firms trading with the Soviet Union was compiled and published by Prof Antony Sutton in 1982. (See Appendix VI, US Companies Trading with the Soviet Union, p. 272.)

To conclude, a *general observation about the performance* of centrally-planned economies is that they can only prosper if there are market-orientated economies willing to provide them with the necessary technical services and productive capital units.

Soviet technological innovations are at best derived from "scaling up" Western technologies. *Through research and* development and investment, its size and performance parameters are expanded. Soviet rocket development is a notable example of this. Major sectors of the Soviet economy have relied substantially on Western technology for their development.

Prof Antony Sutton concluded in 1972 *after several years of* research that "there is no such thing as Soviet technology. Almost all, perhaps 90 to 95% came directly or indirectly

from the US and its Allies. In effect, the US and North Atlantic Treaty Organization (NATO) countries have built the Soviet Union."131 The situation has not altered fundamentally since 1972.

It would seem paradoxical that while the Soviets believe in the inevitable triumph of Socialism over Capitalism, that in fact, Capitalism provided the means for its own destruction simply because it has fuelled the economic development of the Soviet Union for the better part of this century. Without Capitalism, the parasitic nature of centrally-planned economic systems would choke on technical inertia and lapse into a permanent state of economic stagnation.

CHAPTER 3 : NOTES

1. VAN DER ELST, P. Capitalist Technology for Soviet Survival, The Institute of Economic Affairs, 1981, p.22.
2. GERSHMAN, C. ..elling them the Rope, Commentary, April 1979, p.37.
3. SUTTON, A. Trilaterals over Washington, Vol II, The August Corporation, 1981, p.38.
4. SUTTON, A. Wes Technology and Soviet Economic Development; 1917-1930, Vol I, Hoover Institution Publications, 1968, p.27.
5. LEVINSON, C. Vodka-Cola, Anchor Press Ltd., 1980, p.253.
6. SUTTON, A. op.cit., 1968, p.140.
7. SUTTON, A. op.cit., 1981, p.253.
8. GERSHMAN, C. op.cit., p.37.
9. SUTTON, A. National Suicide, Arlington House, 1973, p.70.
10. SUTTON, A. op.cit., 1968, p. 248 and GERSHMAN, C., op.cit, p.37.
11. SUTTON, A. op.cit., 1973, p.105.
12. Ibid., p.70.
13. VAN DER ELST, P. op.cit., p.37.
14. Ibid, p.70.
15. SUTTON, A. Western Technology and Soviet Economic Development; 1945-1965, Vol III, Hoover Institution Press, 1973, p.39.
16. Ibid, p.26.
17. SUTTON, A. op.cit., 1973, p.194.
18. PAULEY, E. Report on Japanese Assets in Manchuria to the President of the US, Washington D.C., July 1946, in Gershman, C. op.cit., p.38.
19. Ibid, p.38.
20. PIPES, R. Survival is not Enough, Simon and Schuster, 1984, p.261.
21. VAN DER ELST, P. op.cit., p.42.

22. SUTTON, A. op.cit, 1973, p.128.
23. MILLER, M.E. *The Role of Western Technology* in Soviet Strategy, Orbis, Fall 1978, p.558.
24. SUTTON, A. National Suicide, 1973, p.128.
25. MEYER, H.E. A Plant that could change the face of Soviet Industry, Fortune, November 1974, p.152.
SUTTON, A. Trilaterals over Washington, op.cit., 1981, p.40.
Congressional Record, Speech of the Hon. Glenard P. Lipscomb of California, Selling to the Reds, House of Representatives, October 17 1966, Proceedings and Debates of the 89th Congress.
28. SUTTON, A. op.cit., 1973, p.128.
29. LEE, R.W. Trading with the Communists, Review of the News, July 6 1983, p.58.
30. MEYER, H.E. op.cit., p.151.
31. Ibid, p.155.
32. BUCKLEY, W.F. *Innocents* Abroad, National Review, February 4 1977, p.168; and HOWE, R.W. Weapons : The Shattering Truth about the International Game of Power, Money and Arms, Abacus Books, London, 1981, p.606.
33. HOWE, R.W. Ibid, p.606.
34. MEYER, H.E. op.cit., p.151.
35. PIPES, R. op.cit., p.262.
36. Executive Intelligence Review, January 17 1986, p.19.
37. SUTTON, A. op.cit., 1973, pp.136-147.
38. DESAI, P. Technical Change, Factor Elasticity of Substitution and Returns to Scale in Branches of Soviet Industry in the Post-War Period, (Mimeo), 1974; in Miller, M.E. The Role of Western Technology in Soviet Strategy, Orbis, Fall 1978, p.557.

39. Soviet Chemical Equipment Purchases from the West : Impact on Production and Foreign Trade; A Research Paper, October 1978, Central Intelligence Agency, p.4.
40. Ibid, p.1.
41. Ibid, p.4.
42. Ibid, p.10.
43. Ibid, p.11.
44. Ibid, p.16.
45. LEVINSON, C. op.cit., pp.96-97.
46. LEPKOWSKI, W. Russia's Chemical Feast, National Review, July 24 1981, p.837.
47. FINDER, J. Red Carpet, Holt, Rinehart and Winston, 1983, p.277.
48. Ibid, p.278.
49. Ibid, p.279.
50. CIA Research Paper, op.cit., 1978, p.16.
51. JOHNSON, W.A. Aid and Comfort, Daily News Digest vol. II, no. 30, May 8 1985, p.1.
52. MILLER, M.E. op.cit., p.557.
53. FINDER, J. op.cit., p.280.
54. HOWE, R.W. op.cit., p.603.
55. RANDOLPH, R.S. Trading with the Enemy, A Happy Way to Die? National Review, September 9, 1980, p.1132.
56. VARTABEDIAN, R. Drill Bit Deal seen helping Soviet Arms, Los Angeles Times, May 4 1982.
57. Soviet Union : Vital goods still flow despite Carter's curbs, Business Week, April 28 1980, p.42.
58. BALL, R. Europe warms to Soviet gas, Fortune, June 1 1981, p.76.
59. Ibid, p.79.
60. GROVITZ, G. Europe's Siberian Gas Pipeline : Economic Lessons and Strategic Implications, Institute for Defence and Strategic Studies, Occasional Paper no.6, 1983, p.12.
61. Ibid, p.12.
62. Ibid, p.38.

63. Trade Policy : The US needs to listen to its Allies but should beware of helping the Soviet Union, Business Week, November 21 1983, p.9.
64. CROVITZ, G. op.cit., p.27.
65. Voting Rights in Major Corporations, Staff Study Prepared by the Sub-Committee on Reports, Accounting and Management, Senate Governmental Affairs Committee, January 1978, p.22.
66. BRYAN, P., SULLIVAN S. and PASTORE, S. Capitalists and Commissars, Policy Review, Fall 1982, p.31.
67. KEMPE, F. US Business delegation visits Moscow to urge post-summit revival of trade, Wall Street Journal, December 9 1985, p.28.
68. PIPES, R. op.cit., p.263.
69. See (a) SUTTON, A. Western Technology and Soviet Economic Development (1945-65), Vol III, pp. 318-323;
(b) JUDY, R.E. The Case of computer Technology, in WASOWSKI, S. (editor); East-West Trade and the Technology Gap, New York : Praeger, 1970 and
(c) COSTICK, M.M. The Strategic Dimension of The US Computer Exports to the USSR, Backgrounder no.12, June 8 1977, Heritage Foundation.
70. COSTICK, M.M. ibid, p.10.
71. SUTTON, A. op.cit. Vol III, 1973, p.319.
72. COSTICK, M.M. op.cit., pp. 13 and 15.
73. Business Week, December 27 1969, p.59, in SUTTON, A., Western Technology and Soviet Economic Development, Vol III, op. cit., p. 322.
74. COSTICK, M.M. op.cit., p.11.
75. Soviet Acquisition of Western Technology, April 1982, CIA Report, Exhibit no.1, p.9., in Hearings before the Permanent Sub-Committee on Investigations of the Committee on Governmental Affairs, United States Senate, Ninety-Seventh Congress, Second Session, 4, 5, 6, 11 and 12 May 1982, p.17.

76. COSTICK, M.M. *op.cit.*, p.10.
77. Ibid, p.10.
78. CIA Report, April 1982, op.cit., p.10.
79. Ibid, p.15.
80. Increased "Awareness" of Technology sought, Aviation Week and Space Technology, November 24 1975, p.18.
81. COSTICK, M.M. op.cit., p. 17 and SUTTON, A. The Best Enemy Money can Buy, Liberty House Press, 1986, p.62.
82. HOWE, R.W. op.cit., p.605.
83. Ibid, p.606.
84. Ibid, p.602.
85. SUTTON, A. op.cit., Vol III, 1973, pp.231-241.
86. Ibid, p.243.
87. Ibid, p.246.
88. Pravda, November 1969, in Sutton, A. in ibid, p.244.
89. Business Week, June 14 1969, in Sutton, A. op.cit., Vol III, 1973, p.244.
90. WOLYNSKI, A. Western Economic Aid to the USSR, Conflict Studies Position Paper no.72, June 1976, p.7.
91. Journal Staff from Wire Reports, Fusion : US, Soviets will Cooperate to Harness Limitless Power Source, The Journal, November 29 1985.
92. HANDY, G. Stop Building Communist Missiles!, The John Birch Society Bulletin, no. 282, September 1982, p.7.
93. Boston Herald American, July 26 1975, in Handy, G. ibid, p.7.
94. SUTTON, A. The Best Enemy Money can Buy, Liberty House Press, 1986, pp 96-97.
95. COSTICK, M.M. Soviet Military Posture and Strategic Trade, in Thompson, W.S. (editor), 1980, National Security in the 1980's : From Weakness to Strength, Institute for Contemporary Studies, p.197.

96. Russia's Secret Weapon : US Technology, US News and World Report, March 17 1980, p.52.
97. HARDT, J. The Role of Western Technology in Soviet Economic Plans, a paper presented at the 1976 NATO Colloquim, p3.
98. MILLER, M.E. op.cit., p.555.
99. BERTSCH, G.K. West-East Technology Transfer, Problems of Communism, (Book Review), September/October 1980, pp.77-78.
100. Ibid, p.78.
101. HANSON, P. Western Technology in the Soviet Economy, Problems of Communism, November/December 1978, p.28.
102. COSTICK, M.M. Strategic Trade, Economic Sanctions and the Security of the Free World, Current analysis, Vol II, July 31 1980, p.6.
103. Defence Watch, Published by the US Defence Committee, Vol 7, no.2, March/April 1984, p.3.
104. WOLYNSKI, A. op.cit., p.6.
105. West to East Technology, Intelligence Digest, 1 November 1983, p.6.
106. MARCHUK, G. US-USSR Trade Promotes Peace, Daily World, December 4 1984, p.7-D.
107. Soviet Acquisition of Western Technology, CIA Report, op.cit., p.1.
108. COSTICK, M.M. op.cit., Vol II, 1980, p. 8.
109. Ibid, p.7.
110. HANSON, P. op.cit., p.30.
111. BUCHAN, D. Technology Transfer to the Soviet-Bloc, The Washington Quarterly, Fall, 1984, p.133.
112. HANSON, P. op.cit., p.23.
113. RANDOLPH, R.S. op.cit., p.1132.
114. MILLER, M.E. op.cit., p.552.

115. SUSHKOV, V.M. Trade and economic cooperation with Capitalist countries in the construction of large industrial projects in the USSR, Foreign Trade, no. 2, 1976, p.8; and OGAREV, V. YU. New Forms of economic cooperation in Soviet/American relations, SSHA, Economika Politika, Ideologiya, no.2, February 1976, pp.122-123, in Miller, M.E. op. cit., p.553.
116. BARRON, J. KGB Today : The Hidden Hand, Reader's Digest Press, 1983, p.225.
117. COSTICK, M.M. op.cit., 1980, P.16.
118. Report to the US Congress on Forced Labour in the USSR, US State Department, February 1983, in Crovitz, G. op.cit., p.39.
119. ALLEN, G. The Red Traders, American Opinion, April 1984, p.4.
120. CROVITZ, G. op.cit., p.39.
121. Ibid, p.40.
122. ALLEN, G. op.cit., p.4.
123. Ibid, p.100.
124. CROVITZ, G. op.cit., p.43.
125. ALLEN, G. op.cit., p.4.
126. The Stock Owner's News, Issue no. 7, April 1985.
127. Ibid.
128. Battle Act Report, US Department of State, Washington D.C.. 1963, p.8.
129. SUTTON, A. op.cit., Vol III, 1973, p.XXVIII.
130. LEE, R.W. op.cit., p.58.
131. Testimony of SUTTON, A. before the Sub-Committee VII of the Platform Committee of the Republican Party at Miami Beach Florida, August 15 1972; in Sutton, A. National Suicide, pp. 253-254.

CHAPTER 4 : US TECHNOLOGY = SOVIET MILITARY POWER

In his State Papers published in 1921, V.I. Lenin stated: "The Capitalists will supply us with the materials and the technology we lack. They will restore our defence industry, which we need for our future victorious attacks upon our suppliers. In other words, the Capitalists will work hard to prepare their own suicide."1 Lenin, who had an almost uncanny ability of understanding Capitalists probably better than they understood themselves, has been proved largely correct in his prediction.

In the 1920's, [illegible] as a major supplier of military aid to the Bolshev[illegible]ment. In the 1940's it was the turn of the US, under the auspices of its lend-lease programme. While no direct military aid has flowed to the Soviet Union since 1946, its military development programmes have continued to benefit from the transfer of what is termed "non-strategic" technology from Western countries.

Since the mid-sixties, the most important contribution that Western, and more specifically US, technology has made to the development of the Soviet Union's armed forces, has been to provide the Soviet military establishment with the necessary industrial support base to facilitate the existence of a modern military machine. Foreign economic assistance has enabled the very latest western technologies to be incorporated into the Soviet military/industrial complex. This, in turn, has enabled the Soviets to outstrip the US in military production consistently since 1970, and to spend between 12 and 25% of its GNP on Defence.2 Not only are the Soviets outstripping the West's military production in quantitative terms, they are also rapidly narrowing the qualitative gap in weapons technology development, which is due directly to the acquisition of western technology.

The rest of this chapter analyses the military and strategic dimension of US technology transfers to the Soviet Union, and the implications it holds for US national security.

The Soviet War Economy

What is often not appreciated by the proponents of trade with the Soviet Union, is that the Soviet economy is a war economy which operates on an intermediate level of mobilisation. Since the days of Lenin, the Soviet Politburo has always given priority to the development of their war industries, at the expense of consumerism. Due to the centralised nature of the political system, the Soviet Government is able to transfer large economic resources into the military establishment without recourse to public opinion, a "luxury" not enjoyed by western democracies.

This situation was outlined by Roy Medvedev, a Soviet historian and Marxist intellectual, who once told an American living in Moscow that "We are going to overtake the US, and that is inevitable. ... Our country is a military machine. .. Our system allowed for the spending of colossal resources for one purpose alone - military might. We may be primitive, but we will take over. ... We put everything into rocketry, ... the Government does not care whether or not anything is left over for the population."3

According to Prof Richard Pipes, the Central Planning Agency, GOSPLAN, makes no major investments unless the generals on the staff are satisfied that they meet the needs of wartime mobilisation. Furthermore, each major industrial establishment has a military office that supervises those departments working for the armed forces.4

The point to be emphasised is that Western technology flowing into the Soviet Union will first be channelled into the military sector before going to the civilian sector. Another major problem is that it is virtually impossible to identify a single industry in the Soviet Union which only manufactures civilian products. According to Dr Miles M. Costick, every scientific institute, every research and development facility, every educational institution, every factory, has its First Section staffed by military and KGB representatives.

Furthermore, all identified Soviet scientific and research institutions devote between 70-80% of their time and resources doing work requested by the party's military/industrial complex, and are supervised by the First Section of the KGB.5

The importance of the Soviet Union's research and development complex in overall Soviet military development cannot be under-emphasised. According to Jack Vorona, Director for Scientific and Technical Intelligence in the US DIA, the Soviets have the world's largest research and development force of some 800 000 scientists, working overtime to make the Soviet Union pre-eminent in military power, and determined on absorbing technology and technical information from the West.6

Every facet then of Soviet industry is geared towards the Soviet Union's war machine. All Western technology flowing into the Soviet Union will be assessed primarily for its military potential and only then for its economic usages.

Brief Historical Overview

The use of Western technology by the Soviet military establishment goes back to the 1930's, when T26 and T34

tanks sent by Stalin to the Communist forces in the 1936 Spanish Civil War ran on the US-developed Christie suspension system.7 These same tanks were later used against US forces in Korea in 1952.

The US-built tractor plants in Stalingrad (now known as Volgagrad), Kharkov and Chelybinsk, were used from the start to produce Soviet tanks, armoured cars and self-propelled guns during the 1930's.8 (See Appendix VII, Soviet Tank and Armoured Car Models Produced in US-built Tractor Plants, p. 277.)

During World War II, the Soviet Union under lend-lease received virtually every conceivable type of weapon available at the time from the US, ranging from tanks, aircraft, ships, heavy artillery to machine guns, rifles and pistols.9 US corporations like Douglas Macdonnel and Boeing Aircraft provided the technical basis of the Soviet Union's air power during World War II.10

Although the US and the West stopped the sale of military weaponry to the Soviets in 1946, Soviet dependency on Western technology was visible and clear-cut after World War II. The Soviets illegally acquired US nuclear secrets which led them to develop a nuclear weapons capability in 1949. The Soviet Tupelov-4 bomber was a direct copy of the US Boeing B-29 "Super Fortress, while Rolls Royce jet engine technology powered the first Soviet MIG 15 jet fighters which flew over Korea in 1951."11 The Soviets relied on captured German scientists and German factory installations to construct their post-war rocket industry. Soviet GAZ trucks, operated by Communist forces against US troops in Korea and Vietnam, came from the Ford-built Gorki truck plants, and were identical to US-built Ford trucks.12 Soviet ships supplying arms to North Vietnam ran on Western-built diesel engines, while the PT-76 amphibious

tank used in Vietnam originated from the US-built Volgagrad "tractor" plant.

If Soviet military progress and production based on Western technology was appreciable during the 1940's to the 1960's, it was dramatic during the 1970's and early 1980's, as trade between the US and the Soviet Union rapidly expanded. The chief reason for this was the emergence during the late sixties and early seventies of "dual use" technologies, i.e. products which have both a civilian and military application.

Dual Use Technology

While strategic technologies have been defined since the early days of the Nixon Administration as those which contribute directly to the military capability of the Soviet Union, "dual use" technology poses a major problem in identifying which civilian technology would make a significant contribution to the military potential of the Soviet Union.

The problem of "dual use" technology was outlined by Mr Lawrence Brady, who was a high-ranking Commerce official in both the Carter and Reagan administrations, when he testified to the US Senate that it is nearly impossible today for the US to ensure that advanced technology shipped to the Soviet Union will not be diverted for military use, i.e. computers have both civil and military applications; integrated circuits found in pocket calculators are also critical to missile guidance and aircraft fire control systems; machines to manufacture precision ball bearings are also crucial for the inertial navigation systems of nuclear systems; air traffic control systems can be used for air fighter defence, and so on.13 (See Appendix VIII,

Selected Soviet Acquisitions of US Dual Use Technology, p. 278.)

According to the CIA, the problem is further compounded by the priority accorded to the military over the civilian sector in the Soviet economy, which invariably always finds "dual use" technologies heading first into military industries, and only then into the civilian sectors. As a result, Soviet assurances that legally purchased "dual use" technology will be used solely for civilian applications, can seldom be accepted at face value.14 In fact, the Soviets have on numerous occasions broken assurances on the end use application of civilian technology.

Another problem, according to former CIA director, Richard Helms, is that "virtually any high technology advance can be turned by the Soviets into a military use tomorrow."15 The Soviets are very skilled at this, and have made it their priority to obtain futuristic high technology coming off the production lines in the West, before their military application is discovered by Western countries. As a result, Western "civilian" technology, which has played a substantial role in developing key sectors of the Soviet economy, has also been used to boost the Soviet Union's military capability considerably.

Military Application of US Motor Vehicle Technology

The Soviet motor vehicle industry is the best example of how "dual use" technology of Western origin has been effectively used in the military sector. It has become a recognised fact by most economic experts that every car and truck factory in peacetime has the potential of being turned into a tank and armoured car factory in time of war.

Every truck has a military as well as a civilian mode of application and since the early 1930's, the Soviets have successfully diverted many vehicles built in Western-equipped auto plants to their military establishment.

Giving evidence to the House Armed Services Committee in 1979, Hans Heymann, CIA National intelligence officer for *Political and Economic Affairs, said that in 1978 some of* the 50 000 diesel trucks produced at the Kama River truck plant had gone to the Soviet military.16

In 1979, Jack Vorona testified that Kama engines were being diverted for the construction of tanks and armoured vehicles.17 In 1980, it was estimated by US intelligence sources that a quarter of the entire Kama output was being diverted to the Soviet military. These intelligence reports also indicated at the time that Kama trucks were used in the Soviet invasion against Afhanistan in 1979, and that 10 000 of these trucks, loaded with ammunition, are pre-positioned against NATO in Central Europe to facilitate any future Warsaw Pact invasion against Western Europe.18 In 1980 Graham Clayton, the former Deputy Secretary of Defence, wrote to the US Commerce Department and charged that military trucks, armoured personnel carriers and missiles were being assembled at the Kama River and the US-built Zil truck factories.19

A comprehensive report on the military uses of the Kama truck plant was outlined in the US publication, Industrial Research and Development, which claims that some of the Kama trucks have been outfitted for use as missile launchers, and have been exported to Libya, Syria and Iraq, while some of the Kama engines are believed to have been used in Soviet T-72 main battle tanks. The report went on to state that the mammoth facility is also utilised by the Soviets to build launching platforms for their missiles,

engines for their tanks, and military transport trucks and armoured personnel carriers 20

Pentagon officials have admitted that they had intelligence as far back as 1977 that military vehicles were being built at Kama River,21 and according to a Department of Defence report released in February 1983, Kama River trucks were first reported in use by Soviet forces in East Germany in the summer of 1977.22

An interesting development which occurred during the construction of the Kama Plant was that in the late seventies, the Kama Purchasing Commission in New York, set up to coordinate the purchase of US equipment, was also involved in espionage activities, which included obtaining the sub-system of the miniaturized military computer, produced by United Technologies and known as the PDB-11 series, which is a standard computer deployed in the US armed forces.23

So the US, which supplied the Kama plant with the automated foundry for making the engines, the production line, the IBM computer that controls the plant and nearly $400 million in credit loans, has effectively built for the Soviet Union a military plant which produces a variety of different weapons systems.

The Ford-built Zil plant assembles even more complex weapon systems than does the Kama River plant. According to Dr Miles Costick, the Zil factory is a complete integrated plant which has been supplied during the past 15 years with the most advanced US quality controls instruments and computers. It manufactures most of the Soviet Union's production of missile launchers,24 including the Frog-4, Frog-7 and 122mm, BM-21 heavy rocket launchers.25 Furthermore, a quarter of the 200 000 trucks Zil produces

goes to the Soviet military establishment. According to Lawrence Brady, while the US was shipping updated automated equipment to the ZIL truck factory, ZIL-131 trucks were being used against US troops in Vietnam.

A recent intelligence report states that the generation of diesel engines currently powering East-Bloc tanks is based on West German technology. This came about when the Rumanians legally acquired the licence for an agricultural diesel engine, similar to the engine in the West German Leopard II main battle tank.26

Most Western-built Soviet tractor plants are capable of building armoured vehicles in time of war. This was certainly the case in the 1930's and 1940's. Analysts believe that the go-ahead given to International Harvester (US) to build a $300 million tractor plant in the Soviet Union in the early 1980's could produce armoured personnel carriers.

It can be stated with considerable accuracy that every single truck in the Soviet army was built by US technology, and that the US and other Western countries have significantly contributed to the development of the Soviet missile launchers and the latest generation of Soviet tanks and armoured cars - most of this having occurred under the aegis of detente with the Soviet Union during the 1970's.

Military Application of US Oil and Gas Technology

The military end use of US oil and gas technology in the Soviet Union has been significant, and has a more diversified military application than US motor vehicle technology.

One of the most controversial sales of oil production technology to the Soviet Union during the 1970's, was the [illegible] in 1978 of the $144 million Dresser Drill bit factory [illegible]60). Senior US military officials have stated that ac[illegible] to intelligence information, the Soviets have used the additional production capacity of the Dresser factory to increase their output of anti-tank weapons. *This came about because the Soviet Union gained* the technological capability of manufacturing Tungsten Carbide, an extremely hard, dense and heavy metal alloy with a broad range of military and industrial applications, including deadly weapons that penetrate armour plating.

What particularly concerns the US Department of Defence, is evidence that the Soviets can now build greater numbers of high quality weapons, potentially lethal to the US army's new $2,7 million Abrams main battle tank. As a result, the army is contemplating a multi-billion redesign of the tank to counter this new vulnerability - due originally to the Dresser sale.27

Another critical piece of technology that has a dual use capability for military purposes, are small Array Transform Processors (ATP's) used in seismic oil exploration equipment. ATP's are electronic devices which enhance computer speeds so that computers can interpret millions of tiny variations in the sounds of geographic formations from below the earth. Oil formations have their own unique "finger print" of sand which ATP's can help identify. However, attached to shipboard computers, ATP's perform a central function of anti-submarine warfare - they assist computers in digital signal processing and signal analysis, which enables the computer to identify tiny differences in the sounds under the ocean's surface, from shoals of fish to enemy nuclear submarines.

Geo Space Corporation of Houston, Texas and its French subsidiary in the late 1970's sold 36 ATP systems to the Soviet Union and Red China. Dr Willian Perry, the former Under Secretary of Defence for Research and Engineering, commented at the time that the Soviets "will be able to deteot and monitor all US subs using oil exploration equipment sold to them by the US."28

Purchased by the Soviet All Union Research Institute of Geophysics in Moscow, a Soviet intelligence specialist, a geologist by profession, revealed to Dr Miles Costick after his defection that he and some Soviet navy personnel, trained by Geo Space Corporation, had installed Geo Space ATP's on board Soviet submarines and Soviet anti-submarine warfare surface ships.29

The Soviet Union, which traditionally has always lagged behind the US in anti-submarine warfare capability, have through the purchase of the Geo Space ATP's, been able to leapfrog a ten-year research and development gap vis-a-vis the US and pose a major threat to US submarines. The major problem for US defence planners is that the Soviets now have the ability to monitor their newest submarine, Trident, which is the most effective component of the US strategic triad system to counter the Soviet Union's first strike capability.

Lawrence Brady recommended while he was still in the Commerce Department that 17 oil and gas exploration products be moved from the lax US State Department licensing process and be placed on the Department of Defence's national export control list.

These products include seismic surveying and acoustic equipment (mentioned above); deep well-drilling bits and mud-logging equipment, with magnetic resonances that have

both commercial and military intelligence uses; high pressure, corrosion-resistant pipes and valves that are needed for "sour gas" production; and anti-corrosion metals that can be used in naval weaponry.30

Lawrence Brady has also pointed to the economic and strategic benefits accrued by the Soviet Union from increased oil and gas production, which in turn threatens Western national security. "We must stop helping the Soviets develop their military support infrastructure, particularly oil and gas, the sale of which provides them with 60% of their foreign currency to finance military escalation, espionage ... and surrogate revolutionary forces in Cuba and Nicaragua, while at the same time increasing NATO energy dependence on the Soviet Union."31

US oil and gas technology has not only made a significant contribution to Soviet military potential in certain key areas, but also indirectly helps to furnish the Soviets with much-needed hard currency to obtain further high-technology imports from the West, and to sustain its surrogate forces in key trouble spots around the world.

Military Application of US Chemical Technology

Chemical technology forms the basis of a nation's military explosives and chemical/biological warfare capability. Chemical companies in the US, notably Du Pont and Occidental Petroleum, have over many years contributed indirectly to Soviet explosives technology. For example in 1932, Du Pont built a giant nitric acid plant in the Soviet Union, with a production capacity of 1000 tons a day - an essential raw material for the manufacture of explosives.32

both commercial and military intelligence uses; high pressure, corrosion-resistant pipes and valves that are needed for "sour gas" production; and anti-corrosion metals that can be used in naval weaponry.30

Lawrence Brady has also pointed to the economic and strategic benefits accrued by the Soviet Union from increased oil and gas production, which in turn threatens Western national security. "We must stop helping the Soviets develop their military support infrastructure, particularly oil and gas, the sale of which provides them with 60% of their foreign currency to finance military escalation, espionage ... and surrogate revolutionary forces in Cuba and Nicaragua, while at the same time increasing NATO energy dependence on the Soviet Union."31

US oil and gas technology has not only made a significant contribution to Soviet military potential in certain key areas, but also indirectly helps to furnish the Soviets with much-needed hard currency to obtain further high-technology imports from the West, and to sustain its surrogate forces in key trouble spots around the world.

Military Application of US Chemical Technology

Chemical technology forms the basis of a nation's military explosives and chemical/biological warfare capabilities. Chemical companies in the US, notably Du Pont and Occidental Petroleum, have over many years contributed indirectly to Soviet explosives technology. For example in 1932, Du Pont built a giant nitric acid plant in the Soviet Union, with a production capacity of 1000 tons a day - an essential raw material for the manufacture of explosives.32

During the mid-sixties 63% of Soviet sulphuric production (required in large quantities for explosives manufacture), was produced according to a standardised version of a Western process; while ammonium nitrate, an essential ingredient in the 10 chemical plants built by Occidental Petroleum in the early sixties to produce fertiliser, also has an alternate use in explosives.33

On June 3 1966, the US Commerce Department issued a licence authorising the sale of technical data, to design and construct a glycerol plant capable of producing 24 000 tons of glycerol per annum, to the Soviet Union - a major use being the manufacture of explosives.34

Despite the "dual use" nature of chemical technology, it was nevertheless struck off the list of "strategic" commodities by President Lyndon Johnson in 1966, to become a "non-strategic" item that could be readily sold to Soviet-Bloc countries, and has remained so to this day. Yet it can be safely stated that the ammunition used against US forces in Korea and Vietnam, and more recently the "yellow rain" dropped over Kampuchea and Afghanistan, originated from Western-built chemical plants.

Early in 1985, a Soviet delegation led by Aleksy K. Antonov, a Deputy Chairman of the Senior Council of Ministers, assured West German corporations, which have always been a key source of high technology for the Soviets, that they were in the running for projects worth 20 billion D.M. ($6-7 billion) under the new Soviet five year plan (1986-90).

Among the contracts offered to West Germa[illegible]7 was the construction of two chemical fibre pla[illegible]e Soviet Union. The fibre being sought by the Sovi[illegible]ms a basis for the composite materials used in the structure of new Western high performance weapons systems, including fighter

aircraft, light-weight armour for tanks, and fast missile boats.35

There is also concern among Senate investigations on Capitol Hill that US and European-supplied chemical equipment and expertise have aided Soviet development of chemical and biological warfare. According to one Senate source, two US scientists who had gone to the Soviet Union in 1977 under a chemical/environmental exchange programme "were very suspicious " of what the Soviets were developing in their laboratories.36 On their return, they briefed a Senator on their findings, but it is not known what the contents of these briefings were.

The Soviet Union now has the largest chemical warfare capability in the world, much of this ironically provided through the exports of US chemical technology, designated non-strategic by past and present US administrations.

Military Application of US Computer Technology

No other piece of technical hardware is as vital to both civilian and military sectors as the computer. The importance of Western computer technology in Soviet economic development has already been documented in ch.3. The contribution of Western computer technology to the development of Soviet military forces, has been equally impressive.

Computers form an integral part of all modern military weapon systems. Without computers, modern weapon systems could not be built, integrated, tested, deployed, kept combat-ready or operated. Major strategic weapon systems reliant on high-speed computers include early warning systems, anti-ballistic missile defence, command control

communications (c-3), anti-submarine warfare and space operations.37 Other systems include inter-continental ballistic missile (ICBM) technology, avionics, missile accuracy and particle beam warfare technology.

According to Sean Randolph, much of the US computer systems sent to the Soviets have become part of their ICBM, early warning, radar, anti-aircraft and satellite-based surveillance systems.38 The key US companies responsible for this transfer have been CDC, IBM and Sperry Rand.

Defence analysts agree that IBM 360 and 370 computers are the mainstay of the WARSAW Pact's defence system. IBM officials who visited East European countries were surprised to find four to five times as many IBM machines in Eastern Europe than they thought were there. Dr Miles Costick believes that many IBM computers were illegally diverted there by the KGB.39 US-made IBM 370/S computers stand guard in the only operative anti-ballistic missile defence system in the world, around Moscow.40

In October 1976 CDC was authorised by the Ford Administration to sell two Cyber-172 computers (which have a capacity of 1,4 million OPS), costing between $4 and $5 million a piece, to Peking and a more advanced one to Moscow. Computer experts warned at the time that in their military mode, the 172's could be used for nuclear weapon calculations, for anti-ballistic missile (ABM) systems, or for radar to track hostile missiles.41 In 1977 the Soviet Union obtained the Cyber 7300 computer from CDC, which according to Dr Miles Costick, was "a unique, scientific computer ideal for military applications and about 15 years ahead of current Soviet computer capabilities."42

Nevertheless, despite warnings from the Pentagon and the US Energy Research and Development Agency over the sale of the

172's and the Cyber 7300 computers, Henry Kissinger overruled their objections and gave the go-ahead for the computer sales to the Soviet Union.43

The most controversial computer sale in the 1970's was the proposal to sell CDC's most advanced computer at the time, the Cyber 76, to the Soviet Union. Described as a "scientific marvel", this super computer has a processing capability of 40-100 million OPS and estimated to be at least forty times faster than the best Soviet computer at the time, and 12 to 15 years ahead of the best indigenous computer system in the Soviet Union.44

Congressional pressure eventually halted the sale of this computer in 1977. The Pentagon informed Congress at the time that there were no adequate safeguards to ensure that the Cyber 76, or any other advanced computer system, would not be used in a military mode. Used primarily by US agencies such as the National Security Agency, the Energy Research and Development Agency, NASA and the Pentagon, the sale of the Cyber 76 to the Soviets would have improved their surface to air missile effectiveness, vastly improved their nuclear strategic force capabilities, as well as enable the Soviets to penetrate US military and intelligence computer networks.

Despite the curb on the sale of the Cyber 76, some equally impressive computer systems have found their way to the Soviet Union. This has included the most advanced naval computer system in the West, which first went to sea in the 9600 ton American cruiser, Ticonderoga (of the new Aegis class of US surface warships) in 1983, but had been installed two years earlier in the giant Soviet nuclear powered 28 000 ton battle cruiser, Kirov, which was completed in 1980.

The American Aegis computer system (the world's most advanced) took twenty years to develop, and is capable of computing data from the ship's radar on to a host of enemy targets simultaneously, and of controlling both the ship's air defence missiles and friendly aircraft.

This was revealed by the US Secretary of the Navy, Mr John Lehman, who stated that "the Kirov's phased array, computerised air defence system is based on technology stolen from the US and our Aegis program."45

A $13 million Sperry Rand Univac 1100/10.c. computer, personally approved by President Carter in 1978 and intended for use in Soviet synthetic rubber research, was transferred to a military facility, building the Soviet Union's strategic Backfire Bomber.

The Univac system whose software package is capable of performing stress analysis calculations suitable for aircraft wing design, has been used to upgrade the performance of the Backfire Bomber46, and in all probability was used to help in the development of the new Soviet Blackjack strategic bomber, which is being built at the same factory.

IBM computers run the Kama and ZIL truck factories which manufacture military vehicles for the Soviet army.

Stolen US micro-computer technology made the production of the SS-18 ICBM possible47, while the SS-20's transportation vehicle and launcher was developed using IBM software technology.

It is a known fact that the Soviet's research and development establishment and the military sector have priority over the civilian sector for the acquisition of

Western computer technology, even in the field of personal computer technology. There is no indication that the Soviet Union's dramatic rise in the demand for personal computers will be available for private use by Soviet citizens. Even though they are being introduced at the secondary school level in the Soviet Union, the computer courses will not be conducted by the Ministry of Education, but by the DOSAAF (the Voluntary Society for Cooperation with the Army, Aviation and Fleet), which is a section of the Soviet Defence Ministry.48

The growing emphasis on the significance of the personal computer in the Soviet Union can be gleened from the growing importance that Soviet military literature attaches to the significance and computerisation of the military command and control systems for the effective conduct of deep offensive military operations.

Personal computers are being applied for a military and not a civilian role. The Soviet AGAT personal computer - the first launched by the Soviets - is almost an exact duplicate of the US-made Apple II computer.

In 1983, only the timely intervention of Swedish customs officials foiled what could have been the Soviet Union's greatest computer espionage haul ever. This was the attempted illegal acquisition of the VAX 11/782 multi-network computer system, a higly sophisticated computer, weighing some 60 tons and having a processing database of 101,5 million OPS.49

At a special news conference former US Treasury Secretary, Donald T. Regan, stated that the VAX computer which was intercepted in Sweden was "one of this nation's most sensitive computer systems and was primarily designed for sophisticated military applications." US Secretary of

Defence, Caspar Weinberger, stated at the same news conference that had the Soviets obtained the VAX computer system, it could have accelerated their military development and help them produce "vastly more accurate and destructive weapons."50

According to US Defence officials, the VAX 11/782 could be used for such tasks as missile guidance, control of data acquisition for signals intelligence (SIGINT) and electronic intelligence (ELINT), structural analysis, logic design of military systems, interpretation of transmissions from US satellites and the global coordination of military movements.51

American scientists and engineers believe that the Soviets had hoped to assemble an entire factory for the production of very high speed integrated circuits, (VHSIC's) thereby overcoming a ten-year US lead in this vital field of research. The strategic implications of this potential coup was enormous. VHSIC's enables one "super chip" to do the work of over one hundred ordinary chips, allowing for electronic miniaturisation in a host of weapon systems, ranging from walkie-talkies to jet fighter aircraft.52 Such "super chips" are the key to the West's continued technological lead over the Soviet Union. The country that can build and deploy radar, missiles and other weapons with them, will have a major advantage on the electronic battle field of the future.53

To conclude, computer technology remains the core of any effective military machine. Whoever has superior computer technology will have superior military capabilities - an advantage the US only narrowly enjoys over the Soviet Union.

US Government Knowledge of Military End Uses

A disturbing factor about the transfer of dual use technology to the Soviet Union is that since the early 1970's, successive US administrations have been aware of the military application of ostensibly civilian technology that has been sold to the Soviet Union.

Henry Kissinger was primarily responsible for brushing aside information that US exports to the Soviet Union had military potential and forcing US Government officials to approve the export of equipment with military potential. This equipment included high-powered computers, ball bearing and automobile technology.

At the time of the sale of US equipment to the Kama River truck plant in the early 1970's, Defence officials including the then Secretary of Defence, Melvin Laird, voiced concern that the Soviets might use the Central Asian truck plant, the largest in the world, to produce military equipment.54 European countries also voiced concern at the military potential of the plant.

Henry Kissinger sent a secret cable to US officials in Paris in an attempt to allay European fears, which stated : "Kama trucks are not tactical military vehicles with cross-country capabilities. Some may ultimately be outfitted with front-wheel drive for muddy or icy environments. However, the trucks will not be equipped for deep fording or have other features typical of military models." The cable concluded that "We see little likelihood of diversion to military uses."55 Two years later, Kama trucks appeared with Soviet troops in East Germany.

It has also been revealed that at least 19 of the 150 Kama related licences which the Commerce Department had

scrutinised did, in fact, contain "end use" clauses (i.e. had a military application) which in turn meant that the Nixon Administration approved support for the project with full knowledge that the Kama plant had a military potential.56

More recently in 1980, the US Commerce Department actively encouraged Ingersoll Rand Corp. to go ahead with a deal to build an $8,5 million automated diesel engine assembly line system for the Kama plant,57 after it had been discovered that Kama trucks had been used in the invasion of Afghanistan in 1979.

Sometimes the US Government has openly acknowledged that they are aiding Soviet military production. A memo circulated in the Carter Administration, dated 3 February 1977 and discussing the sale of a $6,1 million computer the US-built ZIL truck factory, asserted : "Problem is a quarter of the 200 000 trucks produced annually goes the military, including 100 missile launchers. State and Commerce support approval, on ground that US Government, aware of (the plant's) military production, has licensed exports to it several times during the 1970's, that the number of missile launchers is small, and that the remaining trucks for the military are basically no different from heavy-duty civilian trucks."58

In a nutshell, the US State and Commerce Departments brushed aside the production of missile launchers as insignificant and de-emphasised the military significance of civilian trucks, which in the first place the Soviets are unable to manufacture themselves.

The most blatant export of dual use technology during the mid 1970's, which had a direct military application, was the $20 million sale of 164 Bryant Chucking grinder

machines to the Soviet Union in 1972. Previously the sale of these sophisticated machines had been halted by the US Administration, when the Soviet Union entered an order with the Bryant Chucking Company back in 1960 for 45 of these machines. At first, the sale of these machines was approved by the US Commerce and State Departments. Even the CIA approved the sale on the grounds that this technology was available elsewhere. Only the US Department of Defence objected to the sale on the grounds that the machines had virtually zero commercial or civilian application, and that no comparable technology existed either in the Soviet Union or Western Europe.59

The sale was brought to the attention of the Senate Sub-Committee on Internal Security, chaired by Senator Dodd, which undertook an investigation into the transfer of the machines to the Soviet Union in 1961. Thirteen ball bearing experts testified to the Sub-Committee that 75 of the machines installed in the US at the time, provided the American military establishment with their entire production of sophisticated ball bearing components, and that no comparable machine existed elsewhere at the time.60

The shipment of the machines was stopped at the last moment by President Kennedy, when Senators Dodd and Eastland saw the President personally with a copy of the findings of the Sub-Committee.

The reason why the Soviet Union was so desperate to acquire the ball bearing grinders was because the machines, capable of making precision ball bearings to a tolerance of 1:25 millionth of an inch, are used to reduce the friction of moving parts in the guidance mechanism of a multiple, independently retargetable vehicle (MIRV) warhead, thereby enabling the missile to change direction rapidly in flight, and thus achieve sharper on-target accuracy.

Without this technology, the Soviets were unable to MIRV their inter-continental ballistic missile (ICBM) warheads, or increase the accuracy of their missiles, which effectively ensured US strategic superiority over the Soviets during the 1960's.

In 1972 the Soviet Union, which had still been unable to manufacture the equivalent of the bearing grinder machines, clinched a deal with the Bryant Chucking grinder company for 164 machines. In 1973, President Nixon and Henry Kissinger approved the sale, despite the obvious military application of the equipment. The consequences of the sale in military terms have been almost catastrophic for the US. In 1972, the Strategic Arms Limitation Talks (SALT) I Agreement did not limit the throw weight of ICBM's or the number of warheads allowed per missile, because US intelligence at the time had estimated that it would take the Soviet Union until the mid-1980's to match US MIRV technology and missile accuracy. As a result, SALT I was signed by the US in the confident belief that Soviet missile forces would remain inferior to US strategic forces for at least another decade. (It was this assumption which allowed the Soviets a massive advantage in land-based ICBM's and in throw weight (i.e. payload) capability.) However, by 1974, just two years after SALT was signed, the Soviets had tested their first MIRV'ed ICBM due to the acquisition of the Chucking grinders, and were deploying them in 1977.61 In December 1978, the Soviet Union successfully tested its huge SS-18 ICBM with twelve nuclear independently targetable re-entry warheads, each capable of yielding an explosive force of one megaton.* On April 26 1979, an SS-18 ICBM was fired from the Baikonur Complex at

---

* 1 million tons of TNT

Tyuratam on a flight to the Kamchatka Peninsula, which demonstrated Soviet capability of deploying 20 objects independently.62 In 1979, the Washington Star reported that these machines had improved the accuracy of the Soviet ICBM's to 600 ft63, which matched the accuracy of the Minuteman III ICBM, the backbone of America's land-based nuclear missile forces. By 1980, the Soviets had built an entire new generation of MIRV'ed ICBM and medium-range ballistic missiles (MRBM), including the SS-17, 18, 19 and 20.

Testifying before the Senate Armed Forces Committee in 1980, the then US Secretary of Defence Harold Brown, stated that by 1982/83, the US Minuteman III ICBM force would become vulnerable to a Soviet First Strike capability.64 Today, military analysts believe that a Soviet nuclear first strike would effectively destroy 90% of America's ageing ICBM land force. The multi-billion dollar MX-ICBM and Strategic Defence Initiative (SDI) programme is in direct response to the increased accuracy of Soviet ICBM's based on US technology. The sale of the Chucking grinders in the early 1970's is currently costing the US billions of dollars in the development of new weapon systems to counter the consequences of US technology transfers.

Scientific and Technical Agreements

One of the most important channels of technology transfers to the Soviet Union has been through a network of scientific exchange programmes set up between the US and the Soviet Union, which has helped facilitate the transfer of critical technical data, often crucial in Soviet military development programmes.

Indications are that the US may have unwittingly trained hundreds of Soviet military engineers and technicians through scientific, educational, technical and commercial exchange programmes.65

Visiting Soviet and East European technical and student delegations to the US generally consist of expert scientists, many of whom are connected with classified work in their home countries. Soviet scientists and students studying in the US differ markedly from their US counterparts studying in the Soviet Union. In one way or another, they are connected with one or other Soviet Government department, which will debrief them on the outcome of their research work in the US once they return home.

Soviet-Bloc scientists who come to the US to study aero hydrodynamic, cryogenic, optic, laser, computer, magnetic bubble computer memory, nuclear, micro-electronic and structural and electronic material technologies, will work on military-related programmes in these areas after their return home.66 Many of these scientists will have direct contact with the Soviet military, and work, or have contact with, GRU (Soviet military intelligence) or the KGB.

Many Soviet scientists arrive in the US to study areas which are currently on the US military critical technologies list. This is partly due to US Government programmes, such as the US graduate student/young faculty programme of the International Research and Exchange Board (IREX), whose proposals according to the CIA have been completely unacceptable in terms of prospective technology loss.67 Between January 1980 and June 1981, the State Department granted visas to 450 Soviet scientists and technicians to attend conferences or to study such topics as lasers, optics, high energy physics and computer software in the US.

The technological know-how acquired by the Soviet Union through these scientific exchange agreements have been extensive and varied. For example, a team of forty Soviet specialists visited and studied production processes at Boeing, Lockheed and McDonnel-Douglas plants and gained the necessary knowledge for the production of wide-bodied jet aircraft - critical for large transport aeroplanes and the deployment of air-launched cruise missiles.

Swindell-Dress Company, a division of Pullman Inc., trained about 400 Soviet engineers in Pittsburgh in the early seventies, who are currently the key personnel at the Kama River truck plant.

Gould Laboratories Materials Technology, a division of Gould Inc., trained 36 Soviet experts in Cleveland for a period of a year in areas of metallurgy, polymetric chemistry, electro-chemistry, mechanical engineering and fluid flow physics.68

Sometimes student exchange programmes between the two super powers has bordered on the absurd. In 1976, for example, a Soviet scientist named S.A. Gubin, managed to take part in an American development project for fuel-air explosives, a large-blast weapons system. His professor was a consultant to the US Navy on secret explosive devices. After concluding his study in the US, Gubin returned to the Soviet Union to continue his research - this time for the Soviet military.69

In the late 1960's, Soviet military research scientists were allowed to study at the Massachussets Institute for Technology (MIT), where they were permitted to tour plants where the latest technology was being utilised in sensitive national defence projects. While these Soviet scientists worked at MIT, they established contact with US firms in

the Boston City area who were known for their work in inertial guidance technology - critical for missile on-target accuracy. According to Major-General George Keegan Jr., Former Head of US Air Force Intelligence: "The Soviet Union has acquired through bi-lateral scientific exchanges all of our inertial guidance technology."70

A team of Soviet scientists that were shown around a factory of Boeing Aircraft Corp. wore special rubber-soled shoes designed by the KGB to pick up metal aircraft splinters off the floor for analysis back in the Soviet Union.71

In August 1967, the US Commerce and State Departments allowed Anatolly K. Kochev, a top researcher in missile technology, and Scientific Member of the Leningrad Polytechnical Institute, Imeni M.I. Kalina, to study construction methods of equipment to measure small accelerations and displacements (i.e. the manufacture of accelerometers) at the Catholic University in Washington.

According to Dr Miles Costick, the accelerometer is an intricate device which measures the pull of gravity on any vehicle such as missiles or a space-orbiting vehicle. It is perhaps the most important part of any guidance system which leads a nuclear warhead to its target. Ironically, the Leningrad Polytechnical Institute was the principal Soviet research and development institution conducting research in accelerometer technology and was already producing the first Soviet accelerometers under laboratory conditions for Soviet missiles, while Kochev was one of the principal researchers in that project.72 In the late 1970's, a Cuban General, affiliated with the Cuban Intelligence Services (DGI), was brought to study data relating to electronic mine field applications at MIT.

As mentioned briefly in chapter 3, Soviet scientists are making a concerted effort to study the very latest space age technologies being develo[illegible] at US research institutes, which may not have reached th[illegible] military applications phase yet. These include magnetic bu[illegible]le memory technology for the new fifth generation of super computers, genetic engineering, fracture mechanics and super plasticity.73

Already under an agreement between the US and the Hungarian Academies of Science, Hungarian scientists are studying magnetic bubble research at leading US univesities.74 Most intelligence analysts concur that this research will eventually filter back to the Soviet Union.

For nearly two decades, the Soviets have had almost unlimited access to the most advanced research facilities in the US, enabling them to keep a finger on emerging technologies, which may have a quantum impact on Soviet military development. Scientific and technical agreements between the US and the Soviet Union have clearly been a one-way street for the Soviets, to the detriment of US and Western national security interests.

Soviet Acquisition of US Military Technology

Leaving aside "dual use technology", the impact that US military technology has had on the development of Soviet military power has been substantial. This is due to the Soviets having gone to considerable lengths to illegally acquire whole military systems, technical blueprints of weapon systems, and sub-components of military systems from the US which can be directly integrated into the Soviet military machine.

According to the very latest US intelligence reports, about 50% of more than 30 000 pieces of Western hardware and about 20% of over 400 000 technical documents collected worldwide (in response to the Soviet Union's tenth five year plan 1976-80) were used to improve the technical performance of very large numbers of Soviet military equipment and weapon systems.

Most importantly, about 60% of that portion of document and hardware acquisitions considered to be the most significant to the Soviets (approximately 5-10% of the total) was of US origin.75

Over 6000 pieces of Western equipment went to the Soviet electronics industry and a further 1500 pieces to communications - both considered the two most important defence industries in the Soviet Union.76

US Defence officials recently stated that more than 150 major Soviet weapons systems contain US technology (most of it stolen), and that illegally-acquired Western technology accounts for more than 70% of new military developments in the WARSAW Pact.77 (See Appendix IX, Major Soviet Weapon Systems that have Benefitted or Will Benefit from Western Technology, p. 281.)

Below is a selection of critical US and European technologies that have been acquired and the impact they have had on the development of major Soviet weapon systems.

* A US Government Accounting Office report stated that a French firm producing integrated circuits for missile guidance and fire (targeting) control under American license, sent Poland a whole turnkey plant manufacturing the same circuits used in the US Minuteman ICBM. The technology would ultimately find its way to the Soviet Union.

* A new Soviet sea-launched cruise missile (SLCM) has been dubbed the "Tomahawski" in Western military circles, because of its resemblance to the US Tomahawk SLCM missile. A Business Week article in April 1983 revealed that the Soviets had pirated from the US the manufacturing technology used in the Soviet SSN-19 cruise missile's turbo-fan engine and a compact computer-controlled radar guidance system filled with semi-conductor chips so advanced that their origin could only have come from the US.78

It was known in the late 1970's that the Soviet Union had been actively trying to obtain the small, high-efficiency, 26 inch sleek turbo-fan engine currently used in the US Air Force's Boeing air-launched cruise missile (ALCM) and the US Navy's general dynamics Tomahawk cruise missiles, but had failed to acquire the manufacturing know-how for the engine through Poland and Rumania.79

* The Soviets obtained the RB-211 engine, used to power wide-bodied jets, and well-suited for long-range bombers. The jet engine was developed on a $300 million US Government research and development grant to the US Lockheed Aircraft Corporation.

* The Austrian firm, Gesellschaft fur Fertigung Technik und Maschinen Bau (GFM Corp.) of Steyr, is the world's principal builder of precision rotary-forging equipment, an exceptionally efficient machine for producing high-quality artillery tubes. The Soviets have been one of the firm's principal customers for almost two decades, purchasing probably hundreds of millions of dollars worth of this equipment.

These machines can radically increase production rates of gun tubes, while simultaneously producing higher quality

barrels for greater rates of fire and higher muzzle velocity. As a result of these purchases, the Soviet Union probably has the greatest gun-barrel manufacturing capability in the world.80 GFM equipment has been used to produce gun-barrels for the Soviet Union's T72 main battle tank and several of its naval warships. The smooth-bore barrels, which Soviet industry had been unable to manufacture on its own, are capable of piercing the latest armour shields developed by NATO. Ironically, the same GFM equipment is being used to manufacture the gun-barrel of the new US Abrams main battle tank.81

* A secret Commerce Department document stated that US-made laser systems have found their way to the Soviet Union.82 The most important illegal acquisition of US technology for laser beam research was made when the Soviets purchased more than 50 water-cooled precision optical mirrors from Spawr Optical Research, Inc. in California. Sending the mirrors through a freight company in Zurich, Switzerland, the US firm completed false export declarations concerning the contents of the crates destined for the Soviet Union.

These laser mirrors have first and foremost a military application. Placed in space on orbiting space platforms, they can be used in conjunction with ground-based high-energy weapons to propagate laser beams onto US intelligence satellites, and in the future destroy US ICBM missiles in their launch path in times of war.

Ironically, the Commerce Department's bureau on East-West trade in fact encouraged Spawr Optical Research Inc.to look at the Soviet market for "fantastic" marketing opportunities.83 Later, defending the Commerce Department's role in the sale of the laser mirrors, Don Furtado, Deputy Under-Secretary of Commerce for Trade

Administration, stated that the illegal diversion was "probably less significant than one might think."84

Nevertheless, the Spawr optical mirrors sold to Moscow were identical to those purchased by the US Air Force Weapons' Laboratory for laser weapons testing,85 and according to Colonel Bob Francis, Commander of the US Air Force Space Technology Centre, the mirrors saved the Soviets 100 man-years in research and development.86

* The Soviet Union has the world's largest oceanographic fleet, consisting of foreign-built ships equipped with some of the most modern Western-manufactured equipment, which will help support the development of Soviet anti-submarine warfare systems against the West.

* The Soviet navigational system called Glonass, has been nicknamed "Navstarski" in the West for its resemblance to the US Navy Navstar programme. Used for global communication between Soviet ships and submarines and Soviet command headquarters, documents submitted in Geneva reveal that the Soviet satellites not only possess orbital parameters vitually identical to those of the US Navstar space satellites, but also transmit on the same frequencies (140 and 400 megahertz).87

* Using documentation on the US F-18 Hornet jet fighter, the Soviets estimate that their aviation and radar industries saved some 5 years in research and development, and $55 million (in 1980 monetary terms) to develop the new "look down, shoot down" engagement radars for their latest generation of jet fighters,88 including the MIG 25 Foxbat, MIG 27 and MIG 29 Fulcrum aircraft.

Furthermore, using F14 and F15 documentation, the Soviets are designing from scratch a new radar-guided air to air

missile.89 The F-14 Tomcat jet fighter has the most sophisticated on-board avionics air to air missile system in the world. Known as Phoenix, it is capable of engaging 14 enemy targets simultaneously. The new Soviet air to air missile will obviously incorporate the most advanced features of the US Phoenix missile system.

* Titanium technology, used to build the US Atlas missile, and "plasticity" technology, which is used on the cone of US missiles, was obtained by the Soviets either through peaceful trade or third parties, i.e. sold to France and then in turn re-exported to the Soviet Union.

* Finnish equipment was installed on the Ivan Rogov, a new type of amphibious warship that carries both helicopters and high-speed air-cushioned landing craft, and is capable of disembarking 550 naval infantrymen to any corner of the globe.90

* Through the acquisition of advanced welding machine tooling equipment used for cutting titanium in the US Apollo space programme, and Western titanium alloys and furnaces for producing titanium plate, the Soviets were able to construct the titanium-plated hulls of their latest generation of nuclear submarines.91 This has enabled the new Soviet Alpha attack submarine and the 27 000 ton giant Typhoon nuclear submarine to withstand far greater deep sea pressures than the most advanced US submarines.

* When the Shah's Government collapsed in 1979, it is believed that the Soviet KGB had access to $10 billion worth of the most sophisticated weaponry in the US armoury. This included one of the most advanced naval ports in the world at Bandas Abbar, and the F-14 Tomcat jet fighter and its Phoenix missile system. "I think the Soviets got everything small and removeable", declared Edward Luttwak,

missile.89 The F-14 Tomcat jet fighter has the most sophisticated on-board avionics air to air missile system in the world. Known as Phoenix, it is capable of engaging 14 enemy targets simultaneously. The new Soviet air to air missile will obviously incorporate the most advanced features of the US Phoenix missile system.

* Titanium technology, used to build the US Atlas missile, and "plasticity" technology, which is used on the cone of US missiles, was obtained by the Soviets either through peaceful trade or third parties, i.e. sold to France and then in turn re-exported to the Soviet Union.

* Finnish equipment was installed on the Ivan Rogov, a new type of amphibious warship that carries both helicopters and high-speed air-cushioned landing craft, and is capable of disembarking 550 naval infantrymen to any corner of the globe.90

* Through the acquisition of advanced welding machine tooling equipment used for cutting titanium in the US Apollo space programme, and Western titanium alloys and furnaces for producing titanium plate, the Soviets were able to construct the titanium-plated hulls of their latest generation of nuclear submarines.91 This has enabled the new Soviet Alpha attack submarine and the 27 000 ton giant Typhoon nuclear submarine to withstand far greater deep sea pressures than the most advanced US submarines.

* When the Shah's Government collapsed in 1979, it is believed that the Soviet KGB had access to $10 billion worth of the most sophisticated weaponry in the US armoury. This included one of the most advanced naval ports in the world at Bandas Abbar, and the F-14 Tomcat jet fighter and its Phoenix missile system. "I think the Soviets got everything small and removeable", declared Edward Luttwak,

a senior Fellow at the Centre for Strategic and International Studies at Georgetown University.92

Commenting on the loss of F-14 technology to the Soviet Union, Vice-Admiral Wesley L. McDonald, Deputy Chief of the US naval operations for air warfare, stated that "the F-14 is the only aircraft in our inventory capable of successfully engaging the Soviet backfire bomber.93 The collapse of Iran represented the largest single haul of Western weaponry by the Soviet Union since World War II.

* Soviet naval listening buoys, copied from advanced US technology, have been discovered monitoring the new US Trident submarine along the American coasts. A buoy, washed up on the US beach, startled Pentagon officials when they discovered on opening it up, that the computer and semi-conductor components were identical to those produced by the Rand Corporation of America and Texas Instruments, and lagged only 3 years behind similar US technology. US Secretary of Defence, Caspar Weinberger, in a speech to the National Conference of Editorial Writers, said that the buoy's micro-electronics were made in the Soviet Union, but were an exact replica of those made in the US.94 Previously, Soviet buoys incorporated outdated Western technology of the 1960's.

* The Soviet SS-18 ICBM is guided by a US micro-processor (chip) which was stolen by Soviet agents from an American trade fair exhibit.95

* The SS-20 multi-megaton medium range ballistic missile (MRBM) could very well have a "made in the West" tag attached to it. The mobile launcher for the SS-20 was designed on IBM computers from New York, using software from MIT. The nose cones of the SS-20's are tipped with a carbon-fibre heat shield, developed in the US,96 while the

three nuclear warheads of each SS-20 will be guided to targets by a gyroscope system, constructed with the help of micro-circuitry developed by the US.

* The striking similarities between the US Minuteman ICBM Silo and the Soviet SS-13 silo, very likely resulted from the acquisition of US documents which helped speed up the deployment of the first Soviet solid-propellant ICBM.97

* The sale of two massive dry docks, one by Japan in 1978 and the other by Sweden three years later, were immediately diverted to the Soviet Pacific and Northern naval fleets. They are capable of repairing and servicing the most advanced Soviet ships, including the new Kiev class/V/ Stol aircraft carriers, and the giant new Soviet aircraft carriers displacing 60-80 000 tons that are due for service in 1987.

* Soviet military aircraft designers have openly ordered, and usually received, documents on Western aircraft. These included plans and drawings for the US C-54 Galaxy transport aeroplane, which contributed to the development of a new Soviet strategic military cargo aeroplane - codenamed the Condor. The Soviet IL-76 candid transport aeroplane resembles the C-141 US Hercules, while the IL-86 Soviet transport aeroplane looks much like the Boeing 747.98

* The Sukhoi 15 Flagon-standard Soviet B-52 jet fighter interceptor that was used to shoot down the Korean airliner in 1983, incorporates US technology in its weapon systems. Its missile systems are dependent on US microchip technology. Its Atoll air-to-air missile armaments are closely modelled on the US sidewinder air to air missile, while the latest version of the SU-15 is equipped with Foxfire radar, which is a copy of a US radar system.

* Updated computers in the MIG 29 Fulcrum jet fighter are based on technical drawings obtained illicitly from American contractors.

* Sophisticated laser range finders on Soviet tanks are carbon copies of US devices, while precision transmission gears for heavy lift helicopters are forged on US-made machine tools in the Soviet Union.99

* The Soviet Y ("Yankee")-class nuclear submarine is copied from the US Polaris nuclear submarine, with plans obtained through the massive Soviet espionage programme in Britain.100

* The AN-72 short take-off and landing cargo aeroplane is almost identical to the Boeing-built YC-14, using the same aerodynamic design. The Soviet version flew just 16 months after the first US aeroplane took off.101

* The Soviets have acquired US aircraft carrier catapult equipment for their new generation of aircraft carriers 102

* The French firm, Turbomeca, is to offer its advanced turboshaft engines for use in Soviet Mil-8 helicopters.103

* On June 20 1977, the Argonne National Laboratory of the US Energy Research and Development Agency delivered a forty ton super-conducting magnetic system to the USSR Academy of Sciences, to be used for research in magneto-hydrodynamics.104 Magnetohydrodynamic technology is the key component for the discharge of pulsed particle beams in military laser systems, which is receiving top research priority by the Soviet military establishment.

* Finally, over the past ten years, the Soviets have virtually completed their entire building construction programme for the manufacture of military micro-electronic components. More than 2500 pieces of major Western controlled and uncontrolled micro-electronics fabrication were acquired, covering the entire spectrum of manufacturing operations.105

The legal and illegal purchases of high-technology micro-electronics equipment has enabled the Soviets to build their own military micro-electronics industry in a remarkably short time. This acquired capability is the critical basis for the current enhancement of Soviet military systems and for their continuing sophistication. Micro-electronics are the core components of every modern weapons system and is the key technology for the emerging era of electronic warfare.

The Soviet Union also relies on the importation of tons of electronics-grade silicon from the West, needed for integrated circuits for both military and civilian uses. According to the CIA, Western technology has enabled the Soviets to narrow the micro-electronics technological gap vis-a-vis the West from 10 to 12 years in 1975 to approximately 4 to 6 years today, and the gap is still narrowing. The US Department of Defence has stated that without the transfusion of US technological (micro-electronics) techniques, Soviet capabilities almost certainly would have remained at the 10 to 12 year gap of the 1965 era.106

"Reverse engineering" also plays a key role in enhancing Soviet military weapon systems, where the Soviets obtain blueprints of US military systems and then duplicate them. The famous Strella Sam-7 surface to air missile used by the Communists in Vietnam, was reverse engineered from the

US Red Eye missile, obtained by Moscow through a Scandinavian country.107

Soviet copying and reverse engineering of Western military and dual use equipment are major characteristics of the Soviet acquisition programme, which the CIA believe is of more immediate value to the Soviets (in the military field) than acquisitions of "technology" in quantity.108

Soviet acquisitions of Western technical data for the purposes of duplication have included blueprints of :

(a) the French Mirage 2000 jet fighter
(b) the US F-18 Hornet fighter aircraft
(c) US Honeywell laser gyroscopes used in missiles
(d) NATO's multi-role combat aircraft, Tornado
(e) the West German, Leopard I, main battle tank
(f) US-made Thompson radar and electronic counter measures systems
(g) the Franco-German Milan anti-tank missile
(h) the ultra-sophisticated US early warning airborne warning and control system (AWACS) spy and surveillance aeroplane.

Nevertheless, the CIA warns that the Soviets will find it increasingly difficult to reverse engineer increasingly sophisticated military weapon systems, because of the sophisticated nature of specialised manufacture technology needed to duplicate the military weapons. As a result, Soviet acquisition of Western military hardware is geared increasingly towards obtaining the necessary technical data and machines necessary to manufacture weapon systems, i.e. micro-electronics.

Closing the Technology Gap

The consequences of this sustained transfer of Western military and dual use technology to the Soviet Union has been a rapidly narrowing gap between the performance of Western and Soviet weapon systems. This trend holds wide-ranging ramifications for US national security, which has always opted for qualitative superiority to offset the quantitative superiority the Soviet Union currently enjoys in almost every category of nuclear and non-nuclear weapon systems, vis-a-vis the US.

A US Defence Department report, comparing US and Soviet standing in basic technologies in 1984, rated the US superior in 15 out of 20 areas deemed most important to military application. In five areas, the Soviets were judged to be equal: in directed energy (laser weapons technology), conventional and nuclear warhead technology, aero and fluid dynamic and mobile power sources.109

The US was rated superior in computers and software, genetic engineering, automated control technology, propulsion for aero-space and ground vehicles, robotics and machine intelligence, signal processing, signature reduction (stealth technology), telecommunications including fibre optics, micro-electronics and integrated circuit manufacturing. The US was also rated superior, but with a diminishing lead in electro-optical and infra-red sensors, guidance and navigation technology, materials and ceramic coatings, optics, radar sensors and submarine silencing.110

However, out of 31 major weapon systems studied, the US was rated superior in only fourteen, thirteen were equal and the Soviets rated superior in four, including ballistic

missile defence, anti-satellite systems, surface to air missiles, and chemical and biological warfare.111

These figures which originated from the CIA, may have de-emphasised Soviet military advances. In 1977, Major-General George Keegan, then US Head of Air Force Intelligence, revealed that the Soviet Union was already in an advanced stage of developing particle beam warfare weapon systems on ground and in space, and that the Soviets were a decade ahead of the US in this critical field of weapons research.112

In 1980, Miles Costick and Jack Vorona, the Director of Scientific and Technical Information for the Defence Intelligence Agency, estimated that the Soviets were clearly superior in the following critical areas of military technology: titanium fabrication; anti-ballistic missile battle management; ICBM "cold launch" technology (the ability to re-use missile silos); command control communications; counter measures and intelligence; air defence missiles; anti-ship missiles; armoured battle vehicles; artillery/rocket launchers; chemical and biological warfare; mobile ballistic missile systems; ICBM payloads and yield (megaton equivalence) and magnetohydrodynamic power.113

In 1985, the CIA acknowledged that in materials, explosives and sensor technologies applicable to deployed tactical forces such as tanks, artillery, and anti-tank and surface to air missiles, the Soviet Union is roughly equal to or slightly better than the West.114 Much of the above gains were made due to the transfer of US and Western technology.

According to the 1986 edition of the authoritative James' All the World's Aircraft, the latest generation of Soviet jet fighters are at least equal to their US counterparts. Quoting US intelligence sources, the editor, John Taylor,

stated that Soviet jets are rated as having superior radar, air to air missiles and more powerful engines than those of their US counterparts. These innovations come from secrets stolen by Soviet spies from US defence companies.

The Soviet AN-124 Condor transport aeroplane has 53% more carrying capacity than the US C-5 Galaxy. The new MI-28 attack helicopter, Havoc, matches the US army's Apache, while the West has no answer to the Soviets' new air to air combat helicopter, code-named Hokum. The Sukhoi 27 Flanker is a Mach 2.3 twin engine fighter, which is touted to match the US F-15 Eagle, while the MIG 29 Fulcrum and the experimental MIG 31, Foxhound, rivals any jet in the West.

Soviet naval technological developments have been equally startling. The Soviet alpha nuclear attack submarine can outrun the fastest US naval ships and submarines, while the 27 000 ton giant Typhoon submarine is regarded by most weapons' experts as the deadliest single weapons system in the world. Twin hulls, separated by a water cushion, makes it practically invulnerable to attacks by conventional torpedoes. Powered by a double nuclear reactor, it is powerful enough to crash through the arctic ice. Armed with twenty SSN-20 submarine-launched ballistic missiles (SLBM's), each tipped with twelve atomic warheads with a range of 8300 km, the Typhoon can sit on the ocean floor for months on end.115 The underwater performance of these new submarines has been largely due to the transfer of titanium fabrication technology and related alloys from Western countries to the Soviet Union.

Richard N. Perle, the Assistant Secretary of Defence for International Security Policy, stated on BBC television that "We're literally exporting to the Soviets the equipment with which they are then arming against the US."116

It has been estimated that through technology transfers, the Soviet Union has reduced the technological gap with the

West from 10-15 years in the late 1960's to less than three years in the mid-eighties. Not only have the Soviets successfully managed to close the technological gap with the US, but they have also managed to save millions of dollars in research and development costs through the acquisition of Western technology. Miles Costick has estimated that the Soviet Union saved over $100 billion in research and development during the 1970's.117 In 1980 alone, Western technology saved the Soviets several tens of thousands of man-years in scientific military research. US technology transfers help release large amounts of scientific manpower and financial resources to other critical sectors of the Soviet war economy.

The CIA concludes that the Soviet acquisition of Western technology has :

1. Saved the Soviets hundreds of millions of dollars in research and development costs, as well as years in research and development lead time.

2. Modernised critical sectors of their military industry and reduced engineering risks by following or copying proven Western designs, thereby limiting the risk in their own military production costs.

3. Achieved greater weapons performance than if they had had to rely solely on their own technology.

4. Incorporated counter-measures to Western weapons systems early in the development of their own weapon programmes.118

The most important point the CIA stresses is that while it is difficult to quantify, it is clear that the Western military expenditures needed to overcome or defend against

the Soviet military capabilities derived from the acquisition of Western technology, far outweigh the West's earnings from the legal sales of its equipment and technology to the Soviet Union.

This point is one which is often ignored by most East-West trade analysts. US technology transfers to the Soviet Union have resulted in some weapon systems becoming virtually obsolete before they ever roll off the assembly line. This is true for the Abrams I main battle tank, which has to be radically modified because of the Dresser sale. The Soviet acquisition of "look down, shoot down" radar systems from the US threatens the ageing US B52 strategic bomber fleet and the new subsonic air-launched and sea-launched cruise missile systems.

The $50-100 billion MX-ICBM development programme and President Reagan's multi-billion SDI programme are in direct response to the deployment of a new generation of Soviet ICBM weapon systems, which relied heavily on Western technology for their development.

The Deputy Assistant Secretary of Defence, Stephen Bryen, testified to Congress on April 14 1982, that "In one area alone, communications switching, the cost of matching what the Soviets have done with American technology appears to amount to tens of billions of dollars."[119]

Ironically, the US is spending over $300 billion a year on defence against an adversary which is being sustained on US technology and financial hand-outs.

Future Acquisition Trends

Looking forward at the next five to ten years, it will be important for the Soviet Union to improve their manufacturing capability to produce modern weapon systems. Although the Soviets have managed to close the technological gap in many key military areas, the US still holds a commanding and increasing lead in fields such as automated production and control, telecommunications, electro-optics and genetic engineering. The increasing sophistication of military systems is making the manufacturing technique of "reverse engineering" increasingly more difficult to sustain, so the Soviet Union will want the manufacturing capability to produce sophisticated weapon systems.

As a result, areas of technology that Soviet acquisition programmes will focus on will include micro-electronics, computers and signal processing. The Soviet Union will also be stepping up its efforts to acquire new and emerging technologies, such as very high speed integrated circuits (VHSIC) and very large scale integration (VLSI) technology from Western universities and commercial laboratories, for both military and commercial applications.120

The Soviets will also make a considerable effort to acquire, in particular, advanced Western electro-optical seeker and sensor technology related to tactical or "smart" weapons121, which include cruise missiles, hand-held anti-tank and anti-aircraft missiles and miniaturised ICBM weapon systems. The Soviets lag behind the West in their ability to miniaturise manufactured components of military hardware into small, but highly effective weapon systems that require little maintenance back-up in the operational field.

Other areas of high-technology the Soviets will make considerable efforts to acquire, is acoustic sensor technology to improve their anti-submarine warfare

capabilities, particularly technology that is applicable to the development of large towed acoustic arrays that would assist in the location of Western submarines in open waters.

The Soviet Union also lags significantly behind the West in precision submarine navigation, especially in the development of submarine inertial navigation systems, critical for the development of long-range cruise missiles for land attack.

The Soviets will want to expand their micro-electronic material base to support the continued expansion of integrated circuit production. In this regard, the Soviet Union is seeking Western help to build two to three poly-silicon plants that will double current Soviet capacity of integrated circuit production for military application.122

Finally, the Soviets will attempt to plug into the latest developments surrounding the US SDI programme, so as to refine its own particle beam warfare and ABM programmes. The Soviets will also want to acquire emerging US technology related to electro-magnetic warfare, especially

counter measures to neutralise the effects of exploding nuclear warheads on electric circuits in computers and telecommunication systems.

To conclude, most of the technology used in the Soviet military build-up since 1972 originated from equipment and expertise bought or stolen from the United States. Through the transfer of high technology, the US and the West have enhanced Soviet capability to :

(a) make its borders and air space almost impenetrable;
(b) destroy US strategic land forces in a surprise nuclear first strike attack;

(c) neutralise major Western weapon systems; and
(d) generate new offensive systems of its own.

In his three volume series on technology transfers to the Soviet Union, Antony Sutton estimated that 90% of the advanced technology needed by the Soviets to pursue their military goals had come from the US and its NATO Allies. Since this assessment was made in the late 1960's, the situation has not changed. Every single major Soviet weapons system produced since 1970 incorporates Western technology in its component and production features. Soviet technical gains which were impressive in the 1970's and 1980's, can only be attributed to a corresponding increase in technological transfers that flowed to the Soviet Union after the dawning of detente between that country and the US in the mid-1960's.

In a speech to the US Senate on April 13 1982, Senator William Armstrong effectively summed up the impact that Western technology transfers have had on the Soviet Union's military capability. "In the last ten years alone, the US and other Western nations have sold to the Soviet Union and its satellites more than $50 billion worth of sophisticated technical equipment the Communists could not produce themselves. This equipment has been used to produce nuclear missiles, tanks and armoured cars, military and control systems, spy satellites and air defence radars. In addition, the Soviets have been able to purchase entire factories, designed and built by Western engineers and financed in large by US and West European banks. Much of the production of these factories is devoted to the manufacture of military transport, ammunition and other logistical items for the Soviet war machine."123

It is difficult to overstate the extent to which the West has contributed to the Soviet military threat that now

endangers the Free World. It is a fact which most Western policy makers have simply not considered, or have chosen to ignore in their dealings with the Soviet Union over the past two decades. The question that must be asked, and which will be discussed fully in the final chapter, is that if detente has failed to ameliorate Soviet behaviour and has instead sustained a hostile and expanding global power, why do certain sectors of the US Estalishment continue so vigorously to promote trade with the Soviet Union?

CHAPTER 4 : NOTES

1. HAAS, W.J. The Soviets are Stealing us Blind, Army Reserve Magazine, Fall 1983, p.13.
2. CROZIER, B. Strategy of Survival, Temple Smith Publishers, 1978, p.41.
3. HERR, R. Spengler in Moscow, The New Republic, March 31 1979, p.15.
4. PIPES, R. Western Contributions to Soviet Might, USIS Information Sheet, 1984.
5. COSTICK, M. Soviet Military Posture and Strategic Trade, in Thompson, W.S. (ed.), National Security in the 1980's, Institute for Contemporary Studies, 1980, p.194.
6. VORONA, J. Statement on Acquisition of Soviet Military Systems, before the Sub-Committee on Procurement, Senate Committee on Armed Services, November 8 1979.
7. SUTTON, A. National Suicide, Arlington House, 1973, p.40.
8. Ibid, p.102.
9. See SUTTON, A. Western Technology and Soviet Economic Development, Vol III (1945-65), Hoover Institution Press, 1973, pp.3-10, for comprehensive list of lend-lease materials.
10. Ibid, pp.254-255.
11. VORONA, J. Testifying at Hearings before the Permanent Sub-Committee on Investigations of the Committee on Governmental Affairs, US Senate, Ninety-Seventh congress, Second Session, 4, 5, 6, 11 and 12 May 1982, p.113; and SUTTON, A. Western Technology and Soviet Economic Development, (1945-1965), Vol. III, op.cit., pp.264-267.
12. SUTTON, A. National Suicide, op.cit., pp.125-126.

13. RANDOLPH, S.R. Trading with the Enemy: A Happy way to Die? National Review, September 19 1980, p.1132.

14. CIA Report, Soviet Acquisition of Western Technology, April 1982, Exhibit no. 1, p.3; in Hearings before the Permanent Sub-Committee on Investigations of the Committee on Governmental Affairs, US Senate, Ninety-Seventh Congress, Second Session, 4, 5, 6, 11 and 12 May 1982, p.11.

15. THOMAS, E. Moles who Burrow for Microchips, Time Magazine, June 17 1985, p.16.

16. HOWE, R.W. Weapons: The Shattering Truth about the International Game of Power, Money and Arms, Abacus Books, London, 1981, p.606.

17. VORONA, J. Statement on Acquisition of Soviet Military Systems, op.cit., p.23.

18. PARKER, A. It was nearly Check-mate by Proxy for Soviets, The Citizen (RSA), September 15 1981.

19. Special Report, US Still Selling Technology to Russia, To the Point, August 8 1980, p.27.

20. AGRES, T. The Dark Side of Technology Export, Industrial Research and Development, July 1980, p.58; and National Security Record, Technology Transfer and Export Controls, no.13, The Heritage Foundation, September 1979, p.2.

21. AGRES, T. Ibid, p.58.

22. LEE, R.W. Trading with the Communists, Review of the News, July 6 1983, p.57.

23. COSTICK, M. Testimony Before the National Committee to Restore Internal Security, Houstan Texas, September 29, 1980.

24. Ibid.

25. COSTICK, M. Soviet Military Posture and Strategic Trade, op.cit., p.193.

26. DE BORCHGRAVE, A., MOSS, R. and REES, J. Technology Transfers, Early Warning, Vol III, no. 2, March 1985, p.5.

27. VARTABEDIEN, R. Drill Bit Deal seen Helping Soviet Arms, Los Angeles Times, May 4 1982.
28. JOHNSON, W.A. Daily News Digest, July 4 1980.
29. COSTICK, M. Soviet Military Posture and Strategic Trade, p.20.
30. SAFFIRE, W. Reagan's selling the Soviets enough rope to hang the US, Los Angeles Herald Examiner, October 10 1983.
31. Review of the News, December 7 1983, p.38.
32. SUTTON, A. National Suicide, op.cit., p.141.
33. Ibid, p.143.
34. LIPSCOMB, G.P. Selling to the Reds, Congressional Record, Proceedings and Debates of the 89th Congress, in the House of Representatives, October 17 1966.
35. DE BORCHGRAVE, A. et al., op. cit., p.6.
36. AGRES, T. op. cit., p.53.
37. COSTICK, M. The Strategic Dimension of Computer Sales to the USSR, Backgrounder, The Heritage Foundation, June 8 1977, p.5.
38. RANDOLPH, S. op. cit., p.1133.
39. AGRES, T. op. cit., p.53.
40. TUCK, J. High-Tech Espionage, Sidgwick and Jackson Ltd., 1986, p.142.
41. HOWE, R.W. op. cit., p.604.
42. Ibid, p.605.
43. COSTICK, M. op. cit., 1977, p.2.
44. Ibid, p.1.
45. WETTERN, D. Reds on top in technology race by stealing from US, The Sunday Times(RSA), March 25 1984.
46. PELTU, M. US Research Fuels Soviet Invasion, New Scientist, January 17 1980, p.139.
47. Defence Watch, United States Defence Committee, Vol 3, no.2, March/April 1984, p.3.

48. DE BORCHGRAVE, A. et al., op. cit., p.[illegible].
49. REES, J. An exclusive interview with the Commissioner of US Customs cites efforts to stop technology thefts by the Reds, The Review of the News, January 25 1984, p.41.
50. L'ANGE, G. Reds may have 8 shipments of latest equipment, The Star (RSA), December 12 1983.
51. KESSLER, F. High tech piracy: Smuggling computers to the Soviet Union becomes big business, The Wall Street Journal, February 15 1984; and DE BORCHGRAVE, A. et al., op. cit., p.6.
52. TUCK, J. op. cit., p.84.
53. KELLY, O. High-tech hemorrhage from US to Soviet Union, US News and World Report, May 7 1984, p.48.
54. ANDERSON, J. UP, February 8 1980, in Sutton, A. and Wood, P. Trilaterals over Washington, Vol II, The August Corp., 1981, p.42.
55. Ibid, p.43.
56. LEE, R.W. op. cit., p57.
57. AGRES, T. op. cit., p.56.
58. LEE, R.W. op. cit., p.58.
59. SUTTON, A. op. cit., 1973, p.92.
60. BRADY, L. Testimony to the National Committee to Restore Internal Security, 1980, p.45.
61. STEED, R.H.C. Birmingham News (USA), May 20 1979.
62. Defence/Space Daily, November 13 1979, p.51, in COSTICK, M. Soviet Military Posture and Strategic Trade, op. cit., p.192.
63. HOWE, R.W. op. cit., p.602.
64. AGRES, T. op. cit., p.54.
65. COSTICK, M.M. Strategic Trade, Economic Sanctions and the Security of the Free World, Vol II, no. 7, July 31 1980. p. 2.
66. CIA Report, Soviet Acquisition of Western Technology, op. cit., p.4.

67. Ibid, p.5.
68. COSTICK, M. Soviet Military Posture and Strategic Trade, op.cit., p.200.
69. TUCK, J. op. cit., p.163, and VORONA, J. Statement of Acquisition of Soviet Military Systems, op.cit., p. 5.
70. COSTICK, M. Soviet Military Posture and Strategic Trade, op. cit., p.207.
71. COSTICK, M. Testimony before the National Committee to Restore [illegible]nal Security, Houstan Texas, September 9 1980.
72. COSTICK, M. Soviet Military Posture and Strategic Trade, op.cit., p.208.
73. Ibid, p.200.
74. VORONA, J. Statement on Acquisition of Soviet Military Systems, op.cit. p.26.
75. CIA Report, Soviet Acquisition of Militarily Significant Western Technology: An Update, September 1985, p.6.
76. Ibid, p.7.
77. High-Tech Spying now the Vogue, The Citizen (RSA), May 21 1984.
78. HAAS, W.J. "The Soviets are Stealing us Blind", Army Reserve Magazine, Fall 1983, p.11.
79. COSTICK, M. Soviet Military Posture and Strategic Trade, op.cit., p.204.
80. VORONA, J. op. cit., p.24.
81. TUCK, J. op. cit., p.118.
82. AGRES, T. op. cit., p.54.
83. COSTICK, M. Testimony Before the House Committee to Restore Internal Security, Houstan Texas, September 20 1980.
84. AGRES, T. op. cit., p.58.
85. How Russia Snares High-Technology Secrets, Business Week, April 27, 1981, p.131.

86. BENNET, R.K. Russia's Great Technology Raid, Reader's Digest, May 1984, p.43.
87. TUCK, J. op. cit., p.119.
88. CIA Report, Soviet Acquisition of Militarily Significant Western Technology: An Update, op.cit., p.8.
89. Ibid, p.8.
90. [illegible] op. cit., p.120.
[illegible] Soviet Acquisition of Western Technology, op. cit., p.7; and PARKER, A. op. cit.
WEBBE, S. KGB Weapons Grab in Iran Feared, The Star (RSA), November 11 1980.
93. Ibid.
94. HAAS, W.J. op. cit., p.47.
95. REES, J. High-Tech Espionage, American Opinion, December 1982, p.24.
96. TUCK, J. op. cit., p.109.
97. CIA Report, Soviet Acquisition of Western Technology, op.cit., p.6.
98. Ibid, p.8.
99. DUDNEY, R.S. How Soviets steal US high-tech secrets, US News and World Review, August 12 1985, p.33.
100. SUTTON, A. The Best Enemy Money can Buy, Liberty House Press, 1986, p.127.
101. GUZZARDI, W. Jr., Cutting Russia's harvest of US technology. Fortune, May 30 1983, p.103.
102. CIA Report, Soviet Acquisition of Western Technology, op.cit., p.8.
103. JOHNSON, W.A. Daily News Digest, Vol II, no. 30, May 8 1985, p.1.
104. HANSON, P. Western Technology in the Soviet Economy, Problems of Communism, November/December 1978, p.29.
105. CIA Report, Soviet Acquisition of Militarily Significant Technology: An Update, op.cit., pp.24-25.

106. US Department of Defence, Soviet Military Power, US Government Printer's Office, July 1981, p.75.
107. COSTICK, M. Soviet Acquisition Posture and Strategic Trade, op.cit., p.205.
108. CIA Report, Soviet Acquisition of Militarily Significant Technology: An Update, op.cit. p.11.
109. MANN, P. US Assesses Technology Leadership, Aviation Week and Space Technology, April 23 1984, p.28.
110. Ibid.
111. Ibid.
112. ROBINSON, C.A. Jr., Soviets Push for Beam Weapon, Aviation Week and Space Technology, May 2 1977, pp.18-21.
113. COSTICK, M. Strategic Trade, Economic Sanctions and the Security of the Free World, Current Analysis, Institute on Strategic Trade, July 31 1980, p.2.
114. CIA Report, Soviet Acquisition of Militarily Significant Western Technology: An Update, op.cit., p.1.
115. US Department of Defence, Soviet Military Power, US Government Printer's Office, 1986, p.29 and TUCK, J. op. cit. p.119.
116. Sapa Reuter, Red Computer Smuggling Ring: 2 Held in UK, The Citizen (RSA), December 13, 1983, p.3.
117. High-Tech Spying Now in Vogue, The Citizen (RSA), May 21 1984.
118. CIA Report, Soviet Acquisition of Western Technology, op.cit., p.10.
119. SUTTON, A. The Phoenix Letter, Vol 1, no. 3, May 1982, p.4.
120. CIA Report, Soviet Acquisition of Western Technology, op.cit., p.5.
121. Ibid, p.14.
122. Ibid, p.14.

123. HANDY, G. Stop Building Communist Missiles, The John Birch Society Bulletin, no. 282, September 1982, p.3.

CHAPTER 5 : SOVIET ACQUISITION PROGRAMME OF US TECHNOLOGY

In accordance with Article 6 of the Soviet Constitution of 1977, the Communist Party of the Soviet Union (CPSU) is "the force that directs and orientates Soviet society ... It defines the general nature of the development of that society." As the chief decision making instrument of the Soviet Union, the Central Committee of the CPSU initiates and guides policy implementations through its individual departments and commissions. Henri Regnard, an experienced French counter-intelligence expert, states that it is the Central Committee that defines policy in the spheres of science and technology.1

Due to the importance attached by the Soviets to the "scientific/technological revolution", the Soviet effort today to acquire and assimilate US technology is massive, well-planned and well coordinated. It is a national level programme which is accorded the highest priority by the CPSU and its various sub-departments. This acquisition programme accords top priority to the needs of the military establishment and its related industries.

The Acquisition Structure

The Soviets have developed a highly complex, bureaucratic structure, where various departments are assigned a particular task relating to the acquisition of Western technology, but nevertheless tend to overlap and complement each other in various areas of work. These departments include the Military Industrial Commission (VPK), the Soviet State Committee for Science and Technology (GKNT), the KGB, Soviet Military Intelligence (GRU), the Soviet Ministry of Foreign Trade, the Soviet Academy of Sciences and the State Committee for Foreign Relations. (See

Appendix X, Key Organisations Involved in the Acquisition of Western Technology, p. 285.) The structures of these departments, and the tasks assigned to them, are discussed in greater depth below.

1. The Military Industrial Commission. The VPK ("Voyenno Promychlennaya Kommissiya") is considered to be the "brains" behind the Soviet acquisition programme of Western technology. Headed by Leonid Smirnov, one of the vice-chairmen of the Presidium of the Council of Ministers, and assisted by Nikolai Stroyen and the Director of the Secretariat, the VPK is a small but powerful group - probably more powerful than the KGB - whose membership includes the twelve top executives of the most important Soviet defence manufacturing ministries.

   The VPK has been likened to a giant switchboard, where the lines of supply and demand meet to cater for the needs of the Soviet military/industrial complex. It provides technical direction to the Soviet acquisition programme and determines which areas of Soviet science and technology need Western technology. It has primarily a military function, coordinating developments between its chief customer, the Ministry of Defence, and the key military suppliers, the twelve industrial ministers. As the expediter for weapons development projects, the VPK is the principal Soviet instrument for eliminating or circumventing the inefficiences characteristic of the Soviet economic system.2

   Each year, the officials of the twelve defence manufacturing industries compose lists of very specific requests for Western technologies. These requests are controlled and processed by a highly

trained scientific and technical advisory group attached to each ministry, known as the Central Organisation of Special Technical Services (TSOSTS : "Tsentralnaya Ostraslevaya Spetsialnaya Tekhnitcheskaya"), which in turn is made up of Directors of the Special Technical Services (STS : Spestsialnaya Tekhnitcheskaya Sluzba"), a specialist technical department within the VPK. (See Appendix XI, VPK Structure, p.286.) Intelligence analysts believe that STS falls under the control of the KGB.3 The most important requests for specific technology items are passed on to the VPK, which instructs the other Soviet collecting agencies through their various established networks to obtain the necessary technology.

Analysts of reliable data indicate that in the VPK programme, the Soviet intelligence services and their East European surrogates are the collectors most often tasked to acquire illegal technology and the most successful,4 while the collection of technology not subject to export controls by Western countries is left to the GKNT and the Soviet Ministry of Foreign Trade. However, this is not necessarily a hard and fast rule, as the dividing lines often tend to blur between the different collecting agencies. According to a former Soviet intelligence officer, there is intense competition between the Intelligence services to acquire Western technology needed for weapons development programmes.5

All incoming technologies and data obtained by the five collecting agencies are sent to the twelve Soviet ministries within the VPK for application into their weapons development programmes. The exploitation of this technology is again carefully controlled and

processed by the STS. However, items of special information are first sent to what is known as the "technical centre" within the National Institute for Interagency Information (VIMI - "Vsesdyouzny Institut Mezhotrasceroy Informatsiy), headed by Valentin Erin.

According t- Henri Regnard, this technical centre serves as the system's drive belt. The centre processes special information sent to it, studies their relative merit and interest and only then passes the information along to the ministri within the VPK that are most [illegible] to use it. It also controls the decisions [illegible]he STS to engage in research and test studi[illegible] function of the estimate of the value of the information acquired.6

The "technical centre", in conjunction with the Central Organisations of the STS, (TSOSTS), puts together yearly a "work verification plan" to monitor each of the dozen ministries of the VPK. Monthly evaluations are forwarded by each STS to the technical centre.7

In turn, the VPK itself each year publishes a report based on the evaluation of each ministry. The report assesses the numbers of technical documents and technology items obtained, and the number of priority requirements satisfied. This report is then sent to the Chairman of the Presidium of the Council of Ministers, and to the Central Committee of the CPSU, while copies are sent to the other collection agencies.

The VPK, through various collection channels, primarily seeks one-of-a-kind military and dual use hardware, blueprints, product samples and test

equipment to improve the technical levels and performance of Soviet weapons, military equipment and defence manufacturing equipment.8

In the late 1970's alone, it has been estimated by the CIA that the VPK reserved $1,4 billion each year for purchases of Western hardware and technical documents. Prices paid for technical documents are considerable, for example, documents on the US shuttle orbiter control system and high-energy laser developments can fetch up to $140 000.00 (in 1980 purchasing terms), while selected research documents on US anti-missile defence concepts can fetch over $560 000.00.

Contributions to this special fund provided by the VPK to purchase Western technology come from the GKNT, Directorate T of the KGB, the Institute for Statistical Medical Research and the Scientific and Technical Counselor of the Ministry of Defence of the Soviet Union.9

In terms of broad defence programmes, Soviet strategic missiles, air defence, tactical forces and weapons manufacturing capabilities have benefitted the most from the VPK programme. Each year the number of VPK requirements grow by about 15%, which the CIA maintain is a strong indication that the expanding Soviet military programme continues to rely heavily on Western technical solutions and advances to upgrade its military capability.

2. The State Committee for Science and Technology (GKNT)
The activities of the VPK are closely coordinated with the GKNT (Gossudarsvennoy Komitet Po Naukiye i Teknikiye), which is chaired by Gury Ivanovich

Marchuk, the son-in-law of Aleksei Kosygin,10 and his assistant Djerman Gvishiani. The GKNT is also accorded ministry rank on the Council of Ministers.

This Committee initiates and manages the complicated network of international agreements that the Soviet Union maintains with Western countries. It is the key Soviet agency which arranges government to government, and government to private sector science and technology agreements. For example, it was the GKNT which signed a long-term scientific and industrial cooperation agreement with Control Data Corporation of the US in 1973, to facilitate the transfer of sophisticated computer technology to the Soviet Union.11

These agreements help to establish access to new technologies, including those just emerging from Western universities, laboratories and high-tech firms. It is the GKNT which allocates Soviet hard currency for the legal purchase of Western technology items. Each year the GKNT technical translators sift through more than 1,5 million scientific papers from 125 countries. These documents are assessed for their value with regard to the contribution they can make to the Soviet military sector, and are obtained legally, if possible, through the complicated network of government to government scientific agreements that the GKNT has at its disposal.

When the GKNT is unable to legally purchase the required technology, it uses another path, scientific exchange, where it works with the ostensibly impartial Soviet Academy of Sciences to obtain the needed technology. If they fail, then the GKNT delegates the task to the KGB's Directorate T and the GRU.

A fact that is largely unknown to senior political, scientific, technical and commercial officials in the West is that the GKNT, which has all the trappings of a civilian government institution, also specialises in intelligence gathering.

According to the US Department of Defence, many of the staff members of the GKNT are KGB and GRU officers.12 The Department of Foreign Relations is the external operating arm of the GKNT, which is composed of a number of officials detailed from the KGB and GRU. Among these are Lev Burdiukov (KGB), who is the Director of the Scientific liaison section of the GKNT, and Feder Mortin, Director of the section for Scientific and Industrial Cooperation.13 Operating under the mantle of the GKNT, Soviet intelligence officials are able to move freely in Western countries.

3. Ministry of Foreign Trade (MFT). Headed by Nikolai Patolichev, the Ministry is the main instrument for the planning, coordination and control of overseas commerce. It administers and operates hundreds of foreign trade organisations and commercial front operations around the world.

The MFT seeks to obtain scientific, technical and technological information through overt official channels using a tightly-woven network of commercial enterprises, international companies and purchasing agents, whose personnel are particularly well qualified at finding and obtaining the necessary technical and technological information in support of the Soviet economy.

Two sections within the MFT deal with information collection. These are (a) the section for commercial relations with Western nations, headed by Leonid Yezhov, and (b) the section for the importation of machinery and material from Western countries, headed by Piotr Milcheyev.14

With its global responsibilities, the MFT is a useful cover organisation for hundreds of KGB and GRU officers involved in technology acquisition efforts. It is also a major independent collector in the VPK programme and attempts to pursue most of its assigned VPK requirements on an overt basis. During the late 1970's and early 1980's, the MFT helped fulfil about 15% of all fully-satisfied VPK requirements - 9% of those being identified as "most critical".15 The MFT operates two key subsidiary spin-offs which are accorded a large degree of independence. The first is the State Committee for External Economic Affairs (GKES : Gossudarstvenny Kommitet po Ekonimicheskim Sviazam), which also seeks to obtain information through official means, including purchasing agencies dealing with specific, specialised areas of products over which it has control.

The second subsidiary is the MFT's main Engineering and Technical Administration (GITU), which appears to handle the Soviet illegal trade programme. Although it is a component of the MFT, GITU is staffed and managed largely by intelligence officers, organised into separate KGB and GRU groups. Its subordinate Department for Technical Cooperation with Foreign Countries is similarly staffed and managed. The GITU staff has grown from about 12 in 1970 to about 70 in 1983. According to the CIA, GRU probably fills most

of the lower positions of the GITU, because the GRU seem to be more involved in trade diversions than the KGB.16

Moving on to the Soviet intelligence services, the Soviet Committee for State Security (KGB) and the Chief Intelligence Directorate of the Soviet General Staff (GRU) have the primary responsibility for collecting Western classified, export-controlled and proprietary technology, using both clandestine and overt collection methods. Both the KGB and GRU in turn make extensive use of the intelligence services of their WARSAW Pact Allies to further their own acquisition efforts.

4. KGB Headed by Colonel-General Viktor Mikhailovich Chebrikov, a protege of the late Yuri Andropov, the KGB is a State Committee which falls directly under the Council of Ministers. Directorate T, the second largest of the three directorates that make up the First Chief Directorate (the largest is Directorate A which is responsible for international subversion). is charged with the collection of high technology.

According to the CIA, Directorate T has approximately 1000 Soviet officers, with nearly 300 on foreign assignment operating under a number of guises. Those personnel on foreign assignments are scientific specialists of both academic and professional training. They operate under various covers in Soviet Embassies - as officials in various Soviet Trade Missions or as members of scientific or other academic exchanges. They may also operate as an "acceptable engineer" at a company with a Soviet contract.17 Current CIA Director, William Casey, testified that

the KGB have recruited 100 Soviet scientists and engineers every year for the past 15 years to roam the world and pick up technology.18

The largest KGB operations overseas include New York, San Fransisco, Bonn, Cologne, London and Vienna. Many KGB agents posted abroad are part of "Line X", which is the overseas arm of the KGB technology specialists at Directorate T, whose sole task is to acquire Western technology.19

Most of the documents purchased by the Soviet Union from the US Government's National Technical Information Service, amounting to over 80000 documents a year, went to Directorate T for evaluation before being passed on to the VPK. Although the US Government finally cancelled the subscriptions in the early 1980's, the Soviet Union for many years had access to all non-classified research documents from US-sponsored research.

5. GRU. Headed for some 20 years by General Petr Ivanovich Ivashutin, a former deputy chief of the KGB,20 GRU is the junior partner to the KGB in the Soviet intelligence community which falls directly under the control of the Ministry of Defence. However, despite its junior status, GRU has fulfilled two to ten times as many VPK requirements as their KGB counterparts. This is probably due, some analysts believe, to the overall scientific proficiency of its members and its clearer understanding of collection objectives related to technology acquisitions.

GRU has emphasised the collection of military scientific data since the earliest days of Soviet

military intelligence. According to the CIA, the GRU, unlike the KGB, has no special department dealing specifically with technology transfers. This is rather the overall responsiblity of the four geographic operational directorates of GRU. The GRU also does not have a separate cadre of career scientific specialists (like its KGB counterpart) in the field. Instead, most GRU officers have a technical educational background, as well as years of specialist military training behind them. Approximately 1500 GRU officers serve outside the Soviet Union. For them, scientific collection is an integral part of their overall responsibilities and a high priority.21

However, the CIA assessments of the GRU's acquisition structure of Western technology is contradicted by other sources, which state that it has at its command "operational sections" and particularly a section for procuring scientific and technical intelligence that concentrates on information with military applications.22 According to Jay Tuck, in his book "High-Tech Espionage", the GRU has its Department B which maintains a staff of qualified scientists specialising in technology acquisition at its residences (embassies) abroad, similar to the KGB's Line X.23

While the GRU does not seem to use cover positions in academic and technical exchanges to the same extent as does the KGB, GRU officers hold many positions in Aeroflot (the Soviet's public airline) and Morflot (the Soviet merchant marine fleet), which enables them to enjoy relatively easy access to Western countries.

military intelligence. According to the CIA, the GRU, unlike the KGB, has no special department dealing specifically with technology transfers. This is rather the overall responsiblity of the four geographic operational directorates of GRU. The GRU also does not have a separate cadre of career scientific specialists (like its KGB counterpart) in the field. Instead, most GRU officers have a technical educational background, as well as years of specialist military training behind them. Approximately 1500 GRU officers serve outside the Soviet Union. For them, scientific collection is an integral part of their overall responsibilities and a high priority.21

However, the CIA assessments of the GRU's acquisition structure of Western technology is contradicted by other sources, which state that it has at its command "operational sections" and particularly a section for procuring scientific and technical intelligence that concentrates on information with military applications.22 According to Jay Tuck, in his book "High-Tech Espionage", the GRU has its Department B which maintains a staff of qualified scientists specialising in technology acquisition at its residences (embassies) abroad, similar to the KGB's Line X.23

While the GRU does not seem to use cover positions in academic and technical exchanges to the same extent as does the KGB, GRU officers hold many positions in Aeroflot (the Soviet's public airline) and Morflot (the Soviet merchant marine fleet), which enables them to enjoy relatively easy access to Western countries.

The KGB and the GRU were involved in collecting about 90% of Western technology acquisitions, judged by the Soviets to be most beneficial to their military development projects over the past decade.

6. The Soviet Academy of Sciences. Presided over by Anatoli Alexandrov, the Academy of Sciences is an agency directly subordinate to the Council of Ministers, and is concerned with the study of physical science and the impact it has on industrial production. However, it is very different to similar institutions found in Western countries.

Soviet scientists that travel to the West operate under a strict code of conduct, supervised and administered by the Soviet Government. No Soviet scientist or scholar (under the auspices of the Academy), participates in a conference or any academic exchange with a foreign country without the project first being assessed for its strategic value by the GKNT.24

Andrei Sakharov, the Soviet Union's foremost dissident, effectively sums up the control that the Soviet Government holds over any Soviet citizen visiting the West. "The Soviet Government and the Party (CPSU) retain control over all possible areas of contact with the outside world. ... Passports are issued for a particular journey and are rescinded immediately on return. ... Everyone going abroad is subjected to detailed checks by a whole series of Government and Party agencies, ending with a special "exit commission" attached to the CPSU Central Committee".25

Soviet scientists going abroad also face grave penalties if they disclose any state secrets. Under Stalin, these penalties were particularly harsh. "Publication or transmission abroad of inventions, discoveries and technical improvements which constitute a secret of the state is ... punishable by confinement in a corrective labour camp for a period of 10 to 15 years."26 While the situation is not as harsh today as it was under Stalin, it seems obvious that Soviet scientists in the West are primarily concerned with the acquisition of useful information for the Soviet Union. Western intelligence analysts have estimated that one out of every three Soviet scientists who meet with Western scientists, engineers and academics in scientific exchanges, are either from the KGB's Directorate T, or from the GRU.27

To conclude, the whole Soviet collection system is very efficient and functions like a giant vacuum cleaner which the West is hard-pressed to contain.

The International Soviet Espionage Network

The Soviet Union has a vast international collection effort involving some 55 000 agents working for the KGB worldwide.28 Precise figures do seem to vary considerably. Stephen Bryen, the US Deputy Assistant Secretary of Defence puts the number of people collating high technology for the KGB at some 20 000,29 while Miles Costick estimates the number of Soviet-Bloc collection personnel in the US alone at 55 000,30 a figure which may be a little high.

The CIA and the FBI put the number of Soviet-Bloc personnel working permanently in the US at 3000, of which 2000 represent the Soviet Union. The Federal Bureau of Investigation (FBI) estimates that 30-40% are directly

involved in intelligence work. Miles Costick, who has personally debriefed many Soviet-Bloc defectors, puts the figure to at least 60%.31 The presence of Soviet-Bloc agents in Western Europe is much higher than in the US. In West Germany alone the Federal Prosecutor, Kurt Rebmann, has estimated that there are as many as 10 000 East-Bloc agents operating,32 which include professionals working for the KGB's T section.33. US officials complain that this deplorable situation has arisen due to the close economic, humanitarian and political ties that exist between East and West Germany.

Nevertheless, the US has serious espionage problems of its own. The FBI and other law enforcment agencies have a major difficulty trying to monitor some 17 000 Soviet-Bloc nationals that enter the US every year. Most of these people are connected in some way or another to Soviet Government departments for the purpose of carrying out various intelligence tasks.34

The Soviet Academy of Sciences, the GKNT and GKES help send approximately 2000 Soviet-Bloc citizens to the US in a non-tourist capacity. Many of these visitors are responding to high priority VPK requirements, and some scientific personnel have been co-opted to some degree by the Soviet intelligence services to do work for them.35 These scientific exchanges and commercial agreements which allow Soviet-Bloc nationals to travel in the United States, enable the Soviets to keep abreast of the most modern technology available for acquisition.

Soviet documents captured by French Intelligence inside the Soviet Union show that the US is still far and away the largest source of covertly acquired technology materials for the Soviet Union. 61,5% of technical materials derived from "special channels" (i.e. covert) came originally from the US, 10,5% from West Germany and 8% from France.36 The

US has potentially a far more serious espionage problem than the West European countries.

The presence of KGB personnel alone has more than doubled in the US during the past decade in order to satisfy Moscow's high technology needs.37 The swollen Soviet Consulate, in San Fransisco has a staff of 100 Soviet personnel. A Soviet defector estimated that 75% of the staff are KGB and GRU officers. The reason for this concentration of Soviet intelligence personnel is the location nearby of Silicon Valley, at Santa Clara, where the world's most advanced micro-chip technology is manufactured. The Soviet Consul-General, Aleksandr Chikvaidze, was a former Chairman of the GKNT, and therefore a specialist in technology acquisitions.38

Many KGB agents expelled from Western countries are expelled because they have usually been engaged in technological espionage. Most of the 105 KGB agents expelled from Britain in 1971 were engaged in this activity, as were most of the 47 KGB and GRU officers expelled from France in 1983. It was the infiltration of one of France's greatest intelligence officers, Lieutenant-Colonel Bernard Nut, into the innermost circles of the KGB's Directorate S department, a top secret arm of Soviet intelligence which infiltrates Soviet-born agents into Western societies, that triggered off the mass French expulsions. From his position, Bernard Nut funnelled priceless information concerning the movements of Soviet agents in France back to his Paris colleagues. His message? That 50% of all Soviet intelligence efforts in France were geared towards the acquisition of French technology, also that 30% of all top-of-the-line French technological developments had already been acquired by the Soviets.39

A report by the French DST (Direction de la Surveillance du Territoire) intelligence services on Soviet technology acquisition efforts, which was presented to President Mitterrand in early 1983, along with the murder of Bernard Nut by the KGB on the slopes of the Alpines in France shortly afterwards, prompted the mass expulsion of 47 Soviet agents from France.

Usually after these expulsions, the Soviets move quickly to re-establish their presence in the home countries. One example of this was the appearance six months later of Valentin Livov, Chief of the sector for France in the KGB's First Directorate, who appeared in Paris under cover as a United Nations' Educational, Scientific and Cultural Organization (UNESCO) delegate. His task was to reactivate old contacts which had been lying low since the mass expulsions in April 1983.40

The major reason for the massive increase in Soviet-Bloc agents in the US since 1970 has been due to the emasculation of America's internal security apparatus, which took place during the late 1970's under the Carter Administration, making it easier for Soviet-Bloc agents to roam freely across the US without detection. Only recently have attempts been made to rectify this situation. Few can deny the observation made by Richard Perle, Assistant Secretary of Defence for International Security Policy, who stated that "At no previous time in history has one nation been able to prey so deeply and systematically on the fruits of its adversary's genius and labour."41

Soviet Technology Acquisition Targets

Through its intelligence services, the Soviet [illegible]argets on the West's commercial sectors that are not normally protected from hostile intelligence services. With more

than 11 000 such firms in the US and hundreds of subsidiaries abroad, US counter intelligence efforts are stretched thinly.

The most important areas targeted by the Soviets in the US are the giant defence contractors. The five most important being General Electric, Boeing, Lockheed, Rockwell International and McDonnell Douglas.42 Not surprisingly, the US aerospace industries are a priority Soviet target for high-technology acquisitions. This is reinforced by a top-ranking Soviet GRU defector, who revealed to British intelligence that Moscow's current priority for GRU is to acquire the plates covering the US shuttle vehicle, which can withstand such extreme temperatures, and the technology which welds the plates to the metal of the shuttle.43 US aerospace industries are also involved in the military SDI programme which the Soviets are increasingly focussing on.

According to Lara Baker of the Los Almos National Laboratory and the US Government's leading expert on Soviet micro-electronics, the Soviet Union knows exactly what technologies they are looking for. She told a US Senate Committee in 1983 that "The Soviets buy nothing they do not have a specific, well-defined need for. They know exactly what they want - right down to the model number - and what they want is part of a carefully crafted design."44

There is even a book compiled by Moscow for its agents operating abroad, which documents precisely the type of technology that is required. This book, which was recently obtained by West German security agents, is a top secret directory of Moscow's plans to buy embargoed Western technology, from missiles to tractors.

The Red Book, the size of a telephone directory, is officially entitled Co-ordinated Demands for Technological

Information Tasks, and is kept under lock and key in Soviet Diplomatic and Trade Missions. Top priority is given in the book to acquiring information on missile guidance systems; micro-electronics; large computers; radar and rocket technology; and anti-tank and anti-submarine systems.45 The West Germans have stated that each Soviet agent is expected to fulfil four "contracts" a year from the directory and could expect great personal prestige and rapid promotion if he did so.

The second most important area targeted by the Soviets in the US, are small high-technology firms working on advanced technology. The US micro-chip industry, centred at Silicon Valley in California, is a prime target for Soviet espionage efforts. Silicon-chip technology dramatically boosts radar, missile guidance, military communication, spy satellite capabilities, etc. Chip technology, which is critical in micro-computers and micro-circuitry, is an area of technology where the Soviet Union still lags some 8 to 10 years behind the US, and is therefore among the highest acquisition priorities in the Soviet intelligence collection efforts.

With some 2200 high-technology firms located in the Silicon Valley, monitoring Soviet espionage activities in the area is a difficult task for both law enforcement agencies and company management. One security expert has stated that any new computer chip that is produced in volume will be in Soviet hands within one week after it comes out of a Silicon Valley plant.46

The vulnerability of high-technology companies can be underscored when in 1978 Californian officials discovered that Peter K. Gopa, a part-owner of a Silicon Valley electronics firm, whose company was involved in trying to purchase top secret micro-processor computer chips, was

partners with an official in the East German Intelligence Agency.47

Pentagon officials state that the Soviets at the moment lack the capability to "scale-up" micro-chip production from laboratory conditions to fully-fledged production units. Miles Costick warns that it would be a disaster for the West if the Soviets could surmount this obstacle, because "it would give them a new military capability across the board".48

Other areas targeted by the Soviet Union include scientific conferences, US subsidiaries abroad and database networks. The latter area is becoming increasingly significant due to the increasing utilization of databases by industry and sensitive government departments in the West. High-powered Soviet computers of Western origin have the capability to break into sensitive data networks belonging to NASA, multi-national corporations, US intelligence networks and the Pentagon, where millions of bits of information are stored for retrieval purposes. One example of database "burglary" was when Soviet scientists working at the International Institute for Applied Systems at Laxenberg (Vienna) hooked into satellite relays around the globe and were soon reaping huge research benefits from Western database networks. The Reagan Administration believes that the Soviet scientists were also tapping into a strategic US-made CRAY-1 high speed computer at Reading University in England, and using it to simulate atomic bomb blasts.49 While one computer expert called in to investigate the case felt that the data-lines were too narrow to handle the complicated calculations the Soviets were accused of doing, electronic bank burglars seldom leave tell-tale traces, which makes it impossible to verify exactly what the Soviets were up to in Reading.

Since the late 1970's, high priority has also been given to US universities as part of the Soviet strategy to acquire emerging technologies in the West, before their military application is understood.

Over this period, the number of US universities targeted has risen from about 20 to over 60. The more important universites include MIT, Carnegie-Mellon, Harvard, University of Michigan, the Californian Institute of Technology and Princeton.

According to the CIA, the VPK has identified Carnegie-Mellon, Cincinnati, Kentucky and MIT as sources for information on new high-strength, high-temperature alloys such as titanium; lightweight structural alloys and powder metal processing. While the California Institute of Technology, Princeton and Stanford were cited as sources for transonic, supersonic and hypersonic aerodynamic research.50

Soviet Commercial Front Operations

Over the past 15 years, there has been increased use of Soviet and East European-owned firms locally chartered in the US and Western Europe to exploit Western-controlled and military-related technology.

Since 1970, the number of Soviet firms operating in the West has risen considerably. In 1970, there were only 28 Soviet-controlled firms abroad. By 1976, the figure had risen to 84,51 and today stands at approximately 500. Before 1975, most Soviet firms in the West operated to market Soviet products and offer various services to boost Soviet hard currency earnings. Soviet firms in the US which focussed on this activity included Belrus machinery

of USA, Morflot American Shipping Inc., US-USSR Marine Resources Company Inc., Sovracht USA Inc., and the Amtorg Trading Corp.52 However, due to Soviet efforts to acquire Western technology, their roles have been changed to one of primarily obtaining high technology.

These firms in the US can legally purchase controlled US technology, and study it without actually violating US export control regulations.53 The Soviet Ministry of Foreign Trade administers and operates the hundreds of foreign trade organisations and firms around the world.

Over the past decade, the Soviet Union has also set up numerous dummy corporations to help facilitate the diversions of illegal trade from the US and Europe. It is estimated that the KGB has set up some 400 dummy corporations in Western Europe alone to buy high technology, mainly from the US.54 Intelligence officials also believe that the Soviet Union secretly owns several high-technology firms in the Silicon Valley. According to Richard Camps, Vice-President of the Barrick Security Group of San Mateo, California, several Silicon Valley high-technology firms "are generally considered to be fronts for the Soviet-Bloc countries or the People's Republic of China."55

Perhaps the single most incredible use of front companies for espionage purposes by the Soviet Union, was a $70 million banking scheme masterminded by the Moscow Narodny Bank (MNB), using a Hong Kong based land speculator named Amos Dawe.

The scheme is traced back to the early 1970's, when Amos Dawe had borrowed heavily from the MNB branch in Singapore to finance his holding companies that operated in South East Asia and California. By 1971, Dawe was $60 million in debt to the MNB.

According to the CIA which monitored the activities of Dawe closely, the MNB offered him $70 million in new credit if his companies purchased certain banks in the US. These were no ordinary banks, but banks situated in the heart of Silicon Valley. Through money secretly borrowed from the MNB, Dawe made down payments for the Peninsula National Bank and two other Californian Banks. Negotiations were in progress for two other Silicon Valley banks, when a Hong Kong financial paper called Target (believed to have links with British Intelligence), revealed Dawe's ties with the MNB. This prompted the Californian banking authorities to investigate Dawe's activities, which resulted in the MNB cutting off its credit lines to Dawe, and his disappearance to Thailand in 1975.

Intelligence officials believe that had the Soviets acquired control of the Silicon Valley banks, they would have had access to the records of hundreds of US scientists and engineers, including the companies they worked for, in the most sensitive sector of electronics production in the US. Similarly, the Soviets would have known which companies had financial problems, making them vulnerable to secret financial take-overs by the Soviet Union.56

The role of dummy firms acting as third parties for trade diversion purposes play an important role in the overall Soviet acquisition programme. Fully 75% of illicit shipments of high technology are now thought to reach the Soviet Union this way.57 Most of these diversions go through Europe, but the use of Asia as a diversion route is becoming increasingly prevalent. The CIA have identified more than 300 firms in more than 30 countries that are engaged in diversions.58 These firms exist for only a short period of time to avoid detection, before being dismantled and replaced with another.

Some of these trade diversions have been impressive. Before his exposure, Richard Mueller is believed to have set up some 41 dummy firms in Europe and Africa (including South Africa), solely for the purpose of facilitating the diversion of sensitive US high technology.59

In another instance, millions of parts, including night vision goggles and semi-conductors, were shipped through New York City and West Germany to North Korea by an Iranian living in West Germany, who worked with a Soviet-born Canadian living in New York.

Japanese officials in Osaka recently seized a Soviet-bound container labelled "ship parts", and found a computerised US sonar device powerful enough to detect large objects to a depth of nearly 40 000 ft. The equipment, made in New England and capable of producing detailed photo-like pictures of ocean floors, had been sent via a complicated route, first to Louisiana, then shipped to New York, and on to Norway and the Far East.60 The military application of the US radar sonar device was obvious -detecting objects underwater, it could also be used for submarine detection purposes.

The role of front companies will continue to play an increasingly important role in the Soviets' acquisition efforts.

The "Technobandits"

Industrial espionage experts have coined the phrase "technobandits" for those people that illegally pirate high technology items or technical data for the Soviet Union.

The Soviets use monetary greed and drugs to induce American businessmen to part with their high-technology wares, or militarily-significant technical blueprints. KGB contempt for Americans generally is summed up in one of their training manuals which states that "The average American soberly regards money as the sole means of ensuring personal freedom and independence. ... This attitude towards money engenders an indifference to the means by which it is obtained."61 There are numerous and willing technobandits eager to cash in on the Kremlin's 500% mark-ups on high-technology items, by acting as middlemen:62 Very few are technobandits for ideological reasons.

As a result, the Soviet Union has acquired some of its most important technical acquisitions through the use of technobandits, and although US enforcement agencies arrested many technobandits, the damage has often a been done. US law enforcement authorities believe they are only scratching the tip of the iceberg in their investigations.

The recent John Walker spy case is believed to be America's most serious since the Rosenbergs were arrested in 1950 for giving US atomic secrets to the Soviet Union. Alfred Whitworth, John, Michael and Arthur Walker sent the Soviets detailed reports on America's anti-submarine warfare capability, amphibious operations, communications coding systems and carrier tactics63 - areas of warfare where the US still enjoys a commanding lead over their Soviet counterparts. The US Navy is still assessing the full impact of the Walker spy ring.

One of the Soviets' most successful espionage coups was the work done by two Americans who were recruited by Marion Zacharski, of the Polish Intelligence Service, Sluzba Bezwieczenstwa (SB). Zacharski was President of the

Polish-American Machinery Corp. (POLAMCO), a state-owned trading company established in 1976 to import Polish machine tools into the US.

In 1979, through financial entrapment Zacharski recruited William Bell, employed as a radar specialist at the Hughes Aircraft Company, where he worked on sensitive projects including advanced US radar systems, air-to-air and surface-to-air missiles. For $110 000.00, William Bell over a period of two years gave his Polish Intelligence contact more than 20 classified technical reports on some of the most advanced US weapon systems.64 These documents included plans for a super secret quiet radar known as "stealth", which is the key to the penetration ability of the new US B1-B strategic bomber into Soviet airspace; the look down, shoot down system used in the US F-15 fighter aeroplanes; a new submarine sonar system; a new air defence system for Western Europe and details of the Hawk, Patriot and Phoenix missiles.65

From this information, the Soviets are building a new air-to-air missile from scratch and have already installed the US look down, shoot down radar system in their modified MIG 25 Foxbat and latest MIG 29 Fulcrum fighter aeroplanes, which threaten the ageing US B-52 bomber force and US Cruise missile systems.

According to the CIA, the documents acquired by Bell advanced Soviet technolgy by about five years in key weapon systems, by permitting them to implement proven design concepts.66 Bell was arrested by the FBI, convicted for spying and given an eight year jail sentence.

The other member of Zacharski's spy network was James Durward Harper, who was an engineer working in the Silicon Valley. Through his wife, he had access to Ballistic

Missile Defence Advanced Technology Centre contracts at Systems Control Inc. in California. For $140 000.00, Harper handed over to his Polish contact a bundle of secret documents about America's first line strategic weapon - the Minuteman ICBM. The documents were invaluable. The KGB were given exact details of command and control capabilities of the Minuteman ICBM, what counter measures are planned against a nuclear first strike to protect the Minuteman, and how much radiation the Minuteman could withstand in a nuclear attack,67 The documents also showed the Soviets how to improve their SS-13 ICBM silos, which are modelled after the US Minuteman silos.

The actions of this surrogate spy ring did incalculable damage to US national security interests, the consequences of which are still reverberating around the US military establishment today.

Ironically, US intelligence officials knew as long ago as 1979 that Zacharski was working for Polish Intelligence, even before William Bell was recruited. Instead of halting his activities immediately, the FBI instead wasted two years monitoring his movements, which enabled vital secrets to be passed on to the Soviet-Bloc.68

Some high-technology companies are also involved in techno-banditry. The most prominent case was the illegal sale of 50 water-cooled laser mirrors to the Soviet Union by the Californian-based Spawr Company, discussed in chapter 4.

Another example was given by Dr Lara Baker, who in a Senate testimony described the role that Continental Corporation played in illegally ferreting high-technology equipment to the Soviet Union. Continental Corporation was a US holding company, owned by a West German citizen, Werner Bruchhausen, which in turn owned 10 electronic firms in

Author Davies-webb Warwick Gun-cuninghame
Name of thesis The Transfer Of United States Technology To The Soviet Union: 1966-1986. 1987

PUBLISHER:

University of the Witwatersrand, Johannesburg
©2013

LEGAL NOTICES:

Copyright Notice: All materials on the University of the Witwatersrand, Johannesburg Library website are protected by South African copyright law and may not be distributed, transmitted, displayed, or otherwise published in any format, without the prior written permission of the copyright owner.

Disclaimer and Terms of Use: Provided that you maintain all copyright and other notices contained therein, you may download material (one machine readable copy and one print copy per page) for your personal and/or educational non-commercial use only.

The University of the Witwatersrand, Johannesburg, is not responsible for any errors or omissions and excludes any and all liability for any errors in or omissions from the information on the Library website.