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Technological neo- colonialism



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INTRODUCTION

Former colonies are developing socially and economically during the epoch of the scientific and technological revolution which exerts great influence on all aspects of society's life.

The direction in which young states will develop their science and technology will be very important for the solution of the most acute problems facing the former colonial periphery of the world capitalist economic system. The developing world today consists of 120 states, or four-fifth of the nations in the world. In many ways the development of mankind depends on how quickly these countries can overcome their economic backwardness.

If developing countries could make wide use of the latest achievements of contemporary science and technology, it would significantly promote their economic growth and the liquidation of poverty, hunger, and disease in these states. The all-around application of new technology makes it possible to solve the problem of industrialization and sharply increase the efficiency of agricultural production in a historically short period of time. However, reality shows that the results of the scientific and technological revolution remain, for the most part, inaccessible for developing countries.

Why is this the case? What prevents the spread of contemporary science and technology to developing countries? In this book the authors have tried to

answer these questions, analyzing the transfer of technology and expertise by the USA to developing countries.

The USA's monopoly on the production and sale of many technologies essential to the developing world gives it the opportunity to influence the directions of economic development and economic policy of these countries in the interests of American monopolies.¹

Controlling the access of the countries of Asia, Africa, and Latin America to the latest scientific and technological achievements, the USA has used its economic control levers (the export of capital and trade) to create a system of technological neo-colonialism in the world capitalist economy, a system of exploitation and subjection of the less developed countries, a system based on economic, scientific and technological supremacy. In its own hands the USA has concentrated an enormous part of the latest scientific and technological achievements and uses them as one of the most important control levers for political and economic pressure on developing countries.

American monopoly capital plays a special role in this process. Its accelerated penetration of the periphery of the capitalist economic system began comparatively recently, but in many ways it determines the forms and methods used in the relations between the West and developing countries today. Having created a network of transnational corporations (TNCs), colossal in terms of the scale of production and sale, and having gotten control of the activities of the International Monetary Fund, the

¹ We use the word "technology" here to mean licenses, patents, technical documentation, models of new machinery, trade marks, manufacturing and technical experience, consultancy and management services, and the professional training of personnel for other states.

International Bank for Reconstruction and Development, and a number of other international organizations, the USA has been provided with the opportunity to interfere directly in the production of goods and services in the developing world.

American technology transferred to developing countries promotes the formation of national scientific and technological potential dependent on the USA. As stated in the Operational Plan for the Implementation of the Vienna Programme of Action on Science and Technology for Development, prepared in 1981 by UN experts, the character of the transfer, selection, and use of specific technology in developing countries has led to the permanent dependence on the methodology, technology, capital equipment and specialized technical services provided by the industrially developed capitalist countries.² A prominent American researcher Peter F. Drucker spoke out even more conclusively on this issue, noting that this dependence has laid the foundation for a new and even more successful imperialism, the imperialism of technology.

American corporations make wide use of their formidable scientific and technological potential in order to force on developing countries terms for collaboration most profitable for the corporations. Taking advantage of the low professional and technical level of the working class and the shortage, and in places the utter absence of qualified engineers and technicians, transnational corporations use their scientific and technological potential very effectively to control the most important branches of industry in developing countries.

In this book we have undertaken to analyze the results of the technological enslavement of develop-

² See UN Document, A/CN, 11/12, May 1, 1981, p. 48.

ing countries by the United States, expose the means and methods used by governmental organizations and American transnational corporations in order to force upon newly independent countries their own terms for the delivery of technology through so-called programs for scientific and technological aid and commercial channels, and bring out new trends in the American policy in the transfer of technology to developing countries.

Chapter I

TECHNOLOGICAL EXPANSION BY THE STATE AND TRANSNATIONAL CORPORATIONS

Amid the modern scientific and technological revolution which has given rise to new trends in the development of the world capitalist economic system, the United States government apparatus and American monopolies have made modifications in their relations with the newly independent countries. Today the United States, aspiring to use the economic gap which has arisen between the center and the periphery of modern capitalism, attaches special significance to the role played by the scientific and technological subjection of developing countries. Technological neo-colonialism is based on historically tested methods of US expansion in the countries of Asia, Africa, and Latin America. These include exerting political pressure, taking advantage of objective economic difficulties, binding the leading international credit and financial organizations to US strategy, and so forth.

Changes in the very structure of the world capitalist economic system have been important factors in the move of American monopoly capital to search for more effective forms for the scientific and technological subjection of developing countries. Here we are talking about, first, the exclusion of the practice of using extraeconomic means of compulsion and the establishment, within the framework of the world capitalist economic system, of new neo-colonialist relations between the West and young states.

Second, the on-going struggle of developing countries to pursue their own independent socio-economic policies and the advent, with the formation of the world socialist system, of the opportunity for diversification of economic ties, have compelled the American monopolies to change their practices in these countries. Third, the destruction of old forms of monopoly domination and the sharpening of the competition for the markets of the developing world among the leading centers of imperialism have forced the United States to concentrate its efforts more intensively on the technological elements of neo-colonialism which it sees as the most important means whereby American transnational corporations can establish control over the production and commerce of young states.

The aspiration of ruling circles in the USA to put the achievements of scientific and technological progress to work for their political and economic expansion is nothing new. There were similar attempts in the 1950s and 1960s. At the turn of the 1980s, the USA sharply stepped up the use of technology to achieve its objectives in economic relations with foreign countries. A policy of technological expansion is being waged in these countries with the active support of the state and private capitalists. The United States takes note of the social and economic diversity of the developing countries, the well-known contradictions between them, and uses a differentiated approach in relations with these countries. This is related to the active search for new, more flexible and disguised forms for foreign expansion on the part of US state-monopoly capital and its transnational corporations, in order to increase profits, broaden markets, get natural resources, and achieve political goals.

The export of state and private capital occupies a pivotal position in the transfer of technology from

the United States to newly independent states. The important role it plays in this process is related to the search for a social foothold in developing countries. As a rule, financial resources are channeled to the countries where the process of capitalist industrialization is connected with the use of American technology. The more capital invested, the more technology can be sold on the markets of these young states and the tighter these countries can be entangled in the American TNCs' chain of manufacturing and marketing.

Within the framework of American imperialism's neo-colonial strategy towards developing countries the export of state capital is considered a means for creating the most favorable circumstances for the functioning of private capital. American state capital was charged with creating an infrastructure for the manufacturing branch which meets the transnational corporations' interests, with assisting in the realization of a series of social programs essential for the training of a more or less qualified manpower in young states, and with setting up a scientific-information system in the developing countries. The need for all these problems to be solved together accounted for the prevalence of the export of state resources in the form of aid to developing countries in the beginning of the 1960s. This period witnessed the beginning of the modification of the system of American investment in newly independent states, a modification provoked by displacements not only in the world capitalist economic system, but in the very mechanism for exploitation of the former colonies. "Development aid" was directed now to keep the newly independent countries dependent on American financial and industrial capital taking the form of peculiar "material costs". The recipient country tried to use it to reduce the gap between accumulated capital and capital investments. The government of

the USA, giving aid to several "key" countries of the developing world, sought to direct their development along capitalist lines, achieve results in an improvement of their economies in order to convince other countries of the advantages of capitalist methods. The American government admits that it will help promote the development of only those countries in which American state-monopoly capital is interested.

Thus, Jamaica was given aid to the extent of 1.1 billion dollars³; the Jamaican government has always looked favorably upon foreign investments and the Western economic system as a whole and openly pursued an anti-communist policy. The IMF supported that US policy by providing Jamaica with aid to the tune of 697 million dollars without the usual requirements for the devaluation of the national currency and wage controls.⁴

The selective nature of American aid, its gradual cutback in the beginning of the 1970s, and then, at the turn of the 1980s, its sharp reduction in comparison with the export of private capital clearly demonstrate a change in US neo-colonialist interests.

The share of loans and credits provided on usual market terms, rather than at preferential terms, has noticeably increased in the structure of the export of American state capital. In comparison with the 1960s, the volume of interest-free subsidies, closely related to the concept of aid, was drastically reduced in the 1970s and 1980s. The relative share of aid in the aggregate export of American state-monopoly capital to developing countries also fell. In 1971-1973 this aid accounted for 47.8 per cent of the general flow of American capital to newly independent

³ *The Washington Post*, April 9, 1981.

⁴ *Ibid.*

countries, while in 1981 it was only 21.9 per cent. The proportion of American GNP devoted to such aid fell in this period from 0.28 per cent to 0.20 per cent.⁵ In this way, the USA does not fulfill the obligations it took upon itself at the 3rd UN Conference on Trade and Development held in Santiago in 1972 to provide aid to developing countries to the tune of 0.7 per cent of its GNP in the form of interstate loans at easy terms with the maximal amount of gratis subsidies.

But the US government, the policy of which is today dominated by a tendency to stimulate the export of private capital to developing states, does not intend to increase its financial aid to Asian, African, and Latin American countries in the future. This is clear from statements made by US officials before the meeting of representatives of a group of developed capitalist and developing states in Cancun, Mexico, in late October 1981. In these statements, *Fortune* magazine explained, newly independent states were told that, first, Western aid could play only a secondary role as a catalyst for their own economic activity, and that they should therefore rely on individual initiative, private enterprise, and trade as the moving force for economic growth. Second, developing countries should bear the greater part of responsibility for their poverty inasmuch as their economic policies work to the detriment of market forces and prevent the formation of a strong private sector. Third, aid would be provided on the condition that young states show their readiness to change these policies.

It is no accident that the position of foreign private investors in the developing world has become

⁵ *Development Co-operation, 1983 Review*, Organisation for Economic Co-operation and Development, Paris, November 1983.

stronger. This situation is due to the opportunity provided by the current stage of the development of young states for transnational corporations to extract enormous profits in these states while subjecting them industrially. The move to neo-colonialism inspired significant changes in the structure of the flow of private capital from the USA, changes reflecting, on the one hand, definite successes achieved by the developing countries in the struggle for their economic independence, and, on the other hand, the new forms of exploitation of these countries, which American imperialism is using so as to adapt to the changing historical conditions.

From 1965 to 1982, the overall volume of American direct private investments increased from 5.3 billion dollars to 53.2 billion dollars, that is, ten-fold.⁶ Moreover, in the 1960s the growth in the flow of American private capital to young states was largely due to new investments, while in the early 1980s they accounted for less than half of all private capital investments made by Americans. This means, first and foremost, that American TNCs have deeply penetrated manufacturing industries of developing countries and created technological enclaves on their territory whose profits permit the subsidiaries of American monopolies to enhance the exploitation of developing countries' natural resources using incomes already extracted from them in the form of monopoly profits. It is especially important to note the accelerated penetration of American transnational corporations in young states' processing industries: in the beginning of the 1980s, 36.1 per cent of all American private investments were made in this sector and this trend is on the rise.⁷ In other words,

⁶ *Survey of Current Business*, August 1983, Vol. 63, No. 8, p. 24.

⁷ *Ibid.*

American monopolies are intensively developing the basic sphere of industrial progress in newly independent countries, taking care to make sure the process of technically equipping this sphere does not slip out of their control.

Strengthening its control over the processing industry of the developing world, the USA is increasingly using new forms of investing its capital in recipient states. These include so-called non-equity patterns of investment. This is fundamentally a means for transnational corporations to diversify their control of manufacturing, technological, and marketing processes in the developing countries' economies. These controls are of various kinds: providing developing countries' national companies with patents, licenses, and franchises; durable and long-term ties between the manufacturer of equipment and its consumer, ties based on agreements for the construction of enterprises in newly independent countries according to so-called turnkey projects; agreements permitting a firm from one country to play an effective role in the management of a firm of another country; and contractual control over a subcontractor without direct participation in the project at hand.

Such forms of non-equity patterns of investment have begun to dominate the commercial transactions concluded by American TNCs with developing countries. In essence, they are a well camouflaged form of indirect control of the industrial development of young states. The enormous scale of accumulated investments (i.e. the sum-total of all capital investments by US monopolies in Asia, Africa and Latin America) permits the USA to determine the directions for the development of most important industrial sectors in many developing countries. Furthermore, this policy is based on a great deal of control by American capital of the leading enterprises in these countries. Thus, 56 per cent of the subsidiaries of

American transnational corporations located in Mexico are wholly controlled by their mother companies, 29 per cent of them are jointly managed and only 15 per cent of these subsidiaries are managed by Mexican entrepreneurs. Taking advantage of this situation, American transnational corporations artificially restrain the development of those industries which, in the long run, might become strong competitive industrial sectors. Trying to prevent national enterprises from gaining access to contemporary technology, American TNCs buy them out. This gives the TNCs the opportunity to set up a kind of production in new states which is most profitable for American monopoly capital.

The following examples clearly demonstrate how powerful a position American TNCs occupy in developing countries' processing industries.

The greater part of American investments in Brazil's processing industry is involved in such sectors as the chemical, machine building, electric technology, electromechanics, electronics, and in the production of transportation equipment. This is approximately the structure of American investments in Mexico, Argentina, and Venezuela. American companies, in practice, fully control the Brazilian automobile industry, hold 80 per cent of all pharmaceutical production, about 50 per cent of all chemical production, 47 per cent of smelted aluminium, and 50 per cent of the production of machinery. We should also note that American corporations are actively working to improve their positions in the processing industry in other countries of Latin America: in the beginning of the 1980s, 87 per cent of the inflow of American capital went to the processing industry of these countries and, accordingly, 66 per cent of the reinvestments, too.⁸ All this allows

⁸ See *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, No. 4, 1983, pp. 32-33.

American transnational corporations to make colossal profits. Thus, in 1950-1981, the USA invested 167.1 billion dollars in industrially developed capitalist states versus 53.2 billion dollars in newly independent states; in this period, profits derived from the former amounted to 94.2 billion dollars, and from the latter, 96.7 billion dollars.⁹ This clearly demonstrates how great American profits are on the periphery of the world capitalist economic system: in 1982 the rate of profit from Western countries was 8.2 per cent and from the developing world it was 16.2 per cent.¹⁰ Who gets these enormous sums of money? According to data on hand, 250-300 of the largest American companies control over 70 per cent of the general volume of direct foreign investments made in developing countries.¹¹ In this way, the development of young states' industry and technology depends, in a large way, on a narrow layer of monopolists, a parasitic force not only in the USA, but also in newly independent states to which it spreads its exploitive system. Turning into the financial and industrial exploiter of the developing world, the USA holds it back from making social progress and restricts the pace at which its productive forces are modernized.

Not only the export of capital, but also American foreign trade policy plays a large role in binding the developing states' economic potential to the American reproduction processes. It is therefore no coincidence that in the end of the 1970s and the beginning of the 1980s one heard calls more and more frequently in the United States to replace aid by

⁹ *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, No. 7, 1983, p. 47.

¹⁰ *Survey of Current Business*, August 1983, Vol. 63, No. 8, p. 24.

¹¹ *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, No. 7, 1983, p. 47.

trade. The developed capitalist states' dependence on natural resources supplied by young states has forced the United States to actively search for new ways and means of the commercial exploitation of the developing world. The constant growth of the newly independent states' share in the United States' foreign trade (it increased from 28 per cent in 1970 to 41.5 per cent in 1981), compared with all other states of the world capitalist economic system, shows the increased significance of this sphere of economic relations with the developing world for American imperialism.

The characteristic feature of America's foreign trade policy is that it forces deliveries of goods which might be made in the developing countries (were it not for unequal trade relations with the West) upon these states themselves. It is no accident that in the course of many years the trade structure of American exports to developing countries remains, on the whole, stable: all sorts of equipment and other kinds of capital goods, semi-finished products, industrial primary materials, and foodstuffs. In the 1980s these goods made up 84 per cent of all American exports to the developing world.¹² In this way the USA tries to set up the industry of these countries so as to orient it towards exports from the United States, compelling these states to set up the technological structure of their industry on the basis of American technology. The realization of this trade policy is quite profitable for the USA. On the one hand, the export of capital goods to developing countries enables the USA to standardize the production of many different kinds of goods, and, accordingly, create favorable conditions for the increased deliveries of American expertise and technology. On the other hand, providing machinery and equipment of various types on the

¹² *Overseas Business Reports*, November 1982.

condition of license restrictions, the USA ties up the importing states' manufacturing potential. Forcing newly independent states to manufacture goods according to "license regulations", the USA in this way restricts the growth of their production (first and foremost in the state sector). Moreover, US monopolies introduce in advance terms profitable for themselves in the contracts they conclude with young states, creating a basis for price increases on manufactured goods exported from the United States. All this leads to the creation of unfavorable conditions for newly independent countries in their trade with the USA, and, at the same time, strengthens the position of the capitalist world's leading country in the markets of the developing world. The increase in the share of this group of countries in American exports proves their importance for the marketing of American goods. In 1970-1980, this group's share in American exports increased from 30 per cent to 38 per cent. In the beginning of the 1980s developing countries bought approximately 40 per cent of all manufactured goods exported from the USA and the volume of this trade in absolute terms reached 62 billion dollars, in comparison with only 8 billion dollars in 1970.¹³

Realizing a massive export of manufactured goods to developing countries, the USA regulates its import policies in an entirely different way. American imports of ready-made goods come from a narrow circle of trade partners and are very limited in the spectrum of goods. Five countries (Mexico, Taiwan, Xiang Gang ((Hongkong)), South Korea, and Brazil) are the source of three-fourths of all American imports of finished goods from developing countries which are

¹³ John A. Mathieson, *US Trade with the Third World: the American Stake*, Occasional Paper 28, The Stanley Foundation, Muscatine, Iowa, January 1982, p. 8.

not exporters of oil; textiles, metals, lumber, footwear, and household electronic appliances make up 70 per cent of the volume of American imports of industrial and consumer goods from the countries of Asia, Africa, and Latin America. Artificially focusing young states' efforts primarily on the production of consumer goods the USA, in this way, hinders the establishment of the heavy industry and precision equipment making sectors, which are necessary for any country's independent industrial development.

However, America's interest in imports from developing countries does not signify that the latter's products have free access to the American market. The expansion of imports from newly independent states in the 1970s and 1980s was strictly controlled by the American Administration. Despite some relaxation of restrictions on deliveries of a narrow group of manufactured goods from developing countries, on the whole the USA has tightened up its protectionist measures.

The generalized system of preferences (GSP), a program very indicative of the primary directions of current American protectionist policy, can be included among the most important commercial-political undertakings of the USA in the second half of the 1970s. The generalized system of preferences in trade with developing countries was initiated by the American government at the end of 1969. However, only five years later, in the December 1974 Trade Reform Act, approved by the Congress, provisions were made to grant developing countries preferences in the form of the right to duty-free exports of their finished goods to the United States. As a result the USA became the last of the developed capitalist states to introduce such a program and, at that, the USA did so with a series of significant restrictions and loopholes.

The GSP was not applicable, for instance, to a large group of goods important to developing countries (textile goods and clothing, clocks and watches, household electronics, and many goods made from steel and glass) and also to all those goods the import of which to the USA was limited due to losses incurred by local manufacturers. This was largely due to the fact that the cost of production of these goods in developing countries was considerably lower than in America because US TNCs exploited these countries' cheap manpower. Obviously, the USA stood to gain both ways: from imposing heavy import duties on goods from developing countries and from producing these goods on their soil. Furthermore, the President was required to review annually the list of goods imported to the USA subject to the GSP program in order to exclude those goods the import of which would inflict losses for American manufacturers of analogous goods. The volume of import of such goods and the growth rate of their retail sales on American domestic markets were to be taken into account in this check. On the basis of the "competitive need test" American authorities stripped goods valued at 6.8 billion dollars of rights to be imported duty-free in 1982.¹⁴

The Trade Reform Act of 1974 also includes loopholes of a political nature. Thus, preferences were not to be granted to countries which nationalized property belonging to subsidiaries of American corporations without paying these firms compensation; they were also not to be granted to states which participated in export associations "disruptive" to the steady supply of raw materials to the USA (first and foremost this meant the OPEC countries). Furthermore, those developing countries which gave

¹⁴ *Eastern Economist*, Vol. 78, No. 16, April 23, 1982, p. 992.

preferences to other developed capitalist states, but not to the USA, were also to be deprived of their customs privileges. Here we are talking about a rather numerous group of countries in Africa, the Caribbean and the Pacific Ocean, which accorded so-called reciprocal preferences to the EEC. Finally, the American President was granted very broad authorities to terminate, interrupt, or restrict the operation of the GSP with respect to any country or any product citing damage to American "national interests". Specifically, Kampuchea and Laos were deprived of their customs preferences for political reasons by the US President's decision.

The generalized system of preferences, which took effect on January 1, 1976, included in 1983 approximately 140 states. Certain countries, in order to receive these customs preferences, compromised to meet American requirements. Approximately 2,300 items were excluded from the GSP framework, among them many goods the production of which has witnessed the greatest success in the developing countries (household utensils, footwear, textile goods, and so forth).

In 1982 the USA imported goods worth 8.4 billion dollars within the framework of the GSP; this amounted to only 3.4 per cent of all American imports or 8.5 per cent of imports from developing countries.¹⁵ In fact, approximately 70 per cent of the entire volume of imports granted preferences came from five countries: South Korea, Taiwan, Hong Kong, Brazil and Mexico; Taiwan's and Brazil's share alone reaching 36.5 per cent.¹⁶ The

¹⁵ Dewy Pritchard, *US Generalized System of Preferences*, Trade Policy Planning and Analysis Division of the Foreign Agricultural Service, Washington, April 1983, p. 1.

¹⁶ *US International Strategy. Hearings before the Subcommittee on International Trade of the Committee on Finance*, 96th Congress, Second Session, Washington, 1981, pp. 15, 100, 132.

preferential regime thus includes a rather narrow spectrum of goods, and, in fact, not those goods which are most important for developing countries.

Even within these tight limits GSP, in its essence, has not become a means for stimulating developing countries' exports of manufactured goods. Having denied privileged access to its markets for the most interesting and saleable items, the USA, applying the "competitive need test", actually eliminated stimuli for the expansion of the exports of those goods which were included in the preference system to begin with. Actually, if a country exceeds the established limits on some product, this product is excluded from the sphere of preferences. Objectively, this condition pushes the exporter to set "voluntary" limits on its deliveries, i.e., achieving the same effect as import quotas.

Thus, American trade with developing countries is based on principles of the subjection of the weak by the strong; it is designed not to stimulate independent development and diversification in a broad spectrum of sectors equipped with contemporary means of production for the countries of the developing world, but to create economies which produce one product or export one raw material and depend on the fluctuations of the American market, that is, economies whose rhythms and scale of activity directly depend on the foreign trade policy of American imperialism.

Closely tied with the system of export of state-monopoly capital, the American government's foreign trade policy has become an element of the neo-colonialist system for the exploitation of the developing world. The use of its channels allows American financiers and industrialists to redistribute the value produced in developing countries in its own favor. Thus young states are limited in their already

insignificant fund of accumulated foreign currency so essential to them for their development and financing of research and development in creation and application of technology so badly needed in their social and economic circumstances, and for the strengthening and development of national industries.

Chapter II

WAYS AND MEANS OF TECHNOLOGY TRANSFER

1. State Scientific and Technical Aid

Using the existing shortage of latest technology and qualified staff in developing countries, the USA tries to turn scientific and technical aid into one of the most powerful control levers for influencing these countries' socio-economic development.

A broad ramified administrative apparatus was created in the United States in the post-war period to effectively use scientific and technical aid in the general system of ways and means for state-monopoly expansion. Since 1950, when the first state organization for scientific and technical aid to young states, the Technical Cooperation Administration, was created, its administrative apparatus has constantly been growing and changing.

The creation in 1961 of a new organization, the Agency for International Development (AID), was an important stage in the redesigning of American scientific and technical policy with respect to newly independent states. Practically all aspects of American scientific and technical aid were concentrated in this agency. The goal of such a centralized governmental policy was to increase its effectiveness, concentrate the planning of aid in one agency, and enhance American penetration in the various regions and countries of the developing world.

In the late 1970s, AID dealt with the questions of scientific and technical aid via three agencies responsible for the realization of specific aid programs and four regional agencies organized according to their

geographic jurisdiction. In this way each agency had its region of activity and could effectively execute the neo-colonial policy pursued by American state-monopoly capitalism.

Almost all programs implemented today by AID and organizations related to it in some way are based on the Foreign Assistance Act adopted in the USA in 1961 and the amendments and additions made to this act in the following years. The characteristic feature of this act is its direct relationship with American policy of forcing newly-independent countries' socio-economic development into various patterns of capitalist economic structure. It is precisely this powerful capitalist tilt oriented on the support of the subsidiaries of American TNCs which became the most important criterion for the expedience of providing American scientific and technical aid. This, however, is merely one side of American technological policy in the developing world. The other side consists of the creation, on the periphery of the world capitalist economic system, of a multi-linked chain of dependence of private and state enterprises on TNCs' reproduction process.

American aid to developing countries has always been tied to conditions designed to ease American exports of private capital to Asia, Africa, and Latin America. This goal was manifested in the general provisions of the Foreign Assistance Act and in the section devoted to issues of scientific and technical aid. The preamble to the Act states that strengthening friendly foreign states by promoting their development of free economic institutions and manufacturing potential and by reducing and eliminating barriers to the flow of private investment capital is American policy.¹⁷

¹⁷ See *Legislation on Foreign Relations*, Washington, D.C., 1966.

Later the relation between state technical assistance and American TNCs was strengthened by the provision tying deliveries of technology to young states with the latter undertaking certain commitments with respect to the American entrepreneurs' property and establishing a preferential and "risk-free" climate for investors for the realization of their programs. In this way the Act makes scientific and technical aid to newly independent countries directly contingent on the establishment of conditions essential for the penetration of American private capital.

The President was given the right to refuse to provide scientific and technical aid when such aid could unfavorably affect the American economy or any of its important sectors, or could damage the American balance of payments. Practice has shown that on the basis of this provision the United States has refused to provide scientific and technical aid to those sectors of developing countries' economies, the development of which could lead to cutbacks in American imports or increases in the export of goods which would be competitive with American goods.

In order to expand the export of productive capital, the USA often consciously refuses scientific and technical aid to developing countries. In so doing, as a rule, even the existence of agreements on the delivery of technological innovations is not taken into consideration. Despite having previously concluded agreements with the USA on the provision of scientific and technical aid, Afghanistan, Burma, Brazil, Mexico, Colombia, Ecuador, Ethiopia, and many other countries, for example, actually failed to receive such aid in 1980. Washington explained this situation saying that young states which had achieved a certain level of economic development were in a position to acquire technology on a commercial basis, and countries with a socialist orientation were automatically excluded from receiving

scientific and technical aid for political reasons. Thus, developing countries were compelled to go to the private market for technology, where the monopolies, using their so-called bloc bidding policy, inflated their prices as much as possible. This leads to a reduction of the already small reserves of currency held by the young states, the use of loans from commercial banks, and, in the end, the growth of indebtedness.

American official sources provide no systematic data on the volume of state exports of technology to developing countries. Even cautious estimates of its scale give a picture of the significance of scientific and technical aid for the strengthening of American imperialist expansion in young states.

As seen from Table 1, AID expenditures in the form of so-called gratis subsidies in 1949-1980 were primarily concentrated on Asia (40 per cent of all such expenditures). The countries of Latin America received 23 per cent of these subsidies, and African states were granted only 19 per cent.¹⁸

The distinctive feature of the geographic designation of American scientific and technical aid in the late 1970s was the broad dispersion of funds among the recipient countries. Thus, almost 70 per cent of AID's subsidies was granted to 56 countries. However, only five countries received technical aid exceeding 10 million dollars: the Arab Republic of Egypt, Israel, Zambia, Indonesia, and the Philippines. There were 2.5 times more countries which received less than one million dollars in aid each. Moreover, the largest sums were accumulated not

¹⁸ Here and elsewhere when sources for statistical materials are not indicated, information about the scientific and technical aid rendered by the USA to developing states has been extracted from *Operations Report; Foreign Assistance and Related Agencies Appropriations* (for corresponding years).

Table 1

EXPENDITURES ON SCIENTIFIC AND TECHNICAL AID TO DEVELOPING COUNTRIES¹⁹
(in millions of dollars)*

Region Designated for Aid	1949-1952	1953-1957	1960	1965	
Asia	13.7	232.2	89.2	100.5	
Latin America	10.2	114.7	37.0	76.4	
Africa	2.2	29.5	12.2	71.5	
Undesignated	2.9	22.6	18.6	51.0	
Total	29.0	399.0	157.0	299.4	

Region Designated for Aid	1970	1973	1975	1977	1980
Asia	68.4	46.3	59.8	137.5	158.3
Latin America	77.0	81.5	74.6	78.8	84.6
Africa	56.5	54.1	68.3	86.7	96.1
Undesignated	59.8	76.2	73.3	79.2	84.0
Total	261.7	258.1	276.0	382.2	423.0

* According to Art. 212 of the Foreign Assistance Act.

by those countries cultivated by American TNCs where the market for American goods was guaranteed owing to an old economic bond between TNCs and the recipient country (for instance, Argentina, Brazil, Mexico, or South Korea) but by those who, at the moment, were only potentially interesting for American exporters and due to a shortage of currency were ready to establish a favorable climate for investments by American monopolies' subsidiaries.

¹⁹ *Operations Report*, Statistics and Reports Division, Office of Financial Management, Agency for International Development, Washington, D.C., 1979.

Let us examine AID's specific distribution schedule for scientific and technical assistance according to the various regions of the developing world.

Asia. The American government has always considered scientific and technical aid to the countries of this continent to be one of the most important priorities of its entire technological policy in the developing world. However, in the late 1970s this situation changed. For instance, the countries of South and Central Asia (India, Iran, Pakistan, Afghanistan, and Turkey) were considered a strategically important outpost against the spread of socialism to all of Asia in the late 1950s, and the USA maintained a policy of accelerated technological assistance to these countries. Nonetheless, American imperialism did not manage to keep this group of states from establishing economic contacts with socialist countries or to cut them off from the reverberations of liberation revolutions on other continents. The attempt to use aid in the form of the export of technology to tie countries bordering on socialist states to the general line of American foreign policy turned out to be not only a failure, but it undercut the international prestige of the leading center of the world capitalist economic system. Therefore, in the early 1970s government circles in the USA proclaimed "a new policy" with respect to the countries of Asia. The most important aspect of this approach was the stimulation of the development of private enterprise and collaboration with the national bourgeoisie by providing technology. Special attention was devoted to the countries of Southeast Asia and, specifically, South Vietnam, on whose territory the USA was waging an aggressive war in those years.

In the middle of the 1970s, about one-fifth of the scientific and technical aid rendered Asian countries went to the realization of regional programs, for

the most part for such organizations of Southeast Asia as the Center for Agricultural Development, the Center for Trade, Capital Investment and Tourism, and the Southeast Asian Fisheries Development Center, as well as others. The goal of this policy was to concentrate the resources supplied on concrete multi-faceted programs in order to effectively control the entire groups of developing states.

An abrupt price increase on oil and the ensuing energy crisis in the West forced the USA, in the middle of the 1970s, to focus its policy on the countries of the Middle East. American oil TNCs, having lost a large part of their concessions in Arab countries, played a decisive role in the shaping of this policy as they came to consider the forcing of technological neo-colonialism on them as an alternative to these countries' independent oil policy.

Latin America. American policy in Latin America is designed to prevent the countries of this region from taking a non-capitalist course of development and to force them to develop along the lines of dependent capitalism, thus turning these countries into an integrate part of the world capitalist economic system on the basis of the neo-colonialist division of labor. In order to achieve this goal the USA periodically revises tactical lines and changes the ways and means of economic influence on the countries of the continent; these revisions and changes are directly reflected in US scientific and technical aid policy.

The profound socio-economic backwardness of the countries of this region in the early post-war years compelled the USA to pursue a policy designed to accelerate economic growth in Latin American states and liquidate their archaic technological structures. Without contemporary technology-intensive industrial sector, American TNCs could not effectively expand their positions in Latin America. Therefore,

in 1961, the USA began to execute its Alliance for Progress Program, the end goal of which was the capitalist industrialization of the region's countries. Within the framework of this program, the USA doubled the size of scientific and technical aid rendered to this region of the developing world in the 1960s; such aid then reached 85 million dollars, representing 28 per cent of all of AID's expenditures.

However, already in the 1970s, coming up against resentment in Latin American countries against the activities of American TNCs, the American Administration proposed the concept of a "new partnership" for the countries of this continent. Under these conditions, the USA practically eliminated its program of scientific and technical aid for a number of the more developed states of the region (Argentina, Brazil, Venezuela, Mexico, and, in 1971-1973, Chile), significantly cut back on aid to other states, and provided such aid only on the condition that the recipient country maintain a policy of "self-sufficiency".

At present, the USA, as a rule, renders aid only to the poorest countries (first and foremost to the island states of Central America and the Caribbean), counting on using minimal resources to receive the maximum in political dividends. Simultaneously, the volume of aid given regional organizations in Latin America has been reduced; this is due to America's aspiration to weaken the economic basis for cooperation among the members of the Organization of American States (OAS). As a result, beginning in 1977, the absolute size of AID subsidies to the region was reduced to the minimum in comparison with funds designated for other regions of the developing world.

Africa. In the middle of the 1960s the United States concluded agreements on economic, scientific and technical aid with more than 30 African states.

But before signing these agreements, the USA, taking into account the processes of social differentiation already underway in the states of the region, spoke out for restrictions on non-capitalist trends developing in a number of countries and against the growing role of their state sectors. Following its selective strategy, the American government expanded the scale of technical assistance rendered first and foremost to the "key" African states ("key" from the point of view of their resource potential and political stability). The export of technology to these countries on a preferential basis was supposed to promote the modernization of their production structure on a narrowly specialized foundation and the expansion of their export of natural resources.

In the late 1970s and early 1980s, the emphasis of American scientific and technical aid policy in Africa moved south (Zambia, Swaziland, Botswana, Lesotho, and Rwanda). On the one hand, according to American opinion, this was supposed to demonstrate US concern about the development of the most backward states in Africa; on the other hand, this was supposed to strengthen imperialism's positions in southern Africa, which, at that time, was staggering from the blow of a group of countries (Angola, Mozambique, and Guinea-Bissau) which decided to go along the route of socialist transformations of their economies while maintaining a progressive, anti-imperialist policy. Nevertheless, the greater part of American scientific and technical aid, as before, was accorded Zaire, Sudan, Kenya, and Somalia, countries upon which the United States places great hopes in implementing its foreign policy on the continent.

In this way, the geographic distribution of American scientific and technical aid clearly shows that its utterly dominant trait is the knocking together, whenever possible, of a bloc of developing states dependent on American technology, a bloc which

American TNCs could use as a stable and risk-free segment of the world capitalist market.

More than 62 per cent of all scientific and technical aid went to the development of the production and socio-political infrastructure of developing countries (Table 2). In other words, this aid was one of the most important factors in the establishment of a climate favorable for the beginning of large-scale exports of private capital to the periphery of the world capitalist economic system.

After the foothold for private investors had been set up in the developing world and American monopolies' export of capital began to regularly outstrip the volume of funds transferred through government channels, significant changes occurred in the sectoral distribution of scientific and technical aid. In accordance with the program of satisfying "fundamental human needs", adopted by the American Administration in the late 1970s, the greater part of American scientific and technical aid in the early 1980s (52.2 per cent) was designated for the development and perfection of the production sphere of the young states, especially for agriculture. At the same time, expenditures for the development of the socio-political infrastructure in the developing states was reduced to 32.9 per cent.

The greatest part of American expenditures related to the developing countries' production sphere is appropriations for agriculture. In the beginning of the 1980s, more than 41 per cent of AID's expenditures for scientific and technical aid to young states fell into this category. In the USA it is felt that the future position of American capital in newly independent states to a great extent depends on the effectiveness of the resolution of one of the most important global problems of our time: providing the developing world with food. But the USA seeks to use the poor state of backward countries' agricul-

Table 2

AID'S SCIENTIFIC AND TECHNICAL AID TO DEVELOPING COUNTRIES²⁰
(by sectors)

Index	1960		1965		1970		1975		1980	
	\$mil	%	\$mil	%	\$mil	%	\$mil	%	\$mil	%
Agriculture	28.1	17.9	44.3	12.0	39.3	15.1	113.2	41.0	173.0	41.2
Processing and Extraction	14.5	9.3	18.1	4.9	5.4	2.1	5.7	2.1	17.9	4.3
Transportation	7.6	4.6	8.8	2.4	3.1	1.2	1.3	0.2	1.9	0.5
Housing Construction	2.2	1.4	1.1	0.2	1.5	0.5	3.1	1.1	13.9	3.3
Energy	-	-	1.2	0.3	0.4	0.1	6.7	2.4	42.7	10.2
Education	26.9	17.1	50.3	13.6	41.6	16.0	43.5	15.9	66.3	15.8
Health	10.2	6.9	22.4	6.1	11.9	4.5	22.6	8.2	36.2	8.5
Social Security	-	-	10.1	2.7	3.0	1.1	2.8	1.0	2.9	0.7
State Apparatus	12.5	7.9	18.4	5.0	11.4	4.4	9.7	3.5	12.3	3.0
Law Enforcement	-	-	19.2	5.2	6.4	2.4	4.5	1.6	-	-
Professional Organizations	3.1	1.9	4.5	1.3	10.8	4.1	7.7	2.8	8.3	2.1
Private Enterprise	-	-	4.5	1.3	3.9	1.5	6.3	2.2	7.1	1.7
Other	32.2	20.6	105.4	28.6	75.2	29.0	32.5	12.2	32.5	7.7
Total*	156.6	100.0	368.8	100.0	259.3	100.0	276.8	100.0	419.7	100.0

* Discrepancies in the total figures are due to the fact that data on the sectoral structure of scientific and technical aid used in this Table do not include all sectors of the economy.

²⁰ *Operations Report*, Statistics and Reports Division, Office of Financial Management, Agency for International Development, Washington, D. C., 1973-1980.

tural sector in order to prepare the social basis for a capitalist economy and support those political forces which serve as an outpost of American policy. In accordance with this, AID worked out a policy of technological modernization of the agricultural sectors of recipient states. Its primary aspects are:

—working out a general agricultural policy for developing countries and executing this policy taking into account the USA's concrete goals in various countries;

—planning, selecting and training agricultural workers for young states;

—developing and stimulating market relations in the agricultural sector; and

—transferring agro-tech expertise and skills to developing countries for undertaking scientific research designed to increase harvests and livestock productivity.

As a rule, American experts have to execute this program and they do so in association with corporations and such organizations of collective neo-colonialism as the International Bank for Reconstruction and Development and the International Monetary Fund. Occupying important positions in the agricultural ministries of the states receiving aid, these experts exert considerable influence on decisions made with respect to the reconstruction of the agricultural sector. Participating in the creation of showplace farms and training local personnel in using American farm technology, American experts orient the fledgling agro-complexes of young states towards intensive capitalist development, advertising this as the most effective solution of the most important agricultural problems for developing countries. From 1960 to 1980, more than 40,000 specialists from developing countries studied in American universities, colleges, and agricultural institutions and enterprises. The representatives of American agro-business, while

helping along the development of the agricultural sector in newly independent states, stake precisely on this battalion of specialists. The training of specialists is structured in such a way as to instill pro-American leanings among these specialists from economically backward countries. In recent years the USA has set up more than 150 agricultural schools right in the developing countries themselves.

In the 1960s, the USA's unwillingness to develop young states' processing industries led to their receiving a minimum of American scientific and technical aid. However, lately the USA has increased appropriations for the modernization of the industrial sector on the periphery of the world capitalist economic system. From 1970 to 1980 expenditures in this sector have increased more than three-fold. This trend can be understood, to a large extent, from the fact that closely tying scientific and technical aid in manufacturing with the activities of private capital, the USA promoted the structural renovation of both sectors of material production in the newly independent states.

AID's primary thrust in manufacturing is focussed on the encouragement of the transfer of manufacturing experience and technical expertise accumulated in the USA to the developing countries. Thus, AID's five-year program in science and technology, carried out jointly with the government of the Brazilian state of São Paulo, promoted, in this state, the expansion of industrial research and the strengthening of the network of research institutes in the sectors most important to American TNCs, namely, metallurgy, machine building, and agro-business.²¹

In order to gain the maximum return on investments in the development of industry, an informa-

²¹ *Some United States Activities Using Science and Technology for Development*, Department of State Publication, Washington, D.C., 1979, p. 18.

tion service was established under AID's auspices. Using an enormous amount of analytical materials on the state of industry in Asia, Africa, and Latin America, AID, in 1978, set up its "data bank", storing about 6,000 separate investigations and recommendations on the means of strengthening America's economic position in the developing world.

Of course, the importance of such research and information goes far beyond the limits of the sharing of experience in rendering scientific and technical aid to young states. In its essence, this is a unique form of planning scientific and technical development leashed to national economies yet at the same time oriented on the potential and interests of American monopoly capital.

American ruling circles' economic plans are designed to secure the development of young states' economies in such a way as to ease the expansion of US monopoly capital and to increase these states' dependence; their socio-political plans are designed to strengthen the social foothold maintained by American imperialism as a result of the local petty bourgeoisie's rapid growth.

For example, the Georgia Institute of Technology, on the basis of contracts with AID, rendered assistance to young states in the development of small-scale production. From 1957 to 1978, this institute helped 9,500 enterprises in developing countries, mostly in Latin America. The Institute's scientific and technical aid consisted in the training of highly qualified specialists from the developing countries in various technical fields; as a rule, most of these specialists were graduated with master's degrees. In addition, the Institute's experts and consultants were sent to the countries of Latin America and Asia and close contacts with the institutes and research centers there were established.²² AID

²² Ibid., p. 21.

rendered assistance in the establishment of private enterprise through the development of small-scale production in Nigeria, Pakistan, Indonesia, South Korea, and other countries.

Recently the USA began to finance development programs for skill upgrading centers, and vocational and technical schools in newly independent states. This process is especially intensive in traditional domains of American TNCs, like Taiwan, Singapore, and South Korea. Taking advantage of these centers and schools, American monopolies hire qualified staff for their local subsidiaries. Thus, the most dynamic and capable contingent of the work force is removed from the national sector and American TNCs exploit them for their own ends.

In the early 1980s, a reduction in the total flow of AID's grants, of the share of resources for the social infrastructure meant no reduction in its significance as the primary channel for influencing developing countries' ways and means of training the most important element of their productive forces—their human resources. It is precisely in this way that the USA seeks to establish ideological and political contact with the young, independent states. From 1960 to 1980, AID appropriated nearly \$900 million for these ends, i.e., almost 15 per cent of the total volume of scientific and technical aid rendered Asia, Africa and Latin America.

American interest in rendering aid to newly independent states for the development of education is related to the fact that this sphere of state capital investment allows the USA to openly brainwash the broad masses of students in the spirit of American imperialism. Custom-designed school curricula and the general system of teaching in institutes of learning are primarily aimed at the study of humanities, not the acquisition of practical technical skills. Developing countries are training an uncalled for number of

lawyers, art historians, theologians, and so forth. There is a catastrophic shortage of specialists which is detrimental to the long-term application of the achievements of scientific and technological progress.

American scientific and technical aid to developing countries is, for the most part, the dispatching of American specialists to these countries, the provision of academic and technical training for the citizens of these countries, and the delivery of goods essential for the realization of aid programs.

The financing of business trips of American experts to newly independent countries is considered the most expedient form of investment of state resources in American programs of scientific and technical aid. All in all, 13,498 US specialists were working in various regions of the developing world in 1981.²³ However, far from all of them were working in the production sphere. The majority of these experts were involved in the socio-political infrastructure, state apparatus, health, and education. It is no accident that American specialists are assigned jobs in this way so as to create and support the actual system of control over the development of the most important (from the American Administration's point of view) elements of developing countries' socio-political and socio-economic development.

Numerous groups of American experts have become a unique "lobby" for American imperialism in the newly independent states.

It is true that in the beginning of the 1980s the forms of American interference in developing countries' state apparatus changed somewhat. This interference was now exercised not from above, but from below, that is, by involving American specialists in the process of social transformation underway in developing countries. In this respect, the agreement

²³ OECD Development Co-operation, Paris, 1982, p. 241.

concluded between some of the Western states (France, Belgium, West Germany, Great Britain, the USA, and Canada) with the members of the Coordinated Action for the Development of Africa Organization (CADAO), created on the personal initiative of former French President Valéry Giscard d'Estaing, is a typical example. According to the agreement, all measures taken for the improvement of hygienic conditions in Africa as of the beginning of 1981 were to be undertaken under US auspices. Numerous American specialists were sent off to Africa. In order to execute this intricate project, the US Congress granted credits amounting to \$35 million. However, an analysis of the expenditures of this sum shows that it was used, for the most part, to pay American experts during their stay in one or another African country, not for the financing of concrete measures to improve health conditions on the continent.

For the USA, this operation was extraordinarily profitable both economically and politically. As the French newspaper *Le Monde* wrote, "Aside from access to the quickly developing markets for vaccines, serums, and other preparations, the execution of this agreement would permit the USA to use aid programs involving health measures, always welcomed by the local population, in order to make political headway in Africa, to which the Americans strive so as to oppose the USSR."²⁴

Lately AID has been hiring more and more experts and specialists from the developing states themselves. Their excellent understanding of national conditions promotes the more effective fulfillment of the tasks set by American scientific and technical aid policy and, moreover, the maintenance of local specialists is 4-5 times less expensive than the hiring of American experts.

²⁴ *Le Monde*, March 3, 1981.

AID also pays special attention to the training of native personnel for the developing countries on the territory of the USA. From 1950 to 1981, over 200,000 people from young states studied in American universities, colleges, and enterprises.²⁵ This kind of American aid is set up in such a way as to instill in them as much American ideology and value orientations as possible. Therefore, the basic scientific and technical training of staff for newly independent states in American institutions is of an academic character, for the most part unrelated to practical problems.

Academic training is conducted in 134 universities and colleges of the USA. The majority of students are trained in ten of the biggest universities of the country, where 100 to 200 students from developing countries are enrolled.

American institutions of higher learning, as a rule, graduate foreign specialists with master's of science and doctoral degrees. Specialists with bachelor's degrees and lower certifications are generally graduated by institutions in the developing countries themselves.

This approach to the training of personnel for developing countries stems from specific economic and political considerations. In social terms, most of the specialists who go to the USA to upgrade their skills form a narrow circle of the most privileged, since in these countries it is first and foremost the representatives of the upper classes who have the opportunity to get a higher education.

The mechanism for supplying goods and services to developing countries significantly strengthens the neo-colonialist nature of American scientific and technical aid. The wide-spread practice of "tied deliveries", for instance, occupies an important place

²⁵ *OECD Development Co-operation*, 1982, p. 240.

in providing this kind of aid. Its distinctive feature is the provision of developing countries with state loans and credits on terms allowing the USA to orient the development of the debtor-countries' economy along certain lines. In the beginning of the 1980s, the proportion of such "tied deliveries" in American aid reached 64 per cent.²⁶ This kind of "aid" entails the American government's provision of credit while it retains the right to veto any plan or project proposed by the country receiving American aid. All loans are tied to equipment deliveries from the USA; the restriction of the customer's right to choose the supplier of equipment is an inevitable result of this policy. It is remarkable that, as a rule, prices of goods delivered as aid are 20 per cent to 30 per cent higher than the prices of similar goods on the world market.

It is essential to note the special variety of American aid known as project assistance. In 1979-1980, its proportion in the total volume of aid rendered developing countries amounted to 65 per cent for Great Britain, 27 per cent for France, 60 per cent for the Federal Republic of Germany, and 88 per cent for Japan. (The USA does not publish statistics on this form of aid.) Constructing capital-intensive installations with a completed cycle of production, the USA gives the impression of making a visible contribution to the developing country's economy, not bothering to concern itself with the effectiveness of the given installation. The USA is most interested in such large-scale projects as hydro-tech plants, railroad and highway construction, harbors and telecommunications, i.e., those projects which require a significant amount of imports. Thus, any kind of scientific and technical aid promotes capitalist production relations in the developing coun-

²⁶ *OECD Development Co-operation*, 1982, p. 226.

tries, and is designed to secure profitable and stable fields of investment for foreign and local capital while aiding the expansion of exports from the capitalist countries.

American use of state resources as scientific and technical aid to developing countries cannot resolve the most acute contradictions in the system of technology transfers from the center to the periphery of the world capitalist economic system.

2. Export of Scientific and Technical Expertise by American Monopolies

Transnational corporations, large monopolies trading in patents, licenses, trademarks, equipment, and consulting services are the main channel for the transfer of scientific and technical expertise to developing countries. Having gathered in their own hands the greater part of the capitalist world's scientific and technological potential, American corporations extract huge profits from these countries by using their network of subsidiaries.

At present, about half of the transactions in the international capitalist trade in technology are concluded between TNCs and their subsidiaries in developing countries. About 60 per cent of all income derived from the export of technology from developed capitalist states to newly independent countries goes to American companies. Thus, for example, of 28 largest pharmaceutical transnational corporations which do about 60 per cent of the world business in medicines and more than 90 per cent of the research in this area, fourteen are based in the USA.

Of course the role played by such corporations is not entirely one-sided. On the one hand, TNCs,

engaging in research and development, organizing the production of new high-tech goods, transferring technology to many countries in Africa, Asia, and Latin America, promote an increase in the level of these countries' technological and economic development. On the other hand, TNCs use the transfer of technology and its application in developing countries to benefit their very own interests, that is, to achieve excess profits and tie these countries to the American economy on the basis of a new technological dependence and control over their national economies.

American TNCs' scientific and technological expansion in developing countries is supported by the US government. This support takes diverse forms: aid in the expansion of corporate activities in private capital investment abroad which promotes the flow of direct investments to developing countries; the program for trade and development, adopted by the government in 1975, designed specifically to increase the export of "high-tech" production to young states; the use of programs of economic, scientific and technical aid to foreign states as a means of stimulating the export of machinery and other equipment; the realization of certain measures to attract small and medium-sized businesses in the USA to expand their export and technology transfer operations; political and diplomatic support for TNCs' activities in developing countries; and so forth. The inequality and discrimination characteristic of the practice of technological exchange between developed capitalist states and developing countries, and the restrictive clauses contained in agreements for the transfer and use of the achievements of modern science and technology are clearly manifested in the very mechanism of technology transfer.

Technology transfer is primarily effected on a commercial basis through two main channels: intra-

firm—transfers made to foreign subsidiaries of the very corporation involved, and interfirm—transfers made under licensing, cooperation, management, and other long-term agreements signed by a corporation with foreign firms or jointly owned companies.

In the first case, American corporations supply their subsidiaries in developing countries with new technology and broad rights to use licenses and trademarks, to export products to third countries, and to spend money on research and development works. Subsidiaries are given all necessary aid in the local organization of production for the more rapid and effective exploitation of innovations created by the mother company. However, this system of rights extends neither to the state sector, nor to young states' national companies. As a result, American subsidiaries form in the host country their own unique technological enclave whose activities, as a rule, increase the contradictions and disproportions in this very country. This helps them to suppress local competition, boost unemployment, draw local entrepreneurs into the orbit of TNC control, and creates a threat to young states' economic plans, and so forth.

In case of interfirm transfers, technology is usually sold to companies in developing countries at later stages of the product's or technological process' "life-cycle", i.e., when the market demand for the good or technology has already fallen.

TNCs secure an uninterrupted flow of new technology to their own subsidiaries, but in interfirm relations, these same corporations act on a one-time basis. Moreover, the receipt of the most advanced technology from TNCs must be stipulated in a contract; this is not always acceptable to the seller who fears competition. Finally, TNCs, transferring technology to companies not under their control, raise the price of this technology, broadly applying all pos-

sible restrictive terms, especially with respect to the licensee's export operations. The fact that in six Latin American countries (Peru, Mexico, Chile, Bolivia, Colombia, and Ecuador), in 480 of 531 agreements on technology transfer there are provisions restricting or prohibiting the export of products made according to licenses is proof that this kind of stipulation is quite widespread. According to estimates made by the UN Conference on Trade and Development (UNCTAD) the proportion of contracts on technology transfer containing such restrictive clauses reached 99 per cent in Peru, 97 per cent in Mexico, 93 per cent in Chile, 43 per cent in India, and 32 per cent in the Philippines (as a percentage of the total number of agreements concluded with each country).²⁷ Here one should note that the application of the first kind of these stipulations (on the restriction of exports) is the one found most frequently. Restrictions on developing countries' exports thwart the expansion of their trade in finished goods and reduce their opportunity to receive foreign currency while increasing their deficits in the balance of payments. Accordingly, although technology is directly transferred through interfirm channels to national enterprises which use it for their own ends, the actual terms of the transfer reduce its ultimate effect.

Technology transfer by American TNCs is effected in a "pure" or "tied" form together with the export of machinery, equipment, instruments, etc.

The most widely used form for the commercial transfer of technology is the "tied transfer". American exports of machinery and equipment to developing countries from 1970 to 1982 increased more than four-fold and amounted to 19.6 billion dol-

²⁷ UNCTAD Doc., TD/B/AC, 11/10 Rev. 1, April 22, 1974, p. 25.

lars.²⁸ In the late 1970s, 38 per cent of all American exports of machinery and equipment and 60 per cent of all American trade in high-tech products went to developing countries.

Of course, such purchases of equipment provide specific benefits for these countries. However, developing countries have to pay certain costs in the form of the negative aspects which go hand in hand with the benefits of such technology transfer. TNCs are not interested in how their technology, transferred in this way, will be used. The buyer has to shoulder all risks and expenses related to the application of the new technology. Even in the event the contract contains no restrictions for the importer of equipment patented by an American firm, having possession of the patent actually means that the seller can dictate his terms for the further use of that equipment to the buyer. The degree of control depends on the buyer's opportunity to acquire this equipment from other countries.

Moreover, as monopolies dominate the world capitalist market, developing countries' enterprises depend on the monopolies as creditors and suppliers of equipment and technology. Washington uses various restrictive trade measures, sanctions, and embargoes as means of achieving its own political ends. These trade practices with respect to developing countries became widespread in the early 1980s.

The middleground between "pure" and "tied" form of providing scientific and technical expertise is occupied by the export of "engineering" services. Various engineering and consulting services for the buyer to optimize capital investments related to some technical project, i.e., the construction of a

²⁸ See *Highlights of US Export and Import Trade, December 1982*, Washington, D.C., 1983.

new or modernization of an already existing plant, are objects of such commercial transactions. The entire set of services related to the planning and construction of a project, or one or several aspects of this set of services may be objects of such a transaction. In modern practice, "engineering" services are often concomitant with the transfer of rights to use patented inventions, technological processes and know-how to the customer in one or another developing country. The licensing of technological processes may entail providing "engineering" or other such services.

There are primarily two kinds of American engineering companies: engineering-consulting and engineering-construction. The first group is the largest and fulfills orders for services without relevant supplies of equipment or providing actual construction services. They are most active in the countries of Latin America and the Middle East. In the Middle East, for instance, in the early 1980s, about 100 such firms were in operation; this was related to the accelerated development of oil refineries and the petro-chemical industry here, for the most part.

The American company Davy McKee is a typical representative of this group. Davy McKee is active in the markets of countries in Asia and Latin America. It specializes in consulting services in the chemical, petro-chemical, and petroleum sectors. Among the largest export contracts concluded by this firm in 1980, one stands out: it was signed by the Indonesian state petroleum company, Pertamina, for consulting services for the construction of methanol factory with projected output of 1,000 tons per day in East Kalimantan. The factory was valued at 270 million pounds sterling. A consortium made up of several Japanese and South Korean firms, as well as the International Finance Corporation, provided

equipment and construction work.²⁹

Engineering-construction firms provide the entire set of services related to the designing of industrial and other projects, performing actual construction work, deliveries, set-up, and assembly of equipment, the commissioning of these projects, and the fulfillment of orders on "turnkey" and "finished goods" bases. In this they have every opportunity to supply their clients with long-term credit. These firms do a significant amount of business in developing countries. From 1970 to 1980, the volume of orders filled by the 400 largest American engineering-construction firms abroad increased 2.9-fold and was worth 34 billion dollars. For example, the Lummus company began, in 1980, to design and construct eight oil-processing plants worth more than 860 million dollars in young states, and the Bechtel company, in 1976-1981 alone, concluded contracts with Saudi Arabia to build several large industrial projects to the tune of 35 billion dollars.³⁰

The export of engineering services promotes the export of machinery and equipment to developing countries and binds these countries even stronger to American technical norms and standards. Lastly, newly independent countries are compelled to overpay enormous sums since the corporations consciously increase the price of the projects in which they participate. This practice has taken on such a scale that many countries have had to take special countermeasures to combat exorbitant construction prices imposed by Western companies. Thus, Kuwait, Saudi Arabia, the United Arab Emirates, Qatar, and Bahrein agreed to exchange information about American and other Western firms' practice of increasing prices of

²⁹ Peter Taffe, "Davy Consortium to Win Indonesia Contract", *Chemical Age*, April 25, 1980, p. 12.

³⁰ *Time*, July 12, 1982, p. 27.

projects: firms caught at foul play, according to this agreement, were to be blacklisted and forbidden participation in development projects.

The most wide-spread form of contractual work performed by engineering-construction firms is "turnkey" contracts. The distinctive features of these contracts are that the contractor fulfills all technical and management operations essential for construction.

The export of complete sets of equipment for enterprises under turnkey agreements amounts to about one-fourth of American aggregate exports of machinery and equipment to developing countries. About 90 per cent of the export of chemical equipment is shipped as packaged deliveries, usually sold together with various services, on turnkey terms.

However, recently, some newly independent countries began to notice serious deficiencies in this kind of enterprise construction. It was discovered that complexes built could not achieve projected capacities over a long period of time, that their output was of lower quality than stipulated in the project, and profits were also low. There were cases when enterprises, built and ready for exploitation, were not operative due to a lack of administrative and technical staff. This meant that the resources invested in the enterprise did not give the desired results. The desire to avoid these deficiencies gave rise to new kinds of contracts. First and foremost these were contracts for the building of enterprises on such terms when the contractor, i.e. the foreign firm, bears full responsibility not only for the prompt and quality construction of the enterprise, but also for its exploitation and achievement of projected capacity and product quality within a specified period of time. As a rule, local staff are employed by the enterprise. According to contracts concluded on these terms, the training of specialists from

among the local population in the management of the enterprise under construction is one of the contractor's functions. Schools and courses are established to train skilled workers, engineers and technicians who also study and acquire their skills at already operative enterprises of the contractor.

Recently, the export of management and organization methods has been turning into an important form of economic relations between American firms and developing states. As a rule, this export takes the form of management contracts, consulting services and aid in setting up management training systems. American corporations conclude more and more management contracts with industrial and other local companies in which they have no partial ownership. Management expertise is transferred in its "pure" form, e.g., "entrepreneurship without capital", expertise and experience commerce. One firm takes upon itself management functions for another company for payments from the latter. This new form of business has arisen due to an increase in the role played by management during the era of the scientific and technological revolution, limits on the import of capital in many developing countries, and due to fears of the nationalization of monopolies' property.

Management contracts for contractor companies mean profits for work in management, income from the sale of its own equipment which it recommends to the given enterprise, and additional opportunities for American capital to penetrate new markets and gain access to various natural resources. In this, the contractor, providing management services for an enterprise which he does not own, may control the enterprise's activities without being subject to risks involved in making investments. American corporations widely practise management contracts in the oil, mining, and extraction sectors in developing

countries, especially in Venezuela, Mexico, Panama, and in the Middle East.³¹

Consulting services in management and organization play an important role in US exports. Consulting firms work out projects on commercial terms in this area and help companies in developing countries to apply and use new methods of management. As distinct from management contracts which are related, as a rule, to the establishment of an enterprise, technical services and consulting in management presuppose the functioning of an already existing enterprise which is managed by a local company. Such "franchising" agreements are widespread in retail trade, food and restaurant services, the hotel business, airport servicing, and car rentals. For example, such a large American aviation company as Trans World Airlines, provides its management services to several airlines in developing countries, thus gaining access to their markets for air freight and making big profits. "Franchising" allows American TNCs to reduce costs and risks which are usually involved in foreign investment, and to make big profits while controlling a significant part of the corresponding service sectors in many young states.

The International Executive Service Corps has a special place in the export of American management practices. Created in 1964, this organization's primary goal is putting US managers' experience to work in the organization of management systems at enterprises in developing countries. The Corps is represented in many developing countries. Despite the fact that the Corps is financed primarily by private companies and the American federal budget, enterprises which are rendered aid must cover the cost of services provided them to a certain extent.

³¹ *The Department of State Bulletin*, Vol. 77, No. 1987, Washington, D.C., July 25, 1977, p. 129.

From 1965 to 1982 the Corps worked on more than 5,000 project assignments in 60 developing countries.³² Now the Corps is working on approximately 700 projects which include various enterprises in the countries of Asia, Africa and Latin America.

Aside from the International Executive Service Corps, a private organization uniting 300 corporations and 70 universities under the name of VITA (Volunteers in Technical Assistance) renders consulting services. The organization's permanent staff is small, however, the number of volunteers who work with this organization exceeds 4.5 thousand; these are scholars, professors and teachers in American universities and colleges. First among the volunteers who participate in the organization are specialists in questions related to the management of business, agriculture, the food industry, water supplies, housing construction, and renewable energy sources.³³

Consulting firms see their work as a means of tying their clients in developing countries to American monopolies. Close ties exist between American banks and consulting firms, many of which are owned by these banks.

Assistance in the organization of management training is still one more form of the export of management expertise from the USA. First and foremost this is the transfer of knowledge and experience to specialists who come to the USA. Training specialists from young states, the USA tries to create for itself an internal social foothold in these countries which it can use as the carrier of American influence, bourgeois ideology, and policies.

³² See *Science and Technology for Development, United Nations Conference 1979*, Washington, Department of State Publication, 1979, p. 16.

³³ Robert P. Morgan et al., *Science and Technology for Development. The Role of U.S. Universities*, New York, Oxford, Toronto..., Pergamon Press, 1980, p. 200.

Transferring management experience to developing countries, American corporations gain significant financial benefits. It is indicative that only one-fourth of payments made by subsidiaries of American firms for services to their mother companies are for licensing, know-how, patents and so forth, while three-fourths of these payments are made for new management methods and similar services. Thus, in 1982, payments made by subsidiaries to their mother companies in the USA reached 1,180 million dollars (including 258 million dollars for licenses), while 922 million dollars were paid in the same year for new management methods and other similar services.³⁴

Lastly, licensing agreements are also a means for the "pure" transfer of technology. These are agreements in accordance with which the owner of some technology (the licensor) issues his counteragent (the licensee) permission to use his patent rights within certain limits. The cost of licensing (license fees) is a specific "rent" based on the lease of this kind.

American corporations' licensing operations abroad include, as a rule, the provision of several different kinds of services, among which are the sale of patents, trade marks, technical aid, marketing aid, management expertise, know-how, etc. However, American corporations try to sell patent rights, know-how, and so forth, individually. In almost every contract on the sale of a license there are provisions regulating the transfer and use of technology. An analysis of licensing agreements concluded by American corporations with firms in developing countries shows that the technology "package" transferred under these agreements includes a limited number

³⁴ *Survey of Current Business*, August 1983, Vol. 63, No. 8, p. 21.

of rights and services, for the most part scientific and technical achievements and know-how.³⁵ In infrequent cases, a local firm can get a full "package" of technology on the basis of a licensing agreement, which is actually the usual practice of American corporations operating in developed capitalist states.

American corporations' activeness in the foreign licensing sector can be explained by the fact that the sale of licenses, in many cases, is preferable to the export of direct investments.

Under the rapid growth of the cost of R & D works, American corporations are looking for all possible ways of recompensing the costs tied to research and development programs. One of these ways is the sale of licenses. Not all scientific and technological achievements made are applied at American corporations' enterprises at home or abroad. Only every fifth discovery leads to commercial success. The sale of licenses or the full sale of patent rights to an invention which has no commercial value for the corporation are the only means to cover their costs.

Sometimes American corporations see the sale of licenses as the most effective method to penetrate some markets in young states. This is the case when direct investments or American exports of goods become impossible or insufficiently profitable. Licensing agreements, in this case, are advantageous for the seller in that he can participate in the profits derived from the production and marketing of goods without significant expenditures of human resources, capital, and other resources which are involved in direct capital investments in joint ventures.

Restrictions on foreign investment in certain of

³⁵ *The Acquisition of Technology from Multinational Corporations by Developing Countries*, UN, New York, 1974, p. 31.

India's manufacturing sectors, as well as the prohibition of the setting up of firms with the participation of exclusively foreign capital provoked American monopolies to use the sale of licenses more actively. American corporations could not get deeply entrenched in India's electrotechnical and chemical industries by means of direct investments, since the government would not allow foreign firms to control such important sectors of the national economy.

American corporations resort to licensing also because it is relatively low-cost. Travel and maintenance expenses of specialists who go to developing countries to provide assistance in the application of American technology as well as costs related to the defense of patent rights, legal consultations, and the transfer of scientific and technical documentation, and other overhead expenses make up the bulk of licensing costs.

American corporations thoroughly study the political conditions in developing countries whose markets they wish to penetrate. The growth of the national liberation movement and the nationalization of property belonging to subsidiaries of American corporations are often grounds for the sale of licenses to local companies instead of direct capital investments. Licensing agreements guarantee regular payments to the American firm for technology it has sold even if an enterprise has been nationalized.

Developing countries account for some 20 per cent of licensing operations executed by American corporations abroad. Argentina, the Arab Republic of Egypt, Brazil, Colombia, India, Morocco, Mexico, Pakistan, and the Philippines are the largest purchasers of licenses.

With the help of licensing agreements American monopolies try to penetrate the most rapidly developing sector of newly-independent states' economies: the processing industry. Thus, in the late 1970s and

early 1980s, more than 70 per cent of the licenses sold to developing countries were sold to the processing industry, for the most part to four of the more "high-tech" sectors of this industry (engineering, electrotechnical, chemical, and instrument-making), i.e. precisely to those sectors of the modern economy the control of which would allow TNCs to subject the further economic development of the given group of countries to their own interests.

A recent UNCTAD analysis of licensing operations of American monopolies has shown that there are numerous artificially created terms and clauses which infringe upon developing countries' interests. These are: "conditional purchases" (the sale of technology on the condition of the customer's orders of initial materials, equipment and spare parts through the firm indicated by the seller of the technology); the total or partial prohibition of the export of products made under the licensing agreement; restrictions on the import of goods which might compete with the products of the company which is selling the technology; and giving leadership positions to Americans who are representatives of the licensing firm.

There are many cases when US corporations sold technology to several firms in a single country, thus managing to get multiple license fees. Not infrequently competing national firms appeal to several foreign corporations for technology; consequently, the market at once features several competing models and similar goods while the interchangeability of parts and standardization become problematic. For example, in India nine firms bought licenses for the production of electric motors and now 23 different kinds of switches and 26 different kinds of polyvinyl cable coating are manufactured in the country. This, naturally, brings down the overall economic efficiency.

In most cases technology transfers by TNCs do not fit well with developing states' national economic plans, failing to promote the comprehensive, optimal development of their economies. Moreover, the American export of technology to developing countries has created a new, technological kind of dependence which complements and enhances economic dependence.

In this area, negative influence of American TNCs on the economies of countries in Asia, Africa, and Latin America manifests itself, first, in the narrowing down of the range of possibilities for these countries' scientific and technological development as a result of monopolistic restrictions; second, in the deformation of the technological development of their economies; and third, in the formation of their industrial specialization in accordance with the interests of monopoly capital.

Restrictive monopolist practices in technology transfers are based on the licensee's restricted rights to manufacture and export, his obligations to acquire spare parts and related equipment only from the licensor, and on restrictions on further research, the use of specialists not indicated by the exporter of the given technology, and applications of the technology after the expiration of the terms of the contract, and so forth.

Monopolies' restrictive practices in the rights of TNCs' industrial ownership of patents and trade marks in developing countries convincingly prove their abuses. American TNCs own more than one-third of all trade marks registered by foreigners in young states,³⁶ and therefore, TNCs use trade marks to inflate prices of goods appearing on markets with

³⁶ *The Impact of Trade Marks on the Development Process of Developing Countries*, Report by the UNCTAD Secretariat, TD/B/C, 6/AC.3/3, June 29, 1977, pp. 29, 31.

the trade mark of some or another manufacturer or trade firm of the USA. Thus, according to data from a special survey, it was established that in Colombia's pharmaceutical industry the average overpricing of semi-finished goods and components imported by foreign-owned subsidiaries reached 155 per cent; in Chile, from 30 to 500 per cent; in Peru, from 20 to 300 per cent. The pharmaceutical industry is no exception; significant overpricing was observed in the electronics, chemical and other industrial sectors of the countries of the Andean Group.³⁷

Within the framework of their manufacturing complexes, the TNCs transfer to developing countries primarily that technology which is suitable for only part of the manufacturing operation concerned (as a rule, for either the beginning or closing phase). This means that the functioning of enterprises built in these countries is deliberately made utterly dependent on American corporations' headquarters. This practice poses serious obstacles to the creation of enterprises with a complete production cycle in these countries and pins them to playing a role of the periphery of the world capitalist economic system.

Lastly, operations of American TNCs in technology transfer have unfortunate consequences for developing countries' industrial specialization. Nowadays the West, especially the USA, can no longer support the system of neo-colonialist exploitation on the basis of keeping the "third world" as a narrow, agrarian and resource supplier. The developing countries' growing struggle for economic independence compels the USA and the other developed capitalist states to make changes in the international capitalist system of division of labor. Now TNCs not only transfer to developing countries morally and physi-

³⁷ UNCTAD Doc., TD/107/Corr. 1, December 29, 1971, pp. 15-16.

cally obsolete technology and expertise, but despatch there energy-, labor-, and material-intensive industries which do not lead to further scientific and technological progress and have become a burden for the developed capitalist countries (for instance, enterprises which pollute the environment).

US government programs for environmental protection required increased expenditures to prevent air and water pollution.

At oil refineries in many states of the Caribbean oil with a high sulphur content is processed for American buyers. In Trinidad and Tobago, for instance, enterprises owned by American monopolies process only imported oil with a high sulphur content while oil with a low sulphur content, native to the area, the processing of which is not accompanied with intensive environmental pollution, is exported to the USA.

According to the example set by the oil corporations, other monopolies, too, have moved their ecologically dirty production processes abroad. Thus, after the introduction of standards regulating air pollution in the USA by enterprises in the asbestos industry, the largest firm of the industry, Amatex, closed its major factory in Norristown, Pennsylvania and simultaneously enlarged its Mexico-based plants.

In the Brazilian city of São Paulo, the site of the greatest concentration of foreign industrial enterprises, air pollution reached 55.7 units on the World Health Organization scale; this exceeds the maximally permissible limits for human health three-fold. One of the fundamental reasons for this situation is that foreign corporations' enterprises do not set up special purification equipment and antipollution devices. Corporations commit such violations in other Latin American countries and in Asia and Africa. The "economies" the TNCs make on purification installations and facilities monitoring the environmental pollution level often have disastrous

consequences for recipient countries. In Bhopal (India), for instance, a poisonous gas escape at a factory of Union Carbide, a US-based chemical TNC, claimed many Indians' lives and affected, in one way or another, some 60,000 people.

Thus, American corporations' policies in technology transfer are designed to involve developing countries into the world capitalist economic system as somewhat more developed elements, but as dependent as ever, and to leash these young states to the American economy on the basis of technological dependence and control over the process of their industrialization.

Together with the direct forms of technological dependence imposed on developing countries, in the last 10 to 15 years the "brain drain" has become a more evident negative problem. In official UN documents this is often called the reverse transfer of technology. According to calculations by the UNCTAD Secretariat, from 1961 to 1975, 119,000 people emigrated from developing countries to the USA, of which 33 per cent were physicians, and about 67 per cent, scientists, engineers, and technicians.³⁸ As a rule, these people are the most qualified specialists in their countries.

It is unlikely that one could agree with American sociologists who claim that the "brain drain" is a spontaneous phenomenon. Of course, there is an element of spontaneity, but this does not determine the content and scale of this phenomenon. Actually, the "brain drain" is a well organized, regulated and at times even a planned undertaking.

It is sufficient to examine the evolution of American immigration legislation to become convinced that

³⁸ UNCTAD V, "Technology: Development Aspects of the Reverse Transfer of Technology", Item 13(d), *Main Policy Issues, Manila, May 1979, TD/239*, January 29, 1979, p. 5.

there have been deliberate moves made to expand the inflow of qualified specialists from former colonies and semi-colonies to the USA. The fundamental law which spells out American policy with respect to the immigration of foreign nationals is the 1965 Immigration Law. Prior to this, American policy in this area, once regulated by laws passed in 1921 and 1952, was based on a system of annual quotas, providing for immigration from individual countries and promoting immigration from European countries. In the 1965 law priority was given to immigrants' qualifications regardless of their national origin, especially in those areas, such as medicine, where there were not enough American experts. The main idea behind all the changes made in the last 15-20 years in American immigration legislation can be summed up this way: it was decided to give priority to highly qualified specialists for immigration to the USA.

The countries of Asia are the greatest suppliers of immigrant-specialists for the USA; among them, India is the greatest source of immigrants: 4,000 to 5,000 people per year. Primarily, these are researchers, engineers, and doctors. According to the Indian information services, the USA and other developed capitalist countries annually attract every tenth medic from India.

The Philippines is the second largest supplier of immigrant-specialists for the USA. Medical workers prevail among Philippine emigrants. Doctors also emigrate to the USA from Thailand. In New York alone in the early 1970s there were more Thai doctors practicing medicine than in all rural areas of Thailand put together.

Pakistan, South Korea, Turkey, Brazil, Chile, Egypt, and Nigeria are also large suppliers of highly qualified immigrant-specialists for the USA. The "brain drain" from other developing countries is relatively small in absolute figures (see Table 3);

however, the number of highly qualified personnel in these countries is very low, too.

Table 3

EMIGRATION OF SPECIALISTS FROM ARAB COUNTRIES TO THE USA IN FISCAL 1976³⁹

Country of Origin	Total Emigrants	Categories of Specialists					
		1	2	3	4	5	6
Bahrein	91	20	2	1	x	x	64
People's Democratic Republic of Yemen	34	+	+	+	+	+	34
Iraq	1,256	61	10	11	3	17	1,154
Jordan	2,416	135	17	2	5	28	2,229
Kuwait	270	56	6	14	1	7	186
Lebanon	4,997	455	46	1,521	11	59	2,905
Oman	9	2	1	x	x	x	6
Qatar	18	6	9	x	x	1	8
Saudi Arabia	246	52	9	14	x	5	166
Syria	681	130	12	80	7	12	440
United Arab Emirates	19	3	1	1	x	1	13
Yemen Arab Republic	423	1	x	x	1	x	421
Algeria	37	12	x	5	1	3	16
Egypt	1,379	408	83	104	36	47	701
Libya	79	29	5	14	2	1	51
Morocco	160	33	3	3	1	6	46
Somalia	20	2	x	1	1	x	16
Sudan	22	4	2	x	x	1	15
Tunisia	24	6	1	1	1	2	11
Total	12,181	1,415	198	426	79	190	9,873

³⁹ From *United Nations Economic Commission for Western Asia. Population and Development*, Beirut, 1982, pp. 234-235.

KEY
x no specialists
+ no data
1 skilled workers
2 engineers
3 doctors
4 researchers
5 teachers
6 others

Specialists essential for the socio-economic, academic, and cultural progress of the newly independent countries are pulled into the waves of migration from these countries. Developing countries supply specialists to the USA even in such new fields of contemporary science and technology as atomic physics and aeronautics. The proportion of engineers reaches 25 to 30 per cent of the total of highly qualified specialists emigrating from developing countries.

American corporations make enormous profits by intentionally enticing and using qualified specialists. This "brain drain" represents a great loss for developing countries and has become, for many of them, quite literally a national disaster. The anti-brain drain effort has acquired the greatest relevance since the end of the 1960s. The "brain drain" problem was discussed many times at national and international forums, including the UN, UNESCO, the UN Consultative Committee on the Application of Science and Technology for Development, the UN Conference on Trade and Development (UNCTAD), and at the UN Conferences on Science and Technology for Development. Local branches of international organizations have carried out investigations and on the basis of their findings have prepared reports published as official documents. Thus, UNCTAD, at its fifth session held in Manila in May 1979, adopted a document which envisioned the working out of measures for developed capitalist

states to make compensation for losses incurred by developing states as a result of their loss of qualified specialists, a loss which seriously affects the young states' economies. In the elaboration of recommendations of UNCTAD's fifth session, an authoritative intergovernmental group, in March 1980, prepared a report on UNCTAD's contribution to the formulation of a new international development strategy. The report has a special section entitled Reverse Transfer of Technology, dedicated to a comprehensive plan of action (for the beginning of the decade) and strategies for the execution of this plan in order to control the immigration of qualified workers which would properly defend the interests of all concerned parties. The report set forth a goal of achieving concrete and substantive results by 1985. Moreover, the report contained an appeal to the USA and other developed capitalist states to set up an international compensation fund and take other appropriate measures in order to encourage the return of those qualified emigre specialists who might want to go home.⁴⁰ American transnational corporations, paying no attention to developing countries' calls and international organizations' declarations, continue, as before, to pursue a policy of enticing qualified specialists from developing countries.

The appearance in developing countries of scientific schools and directions dependent on the USA through which ideas and scientific forces originating in young states are sifted also negatively affects the scientific and technical potential of these countries. The USA manages to establish such dependence in the following ways: financing research centers in developing countries; instituting personnel policies which require that such centers' open positions

⁴⁰ UNCTAD Doc., TD/B/791/Add. 1, March 17, 1980, p. 19.

(usually in the lower level jobs) be filled by specialists of local origin who have studied in the USA; promoting research concepts and methods advantageous for the USA in these centers; and providing priority in securing the leading scientific infrastructure to American researchers and specialists professionally tied to the transnational corporations' interests.

Examining this system of "academic imperialism", as it is called in the West, Paul P. Streeten, a prominent English economist, came to the conclusion that the backward countries' potential to use their own forces to generate new ideas and execute research is undermined by the presence and activities of foreign specialists and that the West's research practices in developing countries are designed to justify the neo-colonial apparatus of exploitation.⁴¹

The transfer of technology, which is the fundamental form of spreading the scientific and technological revolution to developing countries, strengthens American corporations' positions in these countries, much to their detriment, and increases the instability and uneven development of their economies.

According to our calculations, American corporations' direct income from the transfer of scientific and technical expertise to developing countries in 1981 reached 1,591 million dollars (Table 4). Of this sum, about 45 per cent was paid by Latin American countries. The primary countries which import American technology on this subcontinent are Mexico, Argentina, and Brazil. Among the developing countries of Asia, the largest buyers of American technology are India, Indonesia, Taiwan, South Korea, and Hong Kong.⁴²

⁴¹ Quoted in *Scientific Cooperation for Development: Search for New Directions*, New Delhi, Vikas Publishing House, PVT Ltd., 1980, p. 55.

⁴² *Survey of Current Business*, August 1980, Vol. 60, No. 8, p. 32.

Table 4

**THE STRUCTURE OF AMERICAN CORPORATIONS'
INCOME DERIVED FROM THE SALE
OF TECHNOLOGY TO DEVELOPING COUNTRIES⁴³**
(in millions of dollars)

	1960	1965	1970	1975	1978	1979	1980	1981
From Subsidiaries and "Daughter" Companies	135	270	486	734	881	913	1,227	1,331
From Independent Foreign-Owned Companies	26	37	74	105	151	163	215	260
Total	161	307	560	839	1,032	1,076	1,442	1,591

⁴³ Calculated from *Survey of Current Business*, December 1973, p. 19, January 1980, pp. 34-35.

The largest part of this income (84 per cent in 1981) is paid by American subsidiaries in developing countries and only an insignificant part (16 per cent) is paid by independent companies.

Among the sectors of the processing industry, the "high-tech" sectors, machine-building and chemical industries, occupy the leading position in technological payments. The greater part of the payments from Latin America for the transfer of technology is made by subsidiaries of American corporations involved in the production of machinery and equipment for construction and manufacturing, while in Asia, these payments are made by subsidiaries of American corporations involved in the production of small parts and components for electronic apparatus.

The growing amounts of payments made for the acquisition of American technology negatively affect developing countries' finances and economies. This is related to the fact that the intrafirm mechanism for technology transfer allows American transnational corporations to extract enormous excess profits by concealing part of their income from tax liability: the price of technology acquired by a given country is fixed in the subsidiary's books at a reduced figure quite frequently while the real cost is recorded in the accounting books kept in the transnational corporation's headquarters to which the given developing country's tax authorities have no access. As a result, the developing countries bear great losses and this aggravates their already severe imbalance of payments and reduces budget receipts.

It is important to keep in mind that the transfer of scientific and technological expertise, as shown above, is accompanied by payments for "accompanying" equipment, royalties coming from the transferred technology, and profits from direct private capital investments, as well as monies which develop-

ing countries pay as interest on debts, and so forth. Therefore, when all kinds of American corporations' incomes related to technology transfers to developing countries have been totalled, according to our calculations they reached 25.4 billion dollars in 1981. Our calculations are based on the method of determining prices for the transfer of technology used by UNCTAD which includes the following components: American corporations' incomes coming from subsidiaries and independent foreign-owned companies for the sale of technology; income from the export of machinery and equipment related to the transfer of technology; and income from direct American investments in developing countries, excluding the oil-producing countries.

The scientific and technological revolution creates ample opportunities for the solution of the most troublesome socio-economic problems facing developing countries today. However, ways to these solutions are blocked by imperialist policies and the fact that the majority of developing countries continue to depend on the forces of imperialism. The largest American monopolies, having gathered in their own hands the greatest part of the capitalist world's scientific and technical potential, use it to achieve their own economic and political ends.

Chapter III

TRANSFER OF TECHNOLOGY TO DEVELOPING COUNTRIES: RESULTS AND PROSPECTS

Summing up in the most general way the results of technology transfers, one should note that the export of technology to newly independent countries has neither brought about any fundamental changes in the dynamics of their economic development, nor led to these countries' achievement of economic independence. The only result of technology transfer has been the emergence of enclaves of contemporary industrial production within the developing countries' multisectoral economies, enclaves weakly integrated into the national economies. Finally, the export of technology has given rise to a new kind of dependence, technological dependence, the essence of which is found in the exploitation and subjection of developing countries within the modified system of capitalist division of labor.

This problem is especially severe since the United States and its corporations use the technology gap to put pressure on developing countries in politics and in international economic relations. Hungry for patents, technological documentation, equipment, manufacturing and management experience, developing countries cannot say no to the import of foreign technology, and, therefore, the fundamental conflict between them and the USA is focussed on the terms of technology transfer, especially on its price. The complexity of this problem is augmented by the

fact that transnational corporations possess a formidable economic, scientific and technological power and receive support from the state apparatus of developed capitalist nations, international financial organizations, and certain groups of the bourgeoisie and the governmental bureaucracy in the developing countries themselves.

1. Developing Countries' Struggle for Changing the Ways of Technology Transfer

The developing countries' struggle against the political diktat of imperialism, the rapacious exploitation of human and natural resources, and, especially, "technological neo-colonialism" is constantly taking on new forms and methods. However, the goals of this struggle do not change: the regulation of transnational corporations' activities and the achievement of technological independence.

In the second half of the 1960s, developing countries fought to get the developed capitalist states to improve the terms of the transfer and use of technology. This struggle, for the most part, was waged at the national level: developing countries began to set up special agencies to handle the matters related to the acquisition of technical expertise and industrial experience. Such agencies were established in Argentina, Brazil, India, Colombia, Malaysia, Mexico, the Philippines, South Korea, and in other states. Already one can speak of some success in their activities.

India provides a good example of this in that the state's active involvement in the regulation of the acquisition of technology there led to a significant reduction of the proportion of contracts including clauses on "conditional purchases".

In Colombia the establishment of a special council

significantly strengthened the position of national enterprises in their negotiations with foreign firms. In the process of negotiations, the initial requests for licensing fees were brought down by approximately 40 per cent saving almost 8 million dollars annually. Later, with the help of this very council, it was possible to eliminate certain discriminatory clauses.⁴⁴

Mexico's law on the registration of technology acquired and the use of patents, trade names, and trade marks was the first document designed to regulate in a general form the relations between foreign capital and the national economy in questions of technology; it was adopted in 1972 and went into effect in 1973.

With a relatively developed industrial sector, Mexico, nevertheless, is dependent, to a great extent, on foreign, especially American, technology. At present the country's industrial development is characterized by a move from an emphasis on the production of consumer goods to the production of contemporary means of production. This transition would have been impossible without the broad application of foreign technology.

The law on the registration of acquired technology adopted by the Mexican government was one of the most important political instruments aimed at achieving long-term goals of development since it established the permanent supervision of technology transfers. According to the provisions of the law, only those agreements recorded in the national register are legal and binding. Registration procedure requires that the agreements correspond to specific standards of the law. Agreements for the sale of technology which could be produced in Mexico itself, agreements which obligate the importer to

⁴⁴ UNCTAD Doc., TD/B/AC, 11/10/Rev. 1, April 22, 1974, p. 24.

transfer technological innovations and improvements to the exporter of technology or place prohibitions or restrictions on the purchasing enterprise's rights to export, and agreements which require that suits filed with respect thereto are subject to the jurisdiction of courts in a third country, are not registered by law in Mexico.

The law provides for the establishment of a center for technical and industrial information which would advise Mexican enterprises, interested in the acquisition of technology, on technology available in Mexico and abroad and on the terms for its purchase. This center's activities divest foreign (including American) corporations of an opportunity to use the lack of information about the technology market to achieve their own ends.

Measures such as the Mexican registration law have already been adopted in Argentina, Brazil, India, and Pakistan. The experience of the application of these laws clearly shows that these countries have been able to change the terms on which they acquire the technology they need and to make considerable savings when they do acquire technology. Together with this, some developing countries' national legislation provides for the optimal distribution of the fruit born by the import of technology; this promotes the more effective use of this technology. However, many of these measures, in their essence, are limited in nature and, therefore, in many cases, they are ineffective in controlling the transfer of technology from Western transnational corporations' parent enterprises to their local subsidiaries. Nevertheless, such policies reflect changes in attitudes to the problem of technical progress in the private and state sectors of the national economy which frequently underestimate the value of internal potential and encourage the import of foreign technology.

The newly independent countries, acting in a

uniform way and setting up lists of common regional demands which must be met in the import of foreign technology, have begun to play an important role in the struggle against transnational corporations' dominance of the technology market. For instance, in 1971, the countries of the Andean Group signed "Decision No. 24" on a uniform regime for foreign capital, patents, licensing agreements, royalties, and trade marks. The decision is based on important principles of these countries' economic policies, in accordance with which:

- the countries of the subregion bear responsibility for their economic development and social progress;

- the states have full and sovereign rights to freely dispose of their natural resources;

- priority attention should be devoted to national enterprises and capital in the economic development of the subregion; and

- positive contributions to the subregion's economic development are required of foreign capital investments and the import of foreign technology.

This document also envisages the creation of governmental agencies to regulate the procedure for receiving technology and attracting foreign capital investment, making the states participating in the agreement responsible for the execution of the terms of contracts signed between foreign firms' subsidiaries and parent companies, and the establishment of a subregional bureau for industrial property, responsible for the drafting of standard licensing agreements.

Like other developing countries, the members of the Andean Group understand that foreign capital's dominance in their economies, especially in the key sectors, represents a serious threat to their states' sovereignty and their achievement of economic independence. Therefore, their aspiration to regulate

foreign corporations' activities and replace their subsidiaries with mixed companies, the majority of whose stock would belong to national private capital or the state sector, is quite understandable.

A provision in the decision on the uniform regime stipulates that foreign enterprises operating in any of the countries of the Andean Group must sign agreements on their transformation into mixed companies or national enterprises in order to receive customs privileges. National enterprises are considered those in which more than 80 per cent of capital belongs to national stockholders; mixed enterprises are those in which national stockholders own 51 to 80 per cent of capital, while foreign stockholders own less than 51 per cent of capital. The term for such transformations was established as 15 years by Venezuela, Colombia, Peru, and Chile, and 20 years by Bolivia and Ecuador. The decision prohibits foreign capital investment in the countries' financial institutions, transportation, and communications.

It is natural that the idea of setting up mixed companies in developing countries is in itself acceptable since it provides greater access to the technology applied there and the opportunity to control these companies' activities. However, one should not exaggerate the scale of this control because, in the end, the producers dictate the terms to the enterprises buying their technology. In countries where the transnational corporations are still strong, the mixed company is no more than a front for the further unhindered expansion of foreign capital.

Nonetheless, transnational corporations operating in the countries of the Andean Group were very disapproving of "Decision No. 24". Of 56 directors surveyed (mostly in American corporations), 70 per cent expressed their negative attitude to this document and declared that they would review their prior decisions concerning investments in 85 new projects.

American corporations, trying to thwart progressive transformations in the countries of the Andean Group, have their strongest foothold in the area's most reactionary regimes, especially in Pinochet's Chile. The reactionary coup in Chile dealt a heavy blow to these countries' plans for cooperation. The ruling junta, in June 1974, adopted its so-called "Decree 600" which grossly violated the uniform regime for foreign capital adopted by the countries of the Andean Group, and opened up limitless opportunities for foreign, especially American, capital. Although later a firm stand taken by the majority of the Andean countries forced the Chilean junta to reconsider several of the provisions of this law, in practice the junta gives foreign capital free rein. During the second half of the 1970s, one could notice a specific reorientation of Peruvian policy designed to establish a better investment climate for foreign private capital.

The expansion of the state sector by means of the construction of new enterprises or the nationalization of foreign, including American, monopoly property plays a large role in the process of breaking the technological dependence on American imperialism. An increase in the nationalized share of capital to 60-70 per cent was characteristic of the nationalization of American property in the 1970s (in the preceding decade it did not exceed 51 per cent as a rule). Cases of the total transfer of American enterprises to the state were not so infrequent.

Using nationalized enterprises helped developing countries to become accustomed to technical progress since the majority of enterprises which previously belonged to American corporations were fitted with contemporary equipment and modern technology. At the same time, the exploitation of these enterprises has given rise to serious difficulties stemming from the lack of local personnel, interruptions

in supplies of resources, and inexperience in selling products on the world market. In several cases, developing countries were compelled, for these reasons, to maintain business contacts with American transnational corporations.

The USA, in as many ways as possible, resists the nationalization of property belonging to subsidiaries of American corporations. In many instances the USA has resorted to various means of pressure (the termination of economic and scientific and technical aid, withdrawal of most favored nation status in trade, and refusal to grant credit) in order to prevent young states from nationalizing such property. Regulation of operation of transnational corporations gives rise to difficulties not only in relations with the USA and other countries of the West, but it also causes dissent among various groups of the national bourgeoisie. For many groups of national capitalists, especially in those countries which have chosen the capitalist way of development, collaboration with American transnational corporations (as the carriers of modern technology) has become the foundation of economic activity. However, the bourgeoisie in the majority of developing countries seeks to attract and use foreign, especially American, capital on their own terms in mixed companies.

International organizations, especially UN agencies, are called upon to play a leading role in the struggle against transnational corporations' technological diktat. Lately these organizations have become the primary arena for the struggle between developed capitalist states and developing countries with the latter trying to gain a fairer access to modern technology.

International forums have only recently begun to discuss issues of technology transfer. However, it is difficult to find an international or regional organization which does not concern itself with these ques-

tions in one way or another.

After the UN General Assembly, at its 16th session, adopted the first resolution 1713 (XVI) in 1961, which stipulated measures to improve developing countries' access to modern technology, a whole series of important documents was approved which are concerned with the terms of the transfer of technology. Among these, the World Plan of Action for the Application of Science and Technology for Development, adopted in 1971, and analogous regional plans for Asia, Africa, and Latin America, occupy a special place. Such important international organizations as UNCTAD and UNIDO, which directly deal with problems related to the transfer of technology, were established.

Specifically, UNIDO, within the framework of general goals for the acceleration of industrialization in developing countries, makes recommendations with respect to measures essential for increasing labor productivity and reducing overhead costs. Moreover, UNIDO organizes seminars and conferences featuring groups of experts for the review of questions related to technology transfer.

UNCTAD is the primary organization within the UN system responsible for working out such questions. Resolution 74 (X), adopted by this organization in 1970, specified the main aspects of UNCTAD's work in the field of technology transfer:

—identifying the problems and obstacles limiting the transfer of technical expertise to developing countries;

—reviewing various kinds of expenditures in foreign currency related to the transfer of technology and, if necessary, working out suggestions to promote easier, broader, and more rapid ways of transferring modern technical expertise to developing countries through joint actions taken on an international, regional, or national basis;

—reviewing licensing and analogous agreements, paying special attention to factors which could make the development of certain industrial sectors or exports more difficult for newly independent countries or limit their effective use of technical expertise; and

—determining other factors affecting the choice of specific ways and means of the transfer of existing technology by countries providing and receiving such technology.

In elaborating on the resolution's basic provisions at the third session of the UN Conference on Trade and Development in Santiago in 1972, the UNCTAD Secretariat presented a report entitled "The Transfer of Technical Expertise" which spelled out the main difficulties faced by developing countries in acquiring technology. Based on an analysis of information available, the Secretariat recommended that the third session of UNCTAD examine the following measures to improve the situation in the field of technology transfer: the establishment of institutions in developing countries for the resolution of questions arising during the transfer of technology; the training of personnel for these institutions; the organization of a consulting service for evaluating technology transfer projects, searching and selecting alternative technologies, and discussing concrete contracts; and the appropriation of some of the funds contributed by developed countries for R & D works for the realization of projects of special significance for developing countries.

During the discussion of this report, representatives from the developing countries noted their increasing dependence on technology suppliers, emphasizing the need for adopting international legislation to regulate the transfer of technology.

Having reviewed the delegations' statements, documents, and recommendations, including the Lima

Declaration⁴⁵, which spelled out the developing countries' joint statement on the issues, the third session of UNCTAD adopted Resolution 39 (III), entitled "The Transfer of Technology".

The first part of this resolution affirms that it is essential that UNCTAD continue its work in this field relying on appropriate organizational measures. In the two other parts of the resolution, dedicated to the improvement of access to technology and the perfection of the scientific and technical infrastructure in developing countries, there are several concrete recommendations to promote the more effective use by newly independent states of foreign technology. The resolution specifically recommended that developed capitalist states encourage the transfer of technical expertise to developing states in greater volumes, appropriating 0.05 per cent of their GNP for the resolution of these states' technological problems. It was also recommended that developed countries appropriate no less than 10 per cent of the amount of money spent by them on research and development for the resolution of problems of special significance for newly independent countries' economic development.

The adoption of Resolution 39 (III) substantially expanded UNCTAD's authority in the transfer of technology to developing countries and was an important step toward mapping out measures to improve the terms of this transfer.

Resolution 39 (III) is also significant in that it heralded the way for UNCTAD to begin working out an international code for the transfer of technology. As early as in the beginning of the 1960s it was admitted that the existing mechanism for the interna-

⁴⁵ UN Industrial Development Organization, *The Realization of the Lima Declaration and Plan of Action*, New York, 1979, pp. 33-34.

tional exchange of technical expertise on the capitalist market had to be changed. This question was first raised, at the developing countries' initiative, at the 16th Session of the UN General Assembly in 1961. The question was further discussed at its 6th Special Session in 1974. The Program of Action on the Establishment of the New International Economic Order, adopted at this session, states that it is essential to do everything to work out an international code for technology transfer which would meet the needs and conditions of developing countries today.

The problem of improving the developing countries' use of modern technology was broadly discussed at the UN General Assembly's 7th Special Session in August 1975. In the concluding resolution, a special section was devoted to this question. This section specifically recommends the establishment of a UN bank of industrial and technical information and the study of the possibility of organizing regional and sectoral banks which would help developing countries expand their freedom of choice of technology.

The draft of the code submitted for discussion in UNCTAD stipulated the establishment of precise rules and standards of behavior on the world technology market, the need to specify the exact distinction between patented and freely accessible technology, the reflection of this distinction in the terms of trade agreements in the field of technology transfer, and the expansion of trade in patented technology on mutually beneficial terms guaranteeing the establishment of fair prices.

Moreover, the draft of the code specified the principles of relations between suppliers and buyers of technology, in accordance with which it was forbidden to write certain restrictive clauses into relevant agreements. The draft also forbade such practices which, much to the detriment of the devel-

oping countries, affect the smooth transfer of technology, such as the setting up of national or international cartels to control exports and imports.

Among the more serious contradictions between developed capitalist states and developing countries are those related to guarantees and the settling of disputes between suppliers and buyers of technology, since these issues have a direct bearing on the problem of national sovereignty. The developing countries' point of view on these issues is clearly expressed in the draft code which provides for the settling of all disputes between suppliers and buyers of technology by courts in the recipient state.

The draft code, to a great extent, reflected the interests of developing countries in the field of technology transfer. However, it was only a first step toward working out new standards for the relations between suppliers and buyers of technology. Provisions regulating the international trade in technology could be more effective if, while working them out, lawyers took into account the need for the full equality of both concerned parties.

The Western states, led by the USA, and the developing countries presented two quite diverse drafts of the code. The developing countries' demand that the code be considered a legally binding document met with the USA's utterly intransigent position.

Much attention was paid to the question of the code on technology transfer at the UN Conference on Science and Technology (Vienna, 1979), the 5th Session of UNCTAD (Manila, 1979), the UN General Assembly's 11th Special Session (New York, 1980), and the UNIDO Session (1984). In accordance with the decisions adopted by these international forums, the code was to have provisions which would formalize fairer standards for technology transfer and preclude inequitable relations and monopolies' restric-

tive trade practices both in international agreements and in the exchange of technology between transnational corporations and their subsidiaries in developing countries.

Meanwhile, Washington, while paying lip-service to the right to choose technology for import and adaptation, and agreeing to collaborate with several regional centers for technology transfer founded by these countries, insisted that the primary channel for such technology transfer had to be investments of capital made by TNCs in these countries' economies. Moreover, the USA seeks to reduce the list of restrictive trade practices outlawed by the code.⁴⁶ As a result of the Americans' obstructionist position, the code has not yet been fully worked out.

The developing countries are speaking out decisively for the reform of the patent system. Specifically, they recommend that the patent owner be obliged to use the invention practically in the national industrial sector. The practice of issuing and using the author's certificate, adopted in the socialist countries, evokes growing interest in developing countries. This is reflected in several recommendations for the re-examination of the patent system made in UNCTAD, the World Intellectual Property Organization (WIPO) and several other international organizations. Of interest are research and experimental systems to regulate patents and licenses prepared by WIPO. Legislative models providing for the defense of young states' sovereign rights have been worked out specially for developing countries by this organization.

The plan to establish a bank for patents, manufacturing experience, and latest achievements in science and technology, as proposed by WIPO, UNCTAD, and UNIDO, is of special interest. The

⁴⁶ *The OECD Observer*, March 1981, p. 11.

broadest possible exchange of information through this bank would help newly independent states to better orient themselves in their selection of technology on profitable terms.

The need to reorganize the international patent system has been voiced many times at UNCTAD sessions. One of this organization's documents states: "After the current revision of the Paris Convention for the Protection of Industrial Property, all countries should continue to review the ways in which the industrial property system can become an effective instrument for the economical and technological development of developing countries. In particular, efforts should be made to promote the effective exploitation of patents in developing countries."⁴⁷

Furthermore, it is utterly clear that developing countries cannot limit themselves to the import of technology. In order to achieve economic independence the newly independent countries must have great scientific and technological potential, which, at present, the majority of them lack.

In this respect, the 4th Session of UNCTAD adopted the detailed Resolution 37 (IV) on the need to help the developing countries strengthen their scientific and technological potential in order to reduce their dependence on foreign technology. The resolution recommended that developing countries take measures to work out a national technology policy and plans for research and development as part of national economic plans, as well as measures to set up national centers for the transfer of technology. The measures worked out by individual developing countries were recommended to be complemented by cooperation between them, primarily by expanding the exchange of information and

⁴⁷ UNCTAD Doc., TD/B/791/Add. 1, March 17, 1980, p. 19.

experience and by setting up regional and subregional centers for the transfer of technology. All this was a catalyst for the developing countries' elaboration of a more comprehensive and effective technology policy and their establishment of the corresponding institutions.

Acting on this resolution, the developing countries paid much attention to the establishment of national centers for the transfer and development of technology, centers set up to play a role in coordinating efforts of Asian, African, and Latin American countries. The national centers are working out and realizing technology policies, coordinating the activities of national institutes in technological matters, establishing ties with the manufacturing sector, and encouraging and strengthening technical cooperation among developing countries.

National centers were set up in Afghanistan, Ethiopia, Iran, Sri Lanka, and Venezuela. Thailand, Egypt, Somalia, Bangladesh and several other developing countries turned to the UNCTAD consulting service for help in organizing such centers. Together with problems common to all countries in the field of technology transfer, each country, depending on the socio-economic conditions which have developed there, has its own specific problems. Thus, Iraq and Ethiopia set up national centers with broad executive powers. Other countries, such as Sri Lanka and Venezuela, plan to set up centers which would play rather a consulting and coordinating role.

Some of the more advanced developing countries have begun to move on from executing technology policies to making technology plans within the framework of their economic development planning. Thus, in the late 1970s, five countries, Brazil, India, Mexico, Pakistan, and Venezuela, which produce about 40 per cent of all manufactured goods made by newly independent states and account for 45 per

cent of their population, worked out and published their plans in science and technology.⁴⁸ In each country, the elaboration of such a plan led to the establishment of goals for research and development and elaboration of measures to be taken in education and training.

Striving to accelerate the advent of technological independence, the developing countries are setting up regional centers for technology transfer. The comparatively low level of productive forces in the majority of developing countries, the small capacity of domestic markets, and limited financial opportunities push developing countries to establish and expand inter-regional ties.

In the second half of the 1970s, several regional centers for technology transfer were established—the Asian, African, and West Asian.⁴⁹ Work is now going on in the organization of Arab and Latin American regional centers. These centers are important in that they effectively assist developing countries in drafting patent and licensing agreements and in this way strengthen the position of these countries at negotiations with corporations based in the USA and other developed capitalist states. No less important is the role they play in providing young states with information. Regional centers can serve as a specific counterweight to the international computer information systems actively set up by transnational corporations, the use of which significantly increases these corporations' "maneuverability" at negotiations with developing countries' national organizations. Finally, in the future, regional and subregional centers will be able to control the execution of the "code of con-

⁴⁸ UNCTAD V, "Towards the Technological Transformation of the Developing Countries", Item 13(C), *Main Policy Issues, Manila, May 1979, TD/238*, March 15, 1979, p. 74.

⁴⁹ *Ibid.*, p. 45.

duct" in the field of technology transfer. Developing countries are also preparing the ground for preferential agreements concerning the development and transfer of technology to one another.

The state apparatus can play an important role in working out scientific and technological policy since, in the majority of countries in Asia, Africa, and Latin America, practically all national scientific research is concentrated within the framework of the state sector.

The practice of concluding bilateral and multilateral agreements by developing countries (and there are grounds for expanding this practice) has become a new factor in these countries' effort to reduce their scientific and technological dependence on imperialist states and their TNCs. The relatively low level of productive forces in most of the developing countries and their common interests in the struggle against imperialist states' technology policy have made uniting the young states' forces and resources a matter of top priority.

The establishment of broader economic, scientific and technological ties between the developing countries enables them to create high-capacity regional and subregional markets and use national resources effectively. This is assisted by the processes of integration in which specialization and cooperation play an especially important role.

Lately the developing countries have been trying to set up a more favorable climate for cooperation on the basis of bilateral and multilateral agreements. These ties may have a good future, although cooperation in the field of technology is limited by the level of development of the productive forces in these countries. Young states have already established broad economic, scientific and technological ties. For example, Mexico and India signed an agreement on cooperation in science, technology, and industrial

production, in accordance with which Mexico was to provide the Indian government with technical documentation in shipbuilding. India, for its part, was to give Mexico documentation for the construction of atomic power plants. India also concluded an agreement with Argentina to assist it in expanding its production of atomic energy and an agreement with Guyana and El Salvador to cooperate in manufacturing. According to an agreement signed in 1977, Argentina provides technical assistance to Peru in the construction of its atomic power plant. In 1979, Brazil signed an agreement with Nigeria on the sharp increase of oil purchases in exchange for Brazilian agricultural and manufactured goods, and with Iran on oil prospecting. In 1984, Ethiopia and Algeria signed an agreement on economic, technical, and cultural cooperation.

So far these are only the first steps taken by developing countries in the field of scientific and technical cooperation. Their realization objectively helps reduce neo-colonial dependence in technological matters.

Developing countries face the complex problem of effectively using natural, financial, and human resources. In this respect, it is important to properly evaluate the first steps taken by young states in the field of regional scientific and technological cooperation. Thus, the countries of the Andean Group agreed to a subregional program of development and defense of the interests of these countries in matters of technology. In July 1974, they signed an agreement on a joint policy for technology, joint organizational and administrative measures, and the exchange of information. These countries pay special attention to finding their own technological solutions. For instance, they perform research on the use of tropical timber, coal and charcoal. Specialists from these countries have worked out a process for the bacteriological

refinement of copper (instead of the electrolytic process) and patented this invention. Simultaneously, work is going on in these countries in the adaptation of Western technology to local conditions in the chemical, electronics, and other sectors.

In certain regional groups, the developing countries take steps to coordinate their scientific research activities. Thus, decisions adopted in January 1976 by the session of the Latin American Council, the highest organ of the Latin American Economic System which includes 25 states, provide for cooperation in the organization and coordination of research on a regional level. These measures could become an effective means in the struggle against American and other TNCs.

In the last 10 to 15 years many developing countries have turned to new methods in their struggle against the expansion of American imperialism and the dominance of transnational corporations. Young states have achieved tangible successes, using, in part, interimperialist contradictions and competition among various transnational corporations, as well as the rivalry between large corporations and smaller companies which export technology.

In order to gain more profitable terms, developing countries have moved on to the practice of expanding their contacts with middle-sized and smaller American and other Western firms which frequently offer contemporary equipment for sale and have actually worked out new technological processes. Young states more and more frequently resort to policies which restrict or prohibit the activity of foreign capital in several of the economy's leading sectors. This is all proof of the developing countries' aspiration to break their technological dependence on the USA and other imperialist states.

The development of cooperation with the socialist community countries enables developing countries

to maintain their independent foreign policy course and use the achievements in science and technology which the peoples of the socialist community have reached.

The Soviet Union renders scientific and technical aid to newly independent countries on the basis of intergovernmental agreements on economic and technical cooperation. By the beginning of 1982, the Soviet Union had signed such agreements with 70 developing countries; according to these agreements the USSR provides young states with multifaceted economic and technical assistance in the development of various sectors of their economies. The USSR's scientific and technological cooperation with India, Afghanistan, Turkey, Iraq, Syria, and Algeria has taken on a stable nature and is effected on the basis of long-term agreements for 10-15 years, as a rule. The mechanism for cooperation with other countries is being perfected.

The USSR's technological cooperation with developing countries is designed to set up and expand these countries' scientific and technological potential; develop equal and mutually beneficial relations on a stable, balanced, and long-term basis without any kinds of dependence or exploitation; establish close ties between science and production; and effectively train local personnel in the developing countries.

All the technology transferred by the Soviet Union to the newly independent countries as well as enterprises built on the basis of this technology are the recipient countries' own property. The developing countries, in the early 1980s, counted 1,700 industrial enterprises, electric power stations, hydropower plants, and other projects built with Soviet assistance.

The developed capitalist states give the funds they have appropriated for scientific and technical aid primarily to the private sector and, as a rule, not for

the establishment of complexes which would guarantee the most effective use of national resources in the recipient countries' own interests, but for the development of production oriented, for the most part, towards foreign markets.

The characteristic feature of Soviet technical assistance to developing countries is that it is received by these countries' state sector; in fact, in many cases, the projects of such cooperation are the very foundation of the state sector. Thus, enterprises built with Soviet technical assistance form the foundation of India's state sector in the production of mining equipment and power plant and in the medical industry. Syria's state sector is composed of projects built with Soviet assistance in the fields of energy and oil production, and that of Algeria of factories in non-ferrous metallurgy (the production of mercury) and the aluminum industry.

The transfer of the center of gravity in industrial development in many developing countries to their state sector provides an opportunity to oppose imperialist powers' corporations more successfully and effect measures for the nationalization of the economy's key sectors. The state sector allows for the more effective use of planning elements and it is especially important to emphasize that this kind of development, in many newly independent states, meets the needs not of certain groups and strata, but of the overwhelming majority of the population.

The socialist community countries' technological cooperation with developing countries promotes the manufacture of one or another kind of products in order to set up an independent and balanced national economy capable of participating in the international division of labor as an equal partner. Assistance is rendered first and foremost for the development of the production sphere, especially to the young states'

national industries.

The characteristic trait of such economic and technical assistance is its comprehensive nature. Soviet specialists, for instance, render assistance in the construction of projects, in the carrying out of prospecting and other work prior to the start-up of construction, as well as in the exploitation of projects after they have been built. This helps developing countries to imitate and use the Soviet specialists' scientific and technical expertise and experience in all phases. Soviet specialists provide a great deal of assistance in the training of local personnel in various fields.

The comprehensive nature of assistance is also manifested in the establishment of territorial-production complexes. India is the case in point. One of its complexes is made up of metallurgical factories in Bhilai and Bokaro and machine-building plants in Ranchi, Durgapur and Hardwar. In Afghanistan a complex of enterprises for the extraction, transportation, and processing of natural gas was set up. In Guinea several projects were built for a bauxite extraction complex. In Egypt and Syria hydroelectric complexes were established; on the basis of these plants energy-intensive sectors (including the iron-and-steel and non-ferrous metals industries) were set up, the villages were provided with electricity, and large agricultural enterprises were organized.

The USSR and the other socialist countries do not restrict access to their technology. The newly independent countries are given the same technology as used by the socialist countries themselves. There are also no sectoral restrictions such as those used by the Western firms out of fear of losing control over the markets of the developing countries.

Thus, the USSR built several metallurgical plants in Asia and Africa. The largest of these were built in India: in Bhilai, with an output of 2.5 million tons of

steel annually, and in Bokaro, with an output of 1.7 million tons of steel annually. At present, work is being done to increase the output of these two plants to four million tons annually. In March 1979 the two countries signed an agreement on the construction of a third metallurgical giant with a projected output of 3 million tons of steel annually in the city of Vizagapatam (in the state of Andhra Pradesh).

With Soviet aid, the steel-smelting shop in the metallurgical factory in El Hadjar in Algeria has been operative since 1972. Its output reaches 410 thousand tons of steel each year. This is ten times greater than what was produced by all of Algeria before it became independent. The Soviet Union also renders significant technical assistance in the setting up of iron-and-steel plants in Pakistan, Turkey, Nigeria, Sri Lanka, and other newly independent countries.

The Soviet Union has rendered many developing countries assistance in oil and gas exploration surveys. Soviet technical aid helped Syria to set up an utterly new sector in the country's economy within the framework of the state sector, an oil extraction sector, which became the country's primary source of national income. The USSR has given much aid for the development of the oil and gas producing industries of Algeria, India, Iran, Afghanistan, Ethiopia, Nigeria, and many other countries.

The choice of which modern technology to use is made by Soviet foreign trade organizations only with the consent of their partners and in accordance with the plans of the recipient state. Thus, in many newly independent countries, in accordance with their wishes, scientific and technical aid was rendered for the development of agriculture. The construction of irrigation and land-improvement projects, as well as those in the food, fishing and other industries, occupies an important place in this field of cooperation.

As distinct from Western countries' policies, designed to restrict developing countries' technological potential, the socialist states permit the broad application of technology acquired from them, including the use of licenses. Licenses are granted in the "pure" form as well as with a comprehensive set of equipment and technology supplied by the socialist states. For example, in 1979, Tyazhprom-export, the Soviet foreign trade organization, licensed the manufacture of spare parts for machinery sold previously to a metallurgical factory in Turkey. Once licensed, the countries acquire rights to a further improvement of the object of the license, which promotes the development of national research and development services as well as the creation of their own models of machinery, equipment and technologies.

The Soviet Union is opposed in principle to the application of restrictive business practices in the transfer of technology. Developing countries often pay for Soviet technology by exporting goods to the USSR. This approach leads to the development of economic, scientific and technical cooperation on a product-pay-back basis which is the most promising form for foreign trade ties. One of the advantages of cooperation on the product-pay-back basis is that it encourages the establishment of new export sectors in developing countries, thus increasing their potential to purchase essential goods and pay for scientific and technological services.

Soviet scientific and technical assistance to developing countries is designed to promote their appropriate sectoral complex and scientific and technological potential, optimal selection of technology, and scientific infrastructure for the training of local personnel. This is indubitably a difficult task. It is made even more difficult by the fact that the USA and the other capitalist states and transnational corpora-

tions see a threat to their own technological supremacy in the development of national science in young states. Therefore they not only avoid assisting the development of such infrastructure, but they try to hurt it in various ways, including the "brain drain" and patent obstacles.

As far as Soviet aid policy is concerned, it is aimed at shaping elements of the national scientific infrastructure in developing countries, including the establishment of their own research institutions, machine building and industrial construction capable of the rapid absorption of new technology, and the training of local personnel.

Thus, within the framework of its agreements on scientific and technical cooperation with developing countries, the USSR exchanges scientific and technical information, scientific delegations, and specialists; organizes seminars, exhibitions, conferences; effects the transfer of projects and technical documentation; and performs joint research in fields of interest to developing countries. Research and development divisions and design offices are component parts of the majority of enterprises built with technical aid from the Soviet Union. Research and development work is going on in the institutes of higher learning established in the newly independent countries with Soviet assistance. These include institutes engaged in research and development, laboratories, experimental stations, and designing and technological centers. For instance, India's major design and development organization MECON, established with Soviet aid, is the chief consultant for the Indian government on the development of the iron-and-steel industry. MECON specialists execute complex design works for many large national and foreign projects in ferrous and non-ferrous metallurgy. With Soviet aid an atomic research center, called Tajoura, was built and went on line in Libya. In Conakry, the capital of

Guinea, a research center for the carrying out of joint work in oceanography, heliophysics, and the testing of construction materials in tropical conditions has been established.

Such a means for the transfer of technology as the establishment of special consulting and designing bureaux has become widespread in the socialist countries; these bureaux provide developing countries with various kinds of technological services and consult them on questions of new technology and equipment, the execution of design work in the field of construction, the organization and management of production, market research, and so forth. Much work is being done to establish and develop the infrastructure in developing countries. In order to execute such projects and research work, the socialist states are setting up special organizations. Hungary, for instance, set up a Bureau for International Scientific and Technical Cooperation which maintains contacts with many Hungarian design organizations.

The establishment of consulting agencies has won the developing countries' support and approval. In those which already had research and development facilities, the socialist countries set up mixed consulting companies and designing bureaux. Such companies were created in Nigeria, Peru, Algeria, Mali, Tunisia, Ethiopia, and other developing countries.

In setting up the basis for mechanical engineering and industrial construction, the USSR assists in the establishment of enterprises abroad which produce chemical equipment, electronics, instruments, and construction equipment. The mechanical engineering plants in Ranchi, Durgapur and Hardwar, built with Soviet aid, meet 80 per cent of India's domestic demand for metallurgical equipment and 60 per cent of its demand for turbines. Moreover, these factories manufacture power plants with unit capacity of 200 megawatts. Even most developed capitalist states

cannot produce machinery of such capacity.

The Soviet Union gives all-round assistance to the newly independent countries in the training of local personnel, thus helping create the proper conditions for the establishment of complex, contemporary production lines with the use of local resources and forces. During the years of cooperation with the developing countries, 1,250,000 specialists were trained for various fields within the national economies with Soviet aid.

Soviet cooperation with developing countries is characterized by the fact that Soviet economic, scientific and technical aid is an integral whole. The training of local personnel within the framework of technical cooperation, as a rule, is goal-oriented and geared to meet the needs of enterprises being built with Soviet aid.

The further strengthening and development of scientific and technical cooperation between the USSR and the newly independent states will help the countries of Asia, Africa, and Latin America to overcome their technical backwardness and enhance their technological independence from the USA and the other developed capitalist states.

2. New Trends in American Policy of Technology Transfer

Let us now examine the most important, newest elements of American policy on the transfer of technology to developing countries.

American technology transfer policies take into account the socio-economic differentiation of the countries of the developing world and the diversity of American interests in these countries.

The more developed young states (those countries characterized by an annual GNP growth rate in ex-

cess of 4.1 per cent with a relatively strong industrial potential, industrial export sector, and a total population of approximately 650 million people) are becoming an international middle class in the opinion of American economists. American corporations transfer their technology to these countries on a purely commercial basis.

The less developed young states (those characterized by an annual per capita income of less than 550 dollars, a GNP growth rate equal to 1.9 per cent, and a total population of more than 2 billion people) have serious economic difficulties and, first and foremost, need significant financial, scientific and technical aid; the USA transfers technology to these states primarily through governmental channels, through various programs of scientific and technical aid. This aid is primarily given to those developing countries which at present have limited opportunities to expand their trade and economic relations with the USA due to their profound economic backwardness or financial difficulties.

The oil producing and exporting countries, OPEC members (13 countries with a population of approximately 350 million people which produce more than 65 per cent and export approximately 80 per cent of the oil used by the capitalist world), occupy a special place in the American policy of a differentiated approach to the transfer of technology to developing countries. The USA tries to guarantee itself access to their energy resources and put their foreign economic policies under American control.

Representatives of the American government have more than once explicitly and implicitly warned the OPEC member states that in the event of an "unwarranted" price increase on energy resources, the USA would use such control levers as these countries' dependence on the USA for arms, foodstuffs, and modern technology.

At the same time, the USA tries to avoid a further aggravation of the tensions which already characterize its relations with this group of developing countries. Not refusing to use pressure on the OPEC countries or to take measures designed to wean the other developing countries from the OPEC member states, the USA maintains a policy of encouraging scientific, technological, trade and economic relations with these countries. Richard N. Cooper, then Under Secretary-Designate for Economic Affairs for the US State Department, said: "We shall continue our efforts to integrate key OPEC countries into the world economic structure...."⁵⁰

Lately the US Administration has taken to concluding intergovernmental agreements between the USA and the OPEC member countries, especially with the countries of the Middle East, on economic, scientific and technical cooperation, including a broad spectrum of questions, and the establishment, on the basis of these agreements, of mixed commissions to regulate economic, scientific and technical ties between the two parties. Not relying on private companies, the American government interferes in the course of the development of economic, scientific and technical relations with the countries of the Middle East. Thus, in 1974, the USA and Saudi Arabia set up a Joint Commission on Economic Cooperation in order to promote programs of industrialization, trade, agriculture, science and technology. In 1975 the two countries signed an agreement on technical cooperation, in accordance with which, in the course of five years, over 20 projects in various branches of science and technology,⁵¹

⁵⁰ *The Department of State Bulletin*, Vol. 76, No. 1973, April 18, 1977, p. 382.

⁵¹ *Science, Technology, and American Diplomacy 1981: Second Annual Report Submitted to the Congress by the President...*, Washington, D.C., GPO, 1981, p. 151.

at a total value of about one billion dollars, were realized. The formation of the joint commission helped the American companies to lay their hands on government orders in this country, which promoted a sharp and abrupt expansion of American exports to Saudi Arabia (from 0.4 billion dollars in 1973 to 7.9 billion dollars in 1983). Similar agreements were concluded with Egypt, Jordan, Iran, Iraq, Oman, Tunisia, and other countries.

The significant expansion of trade and economic relations and scientific and technical ties between the USA and the oil-producing countries of the Middle East in recent years has made the latter dependent on the American market, especially since many of them are involved in programs of economic development which require a constant flow of high-tech products and technological experience.

The abrupt invigoration of the activities of the transnational monopolies, the largest suppliers of contemporary technology, has become a characteristic feature of American foreign economic policy. In recent years, these monopolies have rapidly strengthened their positions in the mining and processing sectors of developing countries, and this worrisome fact has been explicitly recognized in UN documents.

The transnational monopolies actively use their formidable scientific and technical potential to force the developing countries to accept their terms for cooperation. Through the technology market, American monopolies exert enormous influence on the technical directions taken and the range of goods produced in these countries. It suffices to indicate that in the mid-1970s, of all the patents used in developing countries, 91.2 per cent were foreign, 40.6 per cent were American. Such a situation on the technology market allows American monopolies to make enormous profits and orient developing

countries' economies towards meeting the interests of American capital to the detriment of their own development.

Beginning in the second half of the 1970s, changes took place in American corporations' mechanism for the transfer of technology to developing countries: American corporations took an obvious turn to the transfer of technology to their subsidiaries and daughter companies abroad, in comparison with independent foreign companies. This trend was observed in an analysis of accounts payable and receivable for technology transferred by American firms to their subsidiaries and daughter companies in developing countries on the one hand, and to independent foreign companies in these countries, on the other. Thus, from 1968 to 1980, the average annual growth of payments made by dependent firms reached 19 per cent, while independent firms' payments grew by only 8 per cent.⁵²

In the 1980s, official circles in the USA planned for the broad involvement of universities, institutes, and public organizations in the realization of technology transfer policies. In the USA there are about 600 private and public organizations of which over 100 regularly receive financial support from the American federal budget and participate in programs of scientific and technical aid. These organizations are expanding their activities in areas where cooperation with foreign governments is especially effective from the American point of view. Moreover, relations with public organizations, universities and colleges, as a rule, do not entail difficulties which may arise between countries dealing with each other through governmental channels. The fact that in 1980 these organizations provided 1,301 million dollars

⁵² *Survey of Current Business*, January 1980, pp. 34-35; August 1980, pp. 36-37.

in aid to developing countries, while in 1970 they gave only 598 million dollars, is proof of the scale of these organizations' activities.⁵³

The trend towards increasing the use of universities, colleges, and other public organizations in American foreign economic expansion has been developed by the Reagan Administration which has included in its aid policy priorities the active involvement of American private and public organizations in the realization of scientific and technical aid programs for developing countries.⁵⁴

An increase in the attention paid to agriculture, energy, health, the regulation of population growth, education, and the training of local personnel is becoming characteristic for American scientific and technical aid. In other words, in accordance with the new directions being taken in American aid policy, the USA is clearly holding its course to the concentration of its efforts in so-called "priority spheres" in developing countries' economies and social infrastructures, as distinct from emphasizing the development of the production infrastructure, as was done in the 1960s.

Such a policy is due to the USA's aspiration to adjust to the international economic situation of the 1980s and is a response in its own way to the young states' demand to establish a new international economic order. AID appropriations for agriculture, energy, health, population growth control, education and the training of local personnel increased approximately two-fold from 1973 to 1982, amounting to about 80 per cent of all of this agency's appropriations for aid to foreign states in 1982.

⁵³ Roger Hansen et. al., *US Foreign Policy and the Third World, Agenda 1982*, Prepared for the Overseas Development Council, Praeger, New York, 1982, p. 235.

⁵⁴ "New Directions in Foreign Aid Policy", *Business America*, No. 7, April 6, 1981, p.3.

The use of American achievements in science and technology to help developing countries in the exploitation of the resources of the World Ocean, the peaceful utilization of atomic energy, and the practical application of space technology is a new direction in the USA's scientific and technical aid policy, the direction which arose with the unfolding of the scientific and technological revolution.

The expansion of aid to young states in their exploitation of the resources of the world ocean can be explained by the USA's desire to gain unilateral advantages with respect to rights and practical opportunities for American monopolies to extract and use marine resources located in the developing countries' territorial jurisdiction.

American plans are based on these countries' practically utter lack of expertise, scientific and technical potential, and personnel essential not only for the carrying out of deep-water work, but also for the use of petroleum and mineral resources. In these conditions, the USA is trying to gain access to deep-water resources and resources located on the developing countries' continental shelves and to secure for its corporations an unrestricted and unchallenged position in these countries. Precisely for this reason, the Reagan Administration refused to sign an international convention on maritime law which had been drawn up in 1982 as the culmination of many years of negotiations in the UN.⁵⁵

Under the guise of economic, scientific and technical aid, the USA helps developing countries explore their coastal regions and develop their national facilities for the exploitation of ocean resources. For these purposes, local scientists are invited to participate in American expeditions, and assistance

⁵⁵ *The Department of State Bulletin*, No 2071, February 1983, p. 86.

is given in the analysis and systematization of data and materials; the USA also participates in the training of oceanographers for developing countries, and transfers marine technology to these countries. However, it is clearly obvious, that American aid in the execution of oceanographic research is no act of charity. The United States considers it as one of the means of gaining access to the developing countries' coastal waters, as a course which will open up the possibility for influencing their national programs for marine development, as a first step for drawing American private capital into the exploitation of these states' natural resources.

The use of marine petroleum and gas fields, which the USA considers one of the ways to resolve its energy problem, is the object of special attention in American plans for the development of the World Ocean. American corporations, with their great experience in the organization and execution of work involved in the extraction of oil, owning almost 70 per cent of the world's installations for underwater drilling, had already become intensively involved in the exploration for and extraction of petroleum and gas in practically all the regions of the World Ocean at the end of the 1960s.

For many years, the USA has been active in trying to gain access to resources on the continental shelves and in the coastal regions of countries which have neither financial nor technological means for their exploitation. American oil monopolies are engaged in active exploration projects on the shelves of many countries in Southeast Asia: near the shores of Indonesia, Malaysia, Thailand, the Philippines, as well as on the continental shelves of South Korea and Taiwan.⁵⁶ American oil monopolies' expansion has assumed a large scale in the countries of the Middle

⁵⁶ *Newsweek*, August 27, 1979, p. 14.

East: Saudi Arabia, Abu Dhabi, on the shelves of such Arab Emirates as Bahrain, Dubai, Sharjah, and others. Plans for investigating the ocean floor along the shores of many countries of the Indian and Pacific oceans are being worked out.

Recently, the USA has engaged in research designed to determine a way to use the ocean's thermal energy, energy derived from the temperature difference between surface and lower layers of water. During the energy crisis, the use of this source of energy, according to American scientists, could help reduce the import of oil from a number of developing countries. Therefore, beginning at the end of the 1970s, the US State and Energy Departments have been actively studying the possibility of giving scientific and technical aid to young states precisely in the use of this kind of energy. American interest in this issue can be explained primarily by the significant economic and political profits to be reaped from such cooperation. In the American President's annual report on issues of the international use of science and technology in 1981, it was openly admitted that the creation of technology for the use of the ocean's thermal energy, and the transfer of this technology to developing states "can strengthen economic and political ties with the LDCs, and might reduce LDC budget assistance requirements. In addition, introduction of new technology would open an export market for our OTEC technology, products, and services."⁵⁷

In this way, the provision of scientific and technical aid to developing countries for their tapping the resources of the World Ocean proves the USA's aspiration to maintain its control over the realization of the relevant national programs, use this aid

⁵⁷ *Science, Technology, and American Diplomacy 1981...*, op. cit., p. 239.

as one of the means to gain preferential access to the marine deposits of petroleum and metals located along the coasts of Asian, African and Latin American countries, and promote American foreign economic expansion.

The provision of aid to developing countries in the peaceful uses of nuclear energy is another important trend in American economic activities related to the scientific and technological revolution. However, American policy in this field is rather contradictory. On the one hand, the USA is for the use of nuclear energy as a replacement for oil, which is of great significance in an energy crisis. On the other hand, the USA is afraid of the possibility that developing countries might gain possession of nuclear weapons.

The American position on this issue was reflected in the Nuclear Non-Proliferation Act of 1978. One of the law's primary provisions states: if other countries want the USA to continue to supply them with nuclear fuel for atomic power plants, they must agree with the "American view" of the development of atomic power engineering. Otherwise, the importing countries will be "punished" by the termination of supplies. Furthermore, there are several concrete demands, specifically: the introduction of American control over all facilities where atomic energy is used for peaceful purposes in countries which import American materials; the prohibition of recycling uranium without prior American approval; prohibition on the transfer of imported technology and materials to third countries without prior American consent; prohibition on the stockpiling of plutonium extracted from American-supplied fuel for nuclear reactors at national nuclear installations without prior American consent; and so forth. However, the law provides that the President retains the right to make exceptions from the general rules.

Such a position on questions of the transfer of

nuclear technology is due not so much to American concern for the prevention of the further proliferation of nuclear weapons, as to a bid to return the American monopolies to their position of dominance in the world capitalist market for atomic power installations and nuclear fuel, a position which had been undermined by the Americans' competing allies, especially France and West Germany. This is witnessed by steps taken by the USA itself when it declared, as early as September 1978, that the United States would remain a "reliable supplier" of reactors for atomic power plants and enriched uranium for South Korea. The USA also offered to supply two atomic reactors each for Egypt and Israel, although the latter had not signed the Treaty on Non-Proliferation of Nuclear Weapons.

In the late 1970s and early 1980s, American scientific and technical aid to young states in the wide-scale use of nuclear energy was primarily provided on a multilateral basis through the offices of the International Atomic Energy Agency (IAEA). The USA's main thrust in this organization was concentrated on the realization of the program designed to restrain the proliferation of nuclear weapons and the carrying out of international inspections of nuclear research going on in countries which do not possess atomic weapons.

The USA also participates in the realization of IAEA programs for scientific and technical aid to developing countries for the utilization of radioactive isotopes in agriculture, medicine, manufacturing, and hydrology. The USA supplies uranium-based fuel for scientific research in atomic reactors, equipment for irradiation, and trains local personnel and specialists for several developing countries.^{5 8}

^{5 8} *Science, Technology, and American Diplomacy 1981...*, p. 205.

The step-up in American involvement in the IAEA has meant an increase in the number of American personnel in this organization. Due to the great degree of American influence, more than 50 per cent of the equipment and materials essential for IAEA programs of technical aid is purchased in the USA.

The USA's use of achievements in science and technology related to the exploration of space plays an important and growing role in American scientific and technical aid policy.

The USA has undertaken a series of projects under which the developing countries use American satellites for the exploration of the earth's natural resources, satellites capable of locating oil and mineral deposits, monitoring the development of crops, specifying their vulnerability to disease, forecasting grain harvests over big areas, observing the migration patterns of fish in the ocean, and so forth. Trying to make young states dependent on its achievements in space, the USA grants developing countries subsidies for the construction of stations receiving information from satellites, trains local personnel for them, and establishes preferential tariffs for the use of information received, and so forth.

The USA also attaches great significance to the use of satellites as a means of ideological influence on the people of the developing world. Using the shortage of primary schools and teachers in the young states, the USA, through its satellites, transmits educational programs designed, as a rule, for these countries' adult population.

Taking advantage of the developing countries' desire to have effective communications systems, the USA involves young states in the INTELSAT (International Telecommunications Satellite Organizations) System. The majority of stock in this multinational corporation for working out and exploiting space communications systems is held by COMSAT, an

American Communications Satellite Corporation.

INTELSAT's activities include supporting operations of space segment facilities and ground-based facilities. The corporation uses 10 satellites with a zone of activity which includes the countries of the Atlantic, Indian, and Pacific oceans. The ground sector has 233 stations located in 140 countries and territories. This multinational corporation is actually under American control. All its satellites were launched by the United States and 90 per cent of INTELSAT's purchases related to space technology were made in the USA.⁵⁹ Using its monopoly status, the USA has many opportunities to exert influence on the developing countries which are members of this organization (in 1983 there were more than 60 of them). Together with other media, space communications have an enormous effect on the formulation of the masses' world view and, accordingly, on the ideological struggle and social processes going on in the newly independent countries.

The USA gains significant advantages from participating with developing countries in joint ventures on various issues of space research. National stations for the receipt of data from American weather satellites and from satellites for research in the ionosphere and other experiments are located in Kenya, Egypt, the Sudan, Zaire, Thailand, and other countries. The opportunity to create numerous tracking stations and other objects on the territory of foreign states for ground support for American space experiments brings the USA a whole series of political, scientific, technical, military and strategic benefits. According to official American authorities, the attraction of the developing countries' best scientists to American

⁵⁹ *Science, Technology, and American Diplomacy 1981...*, pp. 256, 259.

space research is and will continue to be very profitable for the realization of American space programs. Thus, new areas of scientific and technical aid, contingent on the development of the scientific and technological revolution, become new directions and trends in American scientific and technical aid policy with respect to the developing countries.

Aside from AID, many American governmental institutions and public organizations are involved in programs of scientific and technical aid; trying to achieve greater efficiency of these programs, the American Administration is devoting much effort to better coordinate aid programs and reorganize their management. Thus, in the second half of the 1970s, the structure of AID was significantly changed: several departments and bureaux were eliminated and this led to the reduction of personnel and the enhancement of administrative responsibility for middle level management; the agency's decision-making process was decentralized; AID improved its methods and procedures for programming and increased its effectiveness in using funds assigned for operative needs.

Adapting the technology transfer mechanism to changing conditions, the American Administration, in March 1979, set up a new governmental organization for rendering aid to developing countries: the Institute for Technological Cooperation (ITC). This organization works on issues of interest for the USA and developing countries, giving priority to problems in agriculture, health care, and education, as well as such global problems as energy, the development of natural resources, and conservation of the natural environment. The Institute is supposed to help expand the scientific and technical ties between developing countries and American governmental agencies, as well as with American universities and private businesses.

The transfer of military equipment and technology to developing countries occupies an important place in American policy. Increasing attention devoted to this problem by the Reagan Administration can be explained, first and foremost, by the overall militarization of Washington's foreign policy course and Washington's more overt use of force or the threat of force to secure America's interests around the globe. For all these reasons, the Reagan Administration has been openly using the transfer of military technology and equipment as an inseparable component of American foreign policy.

American activities in this field include the working out of joint projects for the production of weapons, the establishment of joint enterprises with other countries, and trade in licenses. According to an estimate made by American specialists, in the early 1980s, more than 20 developing countries were producing modern military hardware with technological assistance from the USA and other countries of the West. Trade in military technology, though it makes enormous profits for the American military-industrial corporations, is a heavy burden for the young states' economies, since it swallows up their reserves of hard currency, which they otherwise could have used for the development of civil sectors of the economy. From the economic point of view, the import of military technology is a pure waste of potentially productive profits, since weapons created thereby cannot be used as a means of satisfying the demand for consumer goods or as a means of production. Finally, according to many Western experts, this aspect of American corporations' military export is even more dangerous than the usual sale of weapons, since it leads to the increase in the number of potential producers of weapons, pulling the young states into the arms race.

Rebuffs to American neo-colonial actions on the

international arena have forced the USA to use aid, including scientific and technical aid, more openly as a means of political pressure. Aid is used to directly support reactionary regimes and governments ready to go in the wake of American policies, to bribe influential persons, and to strengthen the position of pro-American circles in many developing countries.

There are more than enough examples of this trend. As a response to the nationalization of American enterprises and banks in Chile during the administration of the Popular Unity Government (1970-1973), the USA terminated its aid to this country. In 1975, the USA stopped the flow of aid to Uganda in connection with the nationalization of property belonging to several American companies there. In March 1979, the USA announced a sharp cutback on aid to Afghanistan because of the revolutionary socio-economic transformations which took place in this country, and in 1980, aid was terminated completely. As of 1981, Nicaragua stopped receiving funds under the economic rehabilitation loan which had already been approved by the US Congress. During the administration of the national revolutionary government in Grenada (March 1979-November 1983), the USA not only cut off aid to this country, but also put pressure on international economic organizations and the member countries of the Common Market to terminate economic aid to this country.

On the other hand, after Egyptian President Anwar Sadat proclaimed an "open door" policy, and especially after the signing of the Camp David accords, the USA sharply increased its aid to Egypt. After Somalia adopted a pro-Western foreign policy, the USA immediately renewed the provision of aid to this country.⁶⁰ In connection with events in Afgha-

⁶⁰ *The Department of State Bulletin*, Vol. 82, No. 2069, December 1982, pp. 24-25.

nistan, the USA significantly increased economic, scientific and technical aid to Pakistan. After its armed intervention in Grenada and the establishment there of a pro-American regime, the USA immediately renewed its aid to this country.

Beginning in the second half of the 1970s, the USA moved to implementing strategies based on the growing use of economic, scientific and technical aid as an instrument of political pressure. Relationships with developing countries, depending on their readiness to support American policies on the international arena, specifically in international organizations, are indicative of this move. For this reason, in 1976, the State Department set up a special department for the analysis of the voting record of the developing states in the United Nations; on the basis of its findings, decisions are made on the provision of scientific, technical and other kinds of aid. Thus, in 1976, the USA decided to terminate aid for Tanzania and Guyana after these countries had voted in the UN for the resolution condemning Zionism and after they had expressed their disagreement with the American position on the Korean issue. At the same time, aid programs to Malawi, the Ivory Coast, Zaire, and several other countries which supported the American government's positions in the UN, were significantly expanded.

This American policy continued to develop during the 1980s as well. In 1983, using just these principles the USA reduced its aid to Madagascar and several other developing countries. At the end of 38th session of the UN General Assembly in 1983, Washington officially announced it would reduce by half the aid given to Zimbabwe, the representative of which had sharply criticized at the General Assembly session American aggression against Grenada, American policy in the Middle East, southern Africa, and refused to support the American position in the

Security Council with respect to the incident with the South Korean airliner.

In April 1977, the USA set up an Inter-Agency Group on Human Rights and Foreign Assistance.⁶¹ This governmental organization, directed by the American Under-Secretary of State, was composed of representatives of the State Department, AID, the Department of the Treasury, the Department of Agriculture, the National Security Council, and other governmental agencies. The facts show that this organization uses the so-called double standard in its policy of "the defense of human rights", guided, first and foremost, by military-political and economic principles while deciding whether or not to provide aid to a developing country. As a rule, the list of countries which receive American scientific, technical and economic aid is made up under the guidance of the Inter-Agency Group, and includes countries which, according to American appraisals, observe human rights.

In reality, the USA grants aid to countries which are of political interest to it, regardless of the degree of democracy observed in these countries. According to data from one private research, only in 1973-1977, the countries with the most authoritarian regimes received from the USA economic, scientific and technical aid amounting to 2.1 billion dollars, not counting loans granted through the American Export-Import Bank.⁶² In 1983, Israel, Haiti, Chile, Paraguay, and El Salvador, countries where the most elementary human rights and freedoms are cruelly abused, were among the largest beneficiaries of American aid.

The United States takes advantage of its participation in international organizations to put political and economic pressure on developing countries.

⁶¹ *Foreign Assistance and Related Agencies Appropriations for 1979*, Part I, Washington, D.C., 1978, p. 578.

⁶² *USA: Economics, Politics, and Ideology*, 1980, No. 8, p. 73 (in Russian).

Thus, in January 1982, the USA used its veto at a meeting of the Board of Governors of the Inter-American Development Bank in order to prevent Nicaragua from getting a loan. A State Department representative announced that the American Administration would thwart every attempt by any international organization to provide any credits to this country. In August 1982, under pressure from the USA, the International Monetary Fund refused to participate in the realization of several economic projects in Grenada. In September 1982, the USA and Great Britain, in a joint meeting of the IMF and the IBDR in Toronto, granted Argentina's request to postpone the payment of its foreign debt which had reached 40 billion dollars, on the condition that Argentina officially promise not to renew military action in the region of the Falklands (Malvinas) Islands. At the same time, in order to support its allies, the USA uses its participation in international organizations to put pressure on the developing countries. Thus, in October 1982, as a response to a renewed campaign to exclude Israel from several UN agencies, especially from the International Atomic Energy Agency (IAEA), the International Telecommunications Union, and the Office of the UN High Commissioner for Refugees, among other agencies, the Reagan Administration announced that the USA would refuse to participate officially in these organizations and would cut off financing of any international agency which would exclude an Israeli representative. In October 1982, trying to put pressure on the developing countries to force them to abandon their hard line with respect to Israel, the USA suspended its financial contributions to the IAEA.⁶³

⁶³ *The Department of State Bulletin*, December 1982, p. 63.

The Reagan Administration's hardening foreign policy course with respect to the developing countries whose policy contradicts the USA's military, political and economic interests, manifests itself in the use of the most diverse ways and means of economic pressure, applied bilaterally and through international organizations. Washington's hardline policy is directed against states which have chosen a non-capitalist path of development, as well as countries which speak out actively against imperialism. American policy with respect to Libya is a convincing example. Trying to force Libya to follow its policy and to make it stop supporting the national liberation movement of the Palestinian people, the USA used various means of economic pressure against this country. In December 1981, the American specialists in Libya were given orders to quit the country, and in March 1982, the USA completely terminated its import of oil from this country and suspended its supplies of petroleum equipment to it.⁶⁴

Under the guise of the struggle for the observance of human rights in other countries, the USA is increasing its expansion in these countries, using its exports of scientific and technical expertise, manufactured goods and technology to them. The defense of "human rights" was the pretense in 1985 for the introduction of an embargo on trade with Nicaragua. In reality, however, the USA wanted to strangle the Nicaraguan revolution economically. Formally for these reasons, the American government has resorted more than once to delaying the granting of licenses for export to individual countries of goods and technology essential to these countries and refused to finance commercial deals with these countries. At present, practically all the American departments which deal with foreign economic activities are

⁶⁴ *Ibid.*, May 1982, p. 80.

obliged to some extent to take into consideration in their deals the status of civil rights in various states, using criteria and referring to instructions issued by the US State Department.

Taking into account the American economic, scientific and technical potential, one cannot underestimate its ability to keep developing countries dependent on it. At the same time, it is impossible not to note that this technological policy is being maintained in new conditions determined by a general change in the balance of forces in the world and the rise of the national movements, which seriously restrict American corporations' opportunities for expansion in this direction. This is even more so since the USA has lost its monopoly on scientific and technical aid to young states because the latter promote their cooperation with the socialist countries.

CONCLUSION

The scientific and technological revolution has given rise to new trends in the development of the world economic and political situation and has led to changes in imperialism's strategy in developing countries. The main idea of these changes is that imperialism, trying to preserve and strengthen the newly independent countries' dependence on the world capitalist system, is more and more broadly resorting to a policy of technological neo-colonialism.

Inequality, discrimination, and diktat are inherent in the imperialist system of international economic relations and manifest themselves fully in the field of technological exchange. The neo-colonial essence of American transnational corporations is especially clear.

In technology transfer, the American transnational corporations' negative effects on developing countries manifest themselves in the restraint of scientific and technical growth through a system of monopolistic trade practices, the deformation of the technological structure of these countries' economies, the destruction of many traditional kinds of production, and in the formation of their industrial specialization in accordance with the interests of American monopoly capital. The price of technology transferred by American corporations is a significant burden for developing countries' national economies; the flow of technology is usually not sufficient; and in many cases, the

technology does not meet local conditions and needs. Moreover, the terms and nature of technology transfers make that technology less valuable for economic development and produce negative effects for the establishment of a national technological potential.

American transnational corporations involved in the transfer of technology influence not only the technological structure of the young states, but also the entire process of their socio-economic development. Monopoly capital seeks to turn the transfer of technology into a "transfer" of private capitalist relations.

The ever broadening scientific and technological revolution creates great opportunities for the modernization of the economies of the independent states in Asia, Africa, and Latin America, for them to overcome their backwardness, hunger, disease, poverty, illiteracy, and other urgent problems. However, this is thwarted by imperialism, by many developing countries' dependence on the world capitalist system. These countries do not take utmost advantages of the opportunities provided by the scientific and technological revolution. Moreover, the largest corporations in the USA and the other developed capitalist states, having concentrated the overwhelming part of the scientific and technical potential of the capitalist world in their own hands, use the achievements of scientific and technological progress for their own economic and political ends. Therefore, on the technology market, as in the other areas of economic relations between capitalist and developing countries, the daily development tasks of the latter are in sharp conflict with the interests of Western corporations.

The imperialist states concentrate on the development of scientific and technical potential, on the newest industries and production methods, but they transfer to the developing countries the labor-inten-

sive, energy-intensive, and so-called "dirty" production processes. Besides, the international corporations' industrial subsidiaries in developing countries are assigned narrow specialties, making them technologically dependent on the monopolist centers.

Western ideologists maintain that the new forms of cooperation between young states and industrial corporations of developed capitalist countries in new sectors will keep these developing countries in the orbit of the world capitalist economic system. In this way, the strategy for the new international division of labor within the framework of the capitalist economic system is designed to promote the developing countries' economic and technological dependence at a higher level of development of productive forces.

US imperialism attributes great importance in the achievement of these goals to transnational corporations which, within the framework of the world capitalist economic system, control more than 90 per cent of American private investments abroad. The American government tries to direct the movement of private capital and use it for the realization of American neo-colonial plans. For this reason, the Overseas Private Investment Corporation has become more active in stimulating the export of American private investments with governmental guarantees. The Reagan Administration has recommended that AID emphasize the granting of scientific and technical aid to developing countries using means and resources of American private capital first and foremost. The reorganization in 1979-1980 of the system of government agencies responsible for American economic policy in developing countries also served to coordinate governmental programs of scientific and technical aid with the activity of American private capital and to use more actively

the "energy of private enterprise".

Attaching great significance to private capital investments as an important factor for the development and strengthening of capitalism, ruling circles in the USA, in their foreign economic strategy, are stepping up the utmost stimulation of the private economic sector in developing countries. American policy is designed to coordinate actions related to technology transfers through private and government channels.

Scientific and technical aid given to developing countries on a bilateral basis is growing at a faster pace than aid granted through international organizations. However, aid is very selective and primarily provided to countries which are closely tied to American imperialist policies. New priorities arise in American scientific and technical aid policy. Previously, aid was mostly considered a means of keeping developing countries in capitalism's orbit, promoting the expansion of American corporations. In the 1980s, aid is supposed to do all this and to help the USA realize its military-strategic plans.

The transfer of technology by American corporations puts serious obstacles on the path to the formation of viable national economic complexes in developing countries, keeping these countries at the periphery of the world capitalist system, and maintaining the unequal status of these countries in the international capitalist division of labor in the field of science and technology.

Many newly independent countries, understanding the real goals of this neo-colonial strategy, defend their national interests by struggling against imperialism and speaking out against technological neo-colonialism. The anti-imperialist, non-aligned movement and scientific and technical cooperation among young states on a bilateral basis and on the regional level are very important for the developing countries'

liberation from technological dependence. Of course, the developing countries' further cooperation with the USSR and the other countries of the socialist community will help promote this process. Experience of recent years shows that relations based on equality and mutual benefit are very effective in this process.

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