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DIRECTORATE OF
INTELLIGENCE

Intelligence Report

Communist Chemical Industries: Integration And Trade

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
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INTELLIGENCE REPORT

COMMUNIST CHEMICAL INDUSTRIES: INTEGRATION AND TRADE

Introduction

1. During the past 10-15 years the Communist countries, 1/ anxious to increase their self-sufficiency in chemical production, have devoted substantial resources to building up their chemical industries. They have hoped to avoid increasing dependence on the Free World for commodities important to their economies, to limit outflows of scarce foreign exchange needed to obtain these commodities, and to increase their own ability to export chemical products. The strategy for development called for increased coordination and cooperation of the chemical industries of the several countries and also assigned an important role to the purchase of complete chemical installations and related technology from the Free World, in order to upgrade production processes and improve efficiency.

2. This report evaluates the effect of cooperation in chemical production and of purchases of equipment and technology from the Free World on Communist foreign trade in chemicals. Prospects for increased interdependence of Communist chemical industries and for a change in their competitive position in Free World markets, including some traditional US markets for chemical products, also are examined.

Conclusions

3. Neither efforts to increase cooperation in chemical production nor large purchases of Western equipment and technology have yet had the desired effect of making the Communist countries more self-sufficient in chemicals. Nevertheless, these measures have made possible large increases in output and have facilitated the entry of some Communist-made chemicals

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1. Unless otherwise indicated, the term Communist countries *is used throughout this report to refer only to the USSR and the East European Communist countries, excluding Albania and Yugoslavia.*

Note: This report was prepared by the Office of Economic Research.

into Free World markets. Over the next several years, as new plants come into operation, the degree of Communist dependence on chemicals imported from the Free World probably will decrease.

4. Communist production of chemicals has grown rapidly – increasing, according to official Communist data, by 180% during 1961-69 – but it has failed to keep pace with rising requirements. Consequently, net chemical imports into the Communist area from developed Free World countries have been increasing rather than decreasing. In 1969, net imports from the Free World, consisting mainly of expensive items, such as plastics, man-made fibers, rubber, pesticides, and specialty chemicals, were at least 60% greater than in 1960.

5. In spite of the lip-service given to cooperation among the Communist countries, nationalistic and autarkic tendencies have kept it at a relatively low level. Nevertheless, the countries depend on one another for many chemical products and raw materials. More than half of their total exports of chemicals go to one another. The USSR plays the major role in supplying raw materials to East European chemical industries and receives chemical intermediates and finished products in return. The USSR also receives substantial quantities of chemical equipment from Eastern Europe.

6. Thus far, benefits from imported Western equipment have been less than expected, partly because of construction delays, and partly because inferior raw materials and inexperienced operation and management have led to high costs and poor quality of output. There are indications, however, that during the latter part of the period 1971-75 the Communist countries may be able to reduce their net imports of chemicals. Although domestic consumption of chemicals is scheduled to rise in all the countries, production probably will rise more rapidly. Many plants now under construction, especially a number of those purchased from the Free World, will be coming on-stream during the next two or three years. Increasing cooperation, in the form of specialization in production and joint efforts in research and development, may also become an important factor in boosting production. Some new plants being built will be large enough to cover the needs of several countries, permitting economies of scale and promoting integration of the chemical industries.

7. During the next two or three years, some of the new plants coming on-stream will lead to duplication of capacity rather than specialization. This is especially true in the case of nitrogen fertilizer production. The Communist countries already produce nitrogen fertilizer in excess of their own needs. The USSR, Romania, Poland, and Bulgaria already have begun to export substantial amounts of nitrogen fertilizer, especially urea. Their markets include countries that, like India, have been

traditional customers of Western countries, incuding the United States. When additional plants become operational, output will increase to a point where the Communist countries may begin to compete with one another for markets, as well as with producers in the Free World.

8. Some of the changes already evident or likely to develop in the chemical trade of the Communist countries are the direct result of imports of Western equipment. Purchases of plants and technology from the Free World have been largely responsible for the ability of the Communist countries to produce and export urea and have contributed to their growing capability to export pharmaceuticals and some synthetic materials. Installations to be built under expansion programs scheduled for 1971-75 probably will rely heavily on Western equipment and licenses, and output from these plants probably will affect future Free World sales to some extent.

9. By 1975 or shortly thereafter, increased Communist capability to produce and export chemical products will be felt in world markets. Communist exports of nitrogen fertilizer, potassium salts, phosphates, and sulfur probably will continue to grow even though world markets for these products are already highly competitive. Certain chemical firms in Western Europe and Japan, which provide the bulk of Free World chemicals sold to Communist countries, may find sales of man-made fibers, certain plastics and soda products reduced as new Communist installations go into operation. US firms, which have not sold significant amounts of either chemicals or chemical equipment to Eastern Europe and the USSR, may note little change in sales to the area but probably will encounter heavier competition from Communist-produced chemicals, especially in Asia, the Middle East, and South America.

Discussion

Communist Cooperation

Background

10. Cooperation among the Communist chemical industries is by no means a recent innovation. Under bilateral agreements signed in the 1950s and early 1960s, for example, the USSR supplied equipment and technical data for production of nitrogen fertilizers to Bulgaria, Hungary, Poland, and Romania; and Czechoslovakia provided equipment for developing Polish sulfur deposits and the East German potash industry. Multilateral agreements also were signed. Some provided for one or more countries to specialize in producing certain chemicals or certain types of equipment and to supply

these products to the other parties to the agreement. Others called for joint investment in such projects as the cellulose installation built in Romania with aid from Poland, East Germany, and Czechoslovakia. Implementation of multilateral agreements, however, especially those calling for specialization in production, frequently fell far short of plans.

Cooperation in Process Development

11. Some 100 chemical research and development projects are being coordinated through the Permanent Commission on Chemicals of the Council for Mutual Economic Assistance (CEMA). Major products to be coordinated during 1971-75 include advanced types of man-made fibers, plastics, synthetic rubber, olefins, and acetylene.

12. Past efforts at joint development of chemical processes have not been outstandingly successful. For example, cooperative accomplishments claimed by the members of CEMA during the period up to 1966 included the development of processes for producing polyester fiber and acrylonitrile. Yet during 1964-66 five of the CEMA members purchased polyester plants and related technology from Free World firms, and four bought acrylonitrile plants.

13. Efforts to improve the efficiency of chemical plants by having multinational teams of experts study production facilities in various Communist countries and propose improvements have perhaps been more productive. Such teams reportedly have succeeded in improving production of caprolactam (an intermediate for nylon) in the USSR and of ammonia in East Germany and Hungary.

Cooperation in Production

14. Some 2,200 chemical products (chiefly reagents, paints, dyes and intermediates, and pharmaceuticals) now are subject to bilateral and multilateral agreements on specialization among the members of CEMA. These products, however, make up only a small share of total chemical production in the Communist area, and many of the agreements merely confirm a specialization that already existed. Specialization agreements calling for a change in production schedules have not always been honored.

Cooperation in Construction and Investment

15. Communist cooperation in building new chemical installations has included the exchange of technical data, the rendering of various services during construction, and the provision of equipment or financial credits. In some cases such cooperation enables the smaller Communist countries to develop production in chemical sectors for which they lack technical

or financial resources. For example, some 43% of the investment for construction of Bulgarian synthetic fiber plants during 1966-70 was scheduled to be provided by credits from the USSR, East Germany, and Czechoslovakia.

16. Joint construction and investment projects, however, have provided at best only stop-gap solutions to the serious problems confronting Communist chemical industries. Some of the plants built through joint efforts have been too small to provide economies of scale. Moreover, the cooperating countries often were unable to provide modern equipment and technology. During the decade ending in 1965 the USSR supplied fertilizer production equipment to Bulgaria and Romania and rubber technology to Poland and Czechoslovakia that were obsolete by the time the plants using them started operation or soon thereafter. Although the installations helped fill some internal needs of those countries for rubber and fertilizer, the high-cost, poor-quality products did little to promote efficiency in the domestic economy or to enhance Communist capability to compete in world markets.

Signs of Change in Cooperation

Trends Toward Large-Scale Plants

17. Starting about 1968, significant changes became discernible in some of the new Communist agreements on cooperation in chemicals. Terms of the more recent agreements indicate that the USSR and East European Communist countries plan to erect modern chemical plants that will provide economies of scale and are ready to accept the higher level of interdependence this will generally entail. Hungary and the USSR, for example, are extending credits to Bulgaria for building a plant in the Devnya Valley that will have an annual production capacity of 1.2 million tons of soda ash 2/ and will be one of the largest such plants in Europe. Output from the plant will be used to repay the credits. Part, if not most, of the required equipment apparently will come from French and Japanese firms.

18. A Soviet-Hungarian agreement signed in 1970 calls for construction of a plant at Leninvaros in Hungary, with an annual production capacity of 250,000 tons of ethylene. The plant will be comparable in size to some of the largest ethylene plants being built in the Free World, and its ethylene capacity will be about ten times that of an existing installation obtained from the USSR that took about ten years to build. Moreover, the plant also is to have capacity for producing 130,000 tons of propylene

2. *Total output of soda ash in Bulgaria in 1969 was 229,000 tons, of which 30% was exported.*

annually and reportedly will be large enough to permit profitable extraction of byproducts such as butadiene. Most of the equipment for the plant, which is scheduled for operation in 1975, probably will be purchased from Free World firms. About half of the ethylene and 38% of the propylene produced will be shipped by pipeline to the USSR. In return, Hungary is to receive other petrochemical products, including polymers derived from ethylene, that will have the same total value (at world market prices) as the ethylene and propylene delivered. The annual value of additional trade between the USSR and Hungary resulting from this agreement will be some $28 million, each country supplying products valued at about $14 million.

Interchem

19. In order to promote integration on a more efficient basis than in the past, the Communist countries at the beginning of 1970 set up a CEMA-sponsored organization known as Interchem. This organization is to coordinate development and production of fairly expensive chemicals produced in relatively small quantities, such as pesticides, dyes, paints, and auxiliary chemicals for the textile, leather, and paper industries. Interchem also is to study world market conditions, coordinate trade in products under its jurisdiction, and decide on purchase or sale of licenses in third countries. Besides seeking to improve production efficiency, the new organization will aim to reduce or eliminate the importation of certain chemicals from the Free World.

20. The brief information published to date on Interchem suggests that in the future a prospective Communist purchaser of Western licenses may seek the right to pass the technology on to one or more other members of Interchem. Presumably the Interchem negotiator, representing several countries, would be able to strike a better bargain than individual countries negotiating separately.

Cooperation with Non-Communist Countries

21. The Communist countries are not restricting their efforts at specialization and cooperation in production of chemicals to agreements with other Communist countries. Hungary has shown more initiative than the other members of CEMA in entering into agreements with Free World countries in the chemical field. A 1968 agreement calls for the Austrian state-owned chemical firm Oesterreichische Stickstoffwerke to supply an intermediate for acrylic fiber to a Hungarian fiber plant in return for future deliveries of synthetic fiber. Other Hungarian agreements with Austrian, Belgian, Swiss, and West German firms concern delivery and processing of intermediates for pesticides, pharmaceuticals, dyes, and plastics. In addition, Poland has been discussing cooperation in the production of fertilizer with French and British firms. Other countries are investigating cooperation

possibilities in non-chemical fields; if these efforts are successful, they may pave the way for cooperative chemical ventures.

22. Terms of future joint ventures may include provisions permitting Western firms to hold minority ownership in Communist enterprises. Romania and Hungary recently passed legislation opening the door to partial ownership by Western firms of enterprises located in those countries. Joint ownership of enterprises in third countries also is being explored. The Romanian Minister of the Chemical Industry, during a visit to West Germany in March 1971, stated that his country intends to promote the formation of joint venture companies with large chemical firms in Western Europe. Free World firms, however, may be slow to undertake such projects.

23. There are indications that Western credits, which will continue to be needed, may be offered on a less restrictive basis than in the past. Heretofore, Western credits for Communist chemical projects have been tied to purchases of equipment and technology in the country extending the credit, although the major contractor could subcontract to firms in other countries. Recently, however, an international banking consortium placed no restrictions on a $30 million credit extended to Hungary for developing its pharmaceutical industry in 1971-75. The credit, if all used for this purpose, will cover about one-third of the scheduled investment in the Hungarian pharmaceutical industry during that period.

Foreign Trade

Net Imports Grow Despite Cooperation and Modernization

24. Although large-scale investment (partly in chemical equipment purchased from the Free World) and attempts at integration have contributed to rapid growth in the production of chemicals, 3/ the chemical industries of the Communist countries have been unable to satisfy increasing domestic demand. Net imports of chemicals and related materials from the Free World grew substantially during the 1960s. Available data do not permit precise measurement of this growth, but the trend is clear. Table 1, based on data from Communist sources, indicates that in 1969 imports

3. Official Communist data indicate that production of chemicals increased by 180% during 1961-69, while total industrial output rose by only 100%. Western estimates indicate that real growth in the output of chemicals in the Communist countries during this period probably was no more than 136% and that the comparable growth in total industry was about 76%. Whichever series is used, the relationship between the growth of the chemical industries and growth in industry as a whole is approximately the same.

of chemicals and related materials by the USSR and Eastern Europe (excluding East Germany) totaled about $2 billion and exceeded corresponding Communist exports by $872 million. This excess of imports over exports had grown from approximately $707 million in 1965 and $542 million in 1960, despite an average annual increase of 12.7% in Communist exports during 1961-69. Table 2, based on data from Free World sources, indicates an even greater increase in net Communist imports of chemicals, showing a rise of approximately 90% from $426 million in 1965 to $808 million in 1969. Although the data in the two tables are not precisely comparable, both tables demonstrate that Communist imports of chemicals grew rapidly during the 1960s. All of the Communist countries listed in Table 1 except Romania experienced a rise in net imports of chemicals during 1961-69, and the USSR accounted for more than four-fifths of the total net increase.

25. Comparison of the two tables indicates that trade with the Communist area accounts for more than one-half of the total value of all chemicals exported by the USSR and Eastern Europe. The high production costs, limited assortment, and inferior quality of Communist-produced chemicals have kept the volume of exports of chemicals relatively low. Although the USSR and Eastern Europe accounted for an estimated 16%-18% of total world output of chemicals in 1968, 4/ they accounted for only about 7%-8% of world exports of chemicals, and Communist exports of chemicals generally have had only a minor effect on world markets. Without the efforts to improve the equipment and cooperation of their chemical industries the Communist countries probably would have incurred even larger deficits in their chemical trade.

Trade Among the Communist Countries

Trade in Chemicals and Raw Materials

26. The potential for expanding trade among the Communist countries has not been fully exploited to date, partly because of the inefficiency of central planning and of barter trade. Lack of a freely convertible currency has been another cause of failure to expand trade adequately among the Communist countries. Moreover, each country apparently has sought to produce as many as possible of the chemicals for which domestic requirements were rising and which were of growing importance in world markets.

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4. One Communist source has claimed that the CEMA member countries accounted for 23% of the world's output of chemicals in 1968. Such claims, however, usually are inflated, either because an inadequate sample is used for the comparison or because a Communist concept of gross output is used that includes some double-counting.

Table 1

USSR and Eastern Europe: Chemical Trade a/

Million US $

Country	1960		1965		1969	
	Imports	Exports	Imports	Exports	Imports	Exports
Bulgaria	43.1	12.6	75.8	25.8	133.8	53.9
Czechoslovakia	167.1	54.2	203.1	101.7	259.0	141.7
Hungary	136.2	53.5	221.0	126.5	286.4	184.1
Poland	126.3	55.7	201.9	110.9	274.8	191.6
Romania	48.2	15.6	67.9	70.9	117.1	115.5
USSR	416.2	203.4	673.4	299.9	963.1	475.5
Total	*937.1*	*395.0*	*1,443.1*	*735.7*	*2,034.2*	*1,162.3*

a. Table 1 does not include comprehensive data on East Germany, because that country does not provide such information on foreign trade in chemicals. Data on the other Communist countries listed in the table, however, include chemical trade with East Germany. All data in Table 1 are based on trade handbooks published by the Communist countries. Official foreign exchange rates were used to convert currency values. The presentation of trade data on chemicals by the Communist countries is not entirely uniform, so the data probably conceal some differences in coverage. These differences, however, are believed to be relatively minor. As far as possible the data selected for Table 1 include basic and intermediate chemicals, fertilizers, plastics, man-made fibers, rubber and rubber goods, pharmaceuticals, paints, lacquers and pigments, photographic chemicals, essential oils, and washing agents.

Table 2

USSR and Eastern Europe:
Chemical Trade with the Free World a/

Thousand US $

Country	1965			1969		
	Imports	Exports	Net	Imports	Exports	Net
Bulgaria	43,834	14,102	-29,732	80,672	33,334	-47,338
Czechoslovakia	92,872	54,385	-38,487	138,479	75,448	-63,031
East Germany	89,623	123,392	+33,769	175,097	136,814	-38,283
Hungary	71,415	25,681	-45,734	126,649	50,911	-75,738
Poland	124,320	62,472	-61,848	206,814	79,641	-127,173
Romania	60,335	23,551	-36,784	104,438	44,191	-60,247
Total Eastern Europe	482,399	303,583	-178,816	832,149	420,339	-411,810
USSR	318,768	71,709	-247,059	536,933	140,773	-396,160
Total	*801,167*	*375,292*	*-425,875*	*1,369,082*	*561,112*	*-807,970*

a. The data in Table 2 are based on a 1971 publication of the US Department of Commerce, Summary of Country by Commodity Series, January-December 1969. *As far as possible, the data were selected to cover the same items as those described in the footnote to Table 1, but the two tables are not precisely comparable. Table 2 deals only with Communist chemical trade with the Free World and includes data on East Germany, whereas Table 1 deals with total Soviet and East European foreign trade in chemicals except for the noted exception relating to trade involving East Germany. Data on Communist exports of man-made fiber yarn to the Free World in 1965 and 1969 and on Free World exports of the same item to Communist countries in 1965 were not included in Table 2 because the item was part of a basket category that included nonchemical terms. A few other categories covered by the data in Table 2 may not equate exactly to items covered in Table 1. Nevertheless, major trends revealed by both tables appear to be consistent.*

27. Soviet purchases of chemicals from Eastern Europe far outweigh corresponding sales to that area. In 1969, for example, such imports by the USSR were valued at $439 million, 72% more than the value of Soviet chemicals exported to Eastern Europe. East Germany and Poland accounted for almost half of all East European chemical sales to the USSR in 1969, the share of East Germany alone amounting to 27%. Soviet imports of chemicals from Eastern Europe indirectly reflect earlier agreements on specialization of production and are heavily weighted with pharmaceuticals, dyes, paints, lacquers, pesticides, and photographic materials. In 1969, Eastern Europe was the source of 87% of all Soviet imports of pharmaceuticals and 62% of the imported dyes, paints, and lacquers.

28. Eastern Europe, on the other hand, is heavily dependent on the USSR for raw materials required in the production of petrochemicals and phosphate fertilizers, and also purchases significant quantities of Soviet potassium fertilizers, plastics and related intermediates, synthetic rubber, and tires. Soviet sales of chemicals to Eastern Europe in 1969 were valued at about $255 million and accounted for 54% of the total Soviet exports of chemicals. Fertilizers and fertilizer raw materials accounted for 39%, and plastics and related intermediates for about 10% of the Soviet sales of chemicals to Eastern Europe. The East European purchases of crude and finished fertilizers from the USSR totaled 4.9 million tons in 1969, up sharply from 2.9 million tons in 1965. Of the Soviet fertilizer materials going to Eastern Europe in 1969, shipments of apatite concentrate (a phosphate raw material) amounted to 3.5 million tons, and exports of potassium salts, to about 500,000 tons. 5/ (East Germany, however, remains the chief supplier of potassium fertilizer to Eastern Europe, its exports to this area in 1969 being about 4.5 times those of the USSR.)

29. Soviet exports of oil and gas, not reflected in the data on chemical trade, are of vital importance in the development of Eastern Europe's emerging petrochemical industries. In 1969 the USSR supplied 90% of the crude oil and natural gas imported by Eastern Europe. 6/ The USSR exports crude oil to all East European countries except Romania, and natural gas to Poland and Czechoslovakia. Soviet shipments of oil to CEMA members, which totaled 138 million tons in 1966-70, are scheduled to be 243 million tons during 1971-75. Exports of natural gas to these countries, which totaled 8 billion cubic meters in the earlier period, are to be 33 billion cubic meters during the current Five-Year Plan (1971-75). Shipments of natural gas to Czechoslovakia and Poland will be increased and the USSR will begin to

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5. The 500,000 tons of potassium salts is equivalent to slightly more than 200,000 tons of fertilizer nutrient (K_2O).

6. The bulk of the crude oil and natural gas going to Eastern Europe is used and will continue to be used as fuel, but utilization for production of petrochemicals is rising rapidly.

supply such gas to Bulgaria, Hungary, and East Germany on completion of pipelines now being built.

Trade in Equipment

30. The quantity, assortment, and efficiency of the chemical equipment obtained by Communist countries from each other determines in part their capabilities to export chemical products. The trade in equipment consists mainly of exports from Eastern Europe to the USSR, which receives about two-thirds of the total volume of chemical equipment exported by Eastern Europe. According to Soviet plans, the USSR was to order chemical equipment valued at $555 million from Eastern Europe during 1966-70, a substantial rise over corresponding imports totaling $405 million in 1961-65. Actual East European deliveries to the USSR during 1966-70 amounted to $538 million and provided 41% of the total Soviet imports of chemical equipment, the rest having come from the Free World. Czechoslovakia and East Germany, the major Communist suppliers of chemical equipment to the USSR, accounted for 70% of the total of such deliveries from Eastern Europe in 1970.

31. As with chemicals, the types of chemical equipment featured in trade among the Communist countries frequently reflect earlier agreements on specialization. Poland is specializing in manufacture of equipment for production of sulfuric acid, fertilizer, and rubber and plastic goods. East German specialties include equipment for production of basic inorganic chemicals, petrochemicals and plastics, while Czechoslovak exports include machinery for fertilizer, pharmaceutical, and petrochemical plants. Although the USSR supplies Eastern Europe with an unspecified but almost certainly smaller amount of chemical equipment than it receives in return, it has helped these countries expand production of basic chemicals and synthetic materials. Some 60% of the output of Bulgaria's chemical industry in 1965 was produced in plants built with the aid of the USSR. More recently the USSR has been supplying equipment for petrochemical plants being erected in Bulgaria and Poland and is scheduled to supply equipment for Hungary's first synthetic rubber plant.

32. Although, as noted, the mutual trade in chemical equipment has helped expansion of Communist chemical industries, the productivity and quality of some of the equipment has been inadequate to ensure rapid improvements in efficiency. The Soviet press implied in 1970 that one-fourth of the chemical equipment sent to the USSR by Eastern Europe is obsolete, and Soviet manufacturers have not been immune to the same charge. To help remedy this situation, the Communist countries are beginning to use Western technology for manufacture of chemical equipment. Poland, for example, is supplying three large sulfuric acid plants

to the USSR that incorporate technology purchased from a Dutch subsidiary of a US firm. In 1971 the USSR was negotiating to purchase US technology for production of centrifugal compressors, critical items in modern ammonia plants. Soviet plans call for the compressors to be produced in either the USSR or Czechoslovakia, with the option of also marketing the equipment in East Germany, Hungary, Poland, and Romania.

Communist Trade with the Free World

Trade in Chemicals and Raw Materials

33. The CEMA countries are large net importers of chemicals and related materials from the Free World. In 1969, Soviet and East European imports of these products exceeded Communist exports of chemicals to the Free World by more than $800 million. West Germany, Italy, and the United Kingdom are the principal Free World suppliers of chemicals and related products to the USSR and Eastern Europe. US trade in chemicals with the Communist countries is negligible. In 1969, US exports of chemicals to the USSR and Eastern Europe amounted to $35 million, compared with total US chemical exports of $3.3 billion. 7/

34. Communist purchases of Free World chemicals and related products are mainly high-priced items such as plastics, man-made fibers, rubber and pesticides, and various organic and inorganic chemicals. Communist sales of chemicals in the Free World largely consist of basic chemicals, fertilizers, and fertilizer raw materials. Also sales of plastics and pharmaceuticals to the Free World are increasing. Substantial quantities of oil have been exported from the USSR to Western Europe and Japan for a number of years, and significant deliveries of Soviet natural gas to the Free World are expected during 1971-75. Some of the Soviet oil and gas going to Free World countries probably will be used for production of petrochemicals.

Trade in Equipment

35. The capabilities of Communist countries to export chemicals to the Free World as well as to each other improved as a result of the large Communist purchases of Free World chemical equipment and technology during 1960-69. During this period Soviet and East European orders for Free World chemical process data and equipment amounted to about $2.8 billion. The East European share in these orders was about 54% of the total.

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7. *These data exclude trade in fabricated rubber and plastic products.*

36. As there is a timelag between orders and actual delivery and again before installation of equipment, the effect of Communist orders placed in 1968-70 for Free World chemical technology and equipment is not yet reflected in Communist foreign trade in chemicals. Earlier purchases, however, probably contributed less to export capabilities of the USSR and Eastern Europe than was anticipated by Communist planners. Although available data on trade in chemicals do not always reveal which Communist exports to Free World countries have resulted from earlier equipment purchases, the purchases clearly have enhanced Communist capabilities for exporting nitrogen fertilizer, plastics, pharmaceuticals, rubber products, and a number of other items to the Free World. During 1960-69, for example, Free World firms contracted to supply to the USSR and East European Communist countries some 18 urea fertilizer plants, at least 10 other nitrogen fertilizer plants, and 30 plants for producing ammonia, a key ingredient in making nitrogen fertilizers.

Trade in Fertilizers

37. In 1965 the Communist countries were net importers of manufactured fertilizers. In 1969, according to data compiled by the US Department of Commerce and shown in Table 3, they were net exporters to the extent of $22 million. Actual Communist sales of fertilizers in 1969 are believed to exceed the total shown in Table 3, 8/ but even the data provided confirm that it was the rising exports of nitrogen fertilizers that were instrumental in changing the Communist countries from net importers to net exporters of manufactured fertilizers.

38. Sales of potassium fertilizers by the USSR and East Germany 9/ and Soviet sales of natural phosphates (largely apatite concentrate 10/) to Free World countries yield substantial earnings of foreign exchange. In 1969,

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8. The data on fertilizer exports in 1969 are believed to understate actual Communist sales to the Free World because details on exports of urea are not reported by all Communist countries. In addition, the Communist countries that do report their exports of urea do not necessarily include the data with statistics on nitrogen fertilizer. The USSR, for example, lists exports of urea with data on plastics and related materials, and this practice also is reflected in US Department of Commerce data on Communist sales of urea. Urea can be used as an intermediate in the production of plastics or as an ingredient in animal feed, but its main use is as a fertilizer.

9. These two countries are the only Communist countries possessing exploitable deposits of potash, the basic raw material for potassium fertilizers, and are the only exporters of these fertilizers.

10. Soviet sales of apatite concentrate to Free World countries rose from 946,000 tons in 1965 to 2.1 million tons in 1969.

Table 3

USSR and Eastern Europe:
Fertilizer Trade with the Free World

Thousand US $

	1965		1969	
Type of Fertilizer	Imports	Exports	Imports	Exports
Nitrogen	13,504	12,301	12,275	35,358
Phosphorus	14,169	Negl.	26,731	2,868
Potassium	6,759	44,513	16,313	48,396
Other	28,503	222	10,260	1,059
Total	*62,935*	*57,036*	*65,579*	*87,681*

Free World purchases of these materials from the USSR and East Germany totaled $87 million compared with corresponding Free World exports totaling $38 million to various members of CEMA. East German and Soviet exports of potassium fertilizers to all areas (including the Communist countries) during the fertilizer year beginning 1 July 1968 accounted for almost 30% of world exports of this commodity. 11/ About 45% of the Communist exports went to non-Communist areas. Free World equipment and technology did not contribute as much to the buildup in Communist production of potassium fertilizers as they did in the case of nitrogen fertilizers. During 1964-67, however, the USSR did purchase from US and West German firms potash mining equipment valued at more than $14 million. In addition, in 1969 the USSR and France signed an agreement on technical and scientific cooperation in the potassium fertilizer industry. Some equipment for the Soviet and East German potassium fertilizer industries has come from Eastern Europe; Poland has supplied equipment for a Soviet combine; and Poland and Czechoslovakia have provided equipment for the East German industry.

39. In the last few years, Communist shipments of fertilizer have been increasing to some Free World countries, such as India, that are important

11. World exports of potassium fertilizer in the fertilizer year 1968/69 amounted to almost 8 million tons, expressed as pure nutrient and excluding potassium contained in compound fertilizers. Soviet and East German exports for the same period are estimated at 2.35 million tons, the average of their exports during the 1968 and 1969 calendar years.

customers of the US fertilizer industry. Communist exports of manufactured fertilizers (including urea) to India in the year starting April 1969 exceeded $30 million, compared with sales of only $7 million four years earlier. In 1968 and again in 1969 the USSR and Bulgaria together exported a total of over 150,000 tons of urea to India, although neither Communist country had exported this fertilizer to India in 1965. Romania and Poland also exported urea to India in this period, but the quantities are not known. US shipments of urea to India, which amounted to 389,000 tons in 1968, fell by about 100,000 tons in 1969 and by an additional 76,000 tons in 1970. The Communist sales of urea to India, however, probably have accounted for only a part of the reduction in US sales because India also imports urea from other Free World countries and, in addition, is building up its own capacity to produce this fertilizer.

40. Communist exports of fertilizers to Free World areas are not limited to the less developed countries. Large quantities of potassium fertilizer are shipped to Japan by the USSR and to the United Kingdom by East Germany. Although capacity for production of fertilizer in France exceeds requirements, large amounts of fertilizer from Communist countries reportedly are being sold there at "dumping prices." Details of these sales are not available, but some Soviet fertilizer originally going to Algeria reportedly has been resold to France. West German manufacturers of fertilizer also have been hurt recently by imports from Eastern Europe, particularly from Romania (and Yugoslavia), although shipments also are being received from East Germany, Hungary, Poland, and Czechoslovakia.

Trade in Sulfur and Pharmaceuticals

41. Polish sales of sulfur have been increasing rapidly, as a result of large increases in production achieved partly through cooperative aid from Czechoslovakia. Polish exports of elemental sulfur to non-Communist countries amounted to about 100,000 tons in 1965, 700,000 tons in 1968, and 1.3 million tons in 1970. 12/ The Polish sales of sulfur to the Free World unquestionably have reduced potential sales by Free World countries, including the United States. US sales of sulfur fell from 2.6 million tons in 1965 to 1.4 million tons in 1970. The Polish sulfur sales, together with increased supplies of sulfur from Free World countries, have contributed to falling world prices for sulfur. In early 1971, for example, sulfur sold in the United States reportedly was moving at only 60% of the price it commanded two years earlier.

42. Among the CEMA member countries, Hungary and Poland are the major exporters of pharmaceuticals, and East Germany and

12. Polish exports of sulfur to all areas rose from 241,000 tons in 1965 to 1.77 million tons in 1970.

Czechoslovakia also are net exporters. Hungarian and Polish sales of pharmaceuticals to all areas in 1969 totaled about $159 million, of which sales to Free World countries amounted to about $32 million. Hungarian pharmaceutical sales to the Free World in 1969 – $21 million – represented an increase of 82% over corresponding exports in 1965, while Polish sales increased by about 64% in the same period. 13/

Prospects for the Future

Cooperation and Mutual Trade Among the Communist Countries

43. Progress in cooperation among the Communist countries, as well as in the efficiency with which workers build and operate chemical plants purchased from Free World firms, will vitally affect the degree to which plans for production 14/ and trade in chemicals during 1971-75 will be fulfilled. Production of chemical products, particularly fertilizers, synthetic materials, and related intermediates, is scheduled to increase substantially. Closer coordination of Communist chemical industries can be expected during 1971-75, in part because the East Europeans are increasingly dependent on the USSR for vital chemical raw materials.

44. Despite the limited effectiveness of past efforts at specialization in production, due partly to delays in introducing new technology, the Communist regimes are promoting this form of cooperation in order to increase mutual trade. Poland and Hungary, for example, are to increase specialization in pharmaceuticals, and Czechoslovakia and Poland, in dyes and cosmetics. Bulgaria is greatly increasing its output of soda ash with a view to supplying sizable quantities to the other Communist countries. An increase in chemical trade among the Communist countries will also occur because the East Europeans wish to make full use of the capacity of huge installations purchased from the Free World which will provide output substantially in excess of any one country's domestic requirements. Greater interdependence among the Communist chemical industries will be

13. These data for Hungary and Poland were obtained or derived from Communist publications. The value shown for Hungarian and Polish exports to Free World countries in 1969 are substantially higher than are shown in data for 1969 compiled by the US Department of Commerce. It is possible that the Communist data cover a broader segment of pharmaceutical products.

14. Data on production of selected chemicals in the USSR and Eastern Europe in 1965 and 1970 and plans for 1975 are shown in the Appendix.

particularly noticeable with respect to petrochemicals, man-made fibers, plastics, fertilizers and fertilizer raw materials, and pesticides. 15/ Implementation of Communist agreements on specialization of production may also improve, in part because stiffer penalties are to be imposed for nonfulfillment of obligations accepted under these agreements. By 1975 the USSR and the Communist countries of Eastern Europe probably will satisfy a larger share of their requirements for chemicals from domestic output and from trade among themselves.

Equipment and Technology

45. In areas in which increased output and specialization are being emphasized, the Communist countries will continue to supplement domestically manufactured equipment by purchasing chemical installations from Free World firms. Prospects appear good for Free World sales in the near future of complete installations for production of ethylene and polyethylene, polypropylene, polyester fibers, polybutadiene rubber, pesticides, complex fertilizer, and a number of other chemical products. In addition, Communist manufacture of chemical equipment under Western license is likely to grow.

46. Given their lack of experience in erecting and operating chemical plants that have very large unit capacities, the Communist countries almost certainly will experience delays that will prevent fulfillment of some chemical goals for 1975. In addition, the East Europeans are unlikely to meet a plan that calls for them to send the USSR chemical equipment valued at about $1.4 billion during 1971-75. This is 2.7 times the level of such deliveries during 1966-70. Nevertheless, a gradual increase in the efficiency of the Communist chemical industries should be achieved by 1975, helped in some cases by a long-overdue phasing out of obsolete installations as new, modern plants go into operation. Some older ammonia plants in the USSR, for example, are to be shut down, on completion of larger, more efficient units purchased from Free World firms.

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15. In addition to the Soviet-Hungarian agreement on ethylene and polyethylene cited earlier, other agreements signed in 1970 and early 1971 call for Hungary to supply nylon and acrylic fibers to Poland in exchange for polyester fiber, Romania to supply acrylic fiber to Poland in return for polypropylene, and East Germany to supply ethylene and propylene to the Czechoslovak plastics industry. Hungary has agreed to help develop phosphate deposits in the USSR in return for future deliveries of phosphates, and Poland and Romania are to assist each other in setting up new production capacities for pesticides, dyes, and pharmaceuticals.

Trade with the Free World

47. The structure and perhaps the volume of Communist purchases from Western Europe and Japan may change substantially as the Communist countries begin to cover more of their requirements for chemicals through mutual trade. US exports of chemicals to the Communist countries, however, are very small and probably will be little affected. The Communist countries probably will be less dependent on the Free World for products such as polyethylene and polyvinylchloride plastics, man-made fibers, and soda products. East Germany, which in 1969 purchased nitrogen fertilizers valued at $9.5 million from the Free World, is likely to reduce or eliminate such purchases by 1975. The Communist countries probably will continue to purchase Western reagents, catalysts, organic intermediates, pesticides, and special-purpose plastics.

48. There appears to be a high potential for Communist sale of fertilizers and fertilizer raw materials (including sulfur) in the near future, despite growing world competition in this area that may restrict profitability of such sales. 16/ In 1970 and early 1971 the USSR, East Germany, Romania, and Hungary contracted to purchase eight urea fertilizer plants 17/ with a combined annual production capacity of over 2 million tons, and Romania ordered four plants capable of producing a total of 3.6 million tons of complex fertilizer per year. Process technology and part of the equipment for the Romanian plants will come from Norway, and a US firm will provide construction and engineering services. Five ammonia plants ordered by the USSR during 1969-70 will incorporate US technology and Japanese equipment, and will have a combined annual production capacity of 1.8 million tons, equivalent to about one-fourth of the estimated Soviet output of ammonia in 1970. In the West, economies of scale associated with such plants have reduced unit investment costs by 30%-40%, and operating costs by as much as 50%, so the ammonia plants potentially can increase Soviet capability to compete in world nitrogen fertilizer markets. In addition, the USSR and East Germany are planning large increases in production of potassium fertilizer that could result in increasing sales competition with each other as well as with Free World firms. The growing Communist output of fertilizers may well reduce or limit the growth

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16. Present world capacity for production of sulfur exceeds demand. This situation may be aggravated by Free World measures to recover increasing quantities of sulfur from waste products and from natural and refinery gases.

17. Six of the urea plants were ordered from Czechoslovakia and two from Free World firms.

of future sales by the United States and other Free World countries in areas such as India, Pakistan, Japan, and South America.

49. Foreign sales of elemental sulfur by Poland are scheduled to rise from 1.8 million tons in 1970 to about 4 million tons in 1975, and markets are to be expanded in both Free World and Communist countries. Poland, which specializes in manufacture of sulfuric acid plants, may offer attractive prices to prospective purchasers of such plants who agree to use Polish sulfur. The Poles recently contracted to sell sulfuric acid plants to Hungary and Czechoslovakia, and also to a West German firm, and these deals apparently included tie-in sales of sulfur.

50. Exports of pharmaceuticals to Free World countries by Hungary and Poland will continue to rise. Hungary, which exported about 72% of its total output of pharmaceuticals in 1970, will continue to export these products mainly to Communist countries, but pharmaceutical sales to non-Communist countries are scheduled to increase from $21 million in 1969 to $60 million in 1975. This anticipated increase in sales probably stems in part from the $30 million loan for development of Hungary's pharmaceutical industry obtained from a Free World banking consortium.

51. Communist sales of plastics probably will also continue to increase. Any substantial increase in these exports will reflect purchases of Free World equipment and technology. During 1965-69 the USSR and East European Communist countries purchased five plants for production of polyethylene from Western firms, four for polyvinylchloride, three for polystyrene, and 11 for production or processing of other plastics. Part of the Communist plastics output may be distributed by Free World firms which agree to accept such products in partial payment for chemical equipment or technology sold to the Communist countries.

52. Less developed countries in Asia, the Middle East, and South America are among likely targets for Communist sales efforts. Algeria, currently at odds with France because of partial nationalization by Algeria of French-owned and jointly owned oil companies, may provide an outlet for increasing amounts of chemicals from the Communist countries. Algerian imports of chemicals from France reportedly amounted to about $72 million in 1970. Although the average level of technology employed in production of chemicals in the Communist countries probably will continue to lag behind that in the industrialized West, the greater willingness of Communist countries to accept barter or other terms of payment that do not involve hard currency probably will result in some new sales in the less developed areas.

APPENDIX

USSR and Eastern Europe: Output of Selected Chemical Products

Thousand Metric Tons

	Chemical Fibers			Fertilizers [a]			Plastics		
	1965	1970	1975 Plan	1965	1970	1975 Plan	1965	1970	1975 Plan
Bulgaria	N.A.	23	78	354	749	1,150	33	89	160
Czechoslovakia	79	100	186	478	646	1,304	126	245	500
East Germany	173	215	N.A.	2,506	3,200	N.A.	219	370	N.A.
Hungary	6	10	N.A.	265	517	1,100	27	55	100 [b]
Poland	104	138	200-206 [b]	738	1,631	2,650	118	269	520
Romania	21	77	170	293	895	2,550	76	206	550
USSR	407	623	1,050-1,100	7,389	13,100	22,200	803	1,672	3,257

a. *Expressed in thousand metric tons of nutrient content.*
b. *Estimated.*