SECRET

No 92

Economic Intelligence Report

DEVELOPMENTS IN THE CHEMICAL AND RUBBER INDUSTRIES OF THE SINO-SOVIET BLOC IN 1961 AND PROSPECTS FOR THE FUTURE

CIA/RR ER 62-23

July 1962

CENTRAL INTELLIGENCE AGENCY
Office of Research and Reports

SECRET

50X1

SECRET

Economic Intelligence Report

DEVELOPMENTS IN THE CHEMICAL AND RUBBER INDUSTRIES OF THE SINO-SOVIET BLOC IN 1961 AND PROSPECTS FOR THE FUTURE

CIA/RR ER 62-23

WARNING

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

SECRET

FOREWORD

[redacted] 50X1

[redacted] The 50X1 report includes data on production, trade, and construction in these industries of the Bloc in 1961 and their prospects for the future. Recent trends in Bloc policies on standardization and specialization of chemical products and equipment also are reviewed. Products of the chemical and rubber industries of the Bloc that are discussed in this report include chemical fertilizers, plastics, chemical fibers, synthetic rubber, pharmaceuticals, and motor vehicle tires.

CONTENTS

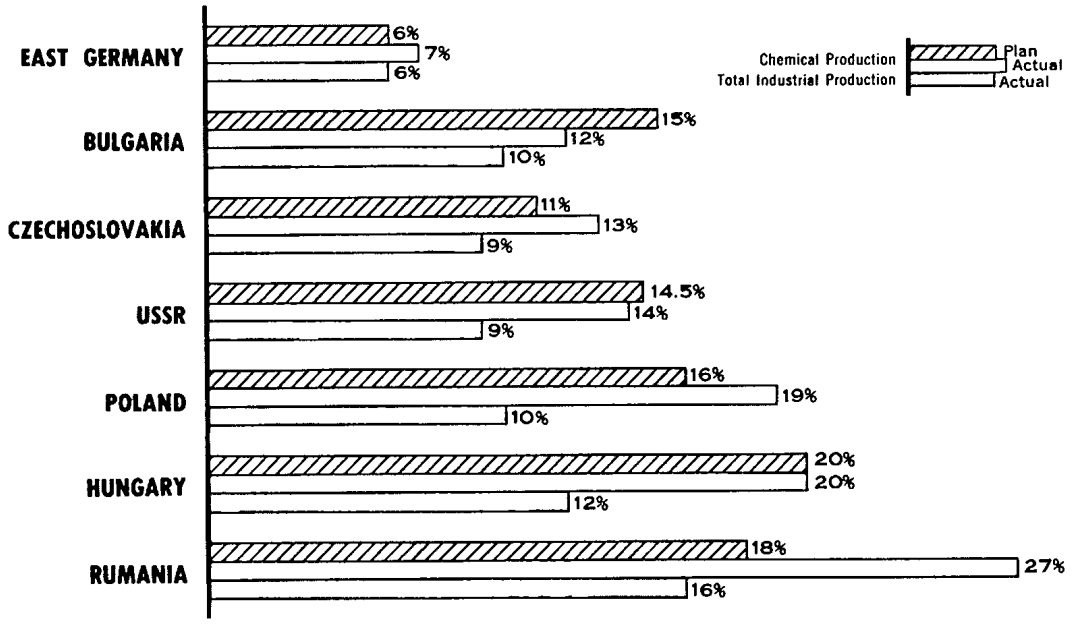
Appendixes

50X1

DEVELOPMENTS IN THE CHEMICAL AND RUBBER INDUSTRIES OF THE SINO-SOVIET BLOC IN 1961 AND PROSPECTS FOR THE FUTURE*

Summary and Conclusions

Output of chemicals in the USSR and the European Satellites rose sharply in 1961, a reflection of the high priority that has been accorded this sector of industry for the past several years. Soviet production in 1961, as shown below, was 14 percent above the level in 1960, an accelerating rate of growth, as the increases achieved in 1959 and 1960 were 10 and 12 percent, respectively. Increases in the European Satellites ranged



36285 5-62

from 7 percent in East Germany to a high of 27 percent in Rumania, but in every country the increase in output of chemicals was greater than the increase in the total industrial production. Production of chemicals was generally in accordance with plans announced at the beginning of the year, although there were some significant failures to meet goals for individual

* The estimates and conclusions in this report represent the best judgment of this Office as of 1 June 1962.

commodities, notably those for synthetic materials in the USSR. In Communist China the plan for production of chemicals was reported to have been fulfilled, although output of the chemical industry actually may have declined. However, production of a few chemicals, notably fertilizer, reportedly increased.

Although the record of chemical production was fairly impressive, the program of constructing new facilities went poorly. In the USSR, investment in the chemical industry was scheduled to rise about 50 percent, but the actual increase was only 13 percent. Investment plans also were underfulfilled in East Germany and Czechoslovakia and probably in Hungary and Bulgaria. Although the Polish investment plan for chemicals reportedly was fulfilled, this achievement is misleading, for 8 of a total of 17 industrial projects not completed on schedule in 1961 were projects of the chemical industry. Construction of chemical plants in Communist China probably slowed considerably, but there is evidence that investment in fertilizer plants was given high priority.

A continuing bottleneck in construction for the chemical industry in the Sino-Soviet Bloc* has been the limited availability of chemical equipment and technology, particularly for new products and processes. To ease this bottleneck, the Bloc placed a number of new orders with chemical engineering and equipment firms in the Free World during 1961. The USSR signed about 18 major contracts in 1961 compared roughly with about 50 signed in 1958-60. Approximately 10 major contracts were known to have been signed by the European Satellites. For the first time, Albania approached the Free World for chemical technology and equipment, evidently to replace Soviet technical assistance that was discontinued following the rupture in relations between the two countries. As an indication of the importance of equipment from the Free World in the chemical field, Polish sources revealed that at least 20 percent of the equipment needed by the chemical industry of Poland in 1962 would be obtained from the Free World.

To increase the accessibility of chemical technology of the Free World, the USSR and several of the Satellites have been offering to the West technical data for various chemicals. Few buyers have appeared as yet, although the USSR and Czechoslovakia may have made a few sales in 1961. Exports to underdeveloped areas of standard types of equipment and technical data in the chemical and rubber fields continued in 1961, and a number of new agreements were concluded. The USSR and Czechoslovakia, for example, agreed to supply tire plants to Ceylon and Ghana, respectively, during the next 3 years.

* For the purposes of this report, the term Bloc hereafter will always refer to the Sino-Soviet Bloc.

In addition to chemical and rubber-fabricating equipment, the Bloc purchased record quantities of natural rubber in 1961. Imports for the year amounted to about 530,000 tons,* more than 100,000 tons in excess of imports in 1960 and about 75,000 tons above the previous peak, which was reached in 1959. A significant curtailment in purchases of rubber by the Chinese Communists was more than offset by a sharp rise in imports by the USSR. The increase in Soviet purchases apparently was a result of the failure to put new capacity into operation according to plan. Imports of synthetic rubber by the Bloc, negligible before 1958, increased to 48,000 tons in 1961, and the upward trend is likely to continue.

Within the Bloc, trade in chemical technology and equipment is being increased, as evidenced by the large number of new agreements concluded in 1961. Furthermore, a working group was set up in 1961 to facilitate the exchange of chemical plant designs among member countries. (Designs purchased from the Free World may be among those disseminated.) Standardization of equipment and designs also is being encouraged, as is specialization in production of equipment. Intensified efforts apparently also were made in 1961 to coordinate research and development work in the chemical and rubber industries and to promote cooperation at the plant level.

In recent years, much has been made in the Bloc of plans for the specialization of chemical production, but statements made during 1961 indicate that little progress has been made so far in this direction. Recommendations submitted for the consideration of the Council for Mutual Economic Assistance (CEMA) apparently have not been economically and technically feasible in many cases. Nevertheless, Czechoslovakia did sign bilateral agreements with East Germany, Poland, and Hungary providing for some specialized production, notably in the pharmaceutical field.

Many of the meetings of CEMA in 1961 on the chemical industry dealt with coordination of long-range plans, and work was begun on forecasts of trends in chemical technology through 1980. Meanwhile, the USSR announced plans apparently calculated to continue the rate of growth in chemical output scheduled in the Seven Year Plan (1959-65) -- about 15 percent annually -- through 1980, and Czechoslovak and Bulgarian planners released various bits of information indicating that their long-range plans also were quite ambitious. Czechoslovakia plans to make the chemical industry a "second basic branch of materials."

With regard to short-range goals, progress to date indicates that many of the targets for 1965 of the Soviet and Satellite industries

* Tonnages are given in metric tons throughout this report.

will not be reached. In the USSR, investment in chemicals during 1959-61 was only about 25 percent of the total planned for 1959-65, and the chemical industry appears headed for a shortfall of at least 10 percent in the goal to triple output during 1959-65. Some production goals, notably the goal for 1965 for fertilizers, which was increased recently from 35 million to 37.7 million tons, may even be missed by much larger margins. Underfulfillment of the goals for 1965 also is virtually certain in the case of East Germany, but progress elsewhere in the Satellites appears to be generally in line with plans. A recognition of the slow progress toward goals in the USSR, as well as the serious view taken of the situation, is evident in Khrushchev's statement in March 1962 that it might be necessary to convene the Central Committee of the Communist Party of the USSR to discuss development problems of the chemical industry.

I. Intra-Bloc Developments

A. Long-Range Planning

In 1961 the USSR announced ambitious plans for the development of its chemical industry during the next 20 years. According to data released at the 20th Party Congress in October 1961, output of chemicals in 1980 is planned to be 17 times output in 1960 compared with a fivefold increase for all industry. The rate of growth for the chemical industry over the next 20 years is to average 15 to 16 percent per year, which is about the same as that planned for the Seven Year Plan (1959-65) but above the average rate of 12 percent actually achieved in 1959-61.

A few Satellite goals for chemical production in 1980 also were released in 1961.* Output of chemicals, the Czechoslovak planners feel, must increase ninefold during 1961-80 while industrial production is increasing fourfold. They say such a relatively great increase is needed because the limitations of the existing raw material base make it necessary to make chemicals a "second basic branch of materials." The Bulgarians announced that output of fertilizers in that country in 1980 is to be 10 times output in 1960. It also was reported that production of plastics in the countries belonging to CEMA, excluding the USSR, would increase 14 times during 1961-80.

Discussions of long-range planning and coordination of such plans for the chemical industry continued at the CEMA level. Following the meetings of the Permanent Commission on Chemicals of CEMA in January and November 1961, it was announced that the coordination of long-range plans had been discussed along with the related problems of specialization by the various countries in production of particular chemicals. At a meeting of one of the Permanent Commission's working groups, planning and equipping of chemical plants under the long-range plan were discussed, and it was stated that the efficient planning and building of new chemical plants would be facilitated by (1) the joint planning of new enterprises; (2) the introduction of new, highly practical machines and aggregates; and (3) the construction of plants and installations in the open. [redacted] 50X1

One of the tasks that has been assigned to the Permanent Commission on Chemicals in connection with long-range planning is the forecasting of trends in chemical technology through 1980, which CEMA planners recognize to be a difficult job because of the highly dynamic

* Goals for 1975 have been announced for the Polish and Rumanian chemical industries.

[redacted] 50X1

nature of the industry. Early in 1961, working groups of the commission were said to have begun this work in the following areas: synthetic rubber, tires and other rubber products, plastics, chemical fibers, mineral fertilizers, petrochemicals, basic inorganic chemicals, and paper and cellulose. The working group for plastics asked a special group of experts to submit, by the end of 1961, a study of the extent to which nonferrous metals could be replaced by plastics. 50X1

B. Specialization in Production of Chemicals

In spite of the claim in December 1960 that CEMA had worked out recommendations for specialization and coordination of production of some 500 chemical products accounting for 80 to 85 percent of the total volume of production of the chemical industries of the countries belonging to CEMA (excluding rubber products), evidence accumulated in 1961 that the feasibility of some of these proposals was being reexamined. For example, CEMA planners reportedly decided that the existing plan for specialization in pharmaceuticals was much too elaborate and that perhaps the manufacture of the most important products should be initiated or kept at the national level. Similarly it was stated in an East German trade journal that problems of planning and implementing specialization in the rubber industry had not yet been satisfactorily solved. The East German press also reported that plans for specialization were not always economically and technically sound and that a "methodology" for specialization in chemicals was being prepared. Finally, the Minister of the Polish chemical industry admitted in November 1961, following a meeting of the Permanent Commission on Chemicals, that specialization in the chemical industry was a "theme which has not so far been developed" and indicated that the meeting was devoted merely to the formulation of conditions on which specialization should be based.* 50X1 50X1 50X1 50X1

Some progress was discernible, nevertheless, as a result of bilateral negotiations. Following a meeting of the Joint Czechoslovak - East German Committee for Economic, Scientific, and Technical Cooperation in August 1961, it was reported that the two countries would cooperate in production of laboratory chemicals, pharmaceutical raw materials, serums and vaccines, textile dyes, rubber and asbestos products, and textile and leather-processing agents.** Similarly, the Czechoslovak-Hungarian

* At the 15th Session of CEMA held the following month, the discussion centered around the guiding principles on which specialization should be based, and intra-Bloc specialization in the production of weed killers reportedly was established.

** In a related development the chief of the East German chemical industry stated in May 1961 that specialization in these products would help free the East German economy from disruptive measures by West Germany.

committee on cooperation reported agreement on bringing about further expansion of specialization in the chemical industry. Also, Czechoslovakia reported an agreement with Poland on specialization in production of synthetic rubber, pigments,* and pharmaceuticals.

C. Exchanges of Technical Data and Equipment

A number of new agreements between countries of the Bloc to exchange chemical technology and equipment were announced in 1961, supplementing the list of those already concluded for 1961-65.** The new agreements included provisions relating to technology and equipment for pharmaceuticals, nitrogen fertilizers, basic chemicals, rubber, and tires. There was mention also of plans for joint construction by the USSR, East Germany, Czechoslovakia, Poland, and possibly Hungary of a phosphorite mining and concentrating combine in Estonia to serve the needs of the latter four countries. At the same time, East Germany complained that the quality of East German tires had been lowered because of a lack of modern equipment that was not available on a large scale from other countries belonging to CEMA. [redacted] Evidence also appeared in 1961 that Poland was unable to obtain technical data for producing organophosphorus insecticides from East Germany or the USSR. 50X1

There are indications that trade between countries of the Bloc in chemical technology and equipment will be accelerated. Deliveries of equipment for complete chemical plants in 1965 are to be about seven times the deliveries in 1958, and efforts are being made to provide for increased specialization in this area. Moreover, it was announced in 1961 that the Permanent Commission on Chemicals had established a Working Group for Designing and Equipment and that the group had recommended an exchange of designs among member countries for approximately 70 processes. [redacted] 50X1

Efforts also are being intensified to coordinate research and development work in the chemical industry. Closer cooperation at the research stage was planned in bilateral agreements involving Bulgaria and Rumania, Czechoslovakia and the USSR, Poland and Rumania, and Poland and Hungary. East Germany and Rumania agreed to joint research on cellulose (rayon) fibers. Close collaboration was said to exist between Soviet and Hungarian research institutes on the basis of a common research plan. East German and Soviet specialists also were reported to be working on the problem of the automation of production of divinylstyrene rubber; East Germany, the USSR, and Czechoslovakia were reported to be collaborating on the automation of production of chlorine; and Soviet and Hungarian specialists were reported to be examining the

* Described as "coloring materials."

** For a selected list of agreements, see Appendix A.

problem of the use of radioactive isotopes in measuring and regulating instruments for the chemical industry. The working group of CEMA on plastics discussed the coordination of research and development work in this area through 1980.

Activities of CEMA in the synthetic fiber field reportedly came to a standstill in 1959-60 following the decision by Rumania, and later by Czechoslovakia, Poland, and the USSR, to buy synthetic fiber plants in the Free World. The Rumanian government allegedly failed to send representatives to a CEMA meeting in the fall of 1958 because it was obligated not to reveal details of technology from the Free World and felt that it would have difficulty avoiding revelations if representatives were present. This case suggests the possibility that efforts by CEMA to increase the exchange of indigenous technical data among Bloc countries would have the effect of promoting the dissemination of technology being obtained in the Free World. 50X1

Cooperation at the operating level is being encouraged. Poland and Hungary have agreed to coordination at the plant level in the fields of polyvinyl chloride, ammonia, caprolactam, pharmaceuticals (steroid-hormones), and photochemicals. Late in 1961, pharmaceutical plants in Hungary and East Germany agreed to cooperate through exchange of skilled workers. Previously in 1960, countries belonging to CEMA had exchanged operating experience in the fields of ammonia and sulfite cellulose through plant visits.

D. Standardization

In 1961, there were evidences of slow progress in standardizing construction of chemical plants in the USSR and the European Satellites. The Polish Vice-Premier pointed to the "need for speeding up work of the CEMA bodies on the standardization of the basic units of machines and industrial equipment, especially as regards the new investment projects in the chemical industry." The lack of standardization in this area, including mechanization and automation of chemical processes, was said to result in much time lost "in the adjustments that are necessary due to the different regulations in the individual countries." Also pointed out was the close relation of this problem to cooperation in production of chemical equipment. Discussions continued in 1961 on development of unified standards for chemical products, but no concrete progress has been reported to date. 50X1 50X1

II. Trade with the Free World

A. Chemical Technology and Equipment

1. Imports from the Industrial West

One of the most significant contracts concluded by the Bloc in 1961 was one involving the purchase of $25 million worth of plastics-making equipment from the UK by a consortium of four European Satellites. Under the contract, which was signed in April after a year of negotiations, East Germany, Poland, Czechoslovakia, and Rumania reportedly will each obtain equipment for a plant capable of producing 24,000 tons of polyethylene plastic per year. Polyethylene is not produced commercially in the Satellites as yet, but imports of this equipment will substantially aid the four countries in meeting their goals for 1965.

During 1961 a number of other major contracts were signed by countries of the Bloc. Among the Soviet purchases were three plants for producing ammonia -- a petrochemical and a raw material for production of fertilizer.* The dramatic rise in imports by the Bloc of chemical equipment from the Free World in recent years as a result of these contracts is illustrated by Soviet trade statistics, now available through 1960, which give the value of imports of equipment for the chemical industry** as follows (in million new rubles***): 1957, 6; 1958, 18; 1959, 70; and 1960, 122. As an indication of the current inflow, Poland has indicated that at least 20 percent of the equipment needed by the Polish chemical industry in 1962 will be obtained in the Free World.

2. Exports to the Industrial West

In 1961, countries of the Bloc made further offers of chemical technology to the Free World as a means of increasing the accessibility of Western technology in this field and also of earning foreign exchange. Late in 1960, East Germany agreed to give a British engineering firm the rights to an extensive list of East German chemical processes in exchange for assistance in obtaining for East Germany the rights to a number of British patents. Then, in 1961, it was reported

---

* Other major agreements made during 1961 are shown in Appendix B.

** As listed in Soviet foreign trade statistics under the category "equipment for the chemical industry." This category probably does not include pumps, compressors, and other types of general industrial equipment for use in chemical plants.

*** Ruble values in this report are given in new rubles (based on the Soviet currency reform of 1961). Foreign trade rubles may be converted to US dollars at the official rate of exchange of 0.9 ruble to US $1 and other rubles at a rate of 0.4 ruble to US $1. Neither rate of exchange necessarily reflects the value of the ruble in terms of the dollar.

that a US firm had obtained rights to 60 Soviet patents* and, in addition, could arrange for rights to 10 chemical processes. Also, a second US firm reported that it was preparing, jointly with a French firm, a survey of chemical and other processes available in the Bloc following visits of its representatives to Eastern Europe.

From the details so far released it seems unlikely that much will come of the efforts of the Bloc to sell chemical technology, because of the generally inferior position of the Bloc in this field. For example, the USSR apparently has offered to sell technical data for producing butadiene from butane, but Polish sources have admitted that the Soviet process is inferior to the comparable US process, which the USSR, Poland, and Rumania have all tried without success to obtain during the last several years. In isolated cases, however, the USSR may have marketable processes -- for example, one to produce phenol and acetone from isopropyl benzene. A recent Soviet press article claimed, in fact, that several foreign countries had purchased licenses from the USSR to use a Soviet process for utilizing byproducts from the cumene process. [redacted] 50X1
It was claimed in the Czechoslovak press that the country had sold technology for making cellulose and nylon, [redacted] but it was not clear whether 50X1
this statement referred to sales to countries of the Free World. Also, Hungary appears interested in selling technology in the pharmaceutical field to the US.

3. Exports to Underdeveloped Areas

There was no significant change during 1961 in the pattern of exports of chemical technology and equipment from the Bloc to the underdeveloped countries. As in the past, exports consisted mainly of technical data and plants for producing basic chemicals, fertilizers, pharmaceuticals, and rubber products. Selected developments are as follows:

a. Czechoslovakia was to have begun construction of a tire plant for India, the daily capacity of which is to be 500 tires and 500 inner tubes.

b. Czechoslovakia signed an agreement to build a tire plant for Ghana during 1962-63.

c. The USSR has contracted to build by 1964 a tire plant for Ceylon, the initial annual capacity to be 250,000 tires and an equal number of tubes.

d. East Germany is supplying India with a plant for making 10,000 tons of calcium carbide per year.

* Not all relating to chemical processes.

e. The USSR will supply Indonesia with a chemical plant capable of producing 100,000 tons of soda ash and 40,000 tons of caustic soda per year.

f. Hungary will supply Ghana with a pharmaceutical plant with an annual capacity of 1 million ampoules and 1 billion tablets.

g. The USSR will supply equipment and technical assistance for pharmaceutical plants in Egypt, Iraq, and Lebanon.

h. The USSR will supply Indonesia with a superphosphate plant.

i. The USSR will supply the United Arab Republic (Egypt) with equipment for a nitrogen fertilizer plant.

j. Hungary will help Guinea build its first pharmaceutical plant.

There was little evidence in 1961 of any current or planned exports of technology or equipment from the Bloc for making rubber, the newer types of plastics and synthetic fibers, and basic chemicals from petroleum and natural gas -- a reflection of the limited capabilities of the Bloc in these areas. There was, however, a report late in 1961 that the nitrogen fertilizer plant which the USSR is to help build for Iraq will be based on natural gas. [redacted] 50X1

B. Chemicals and Chemical Raw Materials

1. Rubber

Imports by the Soviet Bloc of natural rubber increased substantially in 1961 and more than offset a sharp decline in imports by Communist China. Statistics published by the International Rubber Study Group indicate that the total imports by the Bloc amounted to about 530,000 tons compared with imports of 416,000 tons in 1960 and the previous peak of 454,000 tons in 1959. Soviet imports were about 330,000 tons, an increase of about 155,000 tons above imports in 1960.* At the same time, Chinese Communist imports in 1961 were 82,000 tons, only about three-fifths of the 135,000 tons imported in 1960.

The rise in Soviet imports probably reflects a combination of factors, including reduced Soviet stockpiles following curtailed

* Official Soviet statistics on imports of rubber, which are not yet available for 1961, sometimes differ significantly from those of the International Rubber Study Group.

purchases in 1960, lower world-market prices, and the failure to increase production of synthetic rubber according to plan (33 percent, or about 116,000 tons) in 1961.* The reduction in Chinese imports, partly counterbalanced by reduced reexports to the USSR and the European Satellites, probably reflects, in part at least, the general retrenchment of the economy in 1961, efforts to conserve foreign exchange, and reduced activity in the rubber fabricating industry.

Imports of synthetic rubber by the Bloc from the Free World, negligible before 1958, continued to increase in 1961 and are assuming some significance. According to the International Rubber Study Group, the Bloc purchased 48,000 tons in 1961 compared with purchases of about 29,000 tons in 1960 and 16,000 tons in 1959. The USSR purchased 26,000 tons from the Free World, or about two and one-half times the purchase of 10,400 tons in 1960. Purchases by the Satellites also rose. On the other hand, imports by Communist China totaled about 13,000 tons less than in 1960, when 16,000 tons were purchased.

The Bloc made its first purchase of synthetic rubber from Japan in 1961, when the USSR reportedly purchased 2,000 tons and Communist China 500 tons. Larger sales to the USSR may be provided for in a long-term contract now in the planning stages. 50X1

Although the USSR and at least four of the European Satellites -- Poland, Rumania, Czechoslovakia, and Hungary -- have talked of plants for commercial production of stereoregular, or stereospecific, types of rubber,** which are complete substitutes for natural rubber, little progress was reported in this direction in 1961. The USSR, which apparently plans to produce annually about 200,000 tons of polyisoprene by 1965, reported development in August 1961 of a highly automated, low-cost process. Initial production of polybutadiene also was reported. In October 1961 a Hungarian trade official said that Hungary was anxious to obtain technology for the construction of a polybutadiene or a polyisoprene plant. Production of stereoregular rubber elsewhere in the Bloc evidently is still in the planning stages. In view of the limited progress to date in improving the technology of the Bloc in this area, plus the evidence of shortfalls in producing other types of synthetic rubber, it is probable that the Bloc will continue to be a large-scale importer of natural rubber at least through 1965. 50X1

---

* For further details on production of synthetic rubber in the USSR, see III, A, 1, b, p. 17, below.

** Cispolyisoprene and cispolybutadiene. They are referred to as stereospecific because their molecular chains have a definite and specific spatial arrangement. Cispolyisoprene is identical with natural rubber and is often called the synthetic natural rubber. Cispolybutadiene has the same stereospecific structure as natural rubber but is said to have improved properties.

2. Fertilizers

Information published in 1961 by the USSR revealed that the quantities of Soviet potash exported to the Free World continued to rise steadily in 1960 in spite of the fact that supplies of potash to domestic agriculture declined. In 1959, exports amounted to 439,000 tons, all but 8 percent of which went to the Free World. In 1960, exports jumped to 629,000 tons, of which about the same percentage went to the Free World. Meanwhile, supplies to Soviet agriculture declined from 1.9 million tons in 1959 to 1.8 million tons in 1960. Japan, the largest importer of Soviet potash, took 38 percent of exports in 1959 and 40 percent in 1960. It is uncertain as yet whether or not this trend was interrupted in 1961 following the Plenum of the Central Committee in January 1961, when a higher priority for Soviet agriculture was ordered.

A similar conflict between exports and domestic requirements appears to exist in the case of apatite concentrate. In spite of shortages of the concentrate at superphosphate plants and a decline in the amount of phosphorus fertilizers supplied to agriculture, exports, about one-third of which go to the Free World, continued to rise steadily in 1960.

III. Developments in Each Country of the Sino-Soviet Bloc

A. USSR

1. Plan Fulfillment, 1961

a. General

Production of chemicals in the USSR in 1961 rose 14 percent, the highest rate of increase achieved during the Seven Year Plan, but this progress was overshadowed by a significant shortfall in capital investment. The reported increase of 14 percent* in production of Soviet chemicals compared with increases of 10 and 12 percent, respectively, in 1959 and 1960 represents only a slight underfulfillment of the official goal to increase output 14.5 percent. Nevertheless, production of priority chemical products -- fertilizers, rubber, fibers, and plastics -- failed to meet the plan, although increases in fibers and plastics were substantial. Soviet production of selected chemicals in 1961 is shown in the following tabulation:

Product	Unit of Measure	Amount	Percentage Increase Above 1960
Chemical fertilizers (gross weight)	Thousand tons	15,300	10.1
Sulfuric acid	Thousand tons	5,727	6.1
Plastics and resins	Thousand tons	405**	22.0
Artificial and synthetic fibers	Thousand tons	250	18.5
Motor vehicle tires	Million units	19	10.5

* Information made available during 1961 on the value of Soviet chemical output in 1955 suggests that the value of such output in 1961 was about 7.5 billion rubles.

** Computed from reported percentage increase.

Sporadic shortages of electric power and skilled labor in the chemical industry showed up again during 1961. In addition, the midyear fulfillment report indicated that increases in labor productivity in the chemical industry lagged behind those in all industry and thus tended to confirm the reported delays in the introduction of new chemical technology and in the mastery of new processes. A further irritant was the continued lack of coordination in supply and production plans, caused in part by overoptimistic predictions of the startup of plants producing primary chemical materials. Shortcomings continued in the procurement of chemical equipment as a result of the disorganized planning of chemical construction in general.

Reflecting the widespread evidence of shortfalls in construction, capital investment in the chemical industry was officially reported to have increased only 13 percent compared with a planned increase of about 50 percent.* Thus the investment goal for 1961 apparently was fulfilled by only 75 percent. Investment goals were met or exceeded for only 45 of 202 chemical enterprises being built, expanded, or modernized in 1961. In addition, a midyear report revealed that construction costs in the chemical industry had failed to decrease in 3 years -- mid-1958 to mid-1961 -- and that the costs of building some major plants (synthetic rubber and tires) had actually increased.

Glaring examples of the lagging progress in construction and the failure of recently developed chemical processes to meet expectations include the admission that new capacities for chemical fertilizers in 1959-61 fell short of the plan by 2.7 million tons and that the actual capacities of several of the newest Soviet synthetic rubber plants had turned out to be 30 to 40 percent under planned capacities because of errors made in planning the processes. In the vital area of petrochemical raw materials, a plant that reportedly went into operation in 1959 using a process based on electrocracking of methane to produce acetylene had failed to provide any useful output as of November 1961. 50X1

* The official plan published in December 1960 had stipulated an increase of 42 percent in chemical investment in 1961, but the absolute goal (1.278 billion rubles) was 50 percent greater than the level of capital investment subsequently reported for 1960 (852 million rubles). It is thus possible that in December 1960 the USSR overestimated the actual fulfillment for 1960. The data on investment should be considered approximate because the available data through 1960 include both state and decentralized investment, whereas the 13-percent increase reported for 1961 and the absolute figure given in the plan (1.278 billion rubles) presumably represent only state investment. In the case of the chemical industry, however, the difference may be slight.

b. Synthetic Rubber

Although a number of Soviet rubber plants reported initial production or expansion of facilities in 1961, it is virtually certain that the production goal of a 33-percent increase above output in 1960 was not met.* Considerable evidence is available that serious delays in construction were encountered and that defects were revealed in some of the newer production processes. The Omsk Synthetic Rubber Plant, under construction for about 10 years, failed to go into operation again in 1961. At Sumgait the planned startup of facilities for producing butyl rubber and styrene** failed to materialize, and an installation for production of nitrile rubber by a continuous process was dismantled, defects having proved to be too serious to be rectified in place. There has been difficulty in obtaining sufficiently high yields of butadiene at some of the newer rubber plants, and the redesign of certain equipment at the Sterlitamak plant was underway during 1961, although the plant went into operation only in 1960.

Nevertheless, some progress was apparent. New rubber plants went into operation at Stavropol' and Temir-Tau, and initial production of butadiene (sufficient to meet one-third of the plant's requirements) was reported at Sterlitamak.*** Additional butadiene capacity was installed at Sumgait, and the initial production of polybutadiene, one of the new stereoregular rubbers, was reported at Yaroslavl' in December. [redacted] In August the development of a new, highly automated process for production of polyisoprene rubber was reported at an institute at Leningrad, the new process allegedly permitting production at one-fifth the cost of other processes currently available. [redacted] The USSR also claimed development of a one-stage process for production of synthetic rubber in 1961 by chemists of the Azerbaydzhan Academy of Sciences.† 50X1 50X1

c. Motor Vehicle Tires

Production of motor vehicle tires in the USSR rose to 19 million units in 1961, an increase of 10.5 percent, but the shortage of tires that has plagued the Soviet economy during the past several years persisted throughout 1961. The shortage can be attributed to lagging construction of new manufacturing facilities, to inadequate road

* Production in 1960 is estimated to have been 350,000 tons.

** An intermediate for production of copolymer rubber.

*** The Sterlitamak plant went into operation in 1960 but had used butadiene imported from other regions.

† Possibly referring to a one-stage process for producing butadiene, a major component of most types of synthetic rubbers.

life caused by the poor quality of tire components, and to the failure to recap more than a negligible part of wornout tires. Construction delays were encountered at Omsk, Yaroslavl', Krasnoyarsk, and Moscow in 1961. Continued evidence of the low quality of Soviet tire cord is apparent in the admission that 40 percent of all tires in the USSR go out of operation because of inferior tire cord. [redacted] In addition, the quality of synthetic rubber provided by some of the newer rubber plants is substandard. In spite of the shortage of tires, not more than 3 to 5 percent of wornout tires are being repaired. Equipment for 12 tire repair plants scheduled for operation in 1961 had not been provided as of June of that year. 50X1

Progress reported for the Soviet tire industry in 1961 included the commissioning of the Dnepropetrovsk Tire Plant and expansion of production at the Baku Tire Plant. The Dnepropetrovsk facility, supplied by a British firm, reportedly will have an hourly output of about 54 pounds of finished product per worker compared with 48 pounds per worker in leading US tire plants. In spite of the reported expansion of the Baku Tire Plant, there is evidence that many shortcomings are still encountered and that some of the planned improvements in mechanized operation have not been attained. Development is underway on tires using metal cord and on the vulcanization of tires by radiation. In addition, Soviet testing of tubeless tires for trucks is almost completed, and tires with replaceable treads apparently are ready for serial production at one tire plant.

d. Plastics

Production of plastics and resins in the USSR rose to about 405,000 tons in 1961, an increase of 22 percent compared with a planned increase of 32 percent. The failure to achieve the goal for the second straight year suggests that continued difficulties may be encountered in fulfilling the Seven Year Plan. Possible evidence that a revision of the Seven Year goal may already be under consideration appeared in a Soviet article of December 1961, [redacted] in which it was stated that production of plastics in 1965 would be five to seven times that in 1958, whereas the original goal was more than seven times that in 1958. 50X1

Concern is being voiced about disproportionate development of branches producing basic plastic materials and those producing fabricated plastic articles. No comprehensive plan apparently is yet available for the processing of plastics scheduled for production during the Seven Year Plan, especially for provision of the required machinery and engineering talent. [redacted] In addition, some of the new types of plastics starting to be produced do not embody the necessary characteristics for effective use in industry, lacking additives that would impart stability or improved dielectric properties. Development work is lagging on certain of the newer plastics, notably polycarbonates. 50X1

Achievements of the Soviet plastics industry during 1961 included the initial production of polyformaldehyde plastic and polypropylene,* the completion of a polyethylene installation at Groznyy** (to use a low-pressure process), and the construction of a unit for producing urethane foam at the Roshal'sk Plastics Plant.

e. Chemical Fibers***

Soviet production of chemical fibers in 1961 totaled 250,000 tons, an increase of 18.5 percent compared with a planned increase of 20 percent. The industry was again plagued by the low quality of certain raw materials (cellulose and caprolactam†) and by shortages of equipment for new plants. In addition, downtime for repair of existing equipment reportedly was high, and a number of plants attempting to master new processes failed to fulfill the plan for labor productivity. The Soviet offer to sell to Western firms in the early part of 1961 substantial quantities of an intermediate for production of a new synthetic fiber suggests that disproportionate growth is occurring in the industry. [redacted] 50X1

Achievements of the Soviet chemical fiber industry in 1961 included the completion of the second section of the dacron plant at Kursk,†† the first section of the caprolactam plant at Lisichansk, and the initial production of acetate fiber at Engel's. In addition, facilities were being readied in October for production of cellulose from reeds in Astrakhan', and it was reported that work was completed on development of a new process for carbon disulfide.††† The abundant evidence of lags in installing new capacities for chemical fibers in the USSR in 1961 included reports of delays at plants scheduled to produce nylon and orlon types of fibers, cellulosic fibers, and improved viscose tire cord.

f. Fertilizers

Although Soviet production of mineral fertilizers increased 10 percent to a total of 15.3 million tons in 1961, the level

---

* A similar product is produced in the US with the trade name "Delrin."

** It is believed that this plant may have been scheduled for operation as early as 1959 but that technical and other difficulties delayed start-up.

*** Including both cellulosic fibers and synthetic fibers such as nylon and dacron.

† An intermediate for production of a nylon type of fiber.

†† There was some evidence, however, that inventories of dacron accumulated in 1961 because of a lack of proper dyeing facilities.

††† An intermediate for production of rayon.

of output was modest compared with the ambitious goal for 1965, which apparently was revised upward from 35 million to 37.7 million tons during 1961. Although Soviet reports maintain that the goal for production of fertilizers in 1959-61 was exceeded, the planned introduction of new capacities for fertilizer in 1959-61 fell short by 2.7 million tons,* a lag confirmed by Khrushchev at the Plenum of the Central Committee in March 1962.** Earlier, in December 1961, Khrushchev, apparently recognizing the lengthy construction periods required in the USSR for plants producing the more effective fertilizers, stressed the importance of quickly expanding output of the "cheapest kinds of mineral fertilizers -- above all, phosphorite and lime."***

During 1961, two additional nitrogen fertilizer plants in the USSR started using natural gas, and it was reported that 30 percent of all Soviet ammonia was produced from natural gas, [redacted] whereas there was no such production before 1958. Ammonia was produced for the first time at new plants at Salavat and Shchekino, and additional ammonia capacities were put into operation at Novomoskovsk (formerly Stalinogorsk). Initial delivery of raw potassium salts was reported from the new Saligorsk combine,† as was initial production of sulfuric acid and superphosphate at Chardzhou. New plants producing nitric acid went into operation at Rustavi, Novomoskovsk, and Gorlovka. 50X1

The lag in introduction of new fertilizer capacities was amply documented during 1961. Shortages of equipment or defects in equipment†† plagued construction of new or expanding nitrogen plants at Nevinnomyssk, Fergana, Rustavi, and Lisichansk. Lags also were encountered in the construction of facilities for production of superphosphate or phosphorus raw materials at Sumgait, Dzhambul, Sumy, and Kara-Tau. A report of August 1961 indicated that the shortage of phosphorus-containing raw materials and sulfuric acid had resulted in utilization of only 83 to 84 percent of the available capacities at superphosphate plants. In spite of the reported shortage of phosphorus raw materials, however, the USSR continues to export large quantities of such materials.

---

* There is some evidence, however, that the goal for fertilizer for 1959-61 was unrealistically low in view of the ambitious goal for 1965.

** Although Khrushchev did not give the shortfall in absolute terms, he stated that the plan for commissioning new facilities was fulfilled by only 44 percent in 1959-61.

*** In accordance with general practice, lime is not considered a fertilizer in Soviet statistics.

† The Saligorsk combine was originally reported in operation in 1960.

†† The serious nature of the defects in equipment is illustrated by the admission that 200 workers per day were required throughout 1960 to repair defects in new equipment arriving at the Lisichansk Chemical Combine, a producer of fertilizers.

2. New Plans

Production of chemicals in 1962 is planned to increase 16.2 percent compared with the actual increase of 14 percent in 1961. All-Union goals have been announced for several of the more important product groups, with output of ammonia scheduled to increase 28 percent in 1962; plastics and resins, 26 percent; synthetic rubber, 21 percent; and chemical fibers, 12 percent. Production of fertilizers is planned to reach 17.2 million tons (a 12-percent increase) and that of tires 21 million tons (a 10-percent increase).

In December 1961 it was announced that 1.295 billion rubles would be invested in the Soviet chemical industry in 1962, apparently an increase of 17.7 percent above investment anticipated in 1961.* The results in 1961 appear to have been poorer than expected, however, and a more recent Soviet report states that an increase of 22 percent is planned for 1962 above the actual investment in 1961. 50X1

There are indications that the USSR will initiate construction of relatively few new chemical plants in 1962. The regime apparently will put a high priority on completion of current chemical projects, however, and 75 chemical installations are on the list of "especially important" construction projects.

3. Outlook

There is little doubt that the large carryover of uncompleted chemical plants and the decision to initiate construction of only a few new chemical projects in 1962 will result in a substantial improvement in the number of completions. Thus it is quite possible that the rate of increase in production of chemicals in 1962 will be the highest achieved thus far under the Seven Year Plan, although such an increase will partly be the result of the lag in commissioning new capacities in 1961. Increases in production of plastics and rubber probably will be substantial, and goals for production of fertilizers and fibers appear within reach.

Although sizable increases in production of Soviet chemicals were attained in 1959-61, the rate of development required for implementation of the goals for the Seven Year Plan has significantly lagged. Investment in chemicals in 1959-61 appears to have reached only about 25 percent of the investment of 10.0 billion to 10.5 billion rubles planned for 1959-65, and technological improvements have been tardy and often more

* Because the figure of 1.295 billion rubles does not equate with a 17.7-percent increase above the official plan for 1961 (1.278 billion rubles), the percentage increase probably relates to the anticipated fulfillment in 1961 as of December of that year.

expensive than anticipated. If an increase of 16.2 percent is achieved in production of chemicals in 1962, the industry will still require average annual increases of about 20 percent during 1963-65 to meet the Seven Year Plan.* Performance to date suggests that sustained increases of this magnitude are highly unlikely, and the original Seven Year Plan may be underfulfilled by 10 percent or more.

B. East Germany

1. Plan Fulfillment, 1961

In November 1961 it was claimed that production of the East German chemical industry had increased 7.5 percent above output during the same period in 1960, a 0.7-percent overfulfillment of the plan,** whereas production in industry as a whole increased only 6.2 percent for the year, a slight underfulfillment of the plan. Thus the increase claimed for the chemical industry for the first 10 months of 1961 is about the same as the 7.6-percent increase reported for 1960 but substantially below the average annual rate of 11 percent required to fulfill the East German Seven Year Plan (1959-65) for the chemical industry.

In spite of the reported overfulfillment of the plan for the industry, the production plan for several products was not fulfilled. It was announced in November that production of synthetic fibers in 1961 would exceed production in 1960 by 41 percent, whereas the plan for 1962 had called for an increase of 50 percent. It was reported in October that plans were not being met for production of calcium carbide and soda ash and that the supply of rubber products was unsatisfactory because production was lagging in the rubber industry. Production of nitrogen fertilizer actually declined.

Achievements for individual products were considerably below the goals set for 1961 in the Seven Year Plan. Production of synthetic fibers was 13 to 14 percent below the goal, while production of other products for which figures are available fell short of the goals by the following percentage amounts: synthetic rubber and nitrogen fertilizer, 3 to 4 percent; sulfuric acid, calcium carbide, and soda ash, 6 to 7 percent; and phosphorus fertilizer, about 11 percent. Only caustic soda, for which a very modest increase had been planned, was produced in a slightly greater amount than scheduled.

* Fulfillment of goals for some of the more important products groups (fertilizers, chemical fibers, and plastics) will require even higher annual increases during 1963-65.

** These figures imply a planned increase of 6.7 percent for 1961, whereas the planned increase announced early in the year was 6.3 percent.

The investment plan of the chemical industry for 1961 also was underfulfilled. Investment was slightly more than 1 billion DME* but below the plan of 1.23 billion DME. Important additions, however, were made to capacity, including capacity for 180,000 tons per year of calcium carbide, equivalent to nearly one-seventh of production in 1961; for 20,000 tons per year of polyvinyl chloride plastic, equal to more than one-third of production in 1960; and for 6,000 tons per year of polystyrene plastic, or about 150 percent of production in 1960.

Difficulties encountered by the chemical industry in 1961 included the perennial problems of poor management and inadequate support from the designing, construction, and machine-building sectors of the economy and were compounded by problems resulting from the peculiar political climate of 1961. The supply of manpower was inadequate, partly because the large exodus of refugees preceding the closing of the Berlin sector border on 13 August undoubtedly contained at least a proportional share of workers and technicians from the chemical industry but also because insufficient numbers of university and trade school graduates have been entering the industry. 50X1

The performance of the industry also was adversely affected by the campaign to achieve "immunity to disruptive maneuvers" by West Germany -- that is, to become independent of West Germany as a source of important materials and items of equipment. Dislocations occurred as East Germany attempted to produce domestically products that previously were obtained from West Germany or to adapt processes to operate with substitutes. The necessity of making extensive shifts in the economy to assure immunity to disruption has been partly responsible for the failure to maintain the schedules of the Seven Year Plan. To some extent, however, the "immunity" campaign has been a handy excuse for not meeting goals that would not have been met in any event. In November it was reported that of about 30,000 tons of chemical materials for which East Germany had been dependent on West Germany, only about 100 tons remained to be "covered" from other sources. The "covering" 50X1
of import requirements, however, apparently means, in general, an advanced stage of contingency planning rather than an actual placing of contracts. It also should be noted that independence from West Germany does not imply independence from all Western sources and that, in fact, some products previously imported from West Germany are now being furnished by other Western countries.

* Deutsche Mark East (East German marks) may be converted to US dollars at the official rate of exchange of 4.2 DME to US $1.

2. New Plans

Plans for 1962 call for an increase of "more than" 6 percent in chemical output compared wih an increase of 5.8 percent for industry as a whole. Production of plastics is to increase 26 percent and production of chemical fibers 24 percent. Investment in the chemical industry is to be 25 percent greater than in 1961. The emphasis of investments is to be on completing projects already begun rather than on starting new ones. A number of projects, especially those of small size, scheduled to be started in 1962 have been postponed until the period 1963-65. [redacted] Production of cellulose acetate and methylene chloride, both important to the East German film industry and formerly obtained largely through imports from West Germany, is to increase by 100 percent and 50 percent, respectively. The film industry in general has been designated under CEMA as a principal supplier of photographic films to other countries of the Bloc. 50X1

3. Outlook

Although no revisions have yet been announced in the goals for 1965 -- and there is talk of resuming the tempo of the Seven Year Plan in 1963 -- it is clear that the arrears that have accrued to date will necessitate some downward revisions in production goals for 1965. The increase in production during 1959-62 will average only about 8 percent per year, and an increase of 14 to 15 percent per year would be required during 1963-65 to meet the original goal of a 105-percent increase during the 7-year period. Investment in the industry in 1962 is scheduled to be 25 percent greater than in 1961, but a shortfall of 5 to 10 percent in the investment plan for the Seven Year Plan is likely to occur. It is significant that in spite of the emphasis on establishing a petrochemical industry in East Germany, the completion of the first stage of the petroleum refinery at Schwedt, scheduled to be one of the two major centers for petrochemicals, has been delayed a year, from 1963 to 1964.

C. Poland

1. Plan Fulfillment, 1961

The value of output of the Polish chemical industry increased 19.1 percent in 1961, substantially exceeding the planned increase for 1961 of 15.5 percent and the average annual rate of about 15 percent required to achieve a doubling of output during 1961-65. Investment in the chemical industry in 1961 was valued at 7 billion zlotys,* slightly in

* Zlotys may be converted to US dollars at the official rate of exchange of 4 zlotys to US $1. This rate of exchange does not necessarily reflect the value of the zloty in terms of the dollar.

excess of the planned investment of 6.6 billion zlotys for 1961 and one-sixth of the total planned investment of 42 billion zlotys during 1961-65. A partial explanation for the favorable showing in output relative to the plan may be found in a statement by the Minister of the Chemical Industry that higher production than had been anticipated in the plans is being attained at all newly opened plants. 50X1

On the negative side, out of a total of 17 industrial projects that were not completed as planned in 1961, 8 projects were in the chemical industry. In commenting on the fact that about one-half of the delayed projects were chemical installations, the Polish Vice-Premier stated that "this is a disquieting signal if one takes into account the immense and difficult investment in the chemical industry." 50X1

2. New Plans

Output of the Polish chemical industry in 1962 is planned to increase 14 percent above the level in 1961. The amount of investment in 1962 is to be 9 billion zlotys, and in an effort to achieve quick production results the funds are to be concentrated on such projects as the Plock Petrochemical Combine and the nitrogen plant at Tarnow rather than being spread over a wide range of projects. This measure of concentrating investments is to avoid a repetition of the failure to complete the eight projects in the chemical industry in 1961, the completion of which has been postponed until the first quarter of 1962. The Vice-Minister of the Chemical Industry, B. Taban, stated that "in the field of investments, 1962 will be decisive for the development of the chemical industry during the whole Five Year Plan" for 1961-65. 50X1

3. Outlook

The output plan was exceeded in 1961, the typical pattern in recent years, and the relatively modest goal of a 14-percent increase in 1962 also is likely to be exceeded. Similarly the plan to double output in comparison with the 1961-65 period probably will be achieved, aided in a substantial way by the continued heavy import of chemical equipment and technology from the Free World. Difficulties are likely to be encountered, however, in keeping construction of the Plock combine on schedule.

D. Czechoslovakia

1. Plan Fulfillment, 1961

Output of the Czechoslovak chemical industry in 1961 reportedly increased 13 percent above that for 1960, or somewhat in excess of the planned increase of 11 percent. This increase is intermediate between

the average rate of 12.0 percent achieved during the Second Five Year Plan (1956-60) and the rate of 14.5 percent planned for the Third Five Year Plan (1961-65). Although the over-all production plan was over-fulfilled, production goals were not met for a number of important groups of products: nitrogen fertilizers, plastics, sulfuric acid, and chemical fibers.

Moreover, construction in the chemical industry went badly. In December, new superphosphate installations (locations unknown) were reported to have been completed during 1961, but considerable delays were reported in other "key" projects in the chemical industry. [redacted] 50X1
Specific projects where construction was lagging were not mentioned at that time, but these lagging projects may have been the same as those cited in the first quarter of 1961 for construction difficulties. At that time, shortcomings were reported at nine plants covering a broad range of chemical products. As was true in 1960, criticism also was made of long-drawn-out construction periods, with the synthetic alcohol plant at Most-Zaluzi given as an example.

Underfulfillment of construction plans in the chemical industry has been a chronic problem in Czechoslovakia, 1958 having been the only recent year, according to Czechoslovak sources, when the plan was fulfilled. The failures in 1961 were not unexpected, in that it was reported late in 1960 that deliveries of chemical equipment in 1961 from domestic machine-building plants would not be in accordance with previously established construction schedules. Delays in design work were said to have contributed to shortfalls in construction work at the Kralupy Rubber Works and the Stalin Works at Zaluzi. Also, actual construction costs were said to be exceeding the plan. Failures also were admitted in chemical research and development. As of the end of November, some 56 percent of the planned targets for research and development were in danger of not being fulfilled. [redacted] Difficulties also were evident in 50X1
the automation of the chemical industry. The industry will not have computers for working out chemical production data until 1964. Only semi-automatic machines are available at present. Also, the automation plan for the Stalin Works is not being fulfilled.

2. New Plans*

A planned rate of growth in output of chemicals for 1962 has not been released, but Czechoslovak planners expect output to exceed that stipulated for 1962 in the Third Five Year Plan by 500 million koruny.**

* For a discussion of the 20 Year Plan (1961-80), see I, A, p. 5, above.
** Koruny (crowns) may be converted to US dollars at the official rate of exchange of 7.2 crowns to US $1. This rate of exchange does not necessarily reflect the value of the koruna (crown) in terms of the dollar.

Reflecting the lag in construction, however, greater utilization of existing capacity is to play the "decisive part" in increasing output, and the increase as a result of the opening of new plants is to be 300 million koruny lower than envisaged by the Five Year Plan. Although unfinished projects will be given first priority in the construction plan for 1962, the regime finds it necessary to count on slower progress in the expansion of chemical capacities than originally planned. Partly reflecting the lag in production of nitrogen fertilizer, the plan for 1962 provides for the use of fertilizers to a lesser extent than anticipated in the Third Five Year Plan.

3. Outlook

Production targets for 1965 seem to be endangered by the inauspicious performance in construction of chemical plants in 1961 and the cutbacks in construction planned for 1962, but it must be recalled that output goals in the Second Five Year Plan were substantially achieved in spite of a chronic underfulfillment in construction. This situation may be due in part to underestimates by planners of the improvements possible in utilization of existing capacity. Most likely the plan to increase production 97 percent during 1961-65 will not be underfulfilled by any substantial amount, but failures are likely in production of new chemical products such as synthetic rubber.

E. Rumania

1. Plan Fulfillment, 1961

Output of the chemical industry in Rumania* increased 27 percent in 1961 compared with an increase of 16 percent in 1960 and an average rate of 22 percent required to achieve the goal of the Six Year Plan (1960-65) of more than tripling output during 1960-65. The over-all output plan was exceeded, for the planned increase for the year announced earlier was 18 percent. Of the total industrial investment, 18 percent is reported as having gone into the chemical industry.

In spite of this favorable showing with respect to the overall output goal, the chemical industry was criticized for insufficient utilization of production capacities and, in some instances, for the poor quality of products. In addition, several projects were not commissioned on schedule, in part because of delays in supplying blueprints and also because insufficient attention was given to the adoption of new technological processes. Moreover, it appears that output of chemical fertilizers and synthetic fibers was below the planned level. The shortfall in the planned output of fertilizers may be due in part to the

50X1

* Including paper, cellulose, and rubber industries.

failure to commission the nitrogen fertilizer plant at Roznov. It is significant that the plan goal for synthetic fibers, which was not achieved, was quite low -- only 1,700 tons.

2. New Plans

Output of the Rumanian chemical industry is to increase 25 percent in 1962 -- slightly above the average rate required to fulfill the Six Year Plan -- with production of fertilizer scheduled to rise about 50 percent (partly reflecting underfulfillment in 1961). Beginning in the third quarter of 1962, production of tires is planned to reach sufficient levels to fill the country's entire requirement from domestic production. [redacted] 50X1

A continued rapid rise in output of chemicals is probable, although a tapering-off of the current rate of increase is likely to take place during the last 2 or 3 years of the plan period. The extensive purchases of technology and equipment from the Free World will be a significant factor in implementing plans. The failure to commission new installations on schedule may persist in 1962, which could imperil the goals established for output of specific chemical and rubber products in 1965.

F. Hungary

1. Plan Fulfillment, 1961

In 1961 the Hungarian chemical industry produced 20 percent more than in 1960, thus fulfilling its goal. Within the chemical industry, output of pharmaceuticals is reported to have risen nearly 50 percent compared with a planned increase of 20 percent.

Hungary sent a trade delegation to the US in April 1961, at which time the Hungarians presented a shopping list of items that they hoped to purchase for the chemical industry. On the list was a plant to produce acetylene from natural gas, a nylon plant, an activated carbon black unit, a caprolactam installation, and pharmaceutical and plastics raw materials and equipment. In return, the Hungarians offered to sell pharmaceutical technology. This visit apparently has produced no noteworthy results to date.

2. New Plans

In 1962, output of the Hungarian chemical industry is planned to rise 15.1 percent above that in 1961 (possibly including petroleum products and aluminum). Hungary seems to be having considerable success

in raising its output of pharmaceuticals, for by the end of 1962 such output is expected to have reached the level planned for 1963. Pharmaceutical exports for 1962 are expected to rise even more than production.

3. Outlook

The Third Five Year Plan (1961-65) appears to be within reach, as the achieved rates of 22 percent and 20 percent in 1960 and 1961, respectively, were well above the planned increase of about 16 percent per year. Although construction plans are not being implemented on schedule, the increases in output achieved through new investment have exceeded expectations, particularly in the pharmaceutical sector. [redacted] On the other hand, there have been complaints of a shortage of adequately trained personnel, including chemical engineers for operating chemical plants and also for design work. [redacted] 50X1 50X1

G. Bulgaria

1. Plan Fulfillment, 1961

Output of the Bulgarian chemical and rubber industry in 1961 was to increase 15 percent above that in 1960. Actually, this output rose only 12 percent. This result was attributed to shortfalls at two chemical enterprises (which happen to be Bulgaria's two largest) in fulfilling their plans and also at a small antibiotics plant. [redacted] Because expansions were to be commissioned at the two large enterprises, it can be inferred that they did not take place as scheduled. Although significant increases in 1961 above output in 1960 were reported for phosphorus fertilizers, sulfuric acid, and motor vehicle tires, only the plan for the latter was fulfilled. Small increases were achieved in production of caustic soda and nitrogen fertilizers, but output of soda ash declined from the level reached in 1960. 50X1

2. New Plans

According to a draft plan released in November 1961, output of the Bulgarian chemical and rubber industry is to increase 15.5 percent in 1962 compared with an increase of 10 percent in the total industrial output. In spite of the substantial increases currently planned for several products, it should be noted that these, now under the Fourth Five Year Plan (1961-65), represent a downward revision of the goals for 1962 given in 1959 for the terminal year of the now canceled Third Five Year Plan (1958-62). The old and new goals may be compared as follows:

Product	Unit of Measure	New 1962 Plan (Fourth Five Year Plan)	Old 1962 Plan (Third Five Year Plan)
Chemical fertilizers (gross weight)	Thousand tons	686	1,000
Sulfuric acid	Thousand tons	257	290
Soda ash	Thousand tons	232	243
Plastics and resins	Thousand tons	15	16
Motor vehicle tires	Thousand units	286	350 to 400

On the basis of performance in 1961 and earlier years, underfulfillment of the revised plan for 1962 is likely. As regards the goals for 1965 for the chemical industry, none has been disclosed as yet except for chemical fertilizers.

H. Albania

In December 1961 it was reported that the Albanian chemical industry, which consists of one pharmaceutical plant and a few other minor installations, was expected to fulfill its plan by 125 percent. By earlier agreements, Albania was to have obtained a nitrogen fertilizer plant from the USSR and a phosphorus fertilizer plant (to be a part of a chemical metallurgical combine) from Czechoslovakia. Construction actually began on the Czechoslovak plant in February 1961, [redacted] but the USSR reneged completely on its commitment. For this reason, the Albanian government entered negotiations with an Italian firm in 1961 for the purchase of a $25 million nitrogen fertilizer plant in place of the one promised by the USSR. By the end of the year, however, a firm agreement evidently had not yet been concluded. The Chinese Communists apparently are to provide the financial backing for this purchase. 50X1

Albania is now shifting its sources of supply of many such imports from the USSR and the European Satellites to the Asian Bloc and to Western countries, such as Italy. In 1961, Albania signed a trade agreement with Italy for 1962-64 under which Albania is to buy a number of chemical and rubber products formerly obtained from the USSR, including chemical fertilizers, sulfuric acid, pharmaceuticals, pesticides, rubber, and tires as well as artificial and synthetic fibers and polyethylene products. [redacted] A trade agreement signed with Brazil in 1961 called for Albanian imports of chemical products, basic pharmaceuticals, and antibiotics. [redacted] By other trade agreements signed in 1961 and early in 1962, Albania is to obtain chemical products from North Korea and chemical fertilizers and pharmaceuticals from Communist China. [redacted] 50X1 50X1 50X1 50X1

I. Communist China

1. Developments in 1961

a. Output of the Industry

Over-all production of industry in Communist China dropped sharply in 1961, but the indications are that the chemical industry fared somewhat better. The Chinese claimed, in fact, that output of some chemical products increased. Peiping stated in January 1962 that there had been a "considerable increase" in output of chemical fertilizers, insecticides, and consumer goods made from chemicals. The Chairman of the State Economic Commission also claimed an increase in chemical fertilizers and insecticides. Production of antibiotics such as penicillin, syntomycin, aureomycin, and chloromycetin also were said to have increased. China's output of polyvinyl chloride in the first 10 months of 1961 was 12.7 percent greater than in the same period of 1960. Peiping also claimed that the chemical industry "fulfilled" its production plans, but the significance of this assertion is not clear, as no details on plans were announced. 50X1 50X1 50X1 50X1 50X1

Output of some products, however, evidently declined. Imports of crude rubber (natural and synthetic) amounted to about 100,000 tons in 1961 compared with imports of 158,000 tons in 1960, and output of some rubber products probably declined.* Production of alkalies also may have dropped.

b. Output and Supply of Chemical Fertilizers

The report that production of fertilizer increased is difficult to interpret, but it seems unlikely that production of chemical fertilizers in 1961 exceeded 2.8 million tons, the amount of the unattained plan goal for 1960. Several of the eight major plants producing chemical fertilizer claimed to have produced more than in 1960 or at least to have exceeded their production goals. These eight plants account for the bulk of production of nitrogen and phosphorus fertilizers. China's main plant for producing potassium fertilizer is situated in a remote and desolate area in Tsinghai Province. This plant probably had much difficulty in obtaining supplies to sustain its operations during 1961, and consequently the production of fertilizer probably had to be reduced. By mid-1961, however, the plant was producing potassium chloride with an average nutrient content of 48 percent compared with an average of only 30 percent during the first quarter. 50X1

* Reexports to the rest of the Bloc also dropped, from 18,000 tons to virtually zero.

The apparent increase in production of fertilizers tended to be offset by a reduction in imports. Fragmentary information suggests that imports of fertilizers of all types from Bloc and non-Bloc sources may have totaled about 800,000 tons compared with imports of nearly 1.5 million tons in 1960, including a large amount (about 575,000 tons) of phosphate rock from Morocco. Western Europe, the major supplier, is believed to have shipped about one-half of the amount delivered in 1960. With the resumption of limited and unofficial trade with Japan, Chinese agriculture obtained 50,000 tons of Japanese ammonium chloride fertilizer.

c. Construction and Equipment Supply

It does not appear that construction of any large chemical plants was started in Communist China in 1961. Emphasis was on the completion of projects already underway and on the enlargement of existing plants. Construction work continued on eight large new chemical fertilizer plants and on seven of the eight large existing plants that are being expanded. [redacted] Construction of at least some of these large chemical fertilizer plants, however, fell behind schedule. Three of the eight new plants (at K'ai-feng, at Canton, and in Chekiang Province) were scheduled to go into operation in 1961, but available information indicates that they were not completed. [redacted] Nevertheless, 41 percent of all capital investment in the Chinese Communist chemical industry in 1961 was reported to be allocated for construction of chemical fertilizer plants. This investment was said to comprise the highest proportion designated for such uses since the regime came to power and reflects the shift of priorities within the industry in favor of support for agriculture. [redacted] At the same time, it suggests severe cutbacks in construction activity in other sectors of the chemical industry.

50X1

50X1

50X1

Some progress was evident in the construction of "small plants," a program that has been virtually abandoned in other industries. According to the Chinese this approach has been retained in the chemical industry because of the pressing need to supply chemicals to agriculture in a hurry (small fertilizer plants can be built in about 6 months, whereas large ones require 2 years or more) and also because small plants making farm chemicals have an important advantage over small plants in other industries, in that the quality of the product is not so critical.

By 1961 the planners in the chemical industry apparently had decided upon a few types of standard designs for small plants using modern production methods and had convinced the regime that valuable resources should be committed to push forward construction of a number of plants of each type. Most of the miniature synthetic ammonia plants were of two sizes: 800 tons per year (producing about 3,000 tons of

aqueous ammonia fertilizer) and 2,000 tons per year (producing 8,000 tons of ammonium bicarbonate fertilizer). In the Shanghai area alone, there were 12 of the 800-ton plants in production by December 1961. [redacted] One more of the few existing 2,000-ton plants was about to begin operations late in 1961 in Shantung Province. [redacted] 50X1 50X1

The construction of small phosphorus fertilizer plants was more widespread because these plants are relatively simple to build and operate. Plants with a capacity of 4,000 tons per year of sulfuric acid and 10,000 tons per year of superphosphate appear to have been adopted as standard. The Chinese also are using plants that were converted from "discarded" small blast furnaces. These plants have a capacity of 10,000 tons per year of calcium-magnesium phosphate. Construction of plants other than fertilizer plants received little attention in 1961, judging by the dearth of press reports.

Given the priority to concentrate on making equipment for chemical fertilizer plants, various machine and equipment-producing plants strived to step up production of the necessary units. Shanghai apparently was a major producing center for complete sets of synthetic ammonia equipment for plants of various sizes of annual capacities: small (800 tons), medium-size (2,000 tons), and large (25,000 tons). [redacted] 50X1 Enterprises producing tubing, boilers, machine parts, instruments, and electrical equipment turned out seamless steel tubing, high-pressure compressors and piping, meters, valves, and other component parts. In the first half of 1961, Shanghai completed 12 sets of equipment for 800-ton plants and 7 sets for 2,000-ton plants. [redacted] 50X1

2. Outlook

Announcements from Peiping indicate that the general guidelines for the whole economy in 1962 constitute virtually a playback of the policies set down in 1961. Although problem areas in industry are to be further stressed, no significant upturn in industrial output is suggested. Capital construction, however, is to be "further reduced," but the "weak links in industry, such as the capacity of the ... chemical industries, must be strengthened." [redacted] Expectations are that no major construction projects will be started in the chemical industry but that resources will be concentrated on winding up projects near completion, especially large fertilizer plants. Emphasis probably also will be placed on building a small number of modern small and medium-size fertilizer plants. 50X1

The ambitious plans for chemical fertilizers made in 1958 were severely jolted by the withdrawal from Communist China of technicians from the Bloc and by the curtailment in supply of major equipment for expanding the large nitrogen facilities built by the USSR. China is forced to rely

on its own machine-building industry, which apparently has just begun to overcome some problems connected with series production of equipment, notably units to withstand high pressures for making synthetic ammonia. Experience to date, however, has been chiefly in making equipment for small nitrogen fertilizer plants that will add relatively little to the national output of fertilizer for several years, even if problems connected with installation and operation are involved. More time is needed to develop experience and materials for producing equipment for numerous large nitrogen fertilizer plants of 100,000 tons per year or more.

Communist China will continue imports of certain chemical products, particularly fertilizers and crude rubber. There is some evidence that imports in 1962 of fertilizer materials of all types from Western Europe, combined with an anticipated rise in deliveries from Japan, might more than double the estimated amount of about 800,000 tons in 1961. In January a Japanese trade firm concluded a contract to ship 100,000 tons of urea during 1962. Japanese surplus stocks of ammonium sulfate also are available to China, but the latter has continued to insist on a very low purchase price, and the producers believe such sales would hurt their industry and jeopardize sales to other Asian countries. Imports of crude rubber, chiefly natural rubber, are likely to amount to nearly 120,000 tons in 1962. This amount is greater than the estimated import in 1961 but less than receipts during several previous years. Chinese exports of chemical products are not likely to increase appreciably above the low level set in 1961, and the reexport of natural rubber probably will be insignificant.

J. North Korea

1. Production

The chemical industry in North Korea apparently did poorly in 1961, the first year of the North Korean Seven Year Plan (1961-67), which calls for an average annual rate of growth in chemical output of about 26 percent. No report has been issued on over-all plan fulfillment, nor has a percentage increase in chemical output been given, but reported increases in output of several chemicals, as shown below, indicate only modest advances:

Product	Thousand Tons	Percentage Increase Above 1960
Chemical fertilizers (gross weight)	662	18
Sulfuric acid	274	7
Caustic soda	26	5
Calcium carbide	141	12

Production of polyvinyl chloride and other plastics, however, was said to have increased rapidly in the course of the year.

2. New Plans

Practically no information is available on plans for 1962. Although the general aims of the Seven Year Plan for the North Korean chemical industry were announced in 1960, the concrete goals for a number of products, along with added details, were given in 1961. The goals for 1967 are as follows:

Product	Thousand Tons
Chemical fertilizers (gross weight)	1,700
Pesticides	12
Sulfuric acid	650
Caustic soda	100
Soda ash	113
Calcium carbide	530
Plastics and resins	68
Artificial and synthetic fibers	94
Pharmaceuticals	N.A.*

By 1967 the over-all chemical output in terms of value is planned to increase four times the level of 1960, which, as stated above, is an average of about 26 percent per year. As an indication of the scope of North Korean plans for the chemical industry, comparison can be made with the fertilizer plans of certain European Satellites. The North Korean goal for 1967 is 1.7 million tons, whereas, by 1965, Hungary and Bulgaria plan to produce about 1.4 million tons each and Rumania about 2 million tons. The chemical fiber goal given above would make North Korea second to East Germany in the Bloc in per capita production. A petroleum refinery, which also will produce basic petrochemicals, is to be built at Aoji by 1967. North Korea, which produces no tires at present,** is to build a synthetic rubber plant with a capacity of 15,000 to 20,000 tons and a tire plant. The capacity of the latter is unknown, but it is to be supplied by Communist China.

* Five times the level of 1960.

** In 1961 a chemical research institute, aided by workers of the Pyongyang Rubber Plant, succeeded in producing a tire from polybutadiene, a synthetic rubber with properties approximating those of natural rubber. [redacted] 50X1

3. Outlook

North Korea is apt to have difficulty in obtaining the equipment that it needs to implement the Seven Year Plan. The most vulnerable item would appear to be the tire plant to be obtained from Communist China. It also should be noted that North Korea has had difficulty in expanding production of phosphorus fertilizer in the past.

K. North Vietnam

In 1961, the first year of its First Five Year Plan (1961-65), the North Vietnamese government claimed to have increased its output of chemical and rubber products 56.5 percent above that for 1960. The chemical industry, however, is still in an embryonic state, and the first chemical plants of any size will be the Phu Tho Superphosphate Plant, the Viet Tri Chemical Combine, and the Bac Giang Nitrogen Fertilizer Plant, which are now under construction with aid from other countries of the Bloc.

Scattered reports have been received on production of chemicals and rubber products in 1961. North Vietnam reportedly produced 1,900 tons of caustic soda during the year as initial production of this product got underway. Production of apatite, a phosphorus-containing raw material used in producing pulverized crude phosphate fertilizer and superphosphate fertilizer, reportedly rose 17.6 percent in 1961. Most of the apatite extracted from North Vietnam's extensive deposits is exported to other countries of the Bloc, although some 40 tiny fertilizer plants built in the countryside of North Vietnam consume a small part of the output. With Soviet aid, production of polio vaccine began in 1961. By the end of 1961 the Hanoi Rubber Goods Factory, with the assistance of Chinese Communist specialists, was ready to begin trial production of motor vehicle tires.

With regard to construction activity, it appears that the Phu Tho Superphosphate Plant, which is being built with Soviet aid, was not in operation by the end of 1961 as planned. [redacted] Construction of North Vietnam's first modern insecticide plant, with an annual capacity of 1,000 tons, was reported to have been largely completed by the end of 1961, but there has been no indication so far of a start in production. Communist China has been helping with construction of this plant and also with the building of the nitrogen fertilizer plant at Bac Giang. North Vietnam is continuing to establish natural rubber plantations, but commercial output is not expected to begin until 1965. 50X1

The only goal announced for chemical output in 1962 is an increase in production of fertilizer of more than four times.* This announcement

* Index of 530.

suggests that the Phu Tho plant is now scheduled to be put into operation in the course of 1962. One of the major projects in which over-all industrial investments are to be concentrated in 1962 is the Bac Giang Nitrogen Fertilizer Plant.

The fulfillment of these and other goals for the North Vietnamese chemical industry during the First Five Year Plan depends to a large extent on continued receipt of aid from other members of the Bloc. Because of the present economic difficulties in Communist China, North Vietnam may not be able to maintain its schedule for construction of those chemical plants that were to be furnished wholly or in part by Communist China.

L. Outer Mongolia

Some details were released in 1961 on plans to develop a chemical industry in Outer Mongolia during the period of the Third Five Year Plan (1961-65). Under various economic-technical aid agreements signed in 1960-61, Outer Mongolia is to receive chemical plants and technology from several countries of the Bloc. During 1962-63 the USSR is to provide an oxygen plant, which is to produce enough oxygen to cover the industrial and medical needs of Outer Mongolia. By 1963, Communist China is to complete construction of the Dzuunharaa Alcohol Plant, which will produce annually 1 million liters (1.1 million quarts) of alcohol, and by 1964 a second section of this plant is to produce 50 tons a year of carbon dioxide. Hungary is expected to furnish the equipment for a veterinary pharmaceutical plant for production of animal vaccines and hormones. One source reported that in 1961 a plant with an annual production capacity of 5 million plastic articles was to be built in Ulan Bator, but the country providing this plant was not mentioned. Also, in 1961 an official of Outer Mongolia reportedly stated that the government would soon erect a phosphate fertilizer plant, although some members of the Ministry of Agriculture believe that there is no need for fertilizer, because most of the crops are being grown on virgin land.

APPENDIX A

SINO-SOVIET BLOC: PLANNED COOPERATION IN THE CHEMICAL INDUSTRIES IN SUPPLY OF EQUIPMENT AND TECHNICAL ASSISTANCE: SELECTED DEVELOPMENTS IN 1961

Recipient of Aid	Supplier of Aid	Type of Aid	Comments
USSR	Czechoslovakia	Technical data for chemicals and pharmaceuticals	"Technical papers on new technological processes for chemical production and the manufacture of pharmaceuticals." Also information on the design and running of compressors for the chemical industry.
	Czechoslovakia Hungary (?) East Germany Poland	Joint venture	Construction of a phosphorite mine and concentration plant is planned at Kingisepp in Estonia.
	Poland	Chemical equipment	"Numerous Soviet rosin and turpentine plants will receive Polish equipment."
Czechoslovakia	USSR	Technical data	Plans and blueprints for improved technological processes in the chemical industry.
	USSR	Technical data	Relating to the design of a chloroprene rubber plant. The supply of Soviet experience and knowledge reportedly saved the work of a year of 10 research workers.

Recipient of Aid	Supplier of Aid	Type of Aid	Comments
Czechoslovakia (Continued)	USSR	Technical data	Soviet experts will participate in planning a nitrogen fertilizer plant.
	USSR	Technical data	Relating to the design of a plastics-processing plant.
	USSR	Complete plants	For production of sulfuric acid and divinylbenzene.
	USSR	Technical data	Petrochemical technology, including information on methods of purifying olefins used for syntheses and on isolation of aromatic hydrocarbons.
East Germany	USSR	Technical data	All technology necessary for the planning of two tire plants.
Poland	Czechoslovakia	Equipment	Complete plant to produce "phosphorus fertilizer from a carbamide base."
Czechoslovakia	East Germany	Technical data	Relating to production of trichloroethylene, monochloroacetic acid, suspended polystyrene, formic acid, cumene phenol, and acetylaldehyde (from acetic acid).
	Poland	Technical data	Relating to the use of catalyzers in production of synthetic rubber monomers and to production of trichloroethylene.

Recipient of Aid	Supplier of Aid	Type of Aid	Comments
Rumania	Czechoslovakia East Germany Poland	Joint venture	Construction of a cellulose combine for processing reeds.
	Czechoslovakia	Equipment and technology	Czechoslovakia will build a plant to produce 2,300 tons of viscose rayon annually.
	Poland	Equipment	For ammonia synthesis.
Albania	Czechoslovakia	Training of workers	In rubber-fabricating industry.
Communist China	Czechoslovakia	Equipment for chemical fiber production	To be delivered sometime after January 1961.
	Czechoslovakia	Technical data	Inorganic chemical industry and the processing of rubber and plastics.
North Korea	Czechoslovakia	Exchange of technical data	In the field of manufacturing artificial fibers.
Cuba	Hungary	Technical assistance	Assistance in the organization of a pharmaceutical industry and of a planning institute of the chemical industry.
	Bulgaria	Equipment and technical data	Plant for producing calcium carbide will be supplied.
Hungary	USSR	Technical aid and equipment	For a methanol plant with a capacity of 15,000 tons per year.
Bulgaria	East Germany	Complete plant	Cellulose and rayon staple fiber.

APPENDIX B

SINO-SOVIET BLOC: IMPORTS OF CHEMICAL EQUIPMENT AND TECHNOLOGY FROM THE FREE WORLD: SELECTED ORDERS PLACED IN 1961

Type of Plant	Importing Country	Production Capacity (Metric Tons)	Price (Million US $)	Exporting Country	Plant Site	Scheduled Completion Date	Remarks
Plastics							
Polyethylene	East Germany	24,000 per year	6.25	UK	Merseburg	1964	Negotiations conducted by a consortium of countries of the Bloc, including East Germany, Czechoslovakia, Poland, and Rumania. The total value of the contract covering the purchase of specialized equipment and process data for four plants is provisionally set at $25 million.
Polyethylene	Czechoslovakia	24,000 per year	6.25	UK	N.A.	1964	
Polyethylene	Poland	24,000 per year	6.25	UK	Plock or Kedzierzyn	1964	
Polyethylene	Rumania	24,000 per year	6.25	UK	N.A.	1964	
Polystyrene	Rumania	N.A.	2.24	UK	N.A.	1963	To produce all types of general-purpose and impact grades plus special grades and expandable polystyrene.
Chemical fibers and intermediates							
Rayon	USSR	24,000 per year	N.A.	Japan	N.A.	N.A.	
Cellulose acetate	USSR	7,000 per year	N.A.	Japan	N.A.	N.A.	
Cellulose	USSR	200,000 per year a/	16 b/	Italy	Arkhangel'sk	1963	

a. A few sources have ascribed a capacity of 600,000 tons to this plant.
b. Other prices have been quoted between $11 million and $11.9 million.

Type of Plant	Importing Country	Production Capacity (Metric Tons)	Price (Million US $)	Exporting Country	Plant Site	Scheduled Completion Date	Remarks
Chemical fibers and intermediates (Continued)							
Nylon-66	USSR	6,000 per year	11.3	UK	N.A.	Early in 1964	For industrial and tire cord.
Dimethylolethyleneurea	USSR	12,000 per year 50-percent water solution		UK	Ufa	Early in 1964	Product to be used to wrinkle-proof (drip-dry) fibers.
Caprolactam (two plants)	USSR	N.A.	N.A.	Italy	Rustavi Chernigov	N.A.	
Nylon tire cord	Czechoslovakia	N.A.	2.8	UK	N.A.	N.A.	To be constructed by a UK firm with equipment from both the UK and West Germany.
Cellulose	Poland	245 per day	N.A.	Finland	N.A.	N.A.	A Finnish firm will supply "main" machinery.
Cellulose	Poland	100 per day	N.A.	Finland	N.A.	N.A.	"Raw" cellulose plant.
Orlon type of fiber	Poland	Initially 5,000; ultimately 10,000 per year	5.6	UK	Lodz	N.A.	Acrylic fiber. The seller to supply "know-how, plants and machinery."
Rubber and rubber products							
Motor vehicle tires	USSR	(1,000 units per day)	1.21	Italy	Yaroslavl'	N.A.	Equipped to carry out only an intermediate phase in the total production of tires.
Tire-processing equipment	USSR	N.A.	5.07	UK	Vol'zhskiy	Mid-1963	Contract is for all the necessary equipment for handling, storing, and automatic weighing of the basic raw materials for making tires.
Butyl-rubber processing equipment	USSR	N.A.	4.23	UK	N.A.	Delivery scheduled in July-December 1962	Equipment for filtration, drying, wrapping, and packaging butyl rubber.

Type of Plant	Importing Country	Production Capacity (Metric Tons)	Price (Million US $)	Exporting Country	Plant Site	Scheduled Completion Date	Remarks
Fertilizers							
Urea	Poland	500 per day	4.2	UK	Kedzierzyn	N.A.	License, specifications, and equipment. A small part of output will be used as cattle feed. The plant will employ a Japanese process licensed to a British firm.
Petrochemicals							
Ammonia	USSR	350 per day	N.A.	West Germany	Gor'kiy	Delivery early in 1963	Natural gas basis.
Ammonia	USSR	N.A.	N.A.	Belgium	N.A.	N.A.	
Ammonia	USSR	420 per day	N.A. c/	Italy	Tula area d/	Late in 1962 or early in 1963	
Methanol	USSR	720 per day	N.A.	Italy	Tula area	Late in 1962 or early in 1963	
Propylene	USSR	10,000 per year	N.A.	Japan	N.A.	N.A.	
Propylene	USSR	10,000 per year	N.A.	West Germany	N.A.	Delivery scheduled during 1961	
Oxygen and nitrogen	Poland	(Three plants each with 10,000 cubic meters of oxygen and 12,500 cubic meters of nitrogen per 24 hours)	N.A.	UK	Tarnow	N.A.	Delivery of the first compressor is due in December 1962. The UK firm, in conjunction with a US firm, is supplying the process techniques.

c. The ammonia and methanol plants apparently are part of the same installation, at least part of the payment for which will be provided in the form of petroleum.
d. Possibly Shchekino or Novomoskovsk (formerly Stalinogorsk), both being sites of fertilizer plants.

Type of Plant	Importing Country	Production Capacity (Metric Tons)	Price (Million US $)	Exporting Country	Plant Site	Scheduled Completion Date	Remarks
Other chemicals							
Oxygen (six plants)	USSR	(Each unit to have a capacity of 15,000 cubic meters per hour)	14.12	Japan	N.A.	N.A.	
Ethylenediamine	USSR	3,000 per year	N.A.	Italy	N.A.	N.A.	
Monochlorophenoxy acetic acid	USSR	4,200 per year	3.8	UK	Ufa	January 1964	Hormone weed killer.
Ethylene oxide Ethylene glycol	Rumania	N.A.	5.6 (estimate for each plant)	Italy	N.A.	N.A.	The deal is believed to have been completed.
Formaldehyde	Rumania	N.A.	N.A.	Italy	Fagaras	N.A.	An Italian firm is participating in construction.
Tripolyphosphate soda	Rumania	10,000 per year	1.5	Belgium	Ploesti area	N.A.	
Vitamin C	Rumania	N.A.	N.A.	UK	N.A.	N.A.	
Calcium carbide and acetylene	Bulgaria	5 per hour of calcium carbide	N.A.	West Germany	Reka Devnya	By 1965	To be operated in connection with a polyvinylchloride plant under construction

Next 2 Page(s) In Document Denied