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Economic Intelligence Report

SIGNIFICANT DEVELOPMENTS IN THE CHEMICAL INDUSTRIES OF THE SINO-SOVIET BLOC 1959

CIA/RR ER 60-28

October 1960

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CONTENT

Page

Appendixes

[redacted] 50X1

Tables

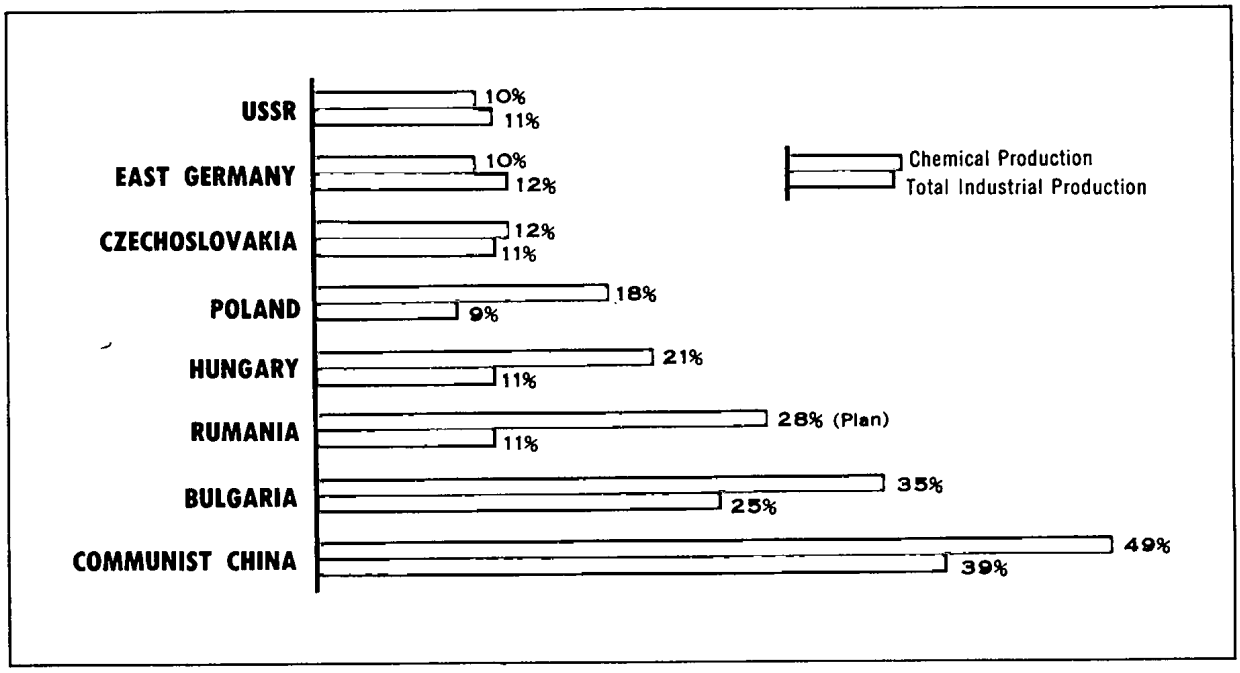
Page

SIGNIFICANT DEVELOPMENTS IN THE CHEMICAL INDUSTRIES OF THE SINO-SOVIET BLOC*
1959

Summary

In 1959, most of the European Satellites announced new long-range plans for their chemical industries. Under these plans, generally for 1961-65, production of chemicals is to increase faster than industrial production as a whole, and major emphasis will be placed on mineral fertilizers, petrochemicals, and synthetic materials such as rubber, plastics, and fibers. Investment in the chemical industries is to be increased to the extent that in Czechoslovakia and East Germany, for example, it will amount to one-sixth of total investment in industry.

Increases in the value of chemical and industrial production in 1959 are shown in the chart below. In the USSR and East Germany, the two largest producers of chemicals in the Sino-Soviet Bloc, the percentage increases in production of chemicals were less than those in total industrial production, and in the USSR the increase of 10 percent fell short of the average annual increases of 16 to 17 percent required for fulfillment of the Seven Year Plan (1959-65).



* The estimates and conclusions in this report represent the best judgment of this Office as of 1 July 1960.

A variety of problems impeded expansion of the chemical industries in the Sino-Soviet Bloc during 1959. Although investments in the chemical industries rose significantly in the USSR, East Germany, and Communist China, plans for such investment appear generally to have been underfulfilled. The chemical industries in all countries of the Bloc also were hampered by outdated technology, obsolete equipment, poor planning of construction, and inadequate supplies of raw materials. In Communist China the overburdened transportation system was unable to maintain schedules of delivery, and the program for building a multitude of small chemical plants failed to develop significantly.

Little progress was made in expanding production of fertilizers* in the Sino-Soviet Bloc. Large percentage increases in some countries reflected the low level of production in 1958, and plans for production of fertilizers in the European Satellites generally were not fulfilled. A few advances were made in production of synthetic materials, such as commercial production of synthetic rubber in Poland and initial production of polyvinyl chloride and synthetic fibers in Rumania and Hungary, but progress was slow in most countries of the Bloc. The USSR reported gains of 13 percent in production of plastics and 8 percent in production of synthetic fibers, but greater annual increases must be realized if the USSR is to achieve the goals of the Seven Year Plan.

Under the auspices of CEMA (Council of Mutual Economic Assistance), a number of new chemical installations went into operation as a result of exchanges of technical data, extensions of credit, or mutual deliveries of equipment. Such installations included plants for production of synthetic fiber in Poland, nylon in Hungary, cellulose and superphosphate in Rumania, melamine plastic in East Germany, and nitrogen fertilizer in Communist China. A pipeline from Rumania to Hungary was completed to supply natural gas for production of petrochemicals. CEMA also continued to promote specialization and standardization in the chemical industries of the Soviet Bloc.

The USSR and the European Satellites continued to make strenuous efforts to purchase technology and equipment from the Free World, particularly for production of synthetic materials and petrochemicals. The USSR placed orders in Free World countries for plants to produce polyethylene and polyethylene pipe, chemical fibers, tire cord, ammonia, acetylene, and a number of other chemicals. Poland and Czechoslovakia purchased process data for producing synthetic fibers. Rumania contracted to purchase installations for producing tires, synthetic fibers, and petrochemicals, and Hungary purchased equipment for

* Production of chemical fertilizers in the Sino-Soviet Bloc in 1958-59 and planned production in 1960 and 1965 are shown in Appendix B.

two plants for producing caustic soda. Negotiations are underway by a number of the European Satellites to purchase plants producing polyethylene.

The pattern of trade with the Free World in 1959 was much the same as in 1958. An outstanding feature of this trade was the large-scale import of natural rubber, principally by the USSR and Communist China. In addition, Communist China imported substantial quantities of phosphates from Morocco in 1959. The USSR and Poland remained large exporters of coal chemicals to the Free World.

Large increases in production of chemicals in the Sino-Soviet Bloc are planned for 1960, ranging from an increase of 7 percent in Hungary to 44 to 65 percent in Communist China.* The planned increases, however, are not yet sufficiently high to assure adequate progress toward the long-range goals. The goals for production of chemicals in 1965 are unlikely to be fulfilled, particularly those for fertilizers and synthetic materials. Of increasing significance will be the degree of success the Bloc has in purchasing chemical technology and equipment from the Free World. Although underfulfillment of the ambitious long-range plans for chemical production in the Bloc is almost certain, production of chemicals will have increased significantly by 1965, permitting somewhat greater satisfaction of industrial and consumer demands. Nevertheless, the Bloc will be unable to satisfy requirements for fertilizers and synthetic materials. Communist China, particularly, will remain dependent on foreign sources of supply for many chemical inputs.

I. Development Within the Sino-Soviet Bloc and Trade with the Free World

A. Mutual Assistance

The exchange of technical data and equipment for development of the chemical industries of the Sino-Soviet Bloc continued in 1959, chiefly in accordance with the directives of CEMA, and a number of

* Communist China recently has been announcing in percentile ranges many of the goals for increases of production, possibly because of uncertainty as to the progress to be made.

agreements were concluded on extension of credit to promote such development.* The USSR reported that it was aiding in the construction of 37 chemical enterprises in the Soviet Bloc, including facilities for production of 100,000 tons of synthetic rubber and 200,000 tons** of phosphorus fertilizers. 1/***

Several new chemical plants and related facilities went into operation during 1959 as a result of intra-Bloc cooperation. Poland became the third country in the Sino-Soviet Bloc to produce synthetic rubber in commercial quantities, with initial production reported at a plant in Oswiecim. The plant is supplied with Soviet equipment and uses a Soviet process for production of butadiene.† In Hungary a nylon plant, equipped almost completely by East Germany, went into operation, and a pipeline from Rumania to Hungary was completed in 1959 to supply natural gas that will be used eventually as a raw material for production of petrochemicals. Under the Rumanian-Hungarian mutual assistance plan, a petrochemical process for production of acetone on a commercial scale was developed at a jointly operated pilot plant located in Rumania. A combine to produce cellulose†† from reeds was built in Rumania with the assistance of East Germany, Czechoslovakia, and Poland, the credit apparently to be repaid from production of the combine. A superphosphate plant commissioned in Rumania was designed by Soviet engineers, and most of the equipment also was supplied by the USSR. At Piesteritz, East Germany, an installation to produce melamine plastic was financed by Soviet credit. In Communist China, two nitrogen fertilizer plants built by the USSR and one equipped by Czechoslovakia went into operation. Trial production of synthetic rubber may have begun at a Soviet-built plant in Lan-chou.

In spite of some progress in achieving cooperation among countries, a few unfavorable factors are still apparent. The technology being traded is not always modern. The rubber plant in Poland, for example, uses an outmoded process which results in a product perhaps twice as expensive as similar products in the US. Furthermore, some of the countries of the Soviet Bloc reportedly are reluctant to share technical data. The USSR, itself attempting to absorb important technical details from other countries of the Bloc, is said to fall short in dispensing Soviet knowledge. 2/

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* For agreements reported in 1959 on exchange of data and equipment and extensions of credit to promote development of the chemical industries of the Sino-Soviet Bloc, see Appendix A.

** Tonnages are given in metric tons throughout this report.

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† An intermediate chemical used in production of synthetic rubber.

†† Initial production was restricted to cardboard, but cellulose apparently is to be produced in 1960.

B. Trends in Integration of the Chemical Industries of the Soviet Bloc

Continued progress was made in 1959 toward integration of the chemical industries of the Soviet Bloc. Although results have not been outstanding, the projected coordination is rapidly moving beyond the discussion stage. At a meeting in Berlin in April 1959, the CEMA permanent commission on chemicals considered questions concerning the supply of raw materials to the participating countries in 1959-65 and stressed the organization of joint research and planning in the chemical industry.

During 1959, additional information was revealed on plans to increase specialization and standardization in relation to production of both chemical products and chemical equipment. The available information is summarized below.

1. Specialization*

In conformance with the guidelines established by CEMA, plants for production of sulfuric acid, chlorine, ammonia, nitrogen fertilizer, and plastics are to be set up in each country. In addition, each country is to specialize in certain chemical products, although the country involved may not be the sole producer of such products.** According to information reported in 1959, the following lines of specialization in production have been approved 3/:

Product***	Country
Polyvinyl chloride	East Germany
Synthetic fibers	USSR, East Germany, and Poland
Synthetic rubber (thiokol type)	Poland
Synthetic rubber (butadiene-styrene)	East Germany
Calcium carbide and soda ash	East Germany and Poland
Potash fertilizers	USSR and East Germany
Phosphate raw materials	USSR
Pharmaceuticals and dyes	Hungary
Coal chemicals	USSR, Poland, and Czechoslovakia
Cellulose	Bulgaria and Rumania

* The efforts at specialization appear to be restricted to the countries that are official members of CEMA and thus exclude the Asiatic Bloc.

** The USSR, for example, probably will produce most basic chemicals and finished chemical products.

*** The list includes some of the more significant chemicals for which lines of specialization have been approved but is not all-inclusive.

There is little information on actual implementation of the plans for specialization, although reportedly Rumania has discontinued production of insulin and aureomycin according to a CEMA agreement.

The general lines of specialization in production of chemical equipment in the Soviet Bloc were approved by sessions of CEMA held in 1959. Reportedly, specialization in production of chemical equipment will lead to an increase of about 45 percent in mutual deliveries among the members of CEMA in 1959-65. The USSR and Rumania are said to share responsibility for production of petrochemical equipment.* New supplementary quotas reportedly were set in December for chemical equipment to be supplied to the USSR by East Germany and Czechoslovakia, 4/ which apparently are scheduled to produce equipment for processing synthetic materials and important basic chemicals.

2. Standardization

Standardization of chemical products and plants under the aegis of CEMA is still in early stages of development. In the field of rubber articles, agreement was reached in 1959 on design parameters for certain tires (sizes 9:00 x 20 for trucks, 11:00 x 20 for buses, and 5:90 x 15 for passenger cars). Following developmental work, preliminary tests of these tires will be made in February 1961. The quality of the standardized tires is to be vastly improved over that of present tires. A tire life of 80,000 to 100,000 kilometers has been set as the goal** for the truck and bus tires and 50,000 kilometers for the passenger car tires. The existing norm for Soviet truck tires is about 32,000 kilometers. 5/

Standardization of designs for entire shops and plants producing rubber articles also is planned. The USSR has been assigned major responsibility for preparation of standardized designs for a tire plant; Poland, for designs of shops producing foam rubber; Czechoslovakia, for shops producing V-belts; and East Germany, for shops producing conveyor and flat belts.***

* East Germany and Czechoslovakia also may supply some petrochemical equipment to the Soviet Bloc, particularly in view of the modest capability of Rumania.

** The goal appears to be considerably more ambitious than domestic goals reported by the USSR, which call for extending average tire life by perhaps 30 to 40 percent.

*** The decisions on allocation of assignments actually occurred late in 1958, but the details above were not published until 1959.

C. Trade with the Free World, 1959

1. Chemical Products

Features of the year included the continued large imports of natural rubber by the Sino-Soviet Bloc, which imported about 452,000 tons* in 1959, the USSR taking 236,000 tons** and Communist China, 146,000 tons. China imported large quantities of phosphatic raw materials from Morocco, the trade agreement for 1959 having called for the import of 500,000 tons of phosphorus ore. The USSR and Poland remained large exporters of coal chemicals to the Free World. Exports of benzene and naphthalene may be curtailed in future years, however, because increasing amounts of these products will be required to support the rapidly growing production of synthetic materials in the Sino-Soviet Bloc.

2. Purchases of Chemical Plants and Process Data from the Free World

The USSR and the European Satellites are making strenuous efforts to expedite development of their chemical industries by purchases of equipment and process data from the Free World, particularly in the fields of synthetic materials, petrochemicals, and fertilizers. About one-third of the Soviet orders for or deliveries of complete plants from the West in 1959 presumably were linked with the projected expansion of the chemical industry. 6/ Most of the orders will be reflected in trade from 1960 to 1963. Suppliers of the equipment will include the US, the UK, West Germany, Italy, Sweden, and Japan. Among the important plants ordered by the USSR in 1959 were installations for production of polyethylene and polyethylene pipe, chemical fibers and tire cord, caustic soda, ammonia, and acetylene.

The European Satellites also have increased the tempo of purchases of chemical equipment and data from the Free World. Poland and Czechoslovakia purchased process data from a UK firm to produce a polyester fiber similar to Dacron. Rumania reportedly concluded contracts during 1959 for the purchase of a tire plant from the UK, several plants from West Germany for production of synthetic fibers, and equipment from France for production of petrochemicals. Hungary purchased from France complete equipment for two plants to produce caustic soda, each with a capacity of 10,000 tons, and ordered from West Germany installations for production of polyvinyl chloride and for recovery of argon. East

* Figures are based on estimates of the International Rubber Study Group, with a conversion from long tons to metric tons. It is not known to what extent these figures represent net imports.
** Official Soviet statistics on imports of rubber, not yet available, sometimes differ somewhat from estimates of the Rubber Study Group.

Germany is to obtain from the UK installations for production of ethylene, and East Germany, Poland, Czechoslovakia, and Rumania are negotiating with the UK for purchase of process data and equipment for production of polyethylene.

3. Supply of Chemical Plants or Process Data to Underdeveloped Countries

The more highly developed countries of the Soviet Bloc sell chemical plants and associated technology, largely for production of basic chemicals, to some of the underdeveloped countries of the Free World, although the volume of such trade is minor compared with the imports of chemical plants by the Bloc. Inasmuch as the internal requirements of the Bloc for chemical plants are not fully satisfied, exports of such equipment must be considered either as a manifestation of political policy or, in certain cases, as a means of earning urgently needed foreign exchange.

In 1959 a tire plant supplied by Czechoslovakia went into operation in Indonesia, and Czechoslovakia also is to collaborate in building a tire plant in India. Poland is to supply a nitrogen plant to India in 1960.

II. Developments in Each Country

A. USSR

1. Significant Events During 1959

In 1959 the Soviet chemical industry made rather modest progress toward the goals of the Seven Year Plan (1959-65), and many of the difficulties experienced in 1958 continued to delay construction of new facilities. A highlight of the year was the revelation, at the June Plenum of the Central Committee of the Communist Party, that 59 chemical projects were included in the list of 250 top-priority industrial construction projects scheduled during 1959-65.* In recognition of the lags in implementing the Seven Year Plan for chemicals, measures were approved by the Plenum to grant higher priority to the chemical industry in securing equipment and materials.

Just before the Plenum in June 1959, the USSR reviewed the size of investments required for new chemical plants and decided that significant economies could be effected by expansions and improvements at existing plants. According to the data published, a saving of more

* In 1960 the number of first-priority industrial construction projects scheduled is 271, of which 50 are chemical projects.

than 3 billion rubles* of investment could be made possible in 1959-65 by expansion of existing plants, where production of basic chemicals, fertilizers, synthetics, and other products could be increased by significant amounts.** 7/ The amount of publicity accorded this report suggests that some expansion will occur at existing plants beyond that originally contemplated under the Seven Year Plan and that such expansion may be accompanied by a corresponding decrease in construction of new plants.

2. Plan Fulfillment, 1959

The value of production of the Soviet chemical industry increased 10 percent in 1959, compared with a 13-percent increase in 1958 and an average annual increase of 16 to 17 percent required for fulfillment of the Seven Year Plan. For the first time since at least 1950, the increase in production by the chemical industry was less than that for industry as a whole. Moreover, the reported increase of 5 percent in labor productivity for the chemical industry compared unfavorably with an increase of 7.4 percent for all industry, at least partly reflecting a lag in the introduction of automation in the chemical industry.

Within the products sector, the plan for 1959 was exceeded for plastics and artificial and synthetic fibers and fulfilled before the end of the year for chemical fertilizers, caustic soda, and motor vehicle tires. The rate of increase for some of these products, however, was actually less than that achieved in 1958. Table 1*** shows Soviet production of selected chemical products in 1959.

Capital investment in the Soviet chemical industry in 1959 was 59 percent above that in 1958, compared with a planned increase of 71 percent. Shortfalls in construction can be ascribed to a number of causes, including shortages of equipment and materials and lack of adequate planning and organization. Again, as in 1958, there is evidence of some diversion of funds from chemical projects, which compounded the adverse effects of the failure to absorb allocated funds in some areas.

* Rubles may be converted to US dollars at the official rate of exchange of 4 rubles to US $1. This rate of exchange, however, may not reflect the dollar value.

** These expansions apparently would be in addition to those already scheduled at existing plants under the Seven Year Plan. Because the expansions presumably would replace equivalent capacities originally scheduled for installation at new plants, there is no indication that the over-all plan for chemicals during 1959-65 has been raised.

*** Table 1 follows on p. 10.

Table 1

Reported Production of Selected Chemical Products in the USSR 1959

Product	Production Unit	Production Amount	Percentage Increase 1959 Above 1958	Percentage Increase 1958 Above 1957
Artificial and synthetic fibers	Thousand metric tons	179	8	12
Motor vehicle tires	Million units	15.5	8	13
Sulfuric acid	Thousand metric tons	5,100	6	5
Fertilizer	Thousand metric tons	12,900 a/	4	6

a. Gross weight. All figures given in this report for production of fertilizers are in terms of gross weight unless otherwise indicated.

3. Progress in Major Products

a. Synthetic Materials

(1) Synthetic Rubber

The absence of synthetic rubber from the list of products for which fulfillment of plan was claimed by the USSR in 1959 suggests that the plan was not fulfilled. There is no evidence that the planned increase of 38 percent in capacity for production of synthetic rubber was attained. There is considerable evidence, however, that lags occurred in construction of new rubber facilities at Sumgait, Stavropol', Sterlitamak, Karaganda, and Krasnoyarsk. At Sumgait an October report claimed completion of the new shops, which are to be the first in the USSR to produce synthetic rubber from oil gases, but a subsequent report suggests that production at the new shops had not been mastered by the end of the year. The new rubber plants at Karaganda and Sterlitamak and the expanded facilities at Krasnoyarsk, scheduled for initial operation in 1959, are now apparently to start up in 1960.

Little progress was evident in 1959 in the building of facilities to produce polyisoprene rubber, a possible substitute for

natural rubber that is scheduled to constitute almost 25 percent of the total production of rubber in 1965. At the Plenum in June 1959, discussion of a suitable process for polyisoprene revealed that considerable disagreement existed between Viktor S. Fedorov, the Chairman of the State Committee for Chemistry, and Aleksandr N. Nesmeyanov, the President of the Academy of Sciences. Although pilot production of polyisoprene has occurred and a basic process reportedly has been selected, there apparently is some reluctance to proceed with construction on the large scale required by the Seven Year Plan, possibly because of dissatisfaction with costs or other aspects of the process.

(2) Tires

Production of tires in the USSR increased 8 percent in 1959, compared with an increase of 13 percent in 1958 and an average annual increase of 10.4 percent required for fulfillment of the Seven Year Plan.

Progress on construction or expansion of tire plants was erratic in 1959. The Baku Tire Plant, originally scheduled for operation in 1958, went into operation in November 1959 but failed to achieve the annual plan for value of output. The Krasnoyarsk Tire Plant, also originally scheduled for operation in 1958, failed to start in 1959. The tire plant at Yerevan was expanded during 1959, and the plant at Yaroslavl' began production of tubeless tires. In mid-1959, Khrushchev censured the project at Dnepropetrovsk for construction of a tire plant purchased from the UK and scheduled for operation in 1960, claiming that the imported equipment had been lying around for more than 6 months and was beginning to rust. It was reported in 1959 that tires are to be produced at rubber combines under construction at Saransk in Mordovskaya ASSR and at Volzhskiy, near Stalingrad.

A development that may have important implications for the tire industry has recently been reported in a Soviet newspaper. 8/ Work has been carried out at the tire plant in Yaroslavl' on development of replaceable treads for tires. The treads consist of three separate bands, which are placed on the tire carcass. When the bands wear out, they may be replaced, using the same carcass, thus offering the possibility of improving tire life* and simplifying production of both treads and carcass. On the basis of the Soviet description, the new treads bear a striking resemblance to a development by an Italian firm that was publicized in the Western press during 1959. Soviet plans for 1960 call for further development of the replaceable treads at the tire plants in Yaroslavl' and Moscow.

* Only a small portion of Soviet tires are presently recapped after the original tread wears out.

(3) Plastics

Soviet production of plastics increased 13 percent in 1959, which, although reportedly an exceeding of the plan, compares unfavorably with the average annual increase of more than 30 percent required by the Seven Year Plan. New installations producing plastics or intermediates for plastics included shops producing polyvinyl chloride and dissocyanates in Dzerzhinsk, a large phenolic plastic shop in Kemerovo, and a polyurethane foam unit in Moskovskaya Oblast.

Progress appears to have been particularly poor in 1959 on development of the versatile plastic polyethylene, production of which is scheduled for a 246-fold increase during 1959-65. The lag in development of polyethylene illustrates one of the critical areas of the Soviet plan for plastics where Free World aid is essential. A polyethylene shop using a high-pressure process reportedly went into operation at Sverdlovsk in July 1959, but subsequent reports indicate that operating difficulties probably prevented shipment of polyethylene to fabricating plants until January 1960. 9/ The difficulties were ascribed largely to the lack of proper equipment, including automatic control and measuring devices. A second high-pressure polyethylene shop, at Ufa, appears to have missed its scheduled starting date in December 1959.

At Dzerzhinsk a pilot plant producing polyethylene by a low-pressure process reportedly was put into operation in January 1959, but an October report revealed that defects in technical data and equipment had adversely affected both the productivity of the unit and the quality of the end product. 10/ The failures at Dzerzhinsk retarded construction of a commercial-scale polyethylene plant at Groznyy, for the latter plant depended on receipt of the necessary technical data from the pilot plant.

(4) Chemical Fibers

Although the Soviet plan for production of chemical fibers allegedly was exceeded in 1959, the 8-percent increase reported compares unfavorably with the 12-percent increase achieved in 1958 and even more unfavorably with the rate of increase required for fulfillment of the Seven Year Plan -- about 22 percent yearly. There is abundant evidence that the planned 35-percent increase in production capacity was underfulfilled by a considerable margin. A report on the construction of 10 fiber plants during the first 8 months of 1959 showed underfulfillment of plan for all but 3 of the plants. Installations for production of chemical fibers went into operation in Krasnoyarsk, Kiev, Minsk, Kalinin, and in Moskovskaya Oblast, but several major facilities, including those at Ryazan', Engel's, and Barnaul apparently failed to go into operation as planned.

Among the accomplishments of the Soviet fiber industry in 1959 was the completion of the following: an experimental shop at Lisichansk producing chemicals for a Dacron type of fiber, an experimental unit at Leningrad to produce fiber from polyvinyl alcohol, and an installation at Kirovakan for production of caprolactam (an intermediate for nylon) by a photosynthesis process.

The quality of Soviet chemical fibers apparently showed little improvement in 1959. A number of reasons are cited, including the lack of technology, equipment, and instrumentation and the poor quality of raw and intermediate materials. 11/ A number of orders for fiber equipment were placed with Free World companies in 1959, and some improvement in quality can be anticipated within 2 to 3 years.

b. Fertilizers

The 12.9 million tons of chemical fertilizers produced in the USSR in 1959 exceeded the amount produced in 1958 by only 500,000 tons, an insignificant increase when compared with the Seven Year Plan, which calls for production to rise to 35 million tons in 1965. The absolute increase in 1959 was less than that achieved the preceding year and below the average annual increase of 855,000 tons planned for 1959-61, 12/ the latter goal itself being surprisingly low when contrasted with the goal under the Seven Year Plan.

Major reasons for the lag in production of fertilizers are to be found in the continued slow progress in construction of new plants and the lack of readily available raw materials. Production of superphosphate is limited by inadequate supplies of sulfuric acid and of phosphatic raw materials that have been upgraded sufficiently. Construction of new fertilizer facilities apparently fell below the plan in 1959. The Stalinogorsk Chemical Combine has been converted to the use of natural gas,* but the scheduled expansions in production of nitrogen fertilizers at Dneprodzerzhinsk, Lisichansk, Rustavi, and Chirchik are not believed to have been fully implemented. For example, a complaint was made that equipment valued at 12 million rubles had accumulated at the Rustavi site, a condition indicative of poor scheduling. Construction of some facilities that are to produce phosphorus fertilizers also lagged in 1959. At the Sumgait Superphosphate Plant, only 53 percent of the planned annual investment had been absorbed by mid-November. Further progress was made in 1959 on construction of the Starobin Potassium Combine in the Belorussian SSR, scheduled to supply more than

* The completed conversion to natural gas applies only to natural gas used as a raw material for production of ammonia. The combine has not yet completed work on using natural gas for fuel or for production of other chemical products.

20 percent of the total Soviet output of potassium fertilizers. Among the decisions announced during 1959 to implement the 7-year goal for wider use of petrochemical raw materials was the plan to produce ammonia for nitrogen fertilizers at the Salavat Petrochemical Combine and the Shchekino Gas Plant and at new plants located in Uzbek SSR at Fergana and Nava.

The slow introduction of new production facilities was only one of several unfavorable aspects of the Soviet program for fertilizer in 1959. A considerable amount of fertilizer continues to be lost during transport and storage. According to a statement in October 1959 by Fedorov, the Chairman of the State Committee for Chemistry, losses of phosphorus fertilizers in many areas of the USSR average 39 percent; of nitrogen fertilizers, 18 percent; and of potassium fertilizers, 28.5 percent. 13/ The losses are attributable partly to lack of proper precautions during transport and storage and partly to the poor quality of the product itself. Both the ammonium nitrate and the potassium chloride are said to cake excessively.

Considerable dissatisfaction with the fertilizer situation was voiced at the December 1959 Plenum of the Communist Party. Attention was directed to the necessity for increasing production of organic fertilizers such as manure and peat, contrasts being drawn between the modest investment required for these and the huge investment needed for plants producing chemical (inorganic) fertilizers. Khrushchev, admitting that funds were insufficient to expand production of chemical fertilizers to the extent needed,* even made the surprising suggestion that it might be feasible to divert some of the planned funds from production of fertilizers to production of herbicides and feed supplements. 14/ There has, however, been no indication as yet that the plan for production of chemical fertilizers in 1965 has been lowered.

4. Major Problems Experienced in 1959

The major problems encountered by the Soviet chemical industry in 1959 bear a striking resemblance to those that plagued the industry in 1958 and earlier years. Moreover, the ambitious nature of the Seven Year Plan for chemicals and the resulting severe demands for new equipment and technology, for large supplies of raw and other materials, and for technical and skilled labor, all present problems that will continue to harass the Soviet chemical industry for several years to come.

* It is not clear, however, whether Khrushchev meant that there was insufficient investment for the planned expansion in fertilizers during 1959-65 or that there was not enough investment to produce chemical fertilizers in amounts sufficient to satisfy all needs of Soviet agriculture.

As in 1958, the most vexing problems continued to be those associated with the lack of equipment and technology. According to Fedorov, the Chairman of the State Committee for Chemistry, although chemical equipment valued at more than 1 billion rubles was planned for his projects in 1959, deliveries at the end of 9 months totaled only 356 million rubles. 15/ The effects of the shortages of equipment are intensified by the poor quality of some of the new equipment and poor scheduling of deliveries.

The problem of equipment is intimately related to the Soviet lag in technology. Complaints continue that planning institutes are supplying technical data on outdated processes or inadequately developed data on new processes. The technological difficulties are reflected not only in the slow pace of construction of new plants but in the continued low quality of many Soviet chemical products, including fertilizers and synthetic materials.

The technological lag is at least partly responsible for the modest progress in automation. Although outlays in 1959 for automation of the chemical industry reportedly were to be 10 percent of the total cost of equipment for the industry (rising to 20 percent by 1965), 16/ there is considerable doubt that the plan was fulfilled. An indication of the inadequate attention to automation is the complaint that the publishing house of the chemical industry failed to produce a single work on automation in 1959 and was planning only one such publication in 1960.

The ambitious scope of the Seven Year Plan for chemicals and the emphasis on development of new products have apparently placed a severe strain on the available supply of skilled and technical personnel at all levels, from research* to engineering to the administration and operation of chemical plants. The shortage of such personnel reportedly has delayed the introduction of new processes, hampered the administration of the chemical industry in certain economic regions, and even caused underfulfillment of plan by some plants.

5. Plan for 1960

The plan for development of the Soviet chemical industry in 1960 calls for a 10-percent increase in production, with investment scheduled to be 30 percent greater than that in 1959 and 2.3 times that in 1958. Construction-installation work on all chemical projects in 1960 is planned to cost 6.2 billion rubles, with installations valued at 7.8 billion rubles coming into operation. 17/

* The shortage of technical personnel is particularly evident in applied research.

Production of plastics is scheduled to rise 20 percent in 1960 and that of chemical fibers, 17 percent. A modest increase (in terms of the Seven Year Plan), of only 600,000 tons is planned for fertilizers, bringing the total production to 13.5 million tons, and production of tires is to increase 1.3 million units to a total of 16.8 million units. Capacities for production of ammonia, synthetic rubber, tires, and caprolactam* that are to be put into operation in 1960 reportedly are much greater than those planned for 1959.

The chemical construction projects that are to receive the highest priority in 1960 include synthetic rubber plants at Stavropol', Omsk, Sterlitamak, and Karaganda; chemical fiber plants at Barnaul, Ryazan', Engel's, Kursk, Balakovo, Chernigov, and Kirovakan; and tire plants at Krasnoyarsk and Dnepropetrovsk.

6. Outlook for Fulfillment of the Plan for 1960 and the Seven Year Plan (1959-65)

During 1960 the partial fruition of measures adopted in 1959 to assure a higher priority for the chemical industry should be evident, particularly in the matter of the supply of construction materials and equipment, although the current lag in development and production of equipment for new chemical products by no means will be eliminated. The chemical industry probably will achieve or exceed the increase in production of 10 percent that is planned for 1960, but this planned rate of increase is still far below that originally required for fulfillment of the Seven Year Plan (16 to 17 percent annually).** Fulfillment of the plan in 1960 will be facilitated by the large carryover from 1959 of uncompleted chemical plants, a significant number of which will produce products of high value such as synthetic rubber, chemical fibers, and plastics. Among the new plants going into operation in 1960 will be a tire plant and one or more fiber plants purchased from the Free World.

The Seven Year Plan for production of chemical products appears unlikely to be fulfilled, the chief doubts centering about the Soviet goals for chemical fertilizers, plastics, and synthetic rubber. In view of the modest goal for production of chemical fertilizers in 1960 (13.5 million tons), fulfillment of the plan for 1965 (35 million tons) will require an average annual increase of 21 percent during 1961-65. In the light of past performance, the achievement of such a rate of growth seems highly improbable. There is even considerable doubt that sufficient financing has been provided to support the

* Caprolactam is used in production of Nylon 6.

** The annual rate of increase now required to fulfill the 7-year goals for chemicals probably exceeds 16 to 17 percent, for the increase in 1959 was only 10 percent.

projected expansion in fertilizers. At the December 1959 Plenum on agriculture, D.S. Polyanskiy, the Chairman of the Council of Ministers of the RSFSR, declared that additional funds were required for construction of fertilizer plants and that a positive decision had to be made concerning construction of these plants, 18/ thus implying that the government had not yet provided the necessary investment funds.

The ambitious goals for production of synthetic rubber and plastics in 1965 also are unlikely to be fulfilled, largely because of the shortages of equipment, technology, and skilled labor. Production of plastics, which increased 13 percent in 1959, is scheduled to increase 20 percent in 1960, but even if the plan for 1960 is achieved, an average annual increase of approximately 39 percent would be required for the subsequent 5 years (1961-65) in order to fulfill the goal for 1965.

Present Soviet technology does not appear adequate to implement the ambitious goal for production of synthetic rubber, particularly that part of the plan which calls for polyisoprene rubber to constitute almost 25 percent of the total production of synthetic rubber in 1965. Failure of the latter goal will result in a continuing Soviet requirement for natural rubber in 1965 -- perhaps 150,000 to 200,000 tons -- if planned requirements are to be met.

Although fulfillment of the plan for the chemical industry in 1965, as indicated, is quite unlikely, the extent of the underfulfillment remains unclear. An increasingly significant factor in plan fulfillment is the amount of aid that may be obtained through Soviet purchases of plants and technology from the Free World. In the past 2 years, the easing of trade barriers between the USSR and many countries of the Free World has resulted in large Soviet orders for chemical plants and equipment and the technical data required to operate them. Such purchases, if continued, will not only serve to facilitate the rapid growth of the Soviet chemical industry but also will aid materially the attainment of a higher rate of productivity, decreased costs of production, and improved quality of end products, for much of the imported equipment can be expected to embody the latest advancements, including mechanization and automation.

B. East Germany

1. Significant Events in 1959

a. Adoption of the Law for the Seven Year Plan (1959-65)

On 1 October 1959 the East German Peoples Chamber formally approved the "Law for the Seven Year Plan" for 1959-65. The law

states that "rapid development of the chemical industry is the central point in solving the tasks of the Seven Year Plan" and lays down goals that the chemical industry must meet to attain the desired development. Gross production of the chemical industry* in 1965 is planned to be 205 percent of production in 1958. The average annual rate of increase thus is to be about 11 percent, compared with a rate of 9 to 10 percent for industry as a whole. Some other industries, such as the construction industry, the machine building industry, and the electrotechnical industry, are scheduled for still more rapid growth, but much of their expansion is in support of the chemical industry. 19/

Goals set in the law for production of specific commodities in 1965 represent upward revisions of earlier, tentative plans for plastics, synthetic fibers, and fertilizers. Goals for so-called "heavy chemicals" (calcium carbide, sulfuric acid, soda ash, and caustic soda) were revised downward from earlier plans, however, as was the plan for synthetic rubber. 20/ Planned increases in production of selected chemical products during the Seven Year Plan are shown in Table 2.**

The Law for the Seven Year Plan allocates approximately 11 billion East German marks (DME)*** in investment funds to the chemical industry for the 7-year period, out of total industrial investments of 60 billion DME. It also specifies that 70 percent of the increase in production in the industry is to be achieved through "Rekonstruktion," that is, modernization and improvement of existing facilities and processes with minimum expenditure. The two largest chemical projects, expansion of the VEB Leuna-Werke and of the VEB Chemische Werke Buna, together are to account for somewhat more than one-quarter of total investment in the industry. The third largest project of the chemical industry is the petroleum refinery to be built at Schwedt/Oder, at the western terminus of the pipeline from the USSR. Earlier East German statements described this plant as the nucleus of a petrochemical industry to supply East Germany with part of the raw materials for the projected expansion in production of plastics and synthetic fibers. Recent reports, however, indicate that the plant is to concentrate, at least initially, on producing fuels and that the new installations at Leuna are to become the main source of petrochemicals for making synthetic materials. 21/

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* The chemical industry in East Germany produces synthetic motor fuels and lubricants in addition to normal chemical products.

** Table 2 follows on p. 19.

*** Deutsche Mark East (DME) may be converted to US dollars at the official rate of exchange of 1 DME to US $0.45. A more realistic equivalent for investments (construction and equipment) is 1 DME to US $0.25 or US $0.30.

Table 2

Production of Selected Chemical Products in East Germany a/
1958 and 1965 Plan

Product	Production in 1958	Planned Production for 1965	
	Thousand Metric Tons b/	Thousand Metric Tons b/	Percentage Increase Above 1958
Plastics	93.0	311.0	234
Of which:			
Polyvinyl chloride	55.0	126.0	128
Polystyrene	3.7	20.0	440
Polyethylene	0	50.0	
Unsaturated polyester resins	Negligible	5.0	
Synthetic fibers	6.7	38.9	481
Of which:			
Dederon (nylon) c/	4.7	13.4	185
Synthetic rubber	83.8	105.0	25
Motor vehicle tires (thousand units)	1,626.0 d/	3,750.0	131
Calcium carbide	830.7	1,180.0	42
Soda ash	553.0	658.0	19
Caustic soda	296.2	403.0	36
Pure phenol	16.7	50.1	200
Caprolactum	7.6	23.9	215
Sulfuric acid (as H_2SO_4)	650.3	1,231.1	89
Nitrogen fertilizer e/	320.0	386.0	21
Phosphorus fertilizer e/	136.3	284.0	108
Potash products e/	1,528.0	2,128.0	39

a. 22/
b. Unless otherwise indicated.
c. Staple fiber, filament, and tire cord.
d. Reported in the official East German Seven Year Plan as including all types of tires, but the East German statistical yearbook lists the figure of 1,979,800 tires for all types.
e. In terms of pure nutrient.

b. Increased Emphasis on Agricultural Chemicals

In December 1959, 2 months after the Law for the Seven Year Plan was approved, the Central Committee of the SED (Sozialistische Einheitspartei Deutschlands -- Socialist Unity Party of Germany) held its seventh plenum, at which Walter Ulbricht, First Chairman of the Central Committee, and Dr. Hans Stubbe, President of the Academy of Agricultural Sciences, called on the chemical industry for greater contributions to agriculture, particularly in the form of chemically improved animal feeds and increased supplies of fertilizers. 23/ It developed later that these appeals were part of a general program to emphasize agriculture in the East German economy, culminating in the drive to collectivize all East German farms before the summit meeting that was scheduled for May 1960.

In response to the appeal for more agricultural chemicals, Werner Winkler, head of the East German chemical industry, cited the virtual impossibility of changing the plans for production and distribution of some of these commodities after balances had already been established for supplies of raw materials and for distribution of products. He promised, however, that the chemical industry would try to improve the quality of fertilizer and would produce additional amounts of fungicides, herbicides, and feed supplements. 24/

2. Plan Fulfillment, 1959

a. Production

The production plan of the East German chemical industry for 1959 reportedly was fulfilled 101.1 percent, production being 10.1 percent higher than in 1958. These results were lower, however, than comparable figures for industry as a whole, which were reported as 101.4 percent and 12.3 percent, respectively.

Although plans for production were exceeded for some chemical commodities, including calcium carbide, nitrogen and phosphorus fertilizer, photographic films, and motor vehicle tires, production fell somewhat short of the plan for several basic heavy chemicals. Production of sulfuric acid, soda ash, and caustic soda reached only 96 to 97 percent of the amounts planned. 25/ Reported production of 12 key chemical products is shown in Table 3.

The high percentage increase in production of polyacrylonitrile fiber merely reflects the low base of the preceding year. The percentage increase in production of motor vehicle tires, however,

* Table 3 follows on p. 21.

Table 3

Reported Production of Selected Chemical Products in East Germany a/
1959

Product	Production: Thousand Metric Tons b/	Production: Percentage Increase Above 1958
Polyvinyl chloride	56.2	3.0
Dederon (nylon) staple fiber	2.8	10.3
Polyacrylonitrile fiber	1.0	34.9
Synthetic rubber	85.2	1.7
Motor vehicle tires (thousand units)	1,892.0	16.4
Calcium carbide	887.5	6.8
Soda ash	559.2	1.1
Caustic soda	303.6	2.5
Sulfuric acid (as H_2SO_4)	688.9	5.9
Nitrogen fertilizer c/	329.2	2.9
Phosphorus fertilizer c/	138.8	1.8
Potash products c/	1,566.2	2.5

a. 26/
b. Unless otherwise indicated.
c. In terms of pure nutrient.

represents a large numerical increase, which is particularly notable in view of the comparatively small increase in production of synthetic rubber. Inasmuch as East Germany has been a large-scale exporter of both synthetic rubber and tires, the sizable increase in production of tires without a concomitant rise in production of synthetic rubber presumably denotes larger exports of tires and reduced exports of rubber and indicates progress toward the announced goal of exporting more finished chemical products and fewer chemical raw materials and intermediates.

b. Investments

Approximately 1 billion DME was invested in the chemical industry in 1959, out of total East German investments of 14 billion DME. Although this amount is less than one-tenth of the total scheduled for the chemical industry during the Seven Year Plan, it represents an increase of 40 percent in comparison with investments in the industry in 1958, whereas industrial investments as a whole increased only 23 percent. 27/

Construction for the chemical industry fell short of plans, even though the construction industry reported fulfillment of its over-all plan. In Halle District (Bezirk), in which all of the larger existing chemical plants are located, progress on construction of the 12 most important chemical projects was reported on 10 December 1959 to average only 85 percent of the plan for the year. Fulfillment of plans for the individual projects ranged from 70 to 98 percent. 28/

3. Problems Encountered in 1959

a. Shortcomings in Planning

The East German chemical industry in 1959 continued to be afflicted with the familiar problems of a centrally planned economy, particularly those associated with shortcomings in planning, scheduling, and management. These difficulties, in turn, resulted in the failure to achieve planned goals for production of some basic chemicals and the considerable underfulfillment of plans for construction. Shortcomings that have been particularly cited have been inadequate coordination of plans between various branches of the economy and a failure, especially on the part of local officials, to recognize that the chemical industry has top priority. 29/

b. Shortages of Materials, Labor, and Electric Power

Shortages of materials and equipment in the East German chemical industry have adversely affected construction. Cement and gravel, acid-resistant materials (plastics and special concrete), rolled products, and alloy tubing have been reported to be in short supply and often inferior in quality. Construction machinery, such as cement mixers and cranes, was inadequately furnished to chemical construction sites in 1959, and machine-building enterprises failed to meet requirements for delivery of chemical equipment. 30/

Shortages of manpower have been most evident in designing and drafting and in construction. The labor force within the chemical industry itself seems to have been generally adequate to operate existing plants, but some concern has been expressed concerning the continuing flight of chemical specialists to West Germany. 31/

Supplies of electric power have not been sustained throughout the year at the levels required by the chemical industry, but shortages apparently have not been acute or of long duration. Lags have been reported, however, in the construction of new powerplants, so that coverage of the expanding demands of the chemical industry cannot be regarded as assured. 32/

c. Shortcomings in Quality

Qualitative inadequacies have been reported, particularly in the products being stressed under the East German Seven Year Plan -- synthetic fibers and plastics. The quality of Dederon (nylon) fiber in particular has been reported to be declining steadily. Complaints about East German plastic and rubber products, however, probably reflect an increasing consciousness of the gap between East German and world standards rather than an actual deterioration in the quality of the East German products. The press has carried many exhortations to improve quality in order to raise the competitive position of East German products on world markets and to meet or exceed West German standards. 33/

4. Plans for 1960

Little information is available on specific plans for the East German chemical industry in 1960, but several new plants and installations are scheduled to go into operation during the year. Production of several products, therefore, should increase perceptibly above that in 1959. For example, supplies of sulfuric acid, an important material for both synthetics and fertilizers, will be augmented considerably if the large gypsum sulfuric acid plant in Coswig starts production in 1960 as scheduled. 34/ Units at Bitterfeld and Premnitz are expected to start producing "PeCe" (polyvinyl chloride) and Prelana (polyacrylonitrile, similar to US Orlon) fibers, respectively, in 1960, and a unit for producing hydrocyanic acid, used in making polyacrylonitrile fibers, started operation in January 1960 at the VEB Chemische Werke Buna in Schkopau. Production of melamine resin (a urea-base plastic) and of the high-grade mixed fertilizer "Nitrophoska" is expected to start in 1960 at new installations at the VEB Stickstoffwerk in Piesteritz. 35/

5. Outlook

There is some indication that problems may be encountered by East Germany in 1960 in constructing new chemical installations. The USSR reportedly will not be able to meet all commitments for deliveries to East Germany in 1960 because of increased requirements for domestic expansion and commitments to underdeveloped countries. 36/ Failure of the USSR to make promised deliveries could have serious consequences for the East German chemical industry, which depends on the USSR for important materials, such as nonferrous metals and alloy steels needed for new chemical plant and equipment.

A further difficulty is the fact that East German production of plastics and synthetic fibers is expanding more rapidly than production of some of the vital input materials for these products, such as

chlorine. Importation of chlorine poses problems not only because it is not readily obtainable, especially within the Soviet Bloc, but also because special equipment is needed to ship it.

Importation of chemical materials and equipment from the Free World also is becoming more difficult, because East German chemical products traditionally exported to the Free World, such as fertilizers and fuels, are being used domestically under the current plans and no longer serve as a source of foreign exchange to pay for imports. An effort is being made to export to the Free World more pharmaceuticals, dyes, textile-processing agents, and other highly processed chemical products in place of the traditional exports, a shift which is described as being "extraordinarily difficult." 37/

Although complete fulfillment of the goals of the Seven Year Plan can hardly be expected, the progress achieved in 1959 probably foreshadows a considerable expansion of the East German chemical industry. The degree of success attained will depend on the extent to which the East German government is able to keep the various problems in balance, so that no one of them becomes insuperable. The configuration of these problems will change somewhat within the next year or two as the principal focus shifts from construction to equipping and operating the new plants. Shortages of labor in construction will become less important, but shortages of skilled labor for operation and maintenance of new chemical plants will be of greater concern.

Development of the chemical industry during the Seven Year Plan also will depend in no small degree on access to technological data and processes from the Free World, for the rapid rate of development required to meet the goals for 1965 precludes devoting the necessary time and domestic manpower to the development of processes and equipment for products that have not yet been produced commercially within the Soviet Bloc. The USSR is providing technological aid in some fields, such as the refining of petroleum, 38/ but it has not yet been able to furnish much assistance in plastics because of its own inexperience. The contract concluded in February 1960 for delivery from Great Britain of complete installations for ethylene, the starting material for polyethylene, will contribute materially to the East German potential for meeting its goals for production of plastics. These installations are to be ready for operation by the end of 1962 and are to have a capacity of 40,000 tons of ethylene, equal to one-half of the total planned output of this commodity at the Leuna plant in 1965.

C. Poland

1. Significant Events in 1959

A highlight of the year 1959 in Poland was the announcement of the new Polish Five Year Plan (1961-65). Production of chemicals is scheduled to double by 1965, the value of output rising to about 60 billion zlotys,* with a subsequent increase to 85 billion to 90 billion zlotys by 1970. Wider use is to be made of raw materials that have had limited domestic application to date, including petroleum, natural and coke gases, and elemental sulfur. As in most countries of the Soviet Bloc, major emphasis is to be placed on production of synthetic fibers, rubber, plastics, and fertilizers. In addition, production of sulfuric acid is planned to increase from 665,000 tons in 1960 to 1.1 million tons in 1965; caustic soda, from 162,000 tons to 245,000 tons; and soda ash, from 510,000 tons to 646,000 tons. 39/

Another significant event in the Polish chemical industry in 1959 was the initial production of synthetic rubber at a plant in Oswiecim. The plant is scheduled to produce 20,000 tons of rubber in 1960 and 36,000 tons in 1962. Under consideration is a plan to supply petroleum-derived butadiene** to Oswiecim, permitting a further expansion to 45,000 tons. 40/

2. Fulfillment of Plan, 1959

The plan for production of chemicals in Poland in 1959 was exceeded, an increase of 17.8 percent being registered above production in 1958. The largest percentage gains were reported for synthetic rubber and pesticides, with modest exceeding of the plan claimed for sulfuric acid, caustic soda, polyvinyl chloride, pharmaceuticals, and motor vehicle tires. Although the plan had called for production of only 1,500 tons of synthetic rubber at the new plant at Oswiecim, about 5,000 tons were produced, permitting the cessation of imports of synthetic rubber for one of the two tire plants in Poland. The value of pharmaceutical production rose to 2.4 billion zlotys, a gain of almost 24 percent above that in the preceding year. The planned production of plastics, 38,000*** tons, was equivalent to production of about 1.3 kilograms per capita, compared with 0.8 kilograms in 1958.

* Zlotys may be converted to US dollars as the official rate of exchange of 1 zloty to US $0.25. This rate of exchange, however, may not reflect the dollar value.

** An intermediate used in production of synthetic rubber. Butadiene at the plant is currently derived from alcohol produced from edible agricultural products, a costly method.

*** The actual production in 1959 probably was very close to this plan because the plan was announced in October 1959.

In spite of the reported exceeding of the plan for the chemical industry, the goals were not reached for production of a number of important products, including soda ash, phosphorus and nitrogen fertilizers, synthetic fiber, polystyrene, and phenol. 41/

3. Plan for 1960*

Poland has announced an ambitious plan for production of chemicals in 1960, the last year of the current Five Year Plan (1956-60). The plan calls for production to increase 13.7 percent above that in 1959, compared with a planned increase of 7.6 percent in total industrial production. Investment is tentatively scheduled to be 4.9 billion zlotys.** Major emphasis of the plan centers on production of fertilizers, pharmaceuticals, and plastics. Production of phosphorus fertilizers is to be increased to about 190,000 tons,*** and, in addition, an effort is to be made to improve quality by increasing the percentage of pure nutrient. Production of pharmaceuticals will be augmented chiefly by increasing the variety of antibiotics and vitamins. Production of plastics is scheduled to rise to nearly 54,000 tons, with production of polyvinyl chloride rising 87 percent and that of polystyrene, 127 percent. Production of synthetic fibers is planned to increase from 2,400 tons in 1959 to 4,500 tons. Other targets scheduled for 1960 include production of 665,000 tons of sulfuric acid, an increase of 9 percent, and 510,000 tons of soda ash, an increase of 14 percent. 42/

4. Outlook

In 1960, Poland probably will experience shortfalls in production of several important chemical products. The goals for production of synthetic materials, with the possible exception of synthetic rubber, are unlikely to be met. In view of the report that the original investment scheduled for the chemical industry has been reduced, 43/ the plans for a number of other chemicals may be revised downward.

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* There appear to have been a number of revisions of the plan for 1960, and it is possible that additional changes will still be made.

** The planned investment is not to be used solely for production of chemicals. For example, 7 percent of the total investment is to be used for the construction of petroleum pipelines and refineries. A recent report suggests that planned investment in the chemical industry was reduced subsequently by 400 million zlotys.

*** Expressed in terms of P_2O_5. This goal apparently represents an opinion of official Polish circles that the original plan for 1960, which calls for production of 207,000 tons of phosphorus fertilizers, will be underfulfilled.

The goals for production of chemicals in Poland in 1965 will be difficult to meet, particularly because the shift in the raw material base to natural gas and petroleum may not be achieved easily. The supply of the petroleum raw materials depends in part on expeditious completion of a pipeline from the USSR. Experience is lacking in production of a number of synthetic materials, possibly a critical factor for certain of the products that are scheduled for initial production late in the plan period. Much depends on Polish success in implementing plans to introduce technological improvements, such as mechanization of processes and more efficient utilization of raw materials, and on continued purchases of plants and process data from the Free World.

D. Czechoslovakia

1. Significant Events in 1959

Details of the Czechoslovak Third Five Year Plan (1961-65) were announced in October 1959. By 1965, production of chemicals in Czechoslovakia is scheduled to increase 86 percent above that in 1960, compared with an increase of 50 percent in total industrial production. The planned investment in the chemical industry in 1961-65 -- 20 billion crowns* -- is one-sixth of the planned investment in all industry and exceeds the aggregate investments in the chemical industry since 1945. A feature of the plan will be the accelerated development of the chemical industry in Slovakia, where production of chemicals is scheduled to rise to 20 to 30 percent of the nation's output of chemicals by 1965.

Production of several important chemical products is scheduled to rise significantly during the Third Five Year Plan, as shown in Table 4.**

Production of antibiotics is scheduled to increase 90 percent and that of vitamins, more than 100 percent. Chemical products to be made for the first time in commercial quantities in 1961-65 include polyethylene, synthetic rubber, polypropylene, and polyester (Dacron type) fibers. 44/

2. Plan Fulfillment, 1959

The plan for production of chemicals in Czechoslovakia in 1959 was exceeded, with production rising 12 percent above that in 1958, compared with an increase of 10.9 percent for all industry. Production

* Crowns may be converted to US dollars at the official rate of exchange of 1 crown to US $0.139. This rate of exchange, however, may not reflect the dollar value.

** Table 4 follows on p. 28.

Table 4

Planned Production of Selected Chemical Products in Czechoslovakia
1965

Product	Planned Production (Thousand Metric Tons)	Index of Planned Production (1960 = 100)
Plastics	183.5	326
Synthetic fibers	21.1	449 a/
Sulfuric acid	1,000	179
Nitrogen fertilizers b/	292.5	202
Phosphorus fertilizers b/	285	194

a. 45/
b. In terms of pure nutrient.

of phosphorus fertilizers rose 15 percent to 135,000 tons.* Production of nitrogen fertilizers -- 133,000 tons* -- was 23 percent above that in 1958, but the plan was nevertheless underfulfilled. Production of sulfuric acid rose 11 percent to 513,000 tons, but again there were indications that the plan was underfulfilled. No indication was given that the plan for production of plastics was fulfilled, although production of polyvinyl chloride increased 19 percent to a level of 5,700 tons. 46/ Production of a nylon type of fiber was initiated in a new plant at Humenne.

3. Plan for 1960

The plan for 1960 calls for production of chemicals to increase 12.2 percent, compared with a planned increase of 10.2 percent in total industrial production. Planned investment in the chemical industry -- 3.2 billion crowns -- will be about 9 percent of the total investment in industry. An important objective of the plan for 1960 is the completion of several new chemical plants, including installations producing synthetic rubber, petrochemicals, and nitrogen fertilizers. 47/ Production of nitrogen and phosphorus fertilizers and sulfuric acid is scheduled to rise by about 9 percent. The plan for 1960 also envisions production of tubeless tires, not previously produced in Czechoslovakia, and the commissioning of a new shop for production of polyvinyl chloride.

* In terms of pure nutrient.

4. Outlook

Fulfillment of a considerable part of the plan for production of chemicals in 1960 appears likely. The goals for production of chemical fertilizers and sulfuric acid probably will be achieved, but attainment of the goals for plastics and synthetic fibers is less certain. The goals for 1965, again except those for production of synthetic materials, are likely to be fulfilled, although the planned increase of 10.1 percent annually in productivity of labor is rather high. 48/ Major factors in plan fulfillment will be the timely receipt of raw materials from the Soviet Bloc, particularly petroleum from the USSR, and the expeditious completion of new chemical plants.

E. Rumania

1. Significant Developments in 1959

Rumania terminated its Second Five Year Plan (1956-60) in 1959, 1 year ahead of schedule, and announced a new Six Year Plan (1960-65). Production of chemicals, particularly fertilizers and synthetic materials, is to be expanded significantly, using domestic supplies of petroleum and natural gas as the principal raw materials. By 1965, production of chemicals is to be four times that in 1958. Production of chemical fertilizers is scheduled to rise to 500,000 tons* in 1965, compared with production of 52,000 tons in 1959. In the field of synthetic materials, a plant with an ultimate capacity of 50,000 tons of synthetic rubber is to be built. Production of phenol and acetone from petrochemical raw materials is to bring production of these products to 18,000 tons and 11,000 tons, respectively, by 1965 or even earlier. 49/

A number of new chemical plants went into operation in Rumania during 1959, but full capacities probably will not be attained for several years. The new installations included plants for production of superphosphate, soda ash, polyvinyl chloride, synthetic fibers, phthalic anhydride, and reed cellulose. 50/

2. Plan Fulfillment, 1959

Fulfillment of plan for the Rumanian Ministry of the Petroleum and Chemical Industry in 1959 was reportedly 102 percent, compared with 103.8 percent for heavy industry as a whole. Production of selected chemical products and the percentage increase above the preceding year are shown in Table 5.**

* In terms of pure nutrient. This goal also has been reported on a gross weight basis as about 2 million tons.

** Table 5 follows on p. 30.

Table 5

Reported Production of Selected Chemical Products in Rumania
1959

Product	Production		Percentage Increase Above 1958
	Unit	Amount	
Tires	Thousand units	321	19 a/
Soda ash	Thousand metric tons	106	27
Caustic soda	Thousand metric tons	64	56
Sulfuric acid	Thousand metric tons	199	38
Chemical fertilizer	Thousand metric tons	52 b/	80
Organic dyes	Thousand metric tons	3.75	22

a. 51/
b. In terms of pure nutrient.

Production of chemical fertilizers, as indicated, almost doubled in 1959, rising to 52,000 tons and almost equaling an earlier goal of 53,000 tons planned for 1960. The major factor in the increase was the output of superphosphate* at the newly opened plant in Navodari.

Underfulfillment of the construction and investment plans for the chemical industry in 1959 was reported. The initial production of polyvinyl chloride apparently fell short of expectations, and the plan to initiate production of polyethylene and vinyl acetate presumably failed to materialize.

3. Plans for 1960

The plan for 1960 calls for Rumania to increase production of chemicals 22 percent above that in 1959, compared with a scheduled increase of 14 percent in total industrial production. Of 23.5 billion lei** scheduled for industrial investment in 1960, 21 percent (4.9 billion lei) is to be invested in the industries producing chemicals, rubber, and cellulose. 52/

* Production of nitrogen fertilizers declined slightly in 1959.
** Lei may be converted to US dollars at the official rate of exchange of 1 leu to US $0.1667. This rate of exchange, however, may not reflect the dollar value.

Production of chemical fertilizers is scheduled to increase 36 percent, polyvinyl chloride about 300 percent, and soda ash nearly 100 percent in 1960. With the opening of a new unit for acrylic fiber, production of synthetic fibers also is scheduled to increase. Initial production of cellulose is planned at the Chiscani Reed-Cellulose Combine, and construction of a new tire plant is to be started.

4. Outlook

The goals for production of chemicals in Rumania in 1960 appear generally capable of realization, although difficulties may be experienced in fulfilling the plans for plastics and synthetic fibers. With construction of two new installations to produce nitrogen fertilizers almost completed and the additional output from the new superphosphate plant in Navodari, attainment of the goal for production of chemical fertilizers is reasonably assured.

Available data on the new Rumanian Six Year Plan for production of chemicals do not permit a complete analysis of probable developments by 1965. The goal for production of chemical fertilizers in 1965 -- 500,000 tons* -- appears clearly unrealistic without the introduction of considerably more plant capacity than has been planned to date. Rumania occupies an advantageous position relative to the other European Satellites as a potential producer of petrochemicals, but satisfactory development will be assured only if sufficient investment funds are available and if Rumania has access to Western technology and equipment. On present evidence, Rumania should begin production of synthetic rubber by 1961, and by 1965 the increased production of rubber should permit a considerable increase in production of tires.

F. Hungary

1. Significant Events in 1959

A highlight of the year for the Hungarian chemical industry was the announcement of a new 5-year plan for 1961-65. The new plan, similar to those announced for other countries of the Soviet Bloc, stresses the accelerated growth of the chemical industry, with major emphasis on developing production of synthetic materials, petrochemicals, fertilizers, and pharmaceuticals. An annual investment of 1 billion

* In terms of pure nutrient.

forints* reportedly is to be spent on the chemical industry** in 1961-65, compared with 300 million to 400 million forints in 1959. 53/ As a result of the increased investment, production of all types of chemical fertilizers is scheduled to increase from 355,000 tons in 1958*** to 1.37 million tons in 1965; plastics, from 5,800 tons to 36,500 tons; and synthetic fibers, from zero to 2,300 tons. 54/ Production of pharmaceuticals is to be doubled. Production of petrochemical raw materials also is to be developed: by 1965, about 200 million cubic meters of natural gas and 100,000 tons of crude oil are to be processed into chemical products annually.

Another highlight of the year was the completion of a pipeline for natural gas from Rumania to Hungary. This line eventually is to provide the basic raw material for a large petrochemical combine under construction at Tiszapalkonya and for the nitrogen fertilizer combine at Kazincbarcika. 55/

2. Plan Fulfillment, 1959

A report in October indicated that the 1959 goals for most major chemicals had been exceeded by the end of September, but the meager reporting on fulfillment of the annual plan for chemicals implied some shortfalls. Available evidence suggests that production of coal chemicals and polyvinyl chloride plastic failed to meet expectations.

Production of the Hungarian chemical industry† in 1959 increased 21 percent above that in 1958, compared with an increase of about 11 percent for industrial production. Significant advances included an increase of about 55 percent for nitrogen fertilizers, production rising from 33,000 tons in 1958 to 50,000 tons†† in 1959, and an increase of 20 to 22 percent in pharmaceuticals, 56/ production of the

* Forints may be converted to US dollars at the official rate of exchange of 1 forint to US $0.085. This rate of exchange, however, may not reflect the dollar value.

** The Hungarian chemical industry includes branches for refining of petroleum and production of aluminum in addition to branches producing chemical products. The annual investment of 1 billion forints is believed to be largely or solely for development of the branches producing chemical products. There has been noted a higher investment figure which apparently applies to total investment in the chemical industry. See 3, below.

*** The year 1958 has been used in Hungarian reports rather than 1960, possibly because the plan was announced early in 1959 or else to facilitate comparison with the plans of other countries of the Bloc.

† Possibly including production of the petroleum and aluminum industries.

†† In terms of pure nutrient.

latter being some 13 percent (180 million forints) above plan by 10 December. Thus it is estimated that the value of the pharmaceutical production for 1959 was approximately 1.6 billion forints.*

Hungary made further progress in 1959 toward developing a synthetic materials industry. Although the plan for production of polyvinyl chloride plastic apparently was not fulfilled in 1959, an installation with a capacity of 600 tons per year went into operation at the Hungaria Chemical Works. At the same plant a unit to make caprolactam, used for producing "Danulon," a nylon fiber, was put into operation with an initial annual output of 300 tons. Pilot plant production of polyester fiber (similar to Dacron) was begun at Veszprem.

3. Plans for 1960

In 1960, the last year of the current Hungarian Three Year Plan, investment in the chemical industry is scheduled to be 2.3 billion forints,** 28 percent*** above that in 1959 and 6.9 percent of the planned total national investment for 1960. The investment for those sectors producing only chemicals may be about 20 to 25 percent of the total investment in the chemical industry.† Production of chemicals in 1960 is planned to increase 7.1 percent above that in 1959.

The planned percentage increases in production of selected chemical products are as follows:

Rubber products	12.0
Nitrogen fertilizers	9.9
Pharmaceuticals	14.8
Dyes	12.3 57/

* According to the Hungarian Statistical Yearbook for 1957, the value of the pharmaceutical output for that year was slightly more than 1 billion forints. In 1957, pharmaceuticals represented about 21 percent of the value of the total chemical output, excluding the value of aluminum products.

** This amount probably includes the investment for the branches of the chemical industry producing other products as well as for those that produce chemicals.

*** [redacted] the investment in 1960 for the chemical industry is to be 50 percent above that in 1959. This latter statement may apply only to the sectors producing chemicals. 50X1

† Investment data for 1959 and 1960 permit the tentative estimate that the sectors producing only chemicals may have accounted for 17 to 22 percent of the total investment in the chemical industry in 1959. The increasing emphasis on chemicals presumably will result in this sector obtaining a slightly higher proportion of total investment in 1960.

4. Outlook

The planned increases in production of nitrogen fertilizers and pharmaceuticals in Hungary in 1960 probably can be achieved. Production of synthetic fibers in 1960 will not be significant.

To compensate for the extremely small domestic production, imports of synthetic fibers will double in 1960.

The goals for production of chemicals in Hungary in 1965 appear generally difficult to attain. Production of chemical fertilizers, in the light of past performance, probably will not reach the goal of 1.37 million tons, unless more external aid is supplied than is now foreseen. The facilities for production of synthetic materials are still largely in the planning stage, and, consequently, the achievement of these goals is even more doubtful. The goal for production of pharmaceuticals, however, an increase of 100 percent above production in 1958, probably will be achieved in view of the increase of 20 to 22 percent in 1959.

G. Bulgaria

1. Significant Events in 1959

In 1959, under the impetus of the "great leap forward," Bulgaria raised the previous goals for production of chemicals during the Third Five Year Plan (1958-62) and announced a number of tentative goals for 1965. Production of chemicals in 1962, originally scheduled to reach a level 2.5 times that in 1957, is now to be 3 times that in 1957 and by 1965 is to rise to 7 times that in 1957. Production of chemical fertilizers, originally scheduled to reach 890,000 tons in 1962, is now planned to be 1 million tons in that year, and the original plan for production of plastics in 1962 -- 8,000 tons -- has been doubled. 58/

Tentative goals for production of chemicals in 1965 include the following:

Plastics	40,000 tons
Chemical fibers	26,000 tons
Soda ash	285,000 tons
Caustic soda	43,200 tons 59/
Sulfuric acid	350,000 tons
Chemical fertilizers	1.6 million tons
Synthetic urea	20,000 tons

In support of the increased goals for production of chemical fertilizers, construction of a new nitrogen fertilizer plant at Kalitinovo was begun in 1959. The plant is to have an annual capacity of 440,000 tons, but full production is not scheduled until 1964.

2. Plan Fulfillment, 1959

The chemical and rubber industries in Bulgaria reportedly exceeded their plans for production in 1959, both industries claiming to have increased production by about 35 percent above that in 1958. Although production of major chemical products in 1959 was significantly greater than in 1958, in many cases it fell below the level necessary to implement the "great leap forward." The plan for 1959 had called for production of 100,000 tons of sulfuric acid and 400,000 tons of fertilizers, whereas only 91,000 tons and 338,000 tons, respectively, were produced. Exceeding of the plan was reported, however, for nitrogen fertilizers, soda ash, caustic soda, plastics, and automobile tires. Initial production of streptomycin was reported. Table 6 shows production of selected chemical products in Bulgaria in 1959.

Table 6

Reported Production of Selected Chemical Products in Bulgaria
1959

Product	Production	
	Thousand Metric Tons	Percentage Increase Above 1958
Soda ash	114	15
Caustic soda	16	13
Sulfuric acid	91	42 a/
Nitrogen fertilizer	185	39
Phosphorus fertilizer	153	129

a. 60/

3. Plan for 1960

The plan for 1960 calls for a continuation of the accelerated development of the chemical industry, with production scheduled to increase 34 percent, compared with a planned increase of 15.3 percent

for all industry. Planned investment in the chemical industry is 4.3 percent (approximately 186.6 million leva*) of total capital investment in industry. The goals of the chemical industry include production of 247,700 tons of nitrogen fertilizers, 275,000 tons of phosphorus fertilizers, 135,850 tons of soda ash, and 151,000 tons of sulfuric acid. Work is to begin in 1960 on new facilities to produce chlorine and polyvinyl chloride at Reka Devnya and sulfuric acid at Dimitrovgrad, the latter installation to have an annual capacity of 80,000 tons of sulfuric acid. In addition, expansion of the soda plant at Reka Devnya is scheduled to provide additional capacity for production of 85,000 tons of soda ash. 61/

4. Outlook

Fulfillment of the immediate and longer range plans of the Bulgarian chemical industry is unlikely, although a considerable expansion of production will occur. The plans for production of chemical fertilizers and sulfuric acid in 1960 are unlikely to be fulfilled, as are those for production of plastics and fertilizers in 1962 and 1965.

H. Albania

1. Significant Events in 1959

The Albanian chemical industry** currently is of minor importance, consisting of four small plants producing oxygen, rubber products, tannin, and pharmaceuticals. Other chemical products must be imported, largely from other countries of the Soviet Bloc. In 1959 it was revealed that the gross production of the Albanian chemical industry in 1958 amounted to 146.6 million leks,*** compared with only 5.5 million leks in 1950. 62/ No similar statistics have been reported for 1959.

In 1959, details of the Albanian Third Five Year Plan (1961-65) were announced. The plan provides for the establishment of a heavy chemical industry. A phosphorus fertilizer plant and a sulfuric acid plant are to be constructed in connection with a planned metallurgical combine. In addition, a nitrogen fertilizer plant is to be constructed, using Albanian natural gas as the primary raw material. Although no

* Leva may be converted to US dollars at the official rate of exchange of 1 lev to US $0.147. This rate of exchange, however, may not reflect the dollar value.

** The Albanian chemical industry is subordinate to the Ministry of Industry and Mines.

*** Leks may be converted to US dollars at the official rate of exchange of 1 lek to US $0.02. This rate of exchange, however, may not reflect the dollar value.

mention was made of establishing production of other petrochemicals, a base for such will exist if production of petroleum should reach its 1965 goal of 2 million to 2.5 million tons. 63/

2. Outlook

Albanian plans for development of a chemical industry will materialize only if considerable aid is obtained from other members of the Soviet Bloc, especially the USSR. A technical assistance program has been promulgated, whereby Albania is to receive a credit of 300 million rubles from the USSR for industrial construction, including chemical plants and pipelines for petroleum and gas. 64/ Unless such construction and the training of Albanian personnel to operate these installations are given priority, it is unlikely that the goals can be attained by 1965. A start, however, will have been made toward production of heavy chemicals.

I. Communist China

1. Significant Events in 1959

The chemical industry of Communist China made substantial progress during 1959. In value of output the chemical industry possibly attained fourth place in the Sino-Soviet Bloc, after the USSR, East Germany, and Poland. Communist China became the leading producer in the Bloc, except for the USSR, of sulfuric acid, caustic soda, and soda ash. Production of fertilizers, the focal point of efforts to expand the chemical industry, also was increased considerably.

The Chinese Communist Ministry of the Chemical Industry continued to pursue the state's policy of "walking on two legs" -- that is, developing simultaneously both central government and locally operated chemical industries; large, medium-sized, and small plants; and production by both modern and "native" methods. Although construction of large and medium-sized chemical plants continued during 1959, the Ministry gave special attention to promoting the program for small plants, particularly plants using modern methods of production rather than crude or "native-style" methods. Emphasis was put on designing and building prototype small plants for producing synthetic ammonia and sulfuric acid.

A number of large chemical plants, construction of which was started in the period of the First Five Year Plan (1953-57), were put into operation during 1959. Among these plants were the Soviet-built synthetic ammonia-nitrogen fertilizer plants at Lan-chou and T'ai-yuan and a similar plant equipped by Czechoslovakia at Chin-t'ang. These three plants alone ultimately will have a combined annual capacity of

more than 1 million tons of nitrogen fertilizer. By the end of the year, trial production of synthetic rubber apparently started in the Soviet-built plant at Lan-chou. Other chemical plants in Dairen, Kirin, Nanking, and Chin-hsi were greatly expanded and became large centers of chemical production.

2. Plan Fulfillment, 1959

The value of gross production of the Chinese Communist chemical industry reportedly increased about 49 percent above that in 1958 compared with an increase of 39 percent for all industry. 65/ Investment in the chemical industry in 1959 exceeded 1.3 billion yuan,* larger than the total chemical investment during the First Five Year Plan. 66/ According to official statements, production of caustic soda, soda ash, tires, and antibiotics reached the original goals for 1962, the last year of the Second Five Year Plan (1958-62). 67/ The estimated production of selected chemical products in 1959 is shown in Table 7.

Table 7

Estimated Production of Selected Chemical Products in Communist China
1959

Product	Production		Percentage Increase Above 1958
	Unit	Amount	
Motor vehicle tires	Thousand units	1,800	20
Soda ash	Thousand metric tons	800	25 a/
Caustic soda	Thousand metric tons	364	35 a/
Sulfuric acid	Thousand metric tons	1,050	42 a/
Chemical fertilizer	Thousand metric tons	2,000 b/	48
Antibiotics	Metric tons	344	137 a/

a. 68/

b. The reported production of 1.333 million metric tons is believed not to include the output of small plants using crude indigenous methods of production or the total output of ammonium nitrate produced in large chemical fertilizer plants.

* Yuan may be converted to US dollars at the standard rate of exchange of 2.5 yuan to US $1. This rate of exchange, however, may not reflect the dollar value.

In 1959, Communist China began excluding data on production of ammonium nitrate from official statistics on production of fertilizers. This exclusion may result from a desire to suppress information concerning this product, which has applications not only as a nitrogen fertilizer and an industrial explosive but also as a military explosive. It is estimated that production of chemical fertilizers,* including ammonium nitrate, increased from 1.354 million tons in 1958 69/ to nearly 2 million tons in 1959.

During 1959, considerable emphasis was placed on the development of small chemical plants to help meet the requirements of local industry and agriculture. It was reported that, in Shanghai, 1,000 sets of equipment were built for small sulfuric acid plants, each plant capable of producing 400 tons of acid per year. By the end of 1959, an additional program had been drafted for the construction of acid plants with capacities of 4,000 tons per year. 70/

One key aspect of the Second Five Year Plan for production of chemical fertilizer was a program for constructing an extensive network of small plants producing ammonium bicarbonate. Most of these plants were to have an annual production capacity of 2,000 tons of synthetic ammonia and 8,000 tons of ammonium bicarbonate per year. There was increasing evidence in 1959 that the program might have been curtailed. As a possible substitute program, the Dairen Chemical Plant built a small prototype plant capable of producing 800 tons per year of synthetic ammonia. The ammonia would be prepared in aqueous form for direct application to crops as a nitrogen fertilizer. It was claimed that such a plant could be built in 4 to 6 months, with an investment of only 900,000 yuan and would need only 200 tons of iron and steel. 71/ Some 30 experimental plants of this kind were to be built in 1959 to determine their feasibility. There were indications that this program lagged, and possibly only a few, if any, of these plants were in operation by the end of the year. The program, however, is scheduled to receive a high priority in 1960.

Even with the increased productive capacity in operation in 1959, the chemical industry reportedly was able to meet only one-half to two-thirds of Chinese Communist requirements for industrial chemicals. Production of sulfuric acid and soda ash was reported to have been only about 70 percent of the amount required, and production of nitric acid and calcium carbide was far below domestic needs. 72/ Although production of raw materials for the chemical industry also increased, the transportation system of Communist China was unable to maintain a continuous supply of these materials to all consumers.

* Excluding output of small plants using native methods.

3. Progress on Major Products

a. Chemical Fertilizers

The fanciful claims of 1958 concerning planned increases in production of chemical fertilizers by 1962 -- at one time, the target was said to be 35 million tons -- apparently gave way in 1959 to a more realistic appraisal of the tremendous technical and material problems to be overcome in reaching such high levels of production. In October 1959, Vice Premier Po I-po presented a 10-year plan for modernizing agriculture and called for an annual production of chemical fertilizer approximating 20 million tons by 1969, 73/ a goal which the regime will have great difficulty in achieving but which is more feasible than the earlier plans. Also, by the end of 1959, Peking was again publicizing the original goal for 1962 of 3 million to 3.2 million tons of chemical fertilizer.

The uncertainty of Chinese Communist plans for production of fertilizers is illustrated even more strikingly by the revision in the plans for 1959 and 1960. Premier Chou En-lai, speaking before the National Peoples Congress in April 1959, stated that production of chemical fertilizer in 1959 would increase by 60 to 85 percent above production of 811,000 tons* in 1958. In mid-September, Hou Te-pang, Vice Minister of the Chemical Industry, declared that the goal had been revised downward to only 22.1 percent above the figure for 1958. In early November, Peking indicated that the estimated production would increase from 37 to 45 percent. Final results announced on 21 January 1960 stated that production in 1959 was 1.333 million tons,* an increase of 64.4 percent above production in 1958. At the end of 1959, official statements indicated that production of chemical fertilizer in 1960 was expected to reach the original goal for 1962 of 3 million to 3.2 million tons. On 30 March 1960, however, at a session of the National Peoples Congress, a goal of 2.8 million tons was announced for 1960. 74/

A number of new large chemical fertilizer plants began operating in 1959, and the output of several other plants that were put into production in 1957 or 1958 rose significantly. Production of nitrogen fertilizers started in plants located at Lan-chou, T'ai-yuan, and Chin-t'ang, and the original production capacity of the Soviet-built plant at Kirin was trebled by 1 October 1959. 75/ Production of phosphorus fertilizers also increased during 1959, chiefly because of increased output at two large superphosphate plants built by the Chinese Communists in 1958 at T'ai-yuan and Nanking. In 1959, production of

* Reported production. This amount is believed not to include output of small plants using crude indigenous methods of production or total output of ammonium nitrate produced in large chemical fertilizer plants.

potassium fertilizer commenced on a commercial scale in Communist China at a plant located in Ka-erh-mu in Tsinghai province. This plant is situated in the Tsaidam Basin in the vicinity of a huge dry salt lake, which reportedly contains billions of tons of carnallite, a source of potassium chloride. The plant was scheduled to produce 200,000 tons of potassium fertilizer during 1959, 76/ but output probably was no more than 50,000 tons.

The need for greater supplies of crude phosphates for the growing fertilizer industry prompted the regime to emphasize the development of domestic phosphorus mines. Although the country has large resources of crude phosphates, Communist China imported a considerable amount of phosphates from Morocco in 1959. A trade agreement between the two countries for that year called for delivery of 500,000 tons of phosphorus ore, and a subsequent agreement for 1960 specified a shipment of 600,000 tons. 77/

b. Synthetic Materials

Considerable priority was given in 1959 to production of synthetic rubber, plastics, and chemical fibers. Communist China expects to be producing a significant amount of synthetic rubber by the end of 1962. Major plants equipped by the USSR have been under construction for several years at Lan-chou and Kirin. The Lan-chou installation, a producer of butadiene-styrene copolymer rubber, was completed and apparently underwent trial production by the end of 1959. 78/ No date has been specified for initial production at the Kirin plant, which is scheduled to make chloroprene rubber. The annual capacity of each of these plants eventually may be 30,000 tons.

Final reports on the progress of the plastics industry in 1959 are lacking, but during the year the regime emphasized its program to develop large-scale manufacture of polyvinyl chloride. Production of this plastic was to begin at plants located in Chin-hsi, Peking, and Shanghai. Trial production was said to have started at Peking in October 1959. Additional facilities were reported to be under construction at Foochow, Tientsin, and Kirin. A number of these plants are scheduled to have annual production capacities of 6,000 tons of polyvinyl chloride each.

In the field of chemical fibers, two new plants were scheduled to begin operating during 1959. One plant located in Pao-ting is a producer of rayon filament with an initial capacity of 5,000 tons per year, and the second plant, in Peking, has an annual capacity of 684 tons of "Chinlon" (similar to US "Nylon 6"). Although statistics on production of chemical fibers in 1959 are lacking, it is clear that Communist China is far behind in the development of its chemical fiber industry, if it is to reach the production goal of 100,000 tons in 1962.

c. Acids and Alkalies

By early 1959 the Chinese Communists recognized that their grandiose plans for 1962 for the chemical industry did not include provisions for assuring a sufficient increase in the output of essential raw materials and basic chemicals. P'eng Tao, Minister of the Chemical Industry, therefore, declared at a chemical conference in January 1959 that first priority must be given to the exploitation of minerals and to production of acids and alkalies.

In February the Ministry of the Chemical Industry discussed capital construction of enterprises for producing acids and alkalies. A plan was approved to build 40 plants in 1959 and to complete the construction of 77 projects begun in 1958. 79/ Among the 40 new plants to be constructed were sulfuric acid installations, each with a production capacity of 120,000 tons, in the provinces of Szechwan, Honan, and Hunan, and soda ash installations, each with a capacity of 80,000 tons, in the provinces of Szechwan and Kwantung. 80/ The Ministry also declared that 300,000 to 400,000 tons of natural soda, enough to produce 100,000 tons of soda ash, would be mined in Inner Mongolia, Kansu, and Tsinghai during 1959. 81/

The weak link in the program to provide increased supplies of chemical raw materials proved to be transportation bottlenecks. It was reported that because of the lack of transport facilities only about 70 percent of the output of pyrite, phosphorus, and borax ores was shipped. 82/

4. Plans for 1960

Communist China plans further substantial development of its chemical industry in 1960. Peking has stated that the industry will continue the "big leap forward" and that the value of gross production is scheduled to rise by 44 to 65 percent above production in 1959. 83/ Efforts will be concentrated on production of chemical fertilizers, acids, alkalies, and synthetic rubber. 84/ The production goals for chemical fertilizers and sulfuric acid are 2.8 million tons and 1.5 million tons, respectively. 85/ The goal for chemical fertilizers presumably includes only the output of plants using modern methods of production but may also include all or a portion of production of ammonium nitrate.

The construction of 17 large plants for the manufacture of chemical fertilizers is to be continued during 1960, and many small and medium-sized plants reportedly will be built throughout the country. 86/ Priority has been assigned to the construction of small plants for production of synthetic ammonia and sulfuric acid.

5. Outlook

During 1960, Chinese Communist production of some major products such as acids, alkalies, and rubber tires will be well above the original goals for 1962. Production of chemical fertilizers, however, probably will not reach the 1962 goal of 3 million to 3.2 million tons. Production of organic chemicals, plastics, and chemical fibers is not likely to advance at the same pace as production of basic industrial chemicals and will continue to fall behind the rapidly growing needs of the economy.

As in 1959, most Chinese Communist production of chemicals in 1960 will come from large existing plants, many of them built with aid from other countries of the Sino-Soviet Bloc. Considerable new construction may be started during 1960, but claims by the regime that large quantities of synthetic ammonia and nitrogen fertilizer will be produced by many small plants using modern methods of production probably will not be realized.

There has been no evidence to date that the Chinese Communist machine-building industry has significantly increased its ability to produce a large volume of equipment and machinery for the chemical industry, particularly of the types that will withstand high pressures and temperatures, such as are required for production of synthetic ammonia. Because continuance of extensive technical aid from the Sino-Soviet Bloc is uncertain, Communist China may seek aid from non-Bloc countries, possibly Western Europe, in the form of equipment and complete plants. Equipment for the manufacture of nitrogen fertilizers is especially needed.

In spite of advances in production, the Chinese Communist chemical industry will still be incapable of meeting domestic needs of agriculture and industry. Communist China must continue to rely heavily on foreign sources for many chemical products, including fertilizer and natural rubber, but imports of some commodities, such as acids, alkalies, tires, and insecticides, will be negligible.

J. North Korea

1. Plan Fulfillment, 1959

North Korea claimed in July 1959 that the Five Year Plan (1957-61) for industry had been fulfilled some 2.5 years ahead of schedule in terms of the value of total production. A number of production goals of the chemical industry remained unfulfilled at the end of 1959, however, indicating that the chemical industry had not reached its goal for 1961. One ambitious aim of the chemical industry was achieved in

1959, when, for the first time under the Communist regime, production of chemicals exceeded the peak reached in 1944 under the Japanese. Production of selected chemical products in North Korea in 1959 is shown in Table 8.*

Production of chemical fertilizer in 1959 was officially reported as 391,000 tons, a marked drop from the reported production of 457,000 tons in 1958. 87/ The reported production for 1959 is difficult to accept, considering reports of increased output at individual plants. A possible explanation is that North Korea has adopted the Chinese Communist procedure of excluding production of ammonium nitrate from statistics on production of chemical fertilizer. The total production of chemical fertilizer, including ammonium nitrate, appears to have been about 500,000 tons in 1959.

Although total production of chemical fertilizer probably increased in 1959, production of superphosphate lagged behind plan. Steps were taken to expand production of superphosphate, however, and it was reported that there were added at the Hungnam Fertilizer Factory and the Nam-p'o Smeltery new facilities that would provide a combined production capacity of 175,000 tons a year. The superphosphate shop of the Hungnam Fertilizer Factory, with a capacity of 150,000 tons, began trial operations in 1959 and eventually will have a capacity of 300,000 tons. The superphosphate shop of the Nam-p'o Smeltery, with a capacity of 25,000 tons, also began operations in 1959 and reportedly will have a capacity of 200,000 tons by 1962.

Another major development in the chemical industry was the start toward making the country self-sufficient in production of plastics and chemical fibers. Construction began at the Pon'gung Chemical Plant on a vinyl chloride plant with an annual capacity of 6,000 tons and a vinalon fiber plant with a capacity of 10,000 tons.

2. Plans

The chemical industry reportedly is to receive a large share of the investment in capital construction in North Korean industry in 1960, and priority will be given to expanding the chemical fiber and plastics industries. 88/ The Pon'gung vinyl chloride plant is scheduled to be completed by the end of 1960 and the vinalon plant by the end of 1962. The regime is emphasizing production of synthetic fiber from carbide and hopes to become self-sufficient in fibers by the end of the First Five Year Plan. Plans call for expansion of the chemical fiber industry to continue during the Second Five Year Plan (1962-66).

* Table 8 follows on p. 45.

P'yong-yang has indicated, however, that the main long-run task of the chemical industry is to increase production of chemical fertilizer and, toward this end, plans in 1961 to build a fertilizer plant with a capacity of 400,000 tons. 89/ The regime has a production goal of 1.5 million to 2 million tons of chemical fertilizer by 1964, but, without substantial external aid and technical assistance, this goal is not likely to be reached.

Table 8

Estimated Production of Selected Chemical Products in North Korea
1959

Product	Production	
	Thousand Metric Tons	Percentage Increase Above 1958
Calcium carbide	135 a/	-10
Caustic soda	24 a/	71
Sulfuric acid	255	6
Chemical fertilizer	500	9
Chlorine	21	69

a/ Reported.

K. North Vietnam

North Vietnam has virtually no chemical industry and, consequently, has been dependent on imports, chiefly from the Sino-Soviet Bloc, to satisfy the limited requirements for chemicals. The Three Year Plan (1958-60), however, has called for establishing the base of an industry designed eventually to make North Vietnam self-sufficient in chemicals. The construction of a superphosphate fertilizer plant with a capacity of 100,000 tons began at Phu Tho in June 1959. This plant, which is scheduled to begin operating in 1960, is being built with Soviet aid and reportedly will have an ultimate annual capacity of 200,000 tons when the second stage of construction is completed. 90/ Plans also call for the building of two ammonium nitrate plants, with a combined capacity of about 30,000 tons. 91/ Other construction plans include the building in 1960 of installations near Phu Tho for production of sulfuric acid, caustic soda, chlorine, and insecticides. The

construction, presumably with Chinese Communist aid, of a tire plant at Hanoi will begin early in 1960. 92/ This plant reportedly will make North Vietnam self-sufficient in production of both automobile and bicycle tires. The North Vietnamese also plan construction, with assistance from East Germany, of an artificial fiber plant with an annual capacity of 5,000 tons.

APPENDIX A

PLANNED COOPERATION IN THE CHEMICAL INDUSTRIES OF THE SINO-SOVIET BLOC IN FIELDS OF INVESTMENT, SUPPLY OF EQUIPMENT, AND TECHNICAL ASSISTANCE*

Recipient of Aid	Supplier of Aid	Type of Aid	Comment
USSR	East Germany	Technical data	In 1958 and 1959 the USSR obtained technical data from East Germany on a number of chemical products, including synthetic rubber, polyvinyl chloride, caprolactam, acetylene, phthalic anhydride, and chemical fibers.
	East Germany	Chemical equipment	East Germany is scheduled to deliver equipment valued at 700 million rubles (US $175 million)** in the 6-year period 1960-65. The plan for 1959 called for delivery by East Germany of equipment valued at 65.5 million rubles (US $16.4 million) for the Soviet chemical and rubber industries.

* Appendix A embraces plans announced in 1959 for mutual aid in significant areas of the chemical industries of the Sino-Soviet Bloc. These plans, to be implemented largely in 1960-65, do not, however, represent all aid to be extended in this period. Sources for this appendix will be available on request.

** All ruble values in this appendix are converted to US dollars at the official rate of exchange of 4 rubles to US $1, a ratio which may not reflect the dollar value.

Recipient of Aid	Supplier of Aid	Type of Aid	Comment
USSR (Continued)	Hungary	Chemical equipment	Hungary reportedly is scheduled to deliver equipment for a number of Soviet plants, including units for production of penicillin, streptomycin, calcium carbide, and phosphorus.
East Germany	USSR	Technical data	Technical data obtained in 1958 and 1959 for a number of products, including chloroprene rubber, synthetic phenol, and terephthalic acid. The USSR also is supplying technical data for an oil refining plant at Schwedt.
	Czechoslovakia	Equipment for the potash industry	The reported value of the equipment is 110 million rubles (US $27.5 million).
	Rumania	Technical assistance in the use of natural gas	Possibly related to the use of natural gas as a raw material in the chemical industry
Poland	USSR	Technical assistance	To include plans for a petrochemical plant to be erected at Plock

Recipient of Aid	Supplier of Aid	Type of Aid	Comment
Poland (Continued)	Czechoslovakia	Credit and equipment for development of sulfur deposits and equipment for a refinery	Poland, in return, is to supply Czechoslovakia with plants to produce sulfuric acid and synthetic phenol and with shipments of sulfur and coal.
	Czechoslovakia	Equipment for the rubber industry	
Czechoslovakia	Poland	Three sulfuric acid plants and a synthetic phenol plant	In return, Poland is to receive credit and equipment for development of sulfur deposits and equipment for a refinery.
Rumania	USSR	Equipment for petrochemical combine	This combine is located at Borzesti. East Germany and Czechoslovakia also have supplied equipment for this combine.
	USSR	Equipment for nitrogen fertilizer combine	This combine is located at Roznov.
	East Germany	Technical aid for production of synthetic fibers	
	East Germany	Technical aid and probably equipment for plants to produce ammonia and urea	Negotiations apparently took place in 1959; the final status is unknown.
	Czechoslovakia	Equipment for production of ammonia	

Recipient of Aid	Supplier of Aid	Type of Aid	Comment
Hungary	USSR	Extension of credit for development of chemical and petroleum industries	Credit of 140 million rubles (US $35 million)* for use starting in 1960
	USSR	Equipment for nitrogen fertilizer plant	
Bulgaria	Hungary	Pharmaceutical plant	
Communist China	Poland	Equipment for three nitrogen plants	Planned value of aid is to be 8 million rubles (US $2 million).
	Czechoslovakia	Equipment for four nitrogen plants	Delivery is to take place between 1960 and 1963.
	Czechoslovakia	Five oxygen plants	Deliveries are to take place between 1960 and 1963.
North Korea	Bulgaria	Technical data for production of urea	
North Vietnam	USSR	Technical data and equipment for a superphosphate plant	Construction began in 1959, with initial operation scheduled in 1960.
	East Germany	Synthetic fiber plant	This plant apparently is scheduled to use rice husks as a raw material.

* This extension of credit is in addition to the credit of US $75 million granted Hungary by the USSR in 1957. The earlier loan was scheduled to extend to 1960.

APPENDIX B

PRODUCTION OF CHEMICAL FERTILIZERS IN THE SINO-SOVIET BLOC
ACTUAL IN 1958 AND 1959 AND PLANNED IN 1960 AND 1965

Thousand Metric Tons

	Production				Planned Production			
	1958		1959		1960		1965	
Country	Gross Weight a/	Pure Nutrient b/	Gross Weight a/	Pure Nutrient b/	Gross Weight a/	Pure Nutrient b/	Gross Weight a/	Pure Nutrient b/
USSR	12,400	2,940 c/	12,900	3,050 c/	13,500	3,190 c/	35,000	8,220 c/
East Germany	N.A.	1,984	N.A.	2,034	N.A.	N.A.	N.A.	2,798
Poland	1,795	382	N.A.	430	N.A.	487	N.A.	840
Czechoslovakia	N.A.	225	N.A.	268	N.A.	292	N.A.	578
Rumania	152 c/	29	314 c/	52	426 c/	71	2,130	500
Hungary	355	70 c/	476	92 c/	529 c/	102 c/	1,370	265 c/
Bulgaria	207	55 c/	338	84 c/	523	123 c/	1,600	416 c/
Albania	0	0	0	0	0	0	N.A.	N.A.
Communist China	1,354	266 c/	2,000 c/	410 c/	2,800	N.A.	N.A.	N.A.
North Korea	457	94 c/	500 c/	102 c/	N.A.	N.A.	N.A.	N.A.
North Vietnam	0 d/	0 d/	0 d/	0 d/	N.A.	N.A.	N.A.	N.A.

a. Reporting of production of chemical fertilizers in terms of so-called "gross weight" varies from country to country. For example, production of nitrogen fertilizers in the USSR, Communist China, and Hungary is reported in terms of ammonium sulfate -- that is, about 20 to 20.5 percent nitrogen, whereas in Rumania and Bulgaria it is reported in terms of about 26 and 32 percent nitrogen, respectively. Similarly, production of phosphorus fertilizers in the various countries is reported in terms of 16.7 to 19 percent P_2O_5 and production of potassium fertilizers in terms of about 40 to 41.6 percent K_2O.
b. In terms of nitrogen, phosphoric anhydride, and potassium oxide.
c. Estimated.
d. Production is limited to a small amount of phosphate rock, which, strictly speaking, is not a chemical fertilizer.

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