NATURAL RESOURCES OF THE SOVIET BLOC

8 December 1955

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NATURAL RESOURCES OF THE SOVIET BLOC

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COLONEL O'NEIL: This morning we are going to consider the "Natural Resources of the Soviet bloc." You know the difficulty of obtaining meaningful data on the Soviet bloc and realize it takes a high degree of enterprise on one's part to publish figures on resources behind the Iron Curtain.

Our speaker has done just that in his book, "Minerals, A Key to Soviet Power." His handiwork is often evident in publications of import. In the early part of this year he contributed to the study for the Joint Congressional Committee on the Economic Report. It was published as "Trends in Economic Growth." Actually, it is an economic comparison of Western Powers and the Soviet bloc.

It is not usual to have as our speaker a man who is so genuinely interested in our College. For example, last year he most successfully completed our Correspondence Study Course. Each year he returns to give his Oral Presentation.

I take great pleasure in welcoming back to the College and presenting to you Dr. Demitri B. Shimkin.

DR. SHIMKIN: Thank you very much. Gentlemen, the subject of my talk this morning is the material resources of the USSR. The problems of other nations of the Communist bloc, although I will mention them in brief, are somewhat too specialized for inclusion in detail within a single hour.

The technological, economic and military developments of the past 20 years have made necessary a basic reevaluation of the concepts of material resources and self-sufficiency. Increasingly, it becomes essential to examine these matters in the contexts of relative cost or advantage rather than of absolute availability.

In agriculture, old concepts of productive potential have been shattered since the war, especially in Western Europe. In mining, concentrations once thought to be trivial, such as magnesium content of sea water and the uranium of phosphate rock, have achieved practical importance. In fisheries, experimentation with sea-bottom

fertilization has manifested great promise for insuring stable and high catches. The phenomenal growth of the petrochemical industry illustrates another change, the discovery of virtually endless new uses for familiar materials. Still another advance, the regeneration of piezoelectric quartz through X-radiation typifies the potentials now opening in economizing and improving nature's products.

All of these developments have in common the elements of technical skill and of investment. Thus, any modern assessment of material resources must be integrally combined with evaluations of the scientific progress, labor force, capital plant, and military-economic policies of the nation in question. For the leading Western countries and the Soviet Union, all of which are characterized by the availability of needed skills, equipment and economic management, the problems of material resources have become primarily ones of optimum use, cost and availability, rather than of absolute presence or absence.

A basic contrast between the United States and the Soviet Union today is the far lower unit cost--measured in the shares of labor and capital allotted--of American raw materials. In the United States, 8.6 million persons, or 15 percent of the labor force, were engaged in agriculture, forestry and lumbering, fisheries, mining and refining in 1950. The corresponding figures for the Soviet Union in 1953 are estimated at 55-60 million persons, or 50-55 percent of the labor force, to produce about 40 percent as much as the United States. In the United States, 1953 farm, mining, and refining capital expenditures comprised 8.2 billion dollars, or 16 percent of our gross investment and less than three percent of our gross national product. The Soviets, in contrast, devoted over half of all their investments and at least 13 percent of their gross national product that same year to agriculture and the fuel and metal industries alone.

The factors underlying these differences in raw material costs and the military-economic implications of these costs form the subject of my discussion of the material resources of the USSR this morning. Let me first consider agriculture. I will discuss briefly the problems of land potential, organization, practices, farm and nonfarm price structure, production and demand.

The arable land of the Soviet Union aggregates about a million square miles, a total exceeded only by the United States and perhaps China. Over 80 percent of this land rests within a rough triangle. This triangle, with which many of you are familiar, runs from Leningrad

almost due east to Irtrutsk, then back to Barnaul, about to Stalingrad, and down southwest to the Black Sea.

This triangle may be divided into three regions: The European steppe, the Siberian steppe, and the European mixed forest. The first of these, the European steppe, or the Black Earth region of the Volga and north Caucasus, is Russia's breadbasket to this day. It is the country's major producer of grain, sugar beets, hemp, and sunflower seed. It pastures at least a third of the livestock. Yet even this cannot be considered prime agricultural land because it is both cold and dry. The southern Ukraine, Russia's best land, is ecologically comparable to the Dakotas and the Canadian prairie, but not to Iowa. Furthermore, in this land the probability of catastrophic drought is approximately one in every five years.

The Siberian steppe has an even harsher climate. This Siberian steppe is the area between the Urals and the Altai ranges, and between the boreal marshlands and the desert. In most parts of the Siberian steppe precipitation does not exceed 15 inches, while frost is a year-round danger. It is marginal land except for livestock, a land in which the extent of agriculture has fluctuated markedly over the past 50 years. The "new lands program," which is highly publicized today, had two previous inaugurations, before the Revolution and in the early thirties, and each time the cultivated acreage receded because of dust-bowl conditions or because of untimely summer frosts that destroyed a large part of the crop. Yet this inadequate food supplier is the main agricultural base for the entire Asiatic part of the Soviet Union.

Central and western Russia--westward of Leningrad and Moscow in the mixed forest area--are the only major areas of the Soviet Union with precipitation in excess of 25 inches. The land is badly drained and characterized by acid podzol and bog soils. Today it produces meager crops of potatoes, rye, other grains, and flax. It is also a significant livestock area. Here are the great agricultural potentials of the USSR, lands, which with proper drainage, sweetening, and fertilization, can produce a definitive answer to the Soviet food problem. These are lands no worse than those of Western Europe a century ago, but their development is still in the future.

In the Crimea, the Caucasus, and Central Asia are the only Soviet territories warm enough to grow cotton, silk, tea, citrus fruits, tobacco, and allied crops. Irrigation is essential here, but because of the high evaporation during the summer, irrigation tends

to become unstable through excessive concentrations of salt in the soil. The maintenance of large-scale irrigation involves both skill and a continuous investment which the Soviets have begrudged. As a result, according to Soviet official figures, the irrigated territory of the Soviet Union in 1954 was only 10 percent greater than in 1938, hyperambitious plans notwithstanding. In addition to cultivation of the irrigated lands, Central Asia and the Caucasus produce hardy grain by dry farming on the upland slopes and livestock, especially sheep and goats, in all of the area.

Finally, the Transbaikal and the Far East have limited areas suitable for agriculture. The most significant is the Maritime Province, where a monsoon climate permits growing rice, soy, and other high producing crops. Otherwise, the region is most important for livestock.

In summary, Soviet land resources, though extensive, are poor in quality, either intrinsically uncertain in yield or in need of large-scale development and fertilization for high production.

What about the organization of Soviet agriculture? As many of you know, the characteristic forms of agriculture in the Soviet Union are the collective farm, with the affiliated machine tractor station, and the State farm. The collective farm is in theory a cooperative organization which, as a rental from the state, is required to deliver a large part of its produce, either on the basis of requisitions at nominal prices or on the basis of purchases at prices far lower than the free market. The State purchases of collective farm products have increased enormously in the last 15 years, and in general the level of procurement in say, meat, milk, eggs, and wool--the high value crops--has increased from about 40 percent of total production in 1940 to over 80 percent today. As a result of this fact, although the state gives somewhat higher prices now than formerly, the virtual abolition of the free market has very badly affected collective farm income.

But there are other problems. The collective farmers are under constant pressure to perform various types of compulsory service. They are required to plant trees; they are required to do a great deal of construction, all out of their own resources; and on occasion they are required to "volunteer" in hundreds of thousands for the construction of earthworks, railroads, or any other mass type of labor.

In addition to this fact, the Soviets have, ever since the thirties, been systematically draining the collective farmers of their best labor through organized recruiting and through the State Labor Reserves which conscript youngsters of 14 to 17 years of age. On top of this fact, there are many bootleg ways of siphoning labor off the collective farms into industry, transport and other nonagricultural pursuits.

The conditions on the collective farms are bad. As a result, the professional manpower of the Soviet Union has avoided them like the plague. Out of about 5 1/2 million persons in the professional and semiprofessional labor force (i.e., those persons with secondary and higher education) in the Soviet Union, there were, at the end of 1953, only 350,000 in all agriculture, including administrative desk workers. Out of 94,000 collective farm chairmen only 16,600 had even a secondary education. Obviously, the quality of the labor force, and particularly the large proportion of women and adolescents 12 to 15 years of age, adversely affects productivity.

Another adverse factor is the wage scale, which gives much higher wages on the collective farm for desk work and the handling or maintenance of machinery than for the care of crops or livestock. The bookkeeper's earnings are second only to those of the collective farm chairman, and the returns from driving a tractor are four times as high as for weeding. All of these differences are aggravated by outside control: the Machine Tractor Stations dominate completely the farms they supposedly serve, while the key positions on the farms themselves are filled by party appointees, in open contempt of the self-governing, cooperative status which the collective farms theoretically hold.

In addition, agricultural practices are rigidly imposed by party and government decree. For example, the collective farms are not permitted to have any field tractors or large agricultural machinery. Today, almost all crops are supposed to be planted in clusters of four, although the rationale of this practice has never been announced. Corn is now the answer to all problems of fodder, and is to replace established crops, such as barley, oats, and millet, even where it cannot ripen to maturity.

Also, the cumulative effects of Soviet economic and political policies have led to the simultaneous development of two polar types of agriculture. On the one hand, the peasants (and, for that matter,

urban workers when they can) have maintained the hand cultivation of tiny, private plots. Intensively worked, these plots continue to provide a significant proportion of Russia's food, and to compete most effectively, in economic return to the present, with regular employment in agriculture. That this should be the case, that the State should be obliged to launch repeated campaigns against such pygmy entrepreneurs, is eloquent testimony to the inefficiency of State agriculture.

That is characterized by hyperextensive land use, which is most inappropriate to the power available. Today the Soviet Union is attempting to cultivate 40 percent more acreage than in the United States, with 15 percent as many tractors and with a shortage of horses (a total of 15 million, compared to 4 million in the U. S., but only half as many as in the USSR in 1928). Furthermore, hyperextensive farming permits adequacy neither in fertilizing nor in weeding; with low yields, seed expenditure is high. Thus, hyperextensive farming is very expensive.

Transportation and marketing (apart from government procurements) are other difficult problems.

Another important factor in Soviet agriculture has been the impact of an artificial price structure which, by the exercise of direct controls on labor and the flow of goods, has been able to maintain and even heighten the relative costliness of manufactures, especially machinery and petroleum products. One very important effect of this structure has been the high cost of investment. If we price Soviet agricultural investment in terms of the average pricing of the Soviet economy, we find that they have been putting into agriculture about the same in absolute sums, dollar equivalent, as we have, but the physical inputs which these sums represent are quite different.

For example, in the period between 1940 and 1955, the Soviet use of tractors increased from 220,000 to 700,000 in physical units (about twice as much in so-called 15-horsepower units.) This calculated increase of half a million may not allow for scrapping or losses. In the United States over the same period, 1940-1955, the number of tractors on American farms rose from 1 1/2 million to 4,700,000. In other words, over the same period our increment in tractors was six times as great as the Soviet. Similarly, Soviet fertilizer input increased from 3.2 million metric tons in 1940 to 8.2 million in 1955.

In the United States over the same period, the rise was from 7.4 to 18.2 million metric tons. In other words, over this same period, our absolute increment in fertilizer was more than twice as great as the Soviet.

It must also be mentioned that a measurable proportion of Soviet agricultural equipment has been either obsolete--like the Universal tractor of model 1925 which is still in production--or inappropriate. As our agricultural people were amazed to find out, Soviet agricultural equipment is generally designed to perform only one operation. As a result, there has to be a phenomenal transfer of grain from harvesting to sacking or from one process to another, a feature which, of course, results in great losses of time, effort, and grain.

Now, with these facts, with the condition of the land, with the policies in regard to organization, with the practices, and the price structure, what has been the production and demand picture? By any measurement, Soviet agricultural production has remained grossly inadequate. Soviet gross agricultural output is certainly less than half of ours and maybe as little as 40 percent, if oil-bearing crops, fruits and vegetables are fully accounted. Furthermore, Soviet agricultural output is primarily concentrated on food grains and potatoes, which contributed 36 percent of the total (at 1926-27 prices) in 1937, and have about the same importance today. Livestock products accounted for 27 percent.

In the United States, on the contrary, all food grains and potatoes put together contributed only 8.5 percent of the farmers' income in 1950-54, while nearly 60 percent came from livestock. By any comparison Soviet agriculture is not only meager but structurally pretty primitive.

Let us compare Soviet agriculture historically. Today's output in relation to 1928 is characterized by very modest increases in grain output, by substantial increases in sugar and cotton, and by very marked decreases in meat and milk production. Certainly Soviet gross agricultural output today is not over 15 or 20 percent greater, by the most generous accounting, than it was at the very beginning of Soviet industrialization when the population of the Soviet Union was 150 million and not 215 to 220 million. On a net basis, if the high costs of the new manufactured inputs are taken into account, no increase can be credited.

Finally, what about demand? Well, the Soviets themselves are quite explicit that the country simply does not produce enough to provide a nutritionally adequate diet. Khrushchev has spelled this out and every calculation we make confirms this. It is true that tourists who visit the Soviet Union do not find people starving on the streets, but this is scarcely scientific evidence of average nutritional status.

Let us now turn to an area where the Soviets have manifested considerably more progress, the field of mineral production. What do we have here? Well, first of all, in total amount and in diversity Soviet mineral resources are very comparable to those of the United States. In coal, in petroleum, in iron ore, there is no doubt of sufficiency. For other minerals, there is a variation in availability. For example, the Soviet Union has tremendous reserves of both chromium and manganese, but is deficient in molybdenum in which the United States is particularly strong. The Soviet Union has moderate resources of nickel, which we lack, while its titanium position (in terms of good ores) is fairly weak. In general, while there are longer term problems, particularly in the nonferrous metals and some absolute deficiencies such as cobalt and diamonds, the overall Soviet mineral resource position is strong. In uranium, which I want to mention specifically, the Soviet position is quite directly comparable to our own. They have low-grade but abundant ores closely similar to the carnotites of the United States. The problems of adequate production are primarily those of technology and investment.

In the geological distribution of its mineral resources, however, the Soviet Union is not nearly as fortunate as this country. The fact is that over 90 percent of Soviet iron ore resources lie to the west of 60 degrees east. The great reserves are in the Krivoy Rog area, still the largest producer in the Soviet Union, in the Crimea, where the reserves are large but low grade and not very much worked, in central Russia where a number of new deposits have come into operation, and in the Urals. The Urals are, contrary to many people's impressions, not terribly rich in iron ore so far as quantity is concerned, although a number of excellent small or relatively small deposits are found. To the east, the Soviets have very few prospected deposits. The most important is near Rudnogorsk on the Angara (the site of an immense hydroelectric project); the primary eastern steel producer, the Kuznetsk Basin of western Siberia, is in an area very deficient in iron ore that must import its iron ore primarily from the Urals. In Kazakhstan, there is great promise of iron ore discoveries, but they

haven't hit the jackpot yet. Central Asia and, to a large extent, the Trans-Caucasus, are deficient in workable grades of enough size.

The contrast with coal is very important because 90 percent of the coal reserves are found to the east of 60 degrees east. Thus, the Soviet Union must make enormous hauls of both iron ore and coal across the country, and these hauls have been increasing in length and increasing in volume rather than decreasing. In 1953, for example, the Soviets were shipping coal in large quantities (10 million tons) from Karaganda coal basin and western Siberia as far as Moscow and in some cases further, a situation under which they consume about as much coal hauling as they bring. Polish coal has provided increasing aid to Soviet industry in European Russia, but this has been partially offset by the decline of the Vorkuta coal field since the amnesty of forced labor in 1953. Also, the Donets Basin is continually declining. It has narrow seams, which are steep and very deep with very large problems of water infiltration. Above all, it does not have much coking coal of good quality.

The Soviets have undertaken, throughout the whole period of industrialization, a tremendous effort to increase mineral output. This effort has been implemented by the lavish use of labor and capital resources. For example, the Soviet labor force in mining and refining today we estimate at not less than 3 1/2 million persons, more than double the American labor force in the comparable category. Similarly, the mining industries and primary refining take at least one-third of all the gross investment in the Soviet economy today. This has maximized output, as we will see in a moment, but it has also resulted in considerable waste.

Excepting for the petroleum industry, where very important new fields have been developed on the Volga and, apparently, in Western Siberia, Soviet mining has continued to depend upon old deposits. This has resulted, for example, in a significant rise (2 percent) in the average ash content of coal output, and the need for drastic increases in the proportion cleaned. It is necessitating a transition from open-pit to much more costly shaft mining in the Urals iron mines.

The problems of rapid depletion have been aggravated by policies of over-capacity production and of "high-grading," i. e., skimming, deposits of their richest ores. For example, the Krivoy Rog mines were, in the summer of 1955, discarding ore with contents of less than 47 percent iron content.

Soviet mining technology has improved greatly since World War II. In the last two years, practices have improved. Improved ventilation and other safety features are now being stressed; the problems of underground fires are no longer prominent. The scale of catalytic cracking has been increased; considerable experimentation with radioactive tracers to ascertain petroleum-bearing structures is now under way. Yet many deficiencies are apparent. For instance, the Soviets are achieving, in their Kazakh copper mines, only 60 percent recovery from siliceous ores (chrysocolla, brochantite) which we mastered long ago. More important has been a reluctance to plan for long-term economy and efficiency, as opposed to quick production at low initial cost. Thus, long-wall rather than chamber-and-pillar coal mining is still the customary layout, and block-caving is far from universal. The results in lowered productivity, especially as the mine is being worked out, are magnified by many imbalances in mechanization. New coal-cutters, to take one instance, are inadequately supported by mechanical timbering or large-capacity transport. In consequence, the gains in productivity have been slow. According to official Soviet data, output per coal miner in 1954 was only 19 percent higher than in 1940, the comparable figure for the United States being 68 percent.

But, with all that, the Soviets have had an enormous growth of mineral production. Since 1926, their mineral output has increased by more than ten times. Since 1950 their increases have been almost phenomenal. Coal and lignite production has risen from 220 million metric tons in 1950 to an annual rate of 375 million this year; petroleum, from 37 1/2 million to 65 1/2; pig iron, from 19 to 32; aluminum, from about 180,000 metric tons to possibly 450 (this is one area where we have done better); copper, from 290 to 420; cement, from 10.6 to 22 million tons. In general, Soviet mineral output today runs between 35 and 40 percent of the level of the United States.

What about demand? Here I want to bring out a very few points in addition to those I have discussed at great length in my volume. First, the Korean war and the period as late as 1953 manifested extremely great pressure on the Soviet mineral position, particularly for alloying metals, which were put under the most severe limitation orders, even for machine tools, for metal plate, and for fuels. There were large cutbacks in motor vehicle, tractor, and railroad rolling-stock production.

One of the permanent effects of the Korean strain was the severe setback in the Soviet construction program, or, to be more exact, in the completion of plants. In the period from 1950 to 1954, the Soviets put into operation only 2,000 new industrial establishments compared to 6,000 between 1946 and 1950. We have direct evidence that their installation of industrial equipment and machinery, 1950-55, approximated only 50 percent of the planned level. The Korean war hurt them badly.

At present, the situation in metals is much easier, and the main problems are those of fuels. These derive from a series of complicated factors, including the very serious decline in the availability and the feasibility of the use of firewood as a primary domestic fuel. Also, the Soviets are now seriously concerned with the question of industrial pollution of the air because of the extensive use of high-ash solid fuels and high-sulphur residual fuel oils in their electric power plants.

In general, the total supply of minerals in the Soviet Union is incomparably stronger today than in World War II. There are still very serious bottlenecks in the capacity, and especially in the technology, of their refining. The transport problem, both in the movement of ores and in the movement of refined products, is bad and continues to be worsening rather than improving. And, finally, there are a limited number of absolute deficiencies.

Let me now turn to the conclusions:

1. The resources base of the USSR in agriculture, forestry, water, and minerals is essentially comparable to that of the United States. The primary differences lie in the stage of development, utilization, and technique rather than in natural endowment.

2. The past history of Soviet agriculture has been dominated by unrealistic planning, coercion, and conflict. As a result, despite substantial and continued investment effort, Soviet agriculture production has stagnated and productivity has risen not more than a third in 30 years. Incidentally, United States agricultural productivity rose 80 percent between 1940 and 1954. Forestry and the lumber industry, in which the role of forced labor has been unusually great, have had similar records.

3. In contrast, Soviet mining and refining have expanded at an extraordinary rate, a twelvefold increase in the past 30 years. The preferential allocation of capital and wage incentives, supported by the lavish use of labor, free and forced, have made this development possible. At the same time, extreme pressure on production has tended to freeze output patterns in obsolete molds, particularly in excessive dependence on solid, low-calorie fuels, and to perpetuate wasteful technological practices.

4. The development of water resources in the USSR was begun on a large scale only after World War II. At present intensive construction on an integrated Volga project, on the Angara in Eastern Siberia, on the Irtysh and other rivers is under way. Power development has been the major purpose, with transportation also significant. At the same time, flood control, especially up river, is neglected and cultivated bottom lands are extensively flooded. Long freezes and wide fluctuations in flow limit the ability of much of the water potential of the USSR.

5. A number of trends have become characteristic of all Soviet resources management: The neglect of conservation with widespread consequences in erosion, pollution or other losses; the concentration of effort on a few objectives at a time, with lavish allotments to those sectors only; the absence of market mechanisms, and, consequently, of true measures of costs; the inadequate control of personnel, despite coercion and forced labor, and hence the inability to hold skilled and professional workers in sectors such as agriculture and mine development; and, finally, obsolete technology, with equipment and practices poorly adapted to requirements.

6. The high cost of resources development in the USSR, the result of a complex series of factors which we have examined, has sapped the growth of other economic sectors. It has been, along with the heavy weight of armaments, a primary cause for the low standard of living of the Soviet population.

7. The availability of raw materials in the USSR is adequate, especially in conjunction with stockpiles, to support a massive military effort. Nevertheless, the effort needed to maintain the continued flow of raw materials would markedly reduce the mobilization potential of the USSR in the event of a prolonged, large-scale war. Even the Korean war had marked effects upon Soviet resources availability, forcing serious retardation in the expansion of producers' goods and in the rate of investment.

8. For the future, no diminution of the cost of Soviet development is foreseeable today. In agriculture, continued population growth, urbanization, and the attempt to maintain powerful stockpiles make continued expansion essential. The easiest phase of this expansion has been completed--this is according to an analysis of the Soviets themselves--and further gains will not be cheap. In mining, economies can be realized by better utilization of metal and fuel so that a reduced rate of growth should prove satisfactory to cover domestic demands. At the same time, little new mining development has taken place, except in petroleum, in nearly 20 years. The effects of this neglect, combined with wasteful exploitation, will become increasingly oppressive.

For the Soviet economy and for Soviet foreign policy these prospects have broad implications. Policies of stress on services and international trade could minimize costs, while policies centered on heavy industry and self-sufficiency would maintain significant drags on the rate of total economic growth, albeit with the maintenance of high military-economic potential.

Thank you, gentlemen.

QUESTION: In your conclusions you mentioned stockpiling in Russia with reference to minerals. Would you mind elaborating with specific reference to whether stockpile is above or underground and in what sectors is it?

DR. SHIMKIN: This is something many people have tried to work on; they have had little success in some areas. No one has a map of the distribution ready for you.

More seriously, the evidence on stockpiling is the result of both direct statements and the net of continued gaps between calculations of demand and production in numerous series, particularly grain and alloying metals. Then we have a good deal of data on what they did on the eve of World War II. In essence, through purchases they build up stockpiles of about a year and a half consumption-level for such metals as molybdenum and nickel.

The Battle Act has had serious effects on the capacity to stockpile, and this is one of the reasons undoubtedly that they took such drastic action in reducing consumption during the Korean operations. For example, they prohibited the use of cobalt, except through special

permission, even in such uses as high-speed tool steels. The same thing happened with tungsten though one would expect tungsten to be relatively abundant, but the Chinese Communists seem to be having trouble renewing production. It is a tough problem.

QUESTION: You indicated that the Korean war had a great impact on Soviet industry. Was that due to materials and arms furnished the Chinese Reds and North Koreans?

DR. SHIMKIN: First of all, I think the Soviets made a direct diversion for their own war reserves. I would say that they probably produced much more ammunition for their own account than they did for the Korean and Chinese.

Another very important factor was the effect on their transportation system. We have direct references to the fact that, particularly in the first year, 1950-1951, the Trans-Siberian was so choked with military traffic that the Soviets had to divert a large part of the Polish Black Sea and Baltic Sea merchant marine fleets to ship grain and petroleum products all the way around to Vladivostock, an area, which normally has a deficiency in manufactures and raw materials. There is just no doubt that the Far East and Eastern Siberia had to stand still economically during the course of these operations. These are two principal ways in which the Korean war had a direct impact.

QUESTION: In the face of the inadequate diets of the Russian populace, what percentage of the total agricultural production is exported?

DR. SHIMKIN: This is a very fluctuating matter and a purely political matter. The Soviets have repeatedly made commitments of exporting a million or a million and a half tons of coarse grains, for example, to Britain, but at the same time their performance on this has not been good. This year they contracted to import 600,000 tons of Canadian grain and so far as we know, there is no export of Soviet grain. Last year's crop, despite the official statement, was very bad, it is quite clear. The satellites, too, are having deficiencies rather than surpluses. Now probably this year, 1955, the Soviet bloc will do fairly well. While the Western Siberian and Kazakh harvests were very poor, the Ukrainian and most of the Balkan crops were good. East Germany was bad. There was a repeated failure in the potato crop--undoubtedly due to introduced Colorado beetles (the Communists will say)--but the Soviets will probably be offering some grain for the market this coming spring. But it is a matter of very irregular export.

QUESTION: Would you care to comment briefly on the source of your information for your presentation?

DR. SHIMKIN: Our basic problem in developing Soviet information is first the assembly of very large amounts of material of quite differing value, most of it suspect in regard to definitions, quantities, and so on; then a rigorous program of clarifying definitions; finally, we verify through various kinds of input-output tests. There is a high probability in our estimates of substantial error for any isolated fact, but we now, I believe, have accumulated enough total facts to get sound general interpretations.

With this difficult kind of material, with statistics and economics, manpower and related subjects, we have a great many technical problems.

For example, you get statements about the Soviet Union increasing six or eight percent, or whatever, per year in gross national product and this is directly compared with United States figures. This can be demonstrated to be a false comparison because of the enormous effects of different price structures, what economists call the index number problem.

There has also been rather invalid talk about Soviet technical potential and the production of scientists and professionals in the Soviet Union. The figures are reasonably good. But the comparisons are invalid, the reason being this, that in the Soviet Union you have very limited sources to supply a large number of specialties. Engineers and professionals of an allied nature must perform not only engineering functions but are the only sources of supply for management, for all of the other areas which we supply with graduates of business schools, with graduates of liberal arts, and other sources. The fact remains quite obvious from Soviet data that there is a perennial shortage of skilled people.

Another fact involved here is that when we talk about our shortages, we don't talk about shortages of engineers for production. We are talking about shortages for research and the drains on the research budget. In the Soviet Union, shortages are acute in terms of maintenance of production, and this is a horse of a very different color.

So the main difficulty today in handling Soviet materials is the carelessness and haste with which people become week-end experts.

The materials are there and much can be done, but, gentlemen, it takes a long time to know what you are about and you cannot become an expert on Soviet statistics without knowing both the Soviet Union and some statistics.

QUESTION: I gather from what you said about the Soviet transportation facilities that they are going to run out of POL shortly after any war would start. I thought the same thing in connection with the German POL situation at the start of the last war, and yet the Germans managed to fight a pretty good war. I was wondering if you could draw any comparison with Germany when war started and the Soviet today.

DR. SHIMKIN: I did not say the Soviet would run out of POL or make specific projections. What I did say was that the evidence was they would have sufficient supplies, both in terms of current production and stockpile, to handle the initial operation, but during the course of operations the manpower and other demands for material production would be so high as to limit the scale and continuity of mobilization. This is a rather different statement and it might have been misleading when heard rapidly.

The point is this: The Soviet Union, contrary to one of the most cherished myths in this country, is darn short of manpower. It has actually, by every calculation I know of, less mobilizing capacity than this country has--with one provision: if this country does its mobilization on a 40-hour week, without considerable stringency in bringing in women, without considerable real effort, of course, this would not hold. But under real mobilization, though with rather more relaxed conditions than the Soviet, we have more people available for military needs than they.

Now in regard to petroleum specifically, the situation today is both easier and more difficult for them than it was in 1940. It is easier for them in the sense that there is a very much greater absolute supply, more than twice as much. Their petroleum cracking is better. They have begun to master it although for certain grades they are very short. For example, they have very short supplies of low-sulphur crudes, usable for high-grade aviation stock, and they have had continual trouble in mastering the refining of high-sulphur, sour crudes. At the same time, their situation is worse because their dependence on mechanization, both for the Armed Forces and for agriculture, as well as for internal transportation, is far higher than it was in World War II.

Now in Germany, one of the major features was that that country retained a horse-drawn agriculture, a horse-drawn army, and a steam-locomotive transportation system. Their needs were centered around direct army utilization, particularly by the combat forces. The trouble with the analysis of Germany was not that the total supply was grossly miscalculated but there was not a careful analysis of demand, especially in terms of the irreducible demand. I think we are aware of these difficulties and have tried to attack them.

Obviously, in case of a war, you have to think of a dynamic situation, what you do to refining, what you do in terms of field distribution as well as what you have in terms of crude. The Soviet distribution system, particularly for field operations on the ground, I would say would be a genuine problem in terms of maintaining and sustaining a rapid movement. So far as I know, there has not been a development in field pipeline operations of the nature that we began in World War II. There are, of course, other questions that cannot be gone into here. Petroleum is serious, but I don't call it the decisive factor at the present time.

QUESTION: Last summer there was an article in the New York Times which mentioned the reduction of the Soviet army. They came up with a figure of 640,000. This gentleman attributed this reduction to the cause of loss of agricultural labor supply. They had to bring these troops home to produce food because they had taken all the labor out of the agricultural system into the urban system for manufacturing and that is why they were not able to keep their production rate. Now they had to get somebody to grow the crops. If that is the case, you sort of intimated that their agricultural production is in pretty bad shape. Under actual wartime conditions, what would be their ability to maintain troops in the field? Would their agriculture be satisfactory to feed the population and to back up the troops? Could they go into the mass armies that they have now or that are computed that they are capable of building up?

DR. SHIMKIN: That question has two parts: One is the problem of evaluating a reference to an alleged Soviet reduction of 640,000--I believe the figure is--troops this summer; secondly, the other problem is the availability of military manpower in time of war.

Well, to answer the first question, I have very grave reservations as to the accuracy of the Soviet statement. Or, to be more exact, there may be a very simple explanation. The Soviet draft cycle begins in

September. The 640,000 men let out at that time could very well represent the people in that class whose term of service was ended the summer before the new draftees were called. It may amount to nothing more than that.

Certainly we are not in a position--I bring up this matter of statistical reliability again--to refine our estimates to a degree where we can sift out a margin of 600,000. If we can come within a couple of million we feel we are doing really well. And, incidentally, gentlemen, on this point, according to the best estimate for the United States made officially, the Census of 1950 underenumerated the population of this country by 1 1/2 percent or 3 million persons. The demographer Ansley Coale estimates that the 1950 population was underenumerated by 5 million. And this is done, I assure you, with the best technical skills we have. Therefore, don't ask us, working with the Soviet material, to get results more precise than we can for this country.

Now to go back to the other part of the question. I cannot go into detail about the mobilization potential of the Soviet Union now. However, I can give you certain broad points.

What were the sources of manpower in World War II and what are the sources of manpower now? In World War II, the Soviet Union mobilized about 37 million men and women to maintain an average armed forces strength of around 13 million. The 37 million men and women were drawn from several sources. One of the most important was the compulsory work force of 14 to 17 year old children, the so-called State Labor Reserves. The second was the lengthening of the work week, first from 41 hours to 48 hours, and then when the war actually was under way, to 66 hours a week. The labor draft was increased to age 60 for men and, I believe, 55 for women. In addition to that, certain other things took place. The construction effort of the Soviet Union was cut back very sharply and most of the labor force in construction was shifted to production. Education was cut back by 1942; they stopped their schools at Grade 4, and there was no further education except in a very few cities. These and similar measures were undertaken.

Our procedure, first of all, has been to develop an estimated age and sex composition of the Soviet Union today. This, of course, has certain degrees of error in it, but we believe that the error is not sufficient to invalidate the conclusions; secondly, from this population

of military and work force age we develop the people who are in the labor force and, what is more, we also calculate the labor input.

Now there are very important differences between the present and the past. At the present time, the work week is not 40 hours but a minimum of 48 hours. At the present time, collective farmers have a much longer compulsory work year. At the present time, children of 14 to 17 continue to be conscripted for labor service. Also at the present time, there is a very large deficiency of males of military age.

From this general picture we construct a model of demand. Actually, you cannot simply say you will up the hours this way and that way, and that you are going to draw on more people to the corresponding extent because when you have more troops you have to have more rather than fewer people in transportation. When you have more women with small children in the labor force, you have to have some people doing baby sitting, and these things must be allowed for.

This is the essential mechanism of computation. I do not believe it is in any way improper to state, as I have, that the conclusions point repeatedly to the margin of strength in this country provided a real program of military mobilization is undertaken.

COLONEL O'NEIL: Dr. Shimkin, your interesting lecture has kept us right up to the time limit. I think we will have to quit. I want to thank you for a very interesting and all-inclusive discussion.

(21 Feb 1956--250)K/en