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THE STRUCTURE AND COMPOSITION OF THE SOVIET INDUSTRIAL LABOR FORCE

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Until fairly recently labor has been considered virtually as a free good in the Soviet Union, i.e., no limitations on quantity, location, or costs. Now, however, the supply of labor is no longer abundant and will be even less so in the 1980's and beyond. Thus, it behooves us to come to a greater understanding of the dynamics and structure of Soviet population and manpower. The need for understanding is even more imperative given the slowing of capital formation which, combined with the reduction in growth of the labor force and the expectation that there will be no major gains in productivity due to technical progress, will undoubtedly lead to a reduction in the rate of economic growth.

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First, we will look at the background data on the growth of the population and certain aspects of vital statistics. Regional differences in population growth rates assume growing importance because of their impact on the location, composition, and quality of Soviet labor, especially the industrial labor force.

The population as a whole can be expected to grow by about 130 million persons between the years 1950 and 2000, from 180 up to 309 million persons. However, especially because of the drop in the crude birth rate, the rate of growth will decrease by the last part of the century to about one-third the 1951-1955 rate, i.e., from 1.7 percent to 0.6 percent per year.[1] In Central Asia, however, the rate of population growth will increase in the same period, and in the case of Kazakhstan, will be much larger than the national rate. In 1951-1955, the rate was 2.8 percent per year in the four core republics of Kirgiziya, Tadzhikistan, Turkmenistan, and Uzbekistan, and 3.1 percent in Kazakhstan; it is projected to be 3.0 and 1.5 percent, respectively, in

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[1]See, Murray Feshbach and Stephen Rapawy, "Soviet Population and Manpower Trends and Policies," in U.S. Congress, Joint Economic Committee, Soviet Economy in a New Perspective, Joint Committee Print, 94th Congress, 2nd Session (Washington, D.C., U.S. Government Printing Office, 1976), p. 115.

1996-2000.[2] In contrast, the largest republic, the R.S.F.S.R., is expected to grow by only 0.1 percent at the end of the century, compared with 1.7 percent per year during 1951-1955. Because of the drop in the aggregate crude birth rate and the demographic catastrophes suffered by the peoples of the U.S.S.R. since the First World War, the population as a whole is aging. The share of the population of males 60 years of age and over and females 55 years of age and over increased from 10.4 percent in 1950 to 15.1 in 1970, and will reach 19.2 percent by the end of the century, almost double the figure for 1950. However, in Central Asia and Kazakhstan the over-aged population will decline from 10.3 percent in 1970 to 9.4 percent in 2000. These patterns will obviously affect the current and projected supply of labor throughout the country.

Due to the demographic catastrophes suffered by the country in the present century--World War I, the Revolution, the civil war, foreign

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[2]Godfrey S. Baldwin, Projections of the Population of the U.S.S.R. and Eight Subdivisions, by Age and Sex: 1973 to 2000, International Population Reports, Series P-91, No. 24 (Washington, D.C., U.S. Department of Commerce, Bureau of Economic Analysis, June 1975), pp. 3 and 6.

intervention, famine, epidemics, collectivization, purges, the labor camps, and World War II--the population of the Soviet Union is perhaps about one-half the size it would otherwise have reached at the present time. (Using an average of 2 percent per year rate of growth compounded for the entire period 1917 to 1974, instead of about 250 million total population in the country there should have been over 490 million.) Military losses during the Second World War and earlier depredations on the male population have resulted in a large sex imbalance in the population--only 78 males per 100 females in 1950 and 85.5 in 1970. The sex ratio is still expected to be below "normal" in the year 2000, when there will be 91.9 males per 100 females, still slightly low, but obviously, significantly improved over the early postwar rate.

The existing and projected demographic trends mean that there are and will be manpower supply problems in the U.S.S.R. throughout the remainder of this century. Soviet recognition of these problems was apparent in General Secretary Brezhnev's firm statement at the XXVth Communist Party Congress in the spring of 1976 in which he called for large gains in productivity and efficiency throughout the economy in order to achieve the

economic goals of the current (Tenth) 5-year plan. On the same occasion, Kosygin, head of the Council of Ministers, made clear reference to acute labor shortages in industry during this plan period and in the 1980's. Assuming little possibility of major inputs of foreign labor, future Soviet labor needs can be satisfied only by the supply of young persons entering the labor force, since all traditional sources, including collective farms, and especially the households, have largely been exhausted. However, as a result of past demographic trends and recent declines in the crude birth rate, the increments to the labor force will decline very sharply in the 1980's and recover only late in the 1990's, as can be seen from the estimates and projections of the new increments to the population of able-bodied ages given in table 1.

According to these estimates, the net increases of the population in the able-bodied ages in the 1980's will be less than one-fourth the annual amounts during the current decade. Correspondingly, the rate of increase in the total population will be only 0.3 percent per year in the 1980's as compared to 1.9 for 1971-1975 and 1.4 percent for 1976-1980. However, in the Russian Republic there will be a net decrease in the able-bodied population in the 1980's and

Table 1. ESTIMATED INCREMENTS TO THE POPULATION IN THE ABLE-BODIED AGES IN THE U.S.S.R., R.S.F.S.R., CENTRAL ASIA AND KAZAKHSTAN, AND THE TRANSCAUCASUS, BY PLAN PERIOD: 1971 TO 2000

(Based on data as of January 1, in thousands)

Plan period	U.S.S.R.			R.S.F.S.R.			Central Asia and Kazakhstan			Transcaucasus		
	Total increase	Average annual increase	Average annual rate of increase	Total increase	As a percent of national increase	Average annual rate of increase	Total increase	As a percent of national increase	Average annual rate of increase	Total increase	As a percent of national increase	Average annual rate of increase
1971-75.....	12,963	2,593	1.9	6,039	46.6	1.6	3,089	23.8	3.7	1,059	8.2	3.3
1976-80.....	10,378	2,076	1.4	3,928	37.8	1.0	3,444	33.2	3.5	1,142	11.0	3.0
1981-85.....	2,664	533	0.3	-813	(X)	-0.2	2,773	104.1	2.4	690	26.1	1.6
1986-90.....	2,630	526	0.3	-880	(X)	-0.2	2,880	109.5	2.2	514	19.5	1.1
1991-95.....	3,291	658	0.4	-425	(X)	-0.1	3,361	102.1	2.4	548	16.7	1.1
1996-2000.....	8,101	1,620	1.0	1,964	24.2	0.5	4,380	54.1	2.7	954	11.8	1.8

X Not applicable.

Source: Unpublished estimates and projections prepared by the Foreign Demographic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce in March 1977.

the first half of the 1990's. This is particularly important because most of the country's industrial plant is located in the R.S.F.S.R. More than 100 percent of the net growth of the population of able-bodied ages will take place in the five Central Asian republics with an additional 20 to 25 percent in the three Transcaucasian republics. Thus, there will be a net decrease in the other six republics, as well as the R.S.F.S.R. referred to earlier.

Given this forecast, the question of potential sources of supply must be addressed at this point. Until the current decade, collective farmers, households, old-age pensioners, and young people (under 16 years of age) contributed a very large proportion of the increments to the labor force. However, by now most of these sources of supply are considered by Soviet analysts to be no longer capable of meeting the expected demand for new workers. The population in able-bodied ages contributed less than one-third in the first half of the 1960's, about one-half in the second half of the decade, 88 percent in 1971 to 1975, and is expected to contribute almost 100 percent

in 1976-1980.[3] Old-age pensioners are now strongly encouraged to continue or return to work. Use of foreign labor (i.e., GastArbeiter) is still relatively small. A significant reduction in the size of the armed forces (although this is a very complicated issue),[4] could contribute a major addition to the civilian labor force. The number of old-age pensioners who are working has increased by almost 2 million persons in the Ninth Five-Year Plan period, from 2,500,000 in 1970 up to 4,424,000 in 1975 (see table 2). However, I doubt that this rate of increase in the supply of "new" pensioner-workers for the labor force can be maintained in the future since it would appear that the backlog of potential "employees" from this source is exhausted if the Gosplan projection that the population of able-bodied ages will contribute "almost 100 percent" of the increments to the labor force is correct.

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[3]Ye. Voronin, "Employment of the Population Is Being Planned," Leningradskaya pravda (Leningrad Truth), August 17, 1976, p. 2, translated in U.S. Joint Publications Research Service, Translations on U.S.S.R. Resources, No. 708, JPRS No. 68100, October 22, 1976, p. 25.

[4]See Feshbach and Rapawy, "Soviet Population," 1976, pp. 144-152, for a discussion of military manpower, and underlying economic and statistical complications related to its measurement.

Table 2. NUMBER OF OLD-AGE PENSIONERS WHO ARE WORKING IN THE NATIONAL ECONOMY (EXCLUDING COLLECTIVE FARMERS): 1960 TO 1975

(In thousands)

Year	Number of old-age pensioners	Of which, number who are working	Percent working
1960	4,531	532	11.7
1964	7,436	748	10.1
1965	7,180	1,025	12.5
1966	8,020	1,268	14.3
1967	10,015	1,528	15.3
1968	10,987	1,748	15.9
1969	12,019	2,272	18.9
1970	13,185	2,500	19.0
1971	14,299	2,942	20.6
1972	15,290	3,259	21.3
1973	16,186	3,616	22.3
1974	17,197	4,019	23.4
1975	18,242	4,424	24.3

Source: M. S. Lantsev, Sotsial'noye obespechenive v SSSR, Ekonomicheskiy aspekt, Moscow, 1976, pp. 127, 131, and 137.

The amount of foreign labor employed in the Soviet Union is increasing. It is certainly important in relieving specific bottlenecks but is still a small proportion of the total Soviet labor force. Friedrich Levcik of the Viennese Institute for International Economic Studies has estimated that there are about 50,000 such workers from East Europe working in the Soviet Union.[5]

[5]Friedrich Levcik, "Migration and Employment of Foreign Workers in the CEMA Countries and Their problems," in U.S. Congress, Joint Economic Committee, East European Economies Post-Helsinki, Joint Committee Print, 95th Congress, 1st Session (Washington, D.C., U.S. Government Printing Office, August 25, 1977), p. 466.

This number is, however, a very small proportion of the 125 to 130 million persons in the labor force.

A significant reduction in military manpower cannot be predicted, but is certainly within the realm of possibilities given the severity of the constraints on Soviet economic growth. The reduction might well be limited to those troops engaged in civilian-type activities, such as construction, railroad and road troops, and also would be only a one-time gain. However, if the hypothesis is correct, as expressed elsewhere, that these troops are already included in the "civilian" employment figures (see footnote 4), then this alternative does not represent a real gain to the labor force.

Having given the background picture of the overall population and manpower trends, it is now appropriate to examine the structure and composition of the Soviet industrial labor force.

First, some brief attention must be given to the definition of "industry" in the U.S.S.R., and to the classes of workers used in Soviet statistics. The scope and coverage of "industry" is in some respects wider in Soviet statistics and in other respects narrower than in U.S. statistics. Soviet statistics include not only manufacturing and mining (S.I.C. Divisions B and D,

Major Groups 10-14 and 20-39) but also fishing, electric power, water supply and gas, which are included in other Divisions, such as Division A "Agriculture" and Division E "Transportation, communications, electric, gas, and sanitary services," in American statistics.[6] Soviet data are narrower to the extent that they include only those engaged in the basic industrial activity of an industrial enterprise plus those working in nonindustrial branches whose activities are identified as industrial in nature. Thus, those workers and employees of an industrial enterprise who are employed in health services, housing, farming, training, and related "nonindustrial" activities are statistically classified under the appropriate other branches of the economy in current labor statistics. The "nonindustrial" personnel may constitute about 10 percent of the total employment in industrial enterprises.[7] U.S. data comprehend all persons in a given enterprise, regardless of activity,

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[6]Executive Office of the President, Office of Management and Budget, Statistical Policy Division, Standard Industrial Classification Manual: 1972 (Washington, D.C., U.S. Government Printing Office, 1972), passim.

[7]See Murray Feshbach, "Soviet Industrial Labor and Productivity Statistics," in Vladimir G. Treml and John P. Hardt (Eds.), Soviet Economic Statistics (Durham, North Carolina, Duke University Press, 1972, pp. 195-228.

according to the primary classification of the organization. (Soviet trade union data include all persons, as well as students in a given union's branch of endeavor.)

Having addressed the basic outlines of these definitions, albeit briefly, it is now appropriate to look at the relevant data on total numbers, distribution among the branches of industry, and various other qualitative and quantitative measures. The structure and composition of the Soviet industrial labor force may well change as a result of the imperatives of the overall slowdown in growth of the labor force indicated earlier, and from the shift taking place from growth in employment in industry to that of services as planned for the current 5-year plan period and probably beyond.

While the total annual average employment in Soviet industry has increased from 15,317,000 persons in 1950 to over 34,054,000 in 1975,[8] more than doubling in 25 years, the annual average rates of increase show an unprecedented slowing in the growth of industrial employment in this same period. Between 1950 and 1958, industrial employment grew at 3.9 percent per year and at 4.0 percent during the Seven-Year Plan period, 1959 to 1965.

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[8]See Feshbach and Rapawy, "Soviet Population," 1976, p. 135.

However, between 1966 and 1970 the growth rate dropped to 2.9 percent per year, in 1971-1975 to 1.5 percent, and a rate of 0.7 percent per year is projected for the current 5-year plan. With maturation of the economy one expects a slowing in the growth of some parameters, but not this precipitous, and especially not in industry, traditionally the engine driving the Soviet economy. Given the trend toward lower annual increases in productivity (i.e., output per worker) in industry as a whole, which are shown even in Soviet projections, for the current 5-year plan period,[9] and the continuing difficulties in agriculture, it is no wonder that the growth of the Soviet economy is decelerating overall.[10]

The most important branch of industry in terms of numbers of workers, amount of investment and significance for defense is the machine-building and metalworking (MBMW) branch. Employing over 13 million persons, this sector accounts for about 40 percent of the total employment in industry and is

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[9]Ibid., p. 139.

[10]Also see CIA projections for the 1980's in U.S. Congress, Joint Economic Committee, Soviet Economic Problems and Prospects, a study prepared for the Subcommittee on Priorities and Economy in Government, 95th Congress, 1st Session (Washington, D.C., U.S. Government Printing Office, August 8, 1977), 30 pp.

more than 2 and one-half times as large as the next largest branch, the so-called "light" industry branch.[11] The machine-building and metalworking branch not only produces the machines needed to make other machines, but is also the major source of products for the defense sector. According to estimates made by the CIA and just released by the Joint Economic Committee of the Congress of the United States, about one-third of the machine-building industry's output goes to defense.[12] After the chemical and petrochemical

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[11] See Feshbach and Rapawy, "Soviet Population," 1976, p. 137. Data on employment in Soviet industry, by branch, in 1960 and 1975, are as follows:

Branch of industry	1960	1975
Total	22,620,000	34,054,000
Electric power	397,000	686,000
Coal	1,196,000	1,009,000
Chemical and petrochemical	792,000	1,753,000
Ferrous metallurgy	1,047,000	1,369,000
Machine-building and metalworking	7,206,000	13,816,000
Construction materials	1,575,000	2,151,000
Timber, woodworking and pulp, and paper	2,698,000	2,795,000
Light industry	3,860,000	5,109,000
Food industry	2,164,000	3,015,000

See Stephen Rapawy, Estimates and Projections of the Labor Force and Civilian Employment in the U.S.S.R.: 1950 to 1990, Foreign Economic Reports, No. 10 (Washington, D.C., U.S. Department of Commerce, Bureau of Economic Analysis, September 1976), p. 31 and Vestnik statistiki (Herald of Statistics), no. 8, August 1976, p. 88.

[12] In addition, the report states that about one-fifth of the metallurgical, one-sixth of the chemical and of the energy sectors also are allocated to defense. See, U.S. Congress, Joint Economic Committee, Soviet Economic, 1977, p. 2.

branch, the MBMW branch is the fastest growing branch of industry. Between 1960 and 1975, employment in MBMW increased by 190 percent, compared with 150 percent for industry as a whole. Since the chemical complex employs only slightly more than one-tenth the number in the MBMW branch (to be more precise, 12.7 percent), the machine-building and metalworking branch remains preeminent in Soviet industry in terms of relative size and rate of growth. Despite these increases, at the XXVth Party Congress in early 1976, Kosygin referred to acute shortages of labor for industry in the Tenth Five-Year Plan period and in the 1980's. Regardless of how a labor shortage is defined, and there are many and differing definitions, there is a great deal of underutilized labor in Soviet industrial enterprises that perhaps could be put to more effective use if appropriate action were taken. The Soviet leadership is addressing a wide range of possible solutions to the labor shortage problem, including mechanization of auxiliary and subsidiary work activities, reduction of the proportion of manual labor, restriction of employment growth in enterprises already in operation, improvement in the norming of labor, reduction of labor turnover, improving labor discipline, more efficient use of worktime, and so forth. Only some of these potential

solutions will be addressed here. Attention must also be paid to the educational level of the Soviet labor force, including improvements over time and implications for the hoped-for major increases in labor productivity.

There are more than twice as many auxiliary wageworkers (vspomogatel'nyye rabochiye) in Soviet industrial plants as in the United States.[13] The Soviet economist, Manevich, of the Institute of Economics, has estimated that there are 85 auxiliary rabochiye for every 100 basic wageworkers in the U.S.S.R., whereas in the United States there are only 38 per 100. If this were not bad enough, the level of labor productivity of Soviet basic workers is some 70 to 75 percent of that of their American counterparts, but the productivity of the auxiliary workers, so prevalent in Soviet industry, is at a level of only 20 to 25 percent. This high proportion of auxiliary workers places a constraint on labor productivity growth because these workers are engaged mostly in manual work. Moreover, as I have noted elsewhere, very little

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[13]Ye. Manevich, "Problems in the Growth of the Labor Force and Means for Improving the Utilization of Labor Resources in the U.S.S.R.," Voprosy ekonomiki (Problems of Economics), no. 10, October 1969.

progress had been made in reducing their share of the total industrial work force in the 13-year period for which we have information. In 1959, they comprised about 55 percent of all industrial workers, and by 1972 their proportion had been reduced only to 49 percent.[14]

According to the eminent Soviet labor economist, M. Ya. Sonin, the proportion of rabochiye performing work by hand was 59.7 percent in 1965 and 55.7 percent in 1972.[15] These proportions include not only those whose work is purely manual but also those who set and adjust machines by hand. Excluding the latter group, manual workers were 48.5 percent of the total in 1965 and 43.1 in 1972 according to another series of data. The figure reported by this series for 1975 was 41.9 percent, and it is planned to reduce the rate to 35.6 percent in 1980.[16] Thus, the machine setters and adjusters

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[14]See Feshbach and Rapawy, "Soviet Population," 1976, p. 140.

[15]M. Ya. Sonin, "Problemy raspredeleniya i ispol'zovaniya trudovykh resoursov," Sotsialisticheskiy trud (Socialist Labor), no. 3, March 1977, p. 97.

[16]N. Pogovskiy, "Ruchnyy trud: Puti yego sokrashcheniya," Ekonomicheskaya gazeta (Economic Gazette), no. 48, November 1976, p. 10, and V. Glagolev, Mekhanizatsiya i avtomatizatsiya truda v promyshlennosti Litovskoy SSR (Mechanization and Automation of Labor in Industry in the Lithuanian SSR), Vil'nyus, 1975, p. 33. The Glagolev data are for the U.S.S.R. as a whole.

amount to 11-13 percent. Adding these to the projected figure for other manual workers in 1980 implies that, even if the planned reduction occurs, and this is open to some doubt, manual workers will still represent almost half the industrial work force in the Soviet Union in 1980. These figures lend significance to the fact that it was only in July of 1976 that the State Committee for Science and Technology had, for the first time ever, completed a program of research aimed at the introduction of new technology to increase the mechanization of heavy manual work for transporting and moving goods.[17] Note that the program is only for research, not implementation. No wonder Brezhnev expressed such strong concern about mechanization of labor at the Party Congress.

The reasons behind the retention of surplus labor by Soviet industrial enterprise managers are manyfold. First, because of the political constraints against unemployment it is difficult (though not impossible) to fire a bad worker. Second, it is still true that in Soviet industry producers and supply agencies cannot be relied upon to provide all needed materials of the

[17] Izvestiya (News), July 26, 1976, p. 2.

right dimension, time and place, hence much of the secondary output in a given plant consists of work done to compensate for the vagaries of the material-technical supply system. Third (and without desiring to encroach on Janet Chapman's area of responsibility at this Conference), the size of the work force in a given factory has prime importance in determining the basic wage levels for the manager, his assistants, and the enterprise workers. From the standpoint of managerial self-interest, it makes no sense to economize on your labor force if the immediate result is to lower your wage category. Further, the plant manager knows that his output targets may be changed upward but not downward, and he may need additional labor to meet new overall output requirements (which are superior success indicators to minimum cost results), and in the event of sturmovshchina (storming) to meet the plan at the end of a given unit of time. Finally, each year the Party and the government are obliged to require individual industrial enterprises and other organizations to provide labor to help bring in the harvest. For these reasons, the so-called Shchekino model, calling for a reduction in employment with rising output per worker, has not been widely implemented. Since its first promulgation at the Shchekino Chemical

Combine in 1967, it has been adopted in only about 1,000 out of about 50,000 enterprises.

Compounding the problem of the structure of the labor force is the question of labor turnover. A high rate of labor turnover creates even more difficulties in a planned economy with a structured and integrated investment, supply, delivery, transportation and output program, than in a market economy. However, the rates in the U.S.S.R. continue to be high and are frequently and strongly deplored by Soviet economists and planners. Between 1940 and 1956 it was a criminal act to leave one's place of work without official permission or assignment to an alternative place of work. Since 1956, it is legally permissible to quit one's job voluntarily. When the rules were changed in 1956, 38 out of every 100 industrial wageworkers either voluntarily left their places of work or were fired for infractions of the work rules. Since 1959 the rate has remained around 20 per 100.[18] Moreover, the reported

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[18]See, Murray Feshbach and Stephen Rapawy, "Labor Constraints in the Five-Year Plan," in U.S. Congress, Joint Economic Committee, Soviet Economic Prospects for the Seventies, Joint Committee Print, 93rd Congress, 1st Session (Washington, D.C., U.S. Government Printing Office, June 27, 1973), p. 539, and L. M. Danilov, "Problemy snizheniya tekuchest' i sozdaniye ustoychivykh trudovykh kollektivov," in M. V. Granov and N. S. Chernykh, Sotsialisticheskaya ditsiplina truda: opyt, problemy (Socialist Discipline of Labor; Performance and Problems), Moscow, Profizdat, 1975, p. 154. The latter source indicates that the 1974 rate was 19.4 percent.

rates understate the actual rate of turnover because they exclude, by definition, certain "acceptable" reasons for departure, such as being drafted into the armed forces, separation on old-age pension, separation on disability pension, termination of temporary work, and so forth. Inclusion of these causes would raise the turnover rate in industry to 30 percent annually. For construction, the corresponding rates are about 27 percent using the narrower definition and 62 percent for all separations, regardless of cause.[19] The national figures also obscure a wide variation by location and by specific industry. In Magadan oblast, the total turnover rate for the food industry in 1965 was 119.9 percent, including 45.9 percent for voluntary quits.[20] Such high rates cannot be rationalized as a search for alternative opportunities that is beneficial to the economy. Furthermore, 40 percent of the Soviet workers who quit one job for another reportedly also

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[19]See, M. S. Kuznetsov, "O prichinakh tekuchesti rabochikh kadrov v stroitel'stve," Ekonomika stroitel'stva (Economics of Construction), no. 4 April 1976, p. 33.

[20]Ya. G. Feygin et al. (Eds.), Problemy ekonomicheskoy effektivnosti razmeshcheniya sotsialisticheskogo proizvodstva v SSSR (Problems of the Economic Effectiveness of Siting Socialized Production in the U.S.S.R.), Moscow, Nauka, 1968, pp. 114-115.

change their trade or specialty.[21] Even if no change in trade takes place it is reported that the worker who has just changed jobs underfulfills his work norms by 25-30 percent in the first month, by 10 percent in the second, and approaches a normal productivity level only by the third month.[22] If the calculations of V. S. Nemchenko (head of the Central Labor Resources Research Institute of the former R.S.F.S.R. State Committee on Labor Resources Utilization) are correct, a worker stays only 3.3 years at one enterprise on the average and only 3.2 years in the same specialty (and 5.6 years in the same branch of the economy), which means that major losses of output are due to this cause.[23] It is no wonder that the latest labor code (effective January 1, 1971) laid emphasis on the reduction of labor turnover through granting of various rights and privileges to the more stable worker.[24]

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[21]S. Batyshev, "Choice of Errors," Literaturnaya gazeta (Literary Gazette), no. 12, March 1969, p. 10.

[22]Ibid.

[23]These estimates are cited in I. S. Maslova, Ekonomicheskiye voprosy pereraspredeleniya rabochev sily pri sotsializme (Economic Problems in the Redistribution of the Labor Force under Socialism), Moscow, Nauka, 1976, p. 34.

[24]Feshbach and Rapawy, "Labor Constraints," 1973, pp. 543-544.

Given time, space, and subject limitations, the last major aspect of the "structure and composition" of the industrial labor force which I will cover is the educational attainment of the labor force. Undoubtedly great strides have been made in the education of labor under the Soviet regime, but some important new data place certain of these achievements in question.

If one looks at formal educational achievement alone, remarkable success has been achieved in upgrading the quality of the Soviet labor force. By 1973 only 2.4 percent of all industrial wageworkers had less than primary education, compared with 23.9 percent two decades earlier (see table 3 below). In 1929, 69.0 percent of all industrial wageworkers had less than 4th grade education.[25] From the data given in table 3, it is apparent that the educational attainment of women, especially in the younger ages, is higher than that of men. Thus, in 1973, 54.9 percent of female industrial wageworkers had completed at least general secondary school studies, compared with 47.0 percent of male industrial wageworkers.

The level of educational attainment among "specialists," i.e., persons who have graduated from higher and specialized secondary educational

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[25] Ibid., p. 524.

Table 3. NUMBER AND PERCENT DISTRIBUTION OF INDUSTRIAL WAGEWORKERS, BY LEVEL OF EDUCATION: 1952 AND 1973

Educational level completed	March 1, 1952 (all ages)		June 1, 1973 (all ages)				June 1, 1973 of which, under 30 years of age			
	Total	Percent	Total	Percent	Percent male	Percent female	Total	Percent	Percent male	Percent female
Total, in industry.....	12,400,000	100.0	23,223,000	100.0	100.0	100.0	8,278,000	100.0	100.0	100.0
Higher, incomplete higher and specialized secondary.....	124,000	1.0	1,310,000	5.6	5.7	5.6	621,000	7.6	6.8	8.2
General secondary.....	173,000	1.4	5,584,000	24.1	22.1	26.3	3,560,000	43.9	39.2	46.7
Incomplete secondary.....	3,162,000	25.5	9,562,000	41.2	41.0	41.3	3,601,000	43.5	46.4	40.7
Primary.....	5,977,000	48.2	6,195,000	26.7	29.2	23.8	486,000	5.9	7.5	4.3
Less than primary.....	2,964,000	23.9	512,000	2.4	2.0	3.0	10,000	0.1	0.1	0.1

Source: Ts. A. Stepanyan et al. (Eds.), Rabochiy klass SSSR i yego vedushchaya rol' v stroitel'stve kommunizme, Moscow, Nauka, 1975, p. 191, and Vestnik statistiki, no. 7, June 1974, p. 92.

institutions, has become much clearer with the release of important new details on graduates by school division. It now appears that previous evaluations of the quality of the middle- and higher-level manpower have to be sharply discounted. Undoubtedly a very large number of persons in the Soviet Union have graduated from these schools, but only recently has it become clear that the proportion of these graduates that come from part-time facilities (i.e., correspondence and evening divisions), is much higher than was thought earlier. This is especially true for engineers, the most publicized group of all. We have heard incessantly about the vast numbers of engineers being graduated each year and have been told repeatedly that the stock of college-graduate engineers in the U.S.S.R. is much larger than in the United States. Disregarding questions of comparability, the number of graduates in the U.S.S.R. was 304,000 in 1975 and the number in the United States was 55,000 in 1974; the corresponding numbers of engineers employed were 3,683,000 and 1,110,000, respectively.[26] But the proportion of

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[26]Tsentral'noye statisticheskoye upravleniye (TsSU) pri Sovete Ministrov SSSR, Narodnoye khozyaystvo SSSR v 1975 godu; statisticheskiy yezhegodnik (The National Economy of the U.S.S.R. in 1975; A Statistical Yearbook), Moscow, Statistika, 1976, p. 156.

engineering students enrolled in part-time studies in the U.S. (most of which is work-study programs rather than studies combined with a full-time job) is an almost negligible 8 percent.[27] In contrast, in the Soviet Union in 1975 the unweighted average share of part-time enrollment in correspondence and evening faculties of engineering fields (including agriculture and forestry, which are partially included according to Soviet definitions) amounts to 45.7 percent. The unweighted average share of graduates from part-time programs in all engineering fields in the U.S.S.R. is 31.5 percent, and the corresponding proportion for technicians is 36.1 percent (see table 4). Since the quality of part-time training in engineering fields cannot be equal to that of full-time study, the fact that such a high proportion of engineers in the U.S.S.R. receives training in this manner cannot but impose some constraints on the growth of productivity.

Given all the factors cited here, it is no wonder that even according to Soviet calculations, labor productivity in industry in the Soviet Union

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[27]Feshbach and Rapawy, "Soviet Population," 1976, fn. 67, p. 141.

Table 4. GRADUATES OF ALL HIGHER AND SPECIALIZED SECONDARY EDUCATIONAL INSTITUTIONS, BY DIVISION, U.S.S.R.: 1975

Specialty group	Graduates of higher educational institutions					Graduates of specialized secondary educational institutions				
	Total	Division			Percent of part-time	Total	Division			Percent of part-time
		Day	Evening	Correspondence			Day	Evening	Correspondence	
Total	713,389	433,303	79,717	200,369	39.3	1,157,032	752,263	125,377	279,392	35.0
Geology and prospecting for mineral resources	5,904	4,731	226	947	19.9	5,740	4,542	(X)	1,198	20.9
Mining and mineral resources	8,298	6,335	848	1,115	23.7	13,145	8,365	3,103	1,677	36.4
Power engineering	14,116	8,832	2,570	2,714	37.4	47,744	24,663	14,913	8,168	48.3
Metallurgy	7,814	5,364	1,743	707	31.4	10,867	6,925	3,138	804	36.3
Machine-building and instrument-making	73,012	43,640	18,299	11,073	40.2	125,614	63,053	45,165	17,396	49.8
Electronic techniques, electrical instrument-making, and automation[1]	49,604	33,115	11,103	5,386	33.2	33,821	21,366	8,564	3,891	36.8
Radio engineering and communications	18,752	11,017	3,866	3,869	41.2	31,612	18,352	4,856	8,404	41.9
Chemical technology	15,424	10,209	3,073	2,142	33.8	19,010	11,841	5,189	1,980	37.7
Timber engineering and wood, pulp, and paper technology	4,673	3,737	210	726	20.0	10,616	7,256	975	2,385	31.7
Technology of food products	10,500	6,258	804	3,438	40.4	39,483	24,709	1,044	13,730	37.4
Technology of consumer goods	7,605	4,532	929	2,144	40.4	24,785	11,032	6,088	7,665	55.5
Construction	44,754	28,685	8,313	7,756	35.9	99,772	63,161	16,312	20,299	36.7
Geodesy and cartography	1,336	1,054	3	279	21.1	2,830	2,458	(X)	372	13.1
Hydrology and meterology	1,271	1,012	(X)	259	20.4	1,558	1,136	(X)	422	27.1
Agriculture and forestry[2]	53,869	36,035	13	17,821	33.1	142,299	97,493	(X)	44,806	31.5
Transportation	17,452	10,500	1,829	5,123	39.8	60,373	34,635	5,972	19,766	42.6
Economics	95,567	38,121	11,943	45,503	60.1	208,296	107,095	5,009	96,192	48.6
Law	13,146	4,140	1,889	7,117	68.5	1,493	704	61	728	52.8
Health and physical culture	53,639	50,611	310	2,718	5.6	141,991	137,300	3,146	1,545	3.3
University specialties	54,613	33,674	6,787	14,152	38.3	(X)	(X)	(X)	(X)	(X)
Specialties in pedagogical and library institutes	154,697	86,785	4,397	63,515	43.9	(X)	(X)	(X)	(X)	(X)
Education	(X)	(X)	(X)	(X)	(X)	109,088	83,155	952	24,981	23.8
Art	7,343	4,916	562	1,865	33.1	26,895	23,022	890	2,983	14.4

X Not applicable.

[1] "Electrical machine-building and electrical instrument-making" in Specialized Secondary Educational Institutions.

[2] "Agriculture" in Specialized Secondary Educational Institutions.

Source: Based on republic data in TsSU SSSR, Narodnoye obrazovaniye, nauka i kultura v SSSR; statisticheskiy sbornik, Moscow, Statistika, 1977, pp. 179-207 and 252-281.

remains at about 50-55 percent of the level in the United States.[28] Moreover, the current 5-year plan calls for a lower rate of growth in productivity in spite of the greater dependence on productivity than hitherto as a means for sustaining growth in output. In view of the inexorable decline in the size of new increments to the labor force, the projected reduction in capital investment in the Tenth Five-Year Plan, and the limited prospects for sustaining high gains in productivity among Soviet workers, the impact of labor force structure and composition on economic growth in the U.S.S.R. is likely to be major in the next two decades.

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[28]Cf., for example, Tsentral'noye statisticheskoye upravleniye pri Sovete Ministrov SSSR. Narodnoye khozyaystvo SSSR v 1970 godu; statisticheskiy yezhegodnik (The National Economy of the U.S.S.R. in 1970; A Statistical Yearbook), Moscow, Statistika, 1971, p. 795 and Narodnoye khozyaystvo SSSR v 1975 godu; statisticheskiy yezhegodnik (The National Economy of the U.S.S.R. in 1975; A Statistical Yearbook), Moscow, Statistika, 1976, p. 815.