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# *Development Strategy and Planning: The Soviet Experience*

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## *Introduction*

The First Soviet Five Year Plan was officially launched almost exactly thirty-five years ago. The hallmarks of the period that was ushered in therewith were rapid extension of social ownership beyond the limits of the modern urban sector, with the full-scale collectivization of agriculture virtually completed by the mid-thirties; the establishment of an all-embracing system of centralized planning; and a remarkably high over-all rate of economic growth. The architects of the system have been insistent in postulating a three-way connection between these elements. Without centralized planning, it was argued, there would be no comparable rates of growth; without extensive social ownership no effective centralized planning would be possible; and without thoroughgoing modernization and concentration of production in the wake of rapid economic growth, both planning and social ownership would lack a firm basis and would eventually either be subverted from within or destroyed from without.<sup>1</sup>

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<sup>1</sup> Cf. the preamble to the First Five Year Plan for a very explicit statement of this view:

“The great task of the five-year plan for the development of the productive forces of the Soviet Union through rapid industrialization and steady strengthening of the socialist elements in national economy is to attain and to surpass the economic level of the advanced capitalist countries in the next historical period, and thus to assure the triumph of the socialist economic system. . . . This makes it imperative to secure, with the aid of the colossal natural re-

In the context of the present inquiry, obviously enough, it is the first of these three propositions that deserves examination, although the other two are by no means irrelevant. Few Western economists would disagree nowadays that the Soviet planning has been "about growth," to paraphrase Professor W. Arthur Lewis's well-known remark, and that it cannot be properly appraised without a clear notion of its performance in the realm of long-range development. It seems, therefore, appropriate to begin by surveying this performance.

### *The Development Strategy*

#### THE OVER-ALL VIEW

In order to keep things in proper perspective right from the start, let us reveal an important part of the plot in advance. In Table 1 are shown some of the most recent Western measurements of Soviet development trends through 1958.

It is, of course, impossible to discuss here the full implications of these figures. Some of them will become clear in the subsequent sections of this paper.<sup>2</sup> A few words of comment are nevertheless in order at this point:

1. The Soviet rate of growth of net national product has unquestionably been high. More specifically, it is well above the U.S. rate of growth over the same period (2.9 per cent during 1929-57), and it exceeds, although by an extremely small margin, the U.S. rate of growth from 1869-78 to 1899-1908 (4.6 per cent); in both cases, the difference is significantly higher when the Soviet series is presented "as

sources of the Soviet Union, the advantages afforded by the system of an organized and planned national economy and the latest technical achievements, a higher rate of economic development than that yet attained by modern capitalist countries" (*The Soviet Union Looks Ahead*, New York, 1930, p. 7; the translation has been slightly corrected).

<sup>2</sup> An extensive analysis can be found in Professor A. Bergson's paper "National Income," which contains Table 1, as well as in Professor Simon Kuznets' "Summary Appraisal," both in *Economic Trends in the Soviet Union* (hereafter cited as *ETSU*, eds. Abram Bergson and Simon Kuznets, Cambridge, Mass., 1963).

The general problem of the reliability of the underlying data and the reasons for not using official Soviet indexes must be likewise bypassed. The reader is referred to the abundant literature on the subject, more particularly, to Abram Bergson, *The Real National Income of Soviet Russia Since 1928*, Cambridge, Mass., 1961; Alexander Gerschenkron, *A Dollar Index of Soviet Machinery Output, 1927-28 to 1937*, Santa Monica, Cal., 1951. Gregory Grossman, *Soviet Statistics of Physical Output of Industrial Commodities*, Princeton for NBER, 1960. G. Warren Nutter, *Growth of Industrial Production in the Soviet Union*, Princeton for NBER, 1962.

TABLE 1

*USSR: Net National Product, Factor Inputs, and Productivity,  
Average Annual Rates of Growth for Selected Periods, 1928-58*

(per cent)

	1928-58	1928-58 (effective years) <sup>a</sup>	1928-40	1940-50	1950-58
Net national product					
In 1937 ruble factor cost	4.1	4.8	4.2	1.9	6.8
As composite, 1937 base <sup>b</sup>	6.0	7.0	9.3	1.7	6.8
Employment: number of workers (adjusted for nonfarm hours)	2.0	2.3	3.7	0.7	1.2
Reproducible fixed capital					
In 1937 rubles	7.0	8.1	9.8	0.5	11.2
As composite, 1937 base	7.1	8.2	11.0	-0.2	10.9
Farm land acres	1.5	1.8	1.6	-1.3	3.7
Livestock herds (1937 rubles)	-0.2	-0.2	-1.9	-0.8	3.2
Selected inputs (1937 weights)	{ 2.9 2.4 2.9	{ 3.4 2.8 3.3	{ 4.2 3.8 4.1	{ 0.6 0.6 0.5	{ 4.0 2.7 4.0
Net national product					
Per worker (adjusted for nonfarm hours)					
Output in 1937 ruble factor cost	2.1	2.4	0.5	1.1	5.6
Output as composite, 1937 base	3.9	4.5	5.4	0.9	5.6
Per unit of reproducible fixed capital					
Output in 1937 ruble factor cost and capital in 1937 rubles	-2.7	-3.1	-5.1	1.3	-3.9
Output and capital as composite, 1937 base	-1.0	-1.1	-1.6	1.9	-3.6
Per unit of selected inputs					
Output in 1937 ruble factor cost and inputs with 1937 weights	{ 1.2 1.7 1.2	{ 1.4 1.9 1.4	{ 0.1 0.5 0.2	{ 1.3 1.2 1.3	{ 2.7 4.0 2.8
Output as composite, 1937 base, and inputs with 1937 weights	{ 3.0 3.5 3.1	{ 3.5 4.1 3.6	{ 4.9 5.3 5.0	{ 1.1 1.0 1.1	{ 2.7 4.1 2.8

<sup>a</sup>Excluding four war years.<sup>b</sup>Comparison with 1937 in terms of the ruble factor cost of the given year.Source: Abram Bergson, "National Income," in *Economic Trends in the Soviet Union*, ed. Abram Bergson and Simon Kuznets, Cambridge, Mass., 1963, p. 6.

composite, 1937 base.”<sup>3</sup> The U.S. output during 1869–78 to 1899–1908 is measured in 1929 dollar prices; a consistent recalculation in terms of prices of an earlier year might decisively alter the results of the comparison of the Soviet 1937 factor cost series with the U.S. series for 1869–78 to 1899–1908 (although it should be remembered that in the context of Soviet development, the 1937 factor cost was definitely not an early-year weight). Moreover, even if such a possibility were disregarded, the Soviet tempo (when measured in 1937 ruble factor costs, at any rate) would not be entirely unprecedented. It has been exceeded, during periods of roughly comparable length, by Australia as well as by the United States (when the years 1869–78 to 1884–93 are considered) in the second half of the last century; and the very high Soviet growth in 1950–58 was more than matched by West Germany and Japan during the same time span.<sup>4</sup> These calculations are undoubtedly of interest. Yet the margin of non-Soviet superiority is low (within one percentage point) in all cases cited, and meaningful comparisons are therefore difficult, not only because of the refractory nature of the statistical material but also in view of the wide differences in the external settings and in the size and resource structures of the respective economies.

2. The divergences in the Soviet rates of growth during the three subperiods are striking. In the period 1928–40 the rate of growth, high by any standard, varies sharply depending on the kind of measurement used—a disparity reflecting the extremely drastic and nonrecurrent change in the product mix during these years, with the “composite, 1937 base” method being better suited for indicating how much more efficient the Soviet economy was toward the end of the subperiod at producing the 1937 mix than at producing the old mix of 1928. (For a proof of this proposition, see Bergson’s *The Real National Income of Soviet Russia Since 1928*, Chapter iii, cited above.) The very high rate of 1950–58 (with the alternative ways of measurement cited above making no difference) is determined in part by the fact that this period encompassed the five most successful years which Soviet collectivized agriculture ever had. (The post-1958 years which are not covered by the calculations of Table 1 show a marked slowdown in growth, due largely, although not exclusively, to the stagnation in Soviet agriculture.) The low rate of the forties is clearly due to wartime developments.

3. The high rate of decline in the productivity of reproducible fixed capital can be viewed as the result of an extremely rapid increase of this

<sup>3</sup> Bergson, *ETSU*, p. 7.

<sup>4</sup> See Kuznets, *ETSU*, pp. 335, 339 (Table VIII.3), and 355 (Table VIII.14).

capital in relation to the employed population—a point repeatedly stressed by Professor Bergson. But, as he indicates, this may not be the whole story. On the face of it, the time-honored law of diminishing returns can be (particularly for a “latecoming” country) effectively counteracted by internal and external economies of scale, the opening up of new areas, and the increasing ability to absorb and generate modern technology. True, it could be argued that in the Soviet case the capital accumulation had been proceeding too rapidly for its effects on returns to be offset in such a way. But it is also not inconceivable (a) that some of these “offsets” were less than fully operative while others were being rapidly exhausted; (b) that the Soviet economy was suffering from certain built-in inefficiencies which proved less tolerable in more advanced stages than in the early ones, and (c) that the unusually rapid increase in capital stock reflected, in part, the urgent desire to compensate for some of these inefficiencies and to make up for the “corner-cutting” in the past. As will be seen later, these obiter dicta are not entirely devoid of substance.

4. The two points presently to be made border on the obvious. As has been explained time and time again, quantity indexes, even if constructed with the utmost care, tend to understate the rate of growth since they do not take fully into account the changes in quality; as a result, they are bound to favor an economy relying in its growth (as compared with other economies) more on rapid multiplication of broadly similar and highly standardized items, a large part of which could be used for purposes of self-reproduction, and less on continual improvements in quality. (It is not suggested that an attempt to allow for such a purely statistical advantage is likely to reduce large differences between the observable rates of growth to insignificance.) Lastly, and, in the present context, more importantly, the index numbers can give us a general notion of the speed with which the economy under review has been moving northeast (or southwest) on the production possibilities map. They cannot, and are not meant to, tell us whether the economy was “on the curve” at a particular point of time, that is, whether or not the familiar optimum conditions were fulfilled, or more generally, whether the route chosen was the most efficient one from the viewpoint of the decision makers’ objectives. It goes without saying that a summary discussion of the underlying developments and policies cannot provide anything like conclusive answers to these formidable questions. It may nevertheless help to establish a *prima-facie* case.

## INVESTMENT POLICY

It is sufficient to glance at the capital stock series in Table 1 in order to realize the crucial importance of investment in the Soviet strategy. The proportion of domestic resources directed toward capital formation under the Five Year Plans has been notably high. Still more remarkable is the rate of speed at which this proportion rose from its initial level. According to the source already cited, the share of gross investment in the national product (measured at 1937 ruble factor cost) went up from roughly 12 per cent in 1928 to nearly 26 per cent in 1937.<sup>5</sup> During the fifties and early sixties, following the precipitous fall during World War II and the fast climb of the recovery years, the increase was decidedly slower, although by no means negligible; according to Professor Bergson's unpublished estimates, the present Soviet rate of gross investment is about 33 per cent. How are we to interpret these figures?

Let us begin with what may look like an overlong digression into *Dogmengeschichte*. It has been customary for the Soviet system's directors (to borrow a term from Professor Bergson) as well as for their leading ideologists to invoke the two-sector model of Marx in support of their development strategy, and with perfectly good reasons on the face of it. True, Marx set up the "reproduction schema" of Volume II of *Capital* in order to lay down conditions for a macroeconomic moving equilibrium on the basis of full-capacity output and not for maximizing (or optimizing) the rate of growth. But it was entirely legitimate to infer from his analysis that, other things being equal, economy A with a larger capital-goods-producing "Department I" relative to the consumer-goods-producing "Department II" was bound to have a higher over-all rate of growth and ultimately also a higher level of consumer goods output than economy B with a lower Department I-to-Depart-

<sup>5</sup> Professor Bergson's estimates, quoted in Kuznets, *ETSU*, p. 352. Professor Kuznets observes that "with the single exception of Canada for 1896-1900 and 1901-10 among the twelve countries for which we have data, in none did the [capital formation] proportion double within a few years [as in the case of the USSR]." As Professor Bergson points out, the rates of *net* (as distinct from *gross*) investment over the period in question were "relatively exceptional" [*The Economics of Soviet Planning*, New Haven and London, 1964 (hereafter cited as *ESP*), p. 317]—a phenomenon easily explainable by the unusually rapid increase of the total investment volume over time and by peculiarities of Soviet replacement policy, still to be discussed. Actually, the initial increase was even more dramatic than the above figures would indicate. The 1937 rate of gross investment was a bit below its level in the preceding years due to the continuous shift toward defense; in fact, it was attained, and even slightly exceeded, by 1932 (cf. Francis Seton, "Social Accounts of the USSR in 1934," *Review of Economics and Statistics*, May 1954, quoted in *ESP*, p. 308).

ment II ratio because the lower share of consumers goods in the A total would be from some time point onward more than compensated for by the growing disparity between the A and B totals, due to the faster rate of addition to capital stock in A.<sup>6</sup>

Consequently, in order to increase the rate of growth, the relative share of capital goods in the total output as well as in the total capital stock of the economy in question would have to be raised accordingly. Furthermore, an increase in the incremental capital-output ratio would demonstrably require a rise in the relative size of the capital goods sector if the existing rate of growth were to be maintained, and a correspondingly steeper rise if the rate of growth were to go up—propositions which could be conveniently stated in terms of the familiar Harrod-Domar equation.<sup>7</sup> No doubt the case for increasing the relative size of the domestic capital goods industry would be weakened if the implicit assumption of a closed economy were relaxed—a point about which Marx was very explicit.<sup>8</sup> But by the same token a country facing sharply

<sup>6</sup> For a rigorous proof, see Evsey D. Domar, *Essays in the Theory of Economic Growth*, New York, 1957, Chap. IX. The path-breaking articles by the Soviet economist G. Feldman, discussed by Professor Domar, are now available in a slightly abridged English translation. See *Foundations of Soviet Strategy for Economic Growth*, ed. Nicolas Spulber, Bloomington, 1964.

<sup>7</sup> The mutual translatability of the Marxian and the Harrod-Domar approaches was made very clear by Mrs. Joan Robinson (cf. her *Rate of Interest and Other Essays*, London, 1952, pp. 91, 95). However, Marx did not make any explicit use of the capital-output ratio in his model building. His "organic composition of capital" could be properly interpreted as an index of the amount of capital per man, and a rise in this index could be compatible, in theory as well as in empirical fact, with an increasing, constant, or declining capital-output ratio, depending on the relative rates of change in the amount of capital per man and in the volume of output per man. (In fact, Marx came close to saying this in so many words; cf. *Capital*, Chicago, 1933, III, 129.) The whole point, incidentally, has a direct bearing on the familiar proposition, according to which the rate of growth of producers' goods must *always* exceed that of consumers' goods in order to ensure the steady growth of the economy as a whole. This thesis, first expounded by Lenin in his *Development of Capitalism in Russia*, was adopted as a guideline by the authors of the First Five Year Plan, and has become one of the cornerstones of Soviet economic orthodoxy, with Stalin restating it in a most dogmatic manner in his last major pronouncement. Actually, this "law" explicitly derived by its originator from the rising trend of the "organic composition" applies only whenever the capital-output ratio, too, is rising, and/or whenever economic growth is not merely steady but accelerating. Yet the practical importance of this overgeneralization in the case under consideration was not great, for reasons which are implied in what has been said already and which will be further clarified as we proceed.

<sup>8</sup> "If a country is unable itself to produce the quantity of machinery which its accumulation of capital allows, it buys it from abroad" (*Theories of Surplus Value*, London, 1951, p. 366).



deteriorating terms of trade for its exports and yet resolved to increase significantly its rate of growth would be bound to rely more heavily on the services of domestic capital goods industries and hence to allot a higher priority to them than if trading prospects had been favorable. The circumstance that in a semideveloped country the capital-output ratio in Department I would tend to be higher than in Department II (owing to the significance of handicraft in the latter sector and to the virtual absence of consumer-durables industries) would add impetus to the shift in priorities. It goes without saying that the Soviet Union on the eve of the First Five Year Plan would fit this general description. It is likewise evident that the policy of rapid expansion of Department I was, in the case in hand, in broad accord with the pattern of the country's natural resource endowment—and the existence of a significant “growth-oriented” nucleus inherited from the prerevolutionary past constituted an important added asset.

In sum, the construct on hand seemed most helpful in providing the argument for a major shift in investment priorities. But granted that the shift was needed, how fast and how far was it to go? This, obviously enough, was the operationally important issue; and here the received theory could lend no aid and comfort to the eventually adopted policy. Indeed, some of the most baffling problems of Soviet development strategy could be conveniently viewed in terms of a deliberate attempt to override the constraints inherent in the model and of the resistance encountered along this path.

To be sure, some of these constraints were not specifically Marxian. The “reproduction schema” clearly implies that the higher the rate of investment, the lower must be, on the assumption of full capacity utilization and/or of full employment, the absolute level of consumption. If this decline in consumption were to be pressed far enough, “other things” would no longer remain equal; the drop in productivity of labor would reduce the size of total income, and “beyond a point this would be true also of the additional income to be obtained subsequently from additional current investment.”<sup>9</sup> Furthermore, there were numerous implicit and explicit caveats against unsettling disparities between aggregate supply and aggregate demand which were bound to develop under capitalism as a result of discontinuous increases in investment

<sup>9</sup> *ESP*, p. 304. Soviet economists of the post-Stalin era not infrequently expressed similar views, although they preferred to do it by emphasizing the favorable effects of rising consumption on the rate of growth via the increase in labor productivity (cf. S. Strumilin, “Balans narodnogo khoziaistva kak orudie sotsialisticheskogo planirovaniia,” *Voprosy ekonomiki*, November 1954, p. 36).

and which the socialist economy should strive to prevent.<sup>10</sup> Yet the most distinctive contribution of the Marxian model consisted in explicitly relating the total and sectoral output flows to capital stocks which produce them, thus bringing in constraints on the capacity side. Concretely, an increase in the rate of investment requires a widening of the margin in productive capacity of Department I over the replacement needs of the economy; this, in turn, calls for expansion in the capacity of Department I both in absolute terms and in relation to the total capital stock. Yet the logic of the model implies that such an expansion cannot be of the blitz variety; its rate of speed is decisively controlled by the size of Department I at the beginning of the relevant period, as well as by the required amount of capital stock per unit of the increment in capacity, the length of the gestation period of new plant, and the size of the investment demand coming from Department II; assuming that the last-mentioned limitation could be lifted by a highhanded decision, the others would remain in force.<sup>11</sup> A blow-by-blow comparison between a

<sup>10</sup> Cf. *Capital*, II, 361–62, as well as the following passage:

“On the basis of social production, it must be ascertained, on what scale those operations which withdraw labor and means of production from it for a long time without furnishing in return any useful product, can be carried on without injuring those lines of production which do not only withdraw continually, or at several intervals, labor-power and means of production from it, but also supply it with means of subsistence and of production” (*ibid.*, p. 412).

<sup>11</sup> A simple numerical example (or rather an extensive hint at such example) may serve as an illustration. Let us assume that values of the capital stock  $K$ , national income  $Y$ , and volume of investment  $I$  are 300, 100, and 15, respectively, and (for the sake of simplifying our arithmetic) that the capital assets are permanent. On the further assumption that the capital-output ratio  $V$  is the same in both departments, we can derive sectoral values from these aggregates;  $K_1$ ,  $Y_1$ , and  $I_1$  would then equal 45 ( $15 \times 3$ ), 15, and 2.25, and  $K_2$ ,  $Y_2$ , and  $I_2$  would accordingly equal 255, 85, and 12.75, respectively. Following the Harrod-Domar formula, the rate of growth,  $r$ , would then be 5 per cent. Suppose now that the economy in question desires to double its  $r$ , which can be accomplished only by doubling the  $I \div Y$  ratio, provided that  $V$  remains constant. But in order to do so, the  $K_1 \div K$  ratio must likewise double. It can easily be shown that even if our economy is prepared to go to the extreme of plowing its total investment back into Department I, and thereby foregoing any increase in the capital stock of Department II for the duration, it will take *four years*, counting from the beginning of this relocation, to attain the desired target, and that the choice of a less drastic alternative (such as the Feldman-Domar expedient of fixing the  $I_1 \div I$  ratio at the level of the terminal  $I \div Y$  ratio for the duration) would lengthen the relocation period. By the same token, the introduction of replacement into the picture would provide an additional degree of freedom: It would now be possible to skip not only the net investment but also the replacement quota of Department II, and this would permit the shortening of the relocation period. (In our numerical example, by adding the over-all replacement quota  $R$  of 20 to the same  $Y$  and modifying the sectoral proportions accordingly, such a

full-fledged model of this type, with the realistic numerical magnitudes inserted in proper places, and the Soviet long-range plans cannot be attempted here. But even a quick glance at a few selected aggregative targets reveals a monumental divergence. According to the final draft of the First Five Year Plan, fixed capital stock of the economy was to increase by more than four-fifths during five years, the national income was to double, and the gross investment in fixed capital was to more than treble its volume. This herculean feat was to be accomplished by an economy whose fixed capital-output ratio in the base year of the operation equaled 2.9 (with an expected decline to the level of 2.5 in the terminal year), the rate of net investment in fixed capital was 16 per cent, and the average length of construction period of new plants approximated 4–5 years.<sup>12</sup> To make things worse, about 40 per cent of Soviet gross investment on the eve of the First Five Year Plan took place in highly primitive peasant agriculture and was therefore to a large extent technologically incapable of being shifted toward the modern capi-

policy would result in the reduction of the minimum relocation period by one-half.)

We have been thus far assuming the average gestation period to equal one year. What if, say, a three-year gestation period is assumed instead? It could be easily demonstrated that the rate of growth would then be reduced as compared with the previous case, albeit not very significantly. (In our example,  $r$  would drop from 5 per cent to 4.8 per cent.) On the other hand, the faster an economy grows, the more pronounced such a reduction will be, because the age group of investment projects reaching the maturation stage will be smaller in comparison with the still incompleting age groups than in an economy growing more slowly. For related reasons, the immediate effect of an *increase* in the rate of investment on the average length of the gestation period (and hence on the rate of growth) would be higher than the sustained effect of the *already established* higher rate. Lastly, the emergence of bottlenecks would obviously affect adversely the gestation period and the rate of growth. (All these points are briefly mentioned in Domar, *op. cit.*, p. 249, footnote.) In the original model of Volume II of *Capital* all these complications are avoided, since the average service life of the "constant capital" and the gestation period are taken to equal one year. (This, to be sure, would permit very rapid changes in the structure of capital stock if the whole gross investment were to be "plowed back" into Department I.) Yet Marx was very explicit about the unrealistic nature of these assumptions, and so were his followers.

<sup>12</sup> For data on capital stock, national income, and investment see Gosplan SSSR, *Piatiletanii plan razvitiia narodno-khoziaistvennogo stroitel'stva SSSR*, Moscow, 1929–30, I, 127–28; II, part 2; p. 38. In distinction from Professor Bergson's estimates quoted above the relevant aggregates are measured at 1926–27 market prices, and national income is shown exclusive of services. The data undoubtedly require a good deal of further processing in order to be used in statistical work; this applies with particular force to the capital stock figures. For broadly illustrative purposes, however, the quoted figures are adequate. For data on construction periods, see B. A. Gukhman, "Na rubezhe," *Planovoe khoziaistvo*, August 1928, p. 135.

tal goods sector, particularly in the short run. At the same time the lines of production which were to spearhead the expansion (machine-building and ferrous metallurgy) accounted between them for slightly more than 15 per cent of the total gross industrial output while the whole net output of large-scale industry generated merely 26 per cent of the Soviet national income.<sup>13</sup>

The whole operation looked like putting the cart before the horse on a most monumental scale. The targets of the plan might have been entirely feasible if the capital stock at the beginning of the operation had the size and structure it was supposed to achieve in the terminal year of the plan; they were definitely not attainable with the capital stock actually on hand. As a result, the planned volume of investment was inadequate and excessive at the same time: too small to bring about the desired output increases and too large when measured against the available capacity of the capital goods sector. Only a veritable explosion of "disembodied" technological progress could have slashed the capital coefficients and gestation periods to a level which would have made it possible to carry through the entire program.<sup>14</sup> Barring such a miracle, the grim realities of the situation could not help but assert themselves in a variety of ways:

1. Since the capacity of the capital goods industries proved woefully inadequate for the task, the gestation period of the new plant, which even under the best of circumstances would be very long in view of the kind and size of the new investment projects, was extended still further.

<sup>13</sup> Cf. *Piatiletanii plan*, I, 137; II, part 2, p. 22; and TsUNKhU, *Sotsialisticheskoe stroitel'stvo SSSR*, Moscow, 1935, p. 169. Here, too, the figures are quite rough, and (in the case of relative shares of machine-building, ferrous metallurgy, and large-scale industry in respective totals) not fully comparable; but they tell the story.

<sup>14</sup> We say "disembodied," because a capital-saving progress of the embodied kind would clearly not do. If new machines could be produced more cheaply, and more quickly, by the same plants that had been producing the old machines, things could be different. But such a possibility cannot be the rule, least of all with regard to a relatively backward economy. Indeed, assuming a substantial degree of technological discontinuity between the old and the new kinds of machinery (particularly if a change in fuel and energy sources is involved) and given the intent to carry out the modernization on a large scale as well as within a short span of time, the shift to the new technology is likely to entail, during the duration for changeover period, a substantially larger volume of investment and a longer average gestation period than if the old type of technology had persisted. The capital-saving effects of the new technology would then become operative only in the long run. It is not surprising that the problem has attracted the attention of Soviet economists from the eve of the First Five Year Plan to the post-Stalin era. For a perceptive recent discussion, cf. V. Bogachev, "Sovershenstvovanie struktury promyshlennogo proizvodstva i planirovanie kapitalnykh vlozhenii," *Voprosy ekonomiki*, February 1963.

Hence plants dependent on supplies from these projects were either slowed down in their construction or forced to operate at a fraction of their full capacity for a more or less extended period, with the lag in the iron and steel industry behind machine-building as a striking case in point.<sup>15</sup> As a result, the capital-output ratios were increasing all around.

2. While the degree of completion of the investment projects fell far short of the targets, the composition of investment likewise departed from the original expectations; in order to approach the planned increase of the capacity of the capital goods sector as closely as possible, the share of the consumer goods sector in the total investment had to be slashed sharply below the planned level (with one important exception, to be mentioned later). The dramatic underfulfillment of the output plans in the consumer goods area was due, in part, to this decision.<sup>16</sup>

3. The abrupt expansion of construction activity was bound to give rise not only to physical but also to organizational bottlenecks which, in turn, resulted in further lengthening of the gestation period—a phenomenon discussed, in a different context, by Professor Kalecki.<sup>17</sup> And vice versa: A bit of plain arithmetic could show that (with the volume

<sup>15</sup> According to the final version of the First Five-year Plan the output of pig iron was to increase from 3.3 million metric tons in 1927–28 to 10 million metric tons in 1932–33; and the output of ingot steel, from 4.2 to 10.4 million metric tons. (In 1930 the deadline of the plan was moved to 1932.) In other words, two basic branches of an industry characterized by the highest capital coefficient and longest gestation periods in the manufacturing sector, and accounting in the base year for a few percentage points of the total national income, were expected to self-multiply several times within five years and, in addition, to lift the capital stock of the rest of the economy by more than half during the same period. It was hardly surprising that increases in iron and steel output, while substantial, fell far short of the target. Their outputs in 1932 were 6.2 million metric tons and 5.9 million metric tons, respectively. (For Five-year Plan targets, see *Piatiletinii plan*, II, part 1, p. 153; for actual outputs, see Nutter, *Growth of Industrial Production*, p. 420.) The output of basic constructional materials behaved very similarly. It may be worth noting that several leading metallurgical experts who had been openly skeptical about the possibility of producing 10 million tons of steel by 1932 were duly convicted as “wreckers.” For a highly informative discussion of the problem of unused capacity in the Soviet machine-building industry during the First Five-year Plan, see David Granick, “On Patterns of Technological Choice in Soviet Industry,” *American Economic Review*, May 1962, pp. 149–57.

<sup>16</sup> The 1932 outputs of cotton cloth and of boots and shoes, for instance, remained virtually unchanged as compared with 1927–28, although planned targets called for a near doubling of the first and a more than 40 per cent rise in the second (*ESP*, p. 84).

<sup>17</sup> See his paper, “Czynniki określające tempo wzrostu dochodu narodowego w gospodarce socjalistycznej,” in *Zagadnienia ekonomii politycznej socjalizmu*, ed. Oskar Lange, Warsaw, 1960.

of investment determined by the existing capacity of Department I), the longer the technologically given average gestation period, the more investment projects would be in operation at any given point of time; this would mean added organizational difficulties, with feedback effects on the length of the gestation period and on over-all efficiency of the economy.

4. The introduction of technological change into the picture, finally, reveals several new aspects of waste inherent in conditions of over-strain. The phenomenon of delays in completion of projects and of temporary idleness as a result of bottlenecks in complementary lines acquires a new dimension: Plants might become obsolescent very soon after having entered full-scale operation, if not before. The switch from old technology to new, whenever it entailed an extensive reconstruction of plant at the giving and/or receiving end, was made costly and time consuming because the construction processes were slow—a consideration acquiring an added edge in the situation of shortages, with strong built-in pressures to “deliver” as soon as possible. Moreover, managers impelled to add powerfully to their capacity and to show results quickly could ill afford to experiment at length with new technology, to carry out adequate explorations in determining the location of the new plant (a particularly crucial matter in the case of extractive industries), or more generally, “to study everything thoroughly, to weigh all pros and cons, and to avoid rash decisions,” as Mr. Khrushchev put it several years ago.<sup>18</sup> (These difficulties, one might add, would lend force to the notion that absorption of new technology cannot be fully effective when carried out in a hurry—a point stressed by Mr. Kaldor in his recent work on the theory of economic growth.) The adverse effects of such corner-cutting, extensively recorded in contemporaneous Soviet writings, proliferated far and wide; and, in virtue of being embodied in durable stocks of productive capital, they could not be treated as a short-run phenomenon.

To be sure, if this were the whole story, it would be hard to see why the Soviet economy did not collapse sometime between 1928 and 1932 or was not forced into a headlong retreat. Are we to conclude that important countervailing factors were overlooked and that there was more “give” in the Soviet economic system than our analysis would suggest? Furthermore, we have been talking until now about the First Five Year Plan only. What about the later period? As will be shown, important relaxation possibilities did exist; but while they helped to pull

<sup>18</sup> Quoted in *Pravda*, January 9, 1963.

the system over the hump and to let it grow, they were unable to transmute a wasteful path of expansion into an efficient one.

#### FOREIGN TRADE

We noted earlier that foreign trade could, under propitious circumstances, permit an economy bent upon growing to forego a corresponding expansion of its own Department I; but circumstances were far from propitious for the Soviet Union of the late twenties. Actually, the situation was more complex than this observation might indicate. It is true that the Soviet Union's terms of trade during the First Five-year Plan fell from 100 in 1929 to 71.5 in 1933 (in fact, they had been steadily deteriorating since 1925). Yet during 1929–31 the volume of Soviet foreign trade attained its all-time peak of the interwar period. More specifically, the gross imports of capital goods amounted to between 12 and 14 per cent of the Soviet gross investment in these years; and this presumably accounted for about half (or, not inconceivably, more than half) of the value of Soviet investment in equipment and installation which constituted 12 to 15 per cent of Soviet gross investment at that time.<sup>19</sup> Professor Holzman is undoubtedly right in concluding that "if the Soviet economy had been closed completely during the First Five-year Plan, industrialization would have been seriously retarded if not completely stopped for a number of years."<sup>20</sup>

The opportunity to trade, it goes without saying, helped to reduce some of the disproportions noted before; but it could not eliminate them completely, given their extent and multiplicity. It will be recalled, for instance, that basic materials were among the worst laggards; but here the direct contribution of foreign trade was relatively small, although the "underfulfillment" in iron and steel would undoubtedly have been more grave had it not been for large-scale imports of metallurgical equipment. Moreover, the same overambitious plans that made imports of foreign capital goods so vitally important were putting obstacles in their way by generating shortages of some of the most tradable commodities and thus making their large-scale exports a heavy burden. Lastly, the autarkic proclivities of the system's directors tended to keep foreign trade more limited in scope, and to confine its extensive use to a shorter time period than the principle of comparative advantage would require after

<sup>19</sup> For data on Soviet trade, see Franklyn D. Holzman, "Foreign Trade," *ETSU*, p. 305. For data on investment breakdown, see Tsentral'noe Statisticheskoe Upravlenie pri Sovete Ministrov SSSR, *Narodnoe khoziaistvo SSSR v 1958 godu*, Moscow, 1959, p. 620. The figures may not be strictly comparable.

<sup>20</sup> Holzman, in *ETSU*, p. 318.

all proper allowances for dynamic considerations and for security needs had been made. It was therefore not surprising that during the Second Five Year Plan, when the acute crisis stage was over, the share of gross imports in the Soviet gross investment dropped to a mere 2 per cent.<sup>21</sup>

#### FACTOR PROPORTIONS

At first glance, Soviet policy in the matter of factor proportions would seem bewildering in the extreme. On the one hand, the biggest possible sizes of plant in industry as well agriculture were striven for, and application of the most up-to-date technology was relentlessly pressed forward, even if it entailed high capital-labor ratios. Yet at the same time quite different policies were followed. The highly capital-using housing and railroad transportation sectors were scheduled to expand their capacity at a rate below the all-economy average right from the start—and their actual growth turned out to be even more modest. Auxiliary processes in industry such as repair, packing, and intraplant transportation activities were carried on in a highly labor-intensive fashion. Some of the new equipment did not measure up to high technological standards, but had relatively low resource content and short construction periods. Old plant was being retired, as a rule, not on account of obsolescence but only after becoming physically unusable. Lastly, the degree of planned capacity utilization in industry rose above the planned level, as the increase in the nonagricultural labor force exceeded the target by nearly 100 per cent during the First Five-year Plan and has continued to exceed its targets (although by much more modest margins) ever since.<sup>22</sup> True, this diversity in approach could be interpreted as the “dual-economy” policy, and such a strategy makes good sense whenever a sizable sector with an above-average capital intensity is expanding much more rapidly than the rest of the economy and at least somewhat more rapidly than the capital supply, while large reserves of open or disguised unemployment still persist. The Soviet Union of the Five-Year-Plan period, at any rate in its early stage, was definitely in this class, although, in distinction from the “ideal type” analyzed by Professor Eckaus,<sup>23</sup> some of its low-priority sectors would be highly capital-intensive and therefore could not be pushed far into the labor-intensive range of their production isoquants. Yet while the implicit principle of dualism was sound, its application in the case on hand was

<sup>21</sup> *Ibid.*

<sup>22</sup> See *ESP*, p. 84. The second Five-year Plan was the only exception.

<sup>23</sup> Cf. R. S. Eckaus, “The Factor Proportions Problem in Underdeveloped Areas,” *American Economic Review*, September 1955.



highly questionable, to say the least. The system's directors were pushing too far and too hard in each of the directions indicated. But they neglected, or deliberately scuttled, several opportunities to use the dual-economy approach in a much more effective manner, and all these errors of commission as well as of omission were largely (although not exclusively) due precisely to the beating-the-clock nature of the development pattern. We shall attempt to substantiate these assertions by going down the list of major cases as rapidly as possible.

"*Giantism.*" The policy of favoring the construction of plants of unusually large size, known as "giantism," can be dealt with briefly because the salient facts are relatively well known.<sup>24</sup> The typical inefficiencies of the "giants" of the early thirties could be summed up under the following headings: (1) internal diseconomies of a conventional sort, caused by growing difficulties of management, rising cost of intraplant transportation, and the like, (2) external diseconomies reflecting primarily the heavy burden placed on the national transportation system, (3) abnormally long gestation periods, causing the returns from some of the large projects, if properly discounted, to be lower than the returns from quick-yielding small projects that could have been undertaken instead. (In some instances, no doubt, the prospective advantages of the larger plant would be sufficiently pronounced to make the projects in question pass the test of the appropriate time discount if such a test had been applied.<sup>25</sup>) The "giantist" policies were checked and partly reversed in the late thirties when pressing demands of the approaching war made output delays a matter of the utmost gravity. As recent Soviet literature on the subject indicates, however, the old trends are again operative.<sup>26</sup>

In short, the sound notion of skipping technological stages and making extensive use of the economies of scale in a rapidly developing "latecomer" country have often been carried to seemingly absurd extremes. The obvious question to be asked is: Why was this done? The

<sup>24</sup> The most substantial Western work in this field was done by Professor Leon Smolinski. See his paper, "The Scale of Soviet Industrial Establishments," *American Economic Review*, May 1962, and his as yet unpublished Ph.D. dissertation (Columbia University, 1960) on the same subject. Unfortunately, no comparable attention has been given thus far to agricultural aspects of the same phenomenon.

<sup>25</sup> "[Some of] these projects (such as the Magnitogorsk combine, for instance) justified themselves brilliantly. Other projects for which even a correct calculation would have yielded a low percentage rate of effectiveness, did not justify themselves (e.g., the giants of the food industry, some hydrostations which remained underutilized for years, and others)" (L. V. Kantorovich, *Ekonomicheskii raschet nailuchshego ispolzovaniia resursov*, Moscow, 1959, p. 223).

<sup>26</sup> See, e.g., Ia. Kvasha, V. Krasovskii, "Ekonomicheskaiia effektivnost kapitalnykh vlozhenii," *Kommunist*, October 1961, p. 71.

foregoing discussion suggests two possible explanations. The actual length of gestation periods in the "giantist" projects was underestimated to a truly fantastic extent, particularly during the early years of Soviet planning. Furthermore, given the stupendous size of the investment program and the firm resolve of the system's directors to push it through, the idea of concentrating the few available managers and skilled workers in a small number of the largest-size plants rather than having them scattered over a much greater number of smaller plants may have seemed appealing even with more realistic estimates of the completion time. As will be seen later on, this was not the whole story, and it is by no means certain that the adopted solution was in fact superior to the rejected alternative. But this merely underlines once more a very basic point: Within the specific framework of Soviet over-all strategy, the possibilities of halfway "rational" decisions in more limited problem areas were nil; it was a matter of choosing the "second worst" rather than "second best."

*Economizing on Social Overheads.* While a "giantist" policy in a capital-poor country is a clear case of waste, the austerity in outlays for social overheads in a similar situation is parsimony of a double-edged kind. As was pointed out repeatedly in recent writings on the economics of development, capital savings of this sort could, depending on the circumstances, be partially, fully, or more than fully offset in their intended effects by the adverse impact on the over-all efficiency of the system.<sup>27</sup> True, in the case of Soviet transportation there was an important strike in favor of the "economizers." The Tsarist regime had bequeathed to its successors a railroad network of relatively recent vintage, built quite substantially "ahead of demand"; hence its capacity could absorb without undue strain a bigger load than it had to carry by 1928, in spite of the policy of underinvestment in transportation for the benefit of accelerated investment in industry during the mid-twenties. This slack, in all likelihood, could have sustained an effective level of performance in an economy growing at a fairly respectable pace, without any dramatic expansion in the railroad facilities. But—the same problem once again!

<sup>27</sup> Moreover, whatever one may think of the allegedly "dynamizing" repercussions of bottlenecks in social overheads in a totally uncontrolled and typically sluggish underdeveloped economy, a deliberate strategy of "unbalanced growth" would certainly be odd in a system in which major investment decisions with regard to all sectors are made centrally and the decision-makers are, to say the least, quite adequately "stimulated" in matters of growth. As will be seen later on, this does not mean that an "unbalanced" behavior pattern is entirely absent in the Soviet economy; but it constitutes a sign of weakness in the system rather than a source of strength.

—in view of the momentum of the industrialization rush and of the concomitant rise in the volume of shipments as well as in the length of haul, the idle capacities were filled to the brim within a few years. Worse still, while the demand for traffic load was growing by leaps and bounds, the investment allotments to transportation were cut below the planned level after the over-all investment program had been conclusively revealed as inconsistent with the size and structure of the total capacity of the economy; and something had to yield the right of way. The results were manifold. The early thirties saw an acute crisis which nearly became a breakdown, and eventually enforced an increase in the investment allotment as well as in organizational effort devoted to the transportation sector. Yet while the danger of total collapse was averted, and did not recur, the state of noncritical overstrain persisted, with a high cost of transportation and an element of uncertainty about the long-distance flow of goods as concomitants; these, in turn, gave rise to counterproductive tendencies toward “self-sufficiency” in particular regions of the country and, more curiously, in individual enterprises as well. No doubt, the policy of keeping capital outlays on transportation to a very modest share of the grand total released investible resources which made it possible to come close to fulfillment of the plans for expansion of basic industrial capacity and to keep interindustrial disproportions within the limits of tolerance. But it is incontrovertible that some of the major operational troubles of the expanding productive apparatus were attributable to such economizing; and they must be taken into account when the over-all balance sheet of Soviet development strategy is drawn.<sup>28</sup>

The situation with regard to housing was analytically similar. The stock of urban housing available on the eve of the First Five-year Plan could not be described as being in a meaningful sense “ahead of demand” for its services; and the deleterious effects which the increasing housing shortage had on productivity of labor (largely, although not exclusively, via rapid increase in the labor turnover) belonged under the heading of impact of the compressed consumption levels on work performance.

*Substitution of Labor for Capital.* The category of relaxation possibilities to which we now turn is certainly not vulnerable to the criticisms put forward in the preceding sections. Huge reserves of former unemployed (or disguisedly unemployed) thrown into the breach may be considered a net addition to the productive potential of the economy.

<sup>28</sup> An extensive discussion of the problem can be found in Holland Hunter, *Soviet Transportation Policy*, Cambridge, Mass., 1957.

The new entrants into the labor force could be used to raise the degree of utilization of the existing plant and to create components of the new ones with not much more than bare hands, as construction work was highly labor-intensive. Less spectacularly, but more importantly (and, from the viewpoint of the Western marginalist, most appealingly), they could be used not only *in lieu* of capital goods which had yet to be built, but also to release some of the actually existing capital goods to uses in which the elasticity of substitution of labor for capital was low. It cannot be denied that if the planned figure for the nonagricultural labor force had not been exceeded, the over-all output targets of the First Five-year Plan would have fared very much worse than they did. The same held true, if to a much attenuated degree, with regard to the later plans.

However, while the momentous mobilization of labor resources probably saved the day, it could not work miracles. The basic disproportions within the industrial sector lost their explosiveness, but did not disappear. A major influx of labor into construction work could help to expand its volume, but not to shorten the long gestation period; in fact, the spreading of the limited supplies of scarce managerial skills over the rapidly growing number of unskilled laborers had, more likely than not, the opposite effect. Some technological coefficients refused to be "unfixed": Abundant labor was not a good substitute for steel needed in metal-processing, nor was it very helpful in getting more pig iron out of a given blast furnace. Moreover, the social cost of the whole operation was far from negligible: The major entries in the bill of particulars included widespread destruction of equipment during the early years in the process of "learning by spoiling" (as Professor Berliner has called it);<sup>29</sup> a marked increase in the disparity between the rapidly increasing

<sup>29</sup> See Joseph S. Berliner, *Factory and Manager in the USSR*, Cambridge, Mass., 1957, p. 139. In a speech made at a somewhat later date Stalin tried to present this policy as a result of a deliberate decision: "We were confronted by a dilemma: either to begin with the instruction of people in technical grammar schools and to postpone for ten years the production and mass utilization of machines, until technically trained people are turned out by the schools, or to proceed directly to the building of machines and to develop a mass utilization of machines in the national economy so that in the very process of building and utilizing machines people would be taught technique and trained cadres would be turned out. We chose the second alternative. We proceeded openly and consciously to the inevitable outlays and overexpenditures associated with the shortage of sufficiently trained people who know how to handle machines. True, we destroyed many machines at the same time. But at the same time we won the most important thing—time—and we created the most precious thing in the economy—cadres" (quoted in *ibid.*, pp. 138–39 from *Pravda*, December 29, 1934).

In the light of what was said in the text about the labor overfulfillment of the initial labor force target for industry, this sounds like an *ex post* rationalization

wage bill and the sluggish supply of consumer goods with mounting inflationary pressures as an inevitable result; and dramatic deterioration of urban housing conditions. In addition, some of the "micro"-policies mentioned before were much less impressive in their implementation than in principle and have met with stern objections in Soviet economic writings. Since these criticisms have not yet received adequate attention in the West, a brief summary of the points raised may be in order:

1. The coexistence of highly mechanized technology in main production processes and of labor-intensive methods in auxiliary work is far from perfect, with the labor-intensive component frequently developing into a bottleneck.<sup>30</sup>

2. The repair work and spare parts supply are fully subject to economies of scale and should be concentrated in large-sized specialized plants rather than be performed in a fairly archaic manner as subsidiary activities of the production enterprises.<sup>31</sup>

3. The cheapness of some of the lightweight machines and the capital savings attributed to slow retirement of old plant appear in a different light if one considers that fully one-third of the total stock of Soviet machine tools was employed in 1962 in repair shops in order to maintain decrepit and inferior equipment in operation.<sup>32</sup>

4. When the postponement of replacement does economize on machinery, it is not always worthwhile because of the heavy strain on supplies of fuel, raw material, and electric power which old equipment consumes in excessively large amounts and which happen to be heavily capital-using.<sup>33</sup>

The strictures, while well taken, seem a bit too harsh. The critics were unwilling to consider the possibility that the condemned policies

plus an understandable attempt to make the best of a disappointing development. Also the sure touch in rigging the argument by overdramatizing the alternatives is worth noting. Actually there is no good reason to assume that the Soviet planners faced an either-or choice between "postponing for ten years the production and mass utilization of machines" and increasing this production and utilization at a backbreaking speed. A less precipitous infusion of unskilled labor into the industry would not only have reduced the wastage of scarce equipment, but would have made it easier for the seasoned workers to tutor the new recruits which would have enhanced the effectiveness of the learning process.

<sup>30</sup> Cf. Akademiia Nauk SSSR, *Voprosy povysheniia proizvoditelnosti truda v promyshlennosti SSSR*, Moscow, 1955, p. 252.

<sup>31</sup> Cf. S. Kheinman, "Promyshlennosti—progressivnuiu otraslevuiu strukturu," *Kommunist*, July 1963, pp. 92–93.

<sup>32</sup> Cf. B. Kapitonov, "O povyshenii kachestva sredstv proizvodstva," *Voprosy ekonomiki*, October 1963, p. 39.

<sup>33</sup> Cf. A. Notkin, "Povysenie ekonomicheskoi effektivnosti i osnovnye voprosy razvitiia obshchestvennogo proizvodstva v novoi piatiletke," *Planovoe khoziaistvo*, June 1964, p. 2.

need not have been equally wrongheaded in all cases, and that they may have made more sense, or less nonsense, at early stages when they could be interpreted as a way of borrowing against the future; more generally, the connection of these practices with the over-all growth pattern was not made explicit.<sup>34</sup> Yet at the same time a broader point which would have been particularly pertinent for the early period of planning was never brought up, and quite understandably so.

## EXIT MIXED ECONOMY

By applying policies described above, the system's directors were, in a sense, substituting not only labor for capital, but also "dual economy" of a substandard sort for a much more sensible sort, that is, for a system in which a private sector comprising small-scale producing units would be operating alongside a publicly owned sector of modern large-scale establishments, and in which there would be a good deal of variety in sizes, levels of technology, and forms of ownership within particular industries as well. This was, to be sure, precisely the setup which existed in the Soviet Union during the so-called New Economic Policy of 1921-28. And although the problem of the proper interrelationship between the two sectors gave rise to intense debates within the ruling party in those years, there was a wide measure of consensus among the Communist and non-Communist experts with regard to fundamentals. The performance of the two-sector system in promoting the economic recovery was rated highly. It was agreed that public ownership had a firm basis in modern industry because of pronounced economies of scale and complementarities prevailing there, and that it could perform a valuable role in promoting the extensive restructuring of the Soviet economy that was on the agenda. But these advantages, it was believed, were less significant in agriculture where the superiority of "bigness" was less striking, the role of incentives rooted in individual ownership very great, and opportunities for increases of efficiency within the limits of existing size distribution and of relatively labor-intensive technology far from exhausted. Hence the two

<sup>34</sup> Some of the cited practices could not be regarded as deliberate adjustments to the actually prevailing, or anticipated, factor scarcities. They constituted either *ad hoc* responses to bottlenecks which came into being *after* the construction and output plans had jelled, or attempts to minimize prospective losses on account of uncertainties in supplies by reducing the number of "linkages" and sticking to whatever plant one has got, good, bad, or indifferent. A minor self-reinforcing process might be at work here. Preservation of large blocks of aged plant was likely to lead to sudden collapses every now and then; and this "radioactive depreciation," when occurring at strategic junctures, could have considerable repercussions, thus adding to uncertainty.

sectors were expected to coexist "in earnest and for a long time," as Lenin had put it; the reorganization of agriculture along the lines of collective ownership was to come only after the development of industry had made big strides forward and, more specifically, after the capital goods industries had expanded powerfully enough to be able to supply the needed amount of large-scale farming equipment without prejudice to the needs of the nonagricultural sector. Indeed, the final draft of the First Five-year Plan was explicit in assuming that the dualistic structure would endure well beyond the quinquennium. Yet the "overfulfillment" was monumental. The collectivized sector of agriculture accounted in 1932 for 78 per cent of the total sown area instead of 13 per cent as scheduled, and by 1937 individual peasant farming had virtually disappeared.

In the light of all the foregoing, the logic of this turnabout seems not hard to grasp. Ragnar Nurkse put it well by saying that the main purpose of collectivization was to collect. Considering the speed of industrialization and the drastic nature of the shift of investible resources toward the capital goods sector, the urban demand for foodstuffs was bound to, and did, increase a great deal faster than the volume of industrial commodities available to the peasantry; in fact, the latter presumably declined in absolute terms, at least temporarily. Indeed, the two strongest "relaxation" factors which we have discussed—larger-than-planned increase in the urban labor force and the brief but dramatic spurt in the export of agricultural products—powerfully added to the disparity. In such a situation, to use Marx's phrase, "inequivalent exchange" of a most drastic kind was in order; the peasant had to be prevailed upon to give up more in return for less than, or at best for as little as, before. But it was far from certain that conventional ways of bringing about forced saving—direct taxation and price manipulation—would be effective for the purpose in hand. In fact, the Soviet peasants had repeatedly demonstrated their ability to dodge the first and to resist the second by sharply reducing the marketable share of agricultural output and devoting the unsold balance to use on their own farms. Such massive "withdrawal from the market" would obviously represent a threat to the industrialization program—a contingency which would appear all the more grave when we consider that the marketable share of grain was (as a result of the egalitarian distribution of land in 1917–18) no more than half of its prewar level on the eve of the Five Year Plan. Collectivization which would do away with peasants' power to bolt and would put the state in effective control of the deliveries seemed like a perfect solution. Was it?

The above question, in this writer's opinion, cannot be answered by a clear-cut "yes" or "no" in terms of economic considerations alone. (We refer, to be sure, to the economic considerations relevant for the system's directors and their over-all strategy; from the viewpoint of efficiency of the agricultural sector and of the consumers' preferences the answer would be grimly unequivocal.) The marketable share sharply increased during the period of the First Five Year Plan and has continued to rise ever since. Yet the food ration secured for the urban population was, particularly in the early stages, too low to sustain the desired productivity standards in industrial work, because total agricultural output showed a marked decline (and, in the case of animal products, a catastrophic drop) during the First Five Year Plan, followed by a tortuously slow upward climb later on. Unsatisfactory as this state of affairs was, things would certainly have been much worse if the system's directors had not stepped into the breach created by the slaughter of more than half of the working livestock, and raised the supplies of large-scale mechanized farm equipment to several times the size of the initial targets. But this meant that peasant resistance against the loss of economic independence forced the Soviet leaders to divert large amounts of desperately scarce investible resources, domestic as well as foreign, from the high-priority areas and to channel them into a sector which would otherwise have been a "natural" one for expanding at a relatively low capital cost.<sup>35</sup>

It is hard to say whether or not the advantages of increased marketable share offset these drawbacks. As Professor Bergson pointed out, the system's directors could still have gone a considerable distance in bringing about an increase in the peasants' marketable share without collectivization even though some of the means used would have to be rather severe.<sup>36</sup> Besides, if the need for the rapid mechanization of

<sup>35</sup> It is worth noting, to give just one example, that the tractor industry consumed 50 per cent of the total annual output of quality rolled steel in 1932 (see M. Gardner Clark, *The Economics of Soviet Steel*, Cambridge, Mass., 1956, p. 16). This percentage share declined later on as the rate of increase in the annual output of tractors slackened.

<sup>36</sup> *ESP*, p. 233. The relevant paragraph deserves to be quoted in full: "If the government had never taken its fateful decision in favor of wholesale collectivization and had chosen instead to continue to rely on independent peasant farms, how Soviet agriculture might have performed is conjectural. Students of the Soviet economy (including this one) have assumed that the record achieved regarding marketings could not have been approached. Even without collectivization, however, the government would have been able to fix the terms for marketings. It could also have induced marketings by levying taxes, which it had some power to enforce. Thus it still could have achieved much. Productivity, it is true, might have suffered. But it has suffered much in the collective farm, and this



agriculture had not arisen, some of the resources that went into this crash program could have been used to produce industrial consumer goods for the peasants and thereby strengthen the latter's inducement to sell. But even if the resources thus released had been fully used for the expansion of the capital goods sector either directly or via foreign trade, the "disproportions" within that sector could have been markedly reduced, and fewer extra workers would have been needed to plug the gaps; as a result, a smaller marketable share might have been tolerable, particularly since it would have constituted a lower percentage of a bigger total. Lastly, although the drastic switch was a once-and-for-all affair and the share of agriculture in total investment dropped sharply after 1933, the needs of maintaining, servicing, and further expanding the stock of mechanized agricultural equipment probably constituted a heavier drain on the capital stock goods sector than would have been the case if the old horse-and-plow technology had been supplanted in a less hurried fashion.

However, all this is highly speculative. And this inconclusiveness merely underlines the fact that in an economy forced to expand at a rate heavily overtaxing its capacity, the choice between dualism and forward flight is sometimes very much touch and go on purely economic grounds, and other considerations, still to be discussed, must come into play in order to bring about a final decision.

#### IS OVERSTRAIN DISAPPEARING?

We are left with an unanswered question. Was not the First Five Year Plan largely unique, and did not things improve later on? If the war and immediate postwar years are disregarded, this was true almost by definition. Because the First Five Year Plan assigned an overriding priority to the capital goods sector, and subsequent plans followed suit, the share of Department I in the total capital stock was increasing from one plan to another. Hence some of the basic disproportions of the early years could be gradually reduced, particularly since the planned rates of over-all output increases did not rise (in fact, they slackened somewhat). Over-all factor productivity has undoubtedly been rising on account of an increase in skills at all levels, the shift of the work force from less productive to more productive occupations, and technological advance. Yet this is only one side of the story. While the capacity for

says nothing of the wholesale losses that attended institution of this form of organization to begin with."

"Still and all, in order to match the record regarding marketings, some sort of war economy probably was unavoidable in early years. But one wonders whether the commitment to the collective farm would have been in order if the system's directors had not also had nonmaterial ends."

growth was increasing, the pressure of competing claims kept mounting too, and some of the compensating factors were getting weaker:

1. It will be recalled that the volume of imports which amounted, within the machinery group, to about half of the apparent consumption during the decisive period of the First Five Year Plan sharply declined later. True, after the war the share of trade in the national income rose again, and according to Western estimates the Soviet Union is at present a net importer of equipment. Yet the ratio of these imports to the apparent consumption is incomparably smaller than it was in 1929–31.

2. A much larger share of the expanded capacity of the capital goods sector is now pre-empted by military demands as the share of defense expenditure in gross national product has risen four- to fivefold since 1928.

3. Labor has become much less abundant than it was at the outset, when “disguised unemployment” was estimated at about 15 per cent of the total agricultural labor force. One of the by-products of this situation is a change in policy with regard to retirement of equipment; obsolescence is no longer being treated as a “bourgeois” foible. Hence, in order to maintain the same rate of net addition to the stock of equipment, its output must increase faster than before. Moreover, the average age of the reproducible capital stock is now higher than it was at the end of the 1928–37 period during which quite a few industries had been created virtually from scratch while many others had been greatly expanded and/or thoroughly reconstructed; and this process of aging, strongly influenced by the slowdown in capital formation during the war-ridden forties, is bound to raise the replacement demand more than proportionately to the increase in volume of the capital stock.

4. The industrial expansion during the First Five Year Plan took place to a preponderant extent in areas to the west of the Urals, with capital-consuming social overheads already in existence. Yet still at the time of the Second Five Year Plan, an eastward shift on a substantial scale had begun, and the trend gained momentum after the Second World War. Since most of the Eastern areas are relatively undeveloped, a lot of “building ahead of demand” in social overheads is necessary, and this pushes the capital-output ratio upward—a fact repeatedly noted by Soviet economists during recent years.

5. The rapid urbanization and rise in skills mean that a large and growing segment of the population is no longer prepared to “take” per capita consumption standards which were by 1953 only slightly above the 1928 level, and in some important respects below it. Stalin’s successors have realized this. On the face of it, the Marxian-type model would provide a reassuring solution: After the share of Department I in

capital stock had been made consistent with the desired rate of investment (with allowance for difference in capital-output ratios between I and II and for the sectoral composition of foreign trade) it might seem perfectly possible to let investment and consumption increase at the same high rate and make everybody happy. Unfortunately for the system's directors, the key to improvements in living standards is a big increase in urban housing and a dramatic expansion in chemical fertilizers, both of which happen to have a very high capital-output ratio. (The relatively cheaper path of agricultural expansion placing main reliance on the opening of "new lands" in Central Asia was essentially a one-shot affair, with its force largely spent by the late fifties.) Moreover, since chemicals are a younger industry than, say, steel, and are expected to grow much faster, the bulk of increase in their output must come from the newly built plants and relatively little from better utilization and partial reconstruction of the old ones, particularly when the output targets were as stupendous as those set by Khrushchev in 1958 (tripling of the output of mineral and chemical fertilizers within seven years). This is, in fact, another reason why the capital-output ratio (as well as the share of incompleting projects in the total investment volume) has been rising during the last several years. An attempt to counter these trends by a still steeper increase in the over-all rate of investment was bound to boomerang. Its immediate effect would be an added pressure on a capacity which had been heavily imposed on anyhow. Moreover, the "revolution of rising expectations" is on the march, and a marked slowdown (or a reversal) in the rise of living standards is likely to have undesirable effects on work performance, as well as unsettling political repercussions.

The conclusion seems evident: While the overstrain in the economy is appreciably less than in the early period, it is still there, and tensions are likely to rise sharply if the system's directors should try to restore the former rate of growth by applying another dose of the old medicine. The alternative would consist in doing something equally drastic but quite new, namely, bringing about a radical change in the organizational system of the economy. And this leads us straight to the concluding part of the paper.

### *Planning and Development*

While discussing the salient features of Soviet economic development, we were, in effect, talking about Soviet planning in action. It will now be our task to follow more explicitly the interplay between the two.

The complexities of the Soviet planning system defy adequate de-

scription in the space available here. Fortunately, the predicament is hopeless but not very serious. The phenomenon in question has been with us for a considerable time, and its basic characteristics have become broadly familiar. Moreover, I could add very little, in terms of over-all appraisal, to what has already been effectively stated by others.<sup>37</sup> Specifically, this implies agreement with the following widely accepted propositions: (1) While the Soviet planners did have rudimentary notions of over-all consistency and of the desirability of producing at the lowest possible cost in resources (expressible in terms of "socially necessary labor time"), they have lacked a meaningful and operational criterion for the optimum allocation of resources; (2) the very far-reaching centralization of the decision-making has caused the decisions to be slow in coming and frequently deficient from the viewpoint of feasibility (not to speak of optimality): Extensive delegation of authority to lower echelons helped to avert total chaos but was still leaving the superior agencies stuck with formidable tasks of aggregation and reconciliation; (3) the system has been seriously inadequate in conveying to managers of the individual production units in unmistakable and easily enforceable ways the directives of the planning agencies; prices have been not meaningful and, in varying degrees, none too operative; "success indicators" have proved ambiguous and conducive to waste; and direct commands much too blunt to be effective in situations of normal complexity. I shall argue (1) that distortions inherent in the Soviet development pattern were aided and abetted by the deficiencies of the Soviet planning system, and vice versa; (2) that, nonetheless, this system has been responsible for making the development pattern work and for preventing its disproportions from becoming explosive; but (3) that its economic usefulness to its directors has been by now drastically reduced.

#### INTERACTION OF INEFFICIENCIES

To be sure, the broad characterization of the Soviet planning system, given above, is no more than a long-winded way of saying that this system is inefficient. To the extent that this is so, the Soviet planning

<sup>37</sup> Reference must be made to Professor Bergson's recent study, the influence of which is in evidence throughout this paper, as well as to the work by Professor Herbert S. Levine. Cf. Levine's "Centralized Planning of Supply in Soviet Industry," *Comparisons of the United States and Soviet Economies*, Part I, Joint Economic Committee, 86th Cong., 1st Sess., Washington, 1959, summarizing the content of his as yet unpublished Ph.D. dissertation, "A Study in Economic Planning: The Soviet Industrial Supply System," Harvard University, 1961. I have also benefited from the already cited monograph by Professor Berliner and from an earlier work by Professor David Granick, *Management in the Industrial Firm in the U.S.S.R.*, New York, 1954.

system would tend to reduce the growth potential of the economy. (This need not mean, to be sure, that the same system could not be favorable to growth in some other respect.) However, certain drawbacks of the Soviet planning system have a more direct and specific impact on growth than this blanket statement would indicate:

1. The effect of inadequacies in the pricing system must be mentioned first. As Soviet economists of the post-Stalin era have been pointing out, the policy of allocating capital to enterprises free of charge provides no incentive whatsoever for speeding up construction. The penchant for "giantism" is likewise reinforced by the lack of an interest charge. Moreover, the absence of the rate of interest and distortions in the relative prices of capital goods contribute to fuzziness in matters of technological choice in general and in the application of the "dual-economy principle" in particular: The choices between full mechanization and partial mechanization or between early and delayed retirement of equipment are inevitably handled in a slapdash, across-the-board fashion.

2. It seems reasonable to assume that, scarce as capital may be in the Soviet economy, the decision-making ability of the central planners constitutes the most important single bottleneck factor. (This observation, it will be noted, is in accord with Professor Hirschman's analysis of the scarcity relationships in an underdeveloped economy, except that in the Soviet case the shortage is largely "system-made.") Harassed members of the planning bodies are vitally interested in cutting down on the number and the complexity of decisions they have to make, particularly since they do not have meaningful prices (explicit or implicit) at their disposal. Hence, the proclivity to make rulings across the board is further strengthened, as is the frequency of garbled applications of a basically sound approach. The strong preference for "fixed proportions," to which Mr. Khrushchev scathingly referred in one of his last public pronouncements, belongs to the same category. It is obviously convenient, after the dramatic transformation in the structure of the economy during the first planning decade, to keep the scheme of investment priorities relatively stable and to change technological coefficients as infrequently as possible, preferably within the limits of established product groups; witness the tendency to improve on the quality of steam locomotives when an expansion in output of diesels would be more appropriate or, more recently, the resistance against the shift toward chemicals. Only when an innovation seems truly striking and/or when it affects a high-priority area, is it likely to be processed with dispatch. For the same reasons the planners find it easier to deal

with relatively few massive investment projects taking place discontinuously (construction of a new plant or substantial enlargement and full-scale replacement of the old) rather than with much more numerous "modernization"-type outlays which occur continuously and which involve partial but often highly important improvements in the technology of the plants. The "giants" are favored on similar grounds: It is easier to supervise a few huge plants than a large number of large- and medium-sized ones. Lastly, the probability of bottlenecks is enhanced as the inevitably desultory nature of top-level decisions affects some areas more strongly than others, depending on the degree of sensitiveness to hurry-up building methods, and on the substitutability of inferior inputs for better ones.

3. The response of the lower-echelon people to the slowness and blundering at the top compounds the distortions. The "do-it-yourself" principle is the twin brother of overcentralization, and it works all the way from an individual plant which crudely manufactures its spare part supplies to the powerful economic ministry of the pre-1957 period and the not-so-powerful regional economic council of today. All try their best to be as self-contained as possible and to retain some of their most valuable supplies for their own use, with supreme disregard for (and ignorance of) considerations of the social opportunity cost. Moreover, the specific nature of relationships between the planning agencies and the manager tends to encourage the latter to interfere with economic progress in several other ways as well. The plant manager's incentive to improve and innovate is weakened by advantages he can derive from using maximum quantities of costly raw materials in order to boost the size of his "gross value output," and by the circumstance that technological change almost inevitably involves a temporary disarray and slowdown in operations which means underfulfillment of the plan and loss of bonus. The unconcern about assortment, as long as the "gross value" target is met, not infrequently results in shortages of machinery and material of the kind actually needed, with surpluses of unwanted items being at best a poor substitute. Finally, it is deemed advisable to "get into the plan" with a big project rather than with a small one, because the supervising agency is likely to feel more reluctant to cut allowances to an "important" recipient in case of unexpected shortages. As a result, the number and size of the projects in construction are inflated, and this has a feedback effect on the length of the construction period.

4. We have seen that the defects of the planning system tended to

exacerbate the difficulties created by the adopted pattern of growth. Yet the relationship worked both ways; in fact, the chain of causation running in the opposite direction has been given a good deal of attention in Western literature, and we can therefore be very brief. The difficulties of making an immense number of decisions at the top echelon level, serious enough in a relatively static situation, were compounded in conditions of extremely rapid and unbalanced change, as was the margin of error. The "project-makers" propensity to understate the actual cost of new investment when first applying for approval and to submit padded requests for additional appropriation later on, as well as the plant manager's inclination to hoard material and to conceal capacity reserves, were reinforced by the awareness that requisite supplies would be hard to come by and that bottlenecks were likely to develop. Lastly, the sellers' market situation frequently forced the final consumer and the manager to make do with supplies which fell far short of the requirements as to quality and specification. True, such hypertension would not have arisen if the system had been allowed to reduce its over-all scale of operation down to the level of the narrowest bottleneck; but this was precisely what the Soviet planners were up in arms against. It is at this point, however, that qualifications are in order, and elements of strength become visible.

#### SAVING THE SYSTEM FROM ITSELF?

It would be nothing short of miraculous for a market economy, of the over-all size, structure, and degree of capacity utilization of its Soviet counterpart of 1928, to generate output and investment plans that would add up to something remotely reminiscent of the First Five-year Plan. But even if the miracle should come to pass, it would be virtually certain that such an economy would slide off the "ceiling" at a rather early stage and recoil toward the base line. As has been pointed out in discussions of the analytically similar case of a "mobilizing economy," the clamping down of purely aggregative controls does not suffice. A headstrong expansionary push is bound not only to generate an over-all excess demand but also to produce bottlenecks in areas with relatively low supply elasticities and concomitant excess capacities in other parts of the system, particularly when a drastic restructuring of the economy is aimed at. Yet although increased taxation might reduce the inflationary overhang, it is too blunt and too indiscriminate a device for dealing with sectoral disproportions; at the same time the operation of the market mechanism makes the massive reallocation of re-

sources that is called for a sluggish and "cobweb"-like process.<sup>38</sup> A system of tight centralized controls could be more effective. With major disproportions clearly visible and increasingly grave for the system, the top planners could not afford to stick to their cheery initial drafts; rather they had to exercise their full powers of command, in order to restore a modicum of rough-and-ready consistency to the economy as rapidly as possible. They could do it by strengthening the crucial bottleneck areas, slashing down investment allotments to low-priority sectors while stepping up the intensity of utilization of their capacity, pushing ahead the development of the "guiding links," and letting the relaxation possibilities play their part; and they could refuse to be stampeded into major retrenchment on account of recurrent shortfalls in capacity utilization and delays in the completion of major construction projects. This was precisely what the Soviet planners did in the early days. As a result, they made the system function as a going concern till some of the monumental investment processes could start to come to fruition and reduce the tensions to a more endurable level. As everyone knows, the operation was backed up by the application of outright compulsion and repression on a hitherto unparalleled scale, and could not have succeeded otherwise against popular resistance and the normal slow-motion processes of the bureaucratic "business as usual"; at the same time, more conventional albeit very drastic taxation measures were applied. Yet brute force and a high turnover tax, between the two of them, would not have turned the tide.

In short, the economy did crash through the "ceiling" along a wide front—at an appalling cost, in nothing like the orderly array anticipated at the start, but still in one piece. From the viewpoint of its directors, this was undoubtedly one of the system's two "finest hours," the wartime performance being the second. It is likewise clear that this resilience *in extremis* highlighted some other less dramatic but equally important

<sup>38</sup> Cf. e.g., Tibor Scitovsky, Edward Shaw, and Lorie Tarshis, *Mobilizing Resources for War*, New York-Toronto-London, 1951, especially Appendix II. More generally, an output pattern sharply deviating from optimum cannot be expected to generate "optimum" prices and to be effectively steered toward optimum merely by market-clearing prices. (The latter can no doubt reduce the waste by allocating the nonrational relative outputs in a rational way; but here, too, a qualification is in order because in situations of shortages and quixotic supply flows, the buyers—plant managers as well as final consumers—would not be acting "rationally" from the social point of view either.) For a succinct statement of the proposition, cf. Tjalling C. Koopmans, "Efficient Allocation of Resources," *Econometrica*, October 1951, p. 463. It goes without saying that the point is no less valid when the output pattern not only deviates from "optimum," but fails to meet a much weaker condition of consistency with the existing capacities.



aspects of its operation which made it less hopelessly confused than our long list of deficiencies might indicate. Some of the system's major inefficiencies have kept each other in check and thus have helped to maintain a modicum of consistency without which Professor von Mises's "planned chaos" would have become living reality. The system of centralized allocation of resources within the framework of a fairly rigid priority scheme, ham-handed as it was, did nevertheless prevent the managers from going to extravagant lengths in beefing up their "gross value outputs" by prodigal use of expensive material, just as it precluded the totally haphazard allocation of resources that would have occurred if grossly misleading prices of producers goods had acted as effective allocators. Similarly, the fixed input norms, while exaggeratedly stiff and neglectful of possibilities of factor substitution, were not entirely ineffective as a disciplining factor in conditions of a seller's market, particularly if it is remembered that in a semideveloped economy the element of slack in utilizing productive resources is by no means negligible. The wasteful devices which were used to simplify the planners' task did avert paralysis of the decision-making mechanism, and many big innovations did emerge from the bureaucratic grinder to be applied, owing to the large investment volume, on a vast scale. And this leads us to another and perhaps even more significant point.

It is certainly true that some externalities are more important than others; besides, most of them admit of great variability in their individual components and in lengths of gestation period—and these differences cannot be properly evaluated without the use of meaningful prices and interest rates (to be sure, with the best possible allowance for anticipated future changes in scarcity relationships). Similarly, a planning system greatly overburdened at the top and saddled with massive distortions at the production level must result in inadequate coordination of the interrelated activities—a task which ideally should have constituted its main forte. There is no question that the Soviet planning system was deficient in all these respects. But it is likewise clear that an economy developing a wide range of interrelated industries at a very rapid pace could not help generating such externalities on a large scale and that coordination possibilities were not entirely inoperative. Lastly, the often-mentioned advantage of a longer time horizon (as compared with the ordinary market economy) did exist, and while it was abused often enough, as our discussion of "giantism" has shown, it was not always abused.

Yet while the allowance for all these strengths, both in moments of peril and in quieter times, helps to dispose of the "it-cannot-work"

fallacy, it certainly does not constitute a good reason for rushing toward the opposite extreme. To begin with, in the discussion of the preceding paragraphs, as well as in many other discussions of the subject, the net was cast too wide: Were there no other alternatives to choose from than a market economy with a superstructure of strictly aggregative controls and a Stalinist supercentralization? We have seen that the purely economic advantages of collectivization were less than certain even within the context of the adopted over-all growth strategy. It is also arguable that an option in favor of selective and less pervasive direct controls would make Soviet planning less wasteful within the same basic context. The central planners could reserve the authority to make "large decisions" regarding the over-all rate of investment and broad sectoral priorities as well as direct control over short-supply items among major industries, while delegating the rest to the individual managers and letting prices reflect relative scarcities. It is perfectly true, however, that in an economy committed to a jerky and unbalanced pattern of expansion, the scope for effective use of such techniques must be severely limited, on account of poor visibility and the frequency of unexpected shortfalls in output. A recent Eastern European wisecrack to the effect that the Soviet-type planning is highly adept at solving problems which are entirely of its own making may be overly flattering in the first part and somewhat less than fair in the second; but it undoubtedly contains an element of truth. Yet all this raises a much more fundamental problem: Was this pattern of growth as well as the concomitant organizational pattern worth maintaining even from the viewpoint of the system's directors themselves, and if so, in what sense?

An important component of the inevitably tentative reply which emerges from the foregoing can be conveniently stated in terms of Figure 1, which is adapted from Figure II in Dr. Branko Horvat's "Optimum Rate of Investment."<sup>39</sup> The points *A*, *B*, *C*, and *D* on the solid curve denote rates of growth of income  $[(\Delta Y)/Y]$  associated with different rates of net investment  $(I/Y)$  which is taken to be an average over a certain period of time in a given economy.<sup>40</sup> As can be readily observed, the  $(\Delta Y)/Y$  ratio rises at an accelerating rate between *A* and

<sup>39</sup> *Economic Journal*, September 1958, p. 754.

<sup>40</sup> The choice of the appropriate time period is admittedly not a simple matter. The period chosen should not be too short because otherwise a large part of the investment under consideration might still be in the pipeline in case of discontinuous development; on the other hand, economies may undergo, within a long period, strong fluctuations in their investment productivities which will be smoothed over by averaging. We are following Dr. Horvat in accepting a 12-year period as a compromise.

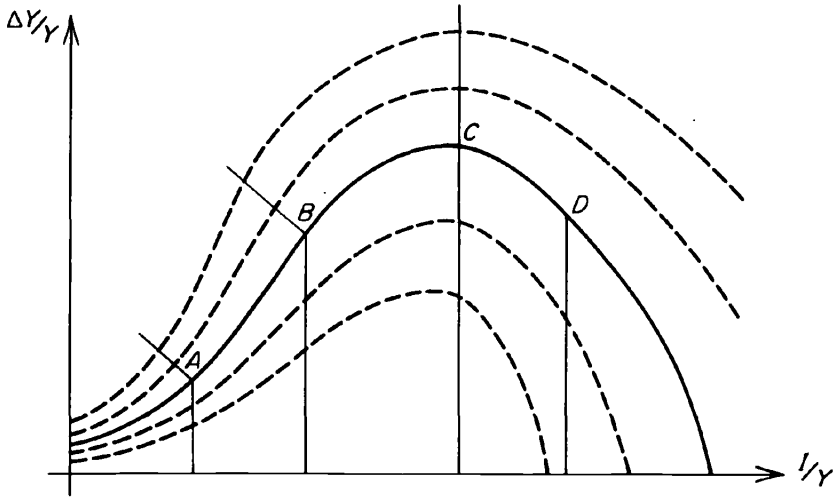


Figure 1

*B* and at a declining rate between *B* and *C* and then begins to decline absolutely. The first of these stages could be taken to reflect significant economies of scale and greatly improved ability to absorb technological innovations; the second—a gradual leveling-off in gains derived from these sources and a correspondingly stronger pull of diminishing long-run returns to capital and of rising short-run investment costs. The declining stage encompassing the *C*–*D* stretch of the curve can be interpreted as a combined effect of several factors discussed earlier: (1) Fall in productivity of labor in response to compression of consumption and extensive use of low-skilled manpower; (2) smaller volume of completed and fully utilizable (as distinct from total) investment because of long delays in construction and of pronounced “disproportions” reflecting, in turn, a sharply adverse reaction of the capital goods sector to mounting pressure on its capacity; (3) decline in flexibility and in “technological dynamism” as a result of general overstrain. A smaller but still substantial rate of investment corresponding to point *C* rather than to point *D* would be consistent with the capacity of the capital goods sector and entail smaller sacrifices in consumption. Hence it could be assumed to produce, at any meaningful terminal date, a volume of completed investment projects that would be larger in its over-all size, more balanced and technologically superior in composition, operated by a better work force, and consequently more effective in contributing to the further expansion of the productive capacity of

the economy.<sup>41</sup> The dotted curves represent loci of increments in income which could be attained at higher or lower levels of allocative and organizational efficiency than those reflected in the solid curve.

In the light of everything we have said thus far, it seems reasonable to assume that the Soviet post-1928 economy was to the right of the maximum-growth point and that it was operating substantially below the highest attainable curve. The first of these propositions applies with particular force to the 1928-40 period encompassing the First Five Year Plan, but the sustained distorting effects of the early "excesses" on the structure of the capital stock and on the quality of work performance, but it is by no means irrelevant also for the post-1950 period, indeed (as was noted above), during the last six years the rate of investment kept creeping upward while the investment productivity was sharply declining. The second proposition is unquestionably valid throughout; in fact its force is likely to have increased over time, for reasons yet to be mentioned. But while the Soviet economy did

<sup>41</sup> It might perhaps be objected that some of the incomplete investment projects might be so phenomenally productive that they could ultimately tilt the scales in favor of *D*, even after the possibility of reinvesting the proceeds of the completed projects had been duly accounted for. Yet if a "slow" investment opportunity with a spectacular payoff was in existence, the planners could take full advantage of it at *C*, while still benefiting from the "compounding effect" (to borrow Maurice Dobb's term) of the quicker-yielding investment projects. It is true, however, that such getting of the best of both worlds would be more difficult in an economy operating at *B* and (a fortiori) at *A*.

A more serious criticism would consist in noting that in a developing economy with important indivisibilities a complete dove-tailing of projects and full-capacity utilization at any particular point of time is impossible almost by definition—a point made very succinctly by Professor Scitovsky in a more general context (cf. his "Growth—Balanced or Unbalanced?" in *The Allocation of Economic Resources*, eds. Moses Abramovitz *et al.*, Stanford, Cal., 1959, pp. 213-14). Yet this argument, unexceptional as a general proposition, would not take us very far in the particular case at hand. The Soviet planners did expect their output targets to balance—at least in the terminal year of the plan, and within the high-priority capital goods sector. Moreover, the chances of their being right against their own initial judgment appear dim for several reasons: First of all, the indivisibilities in some of the overexpanded lines were not very significant with regard to the relevant areas of the economy, which was, to be sure, already quite large in 1928; hence, a more balanced pattern of growth could be achieved, for instance, simply by building fewer machine-building plants and by postponing increases in output of less strikingly productive kinds of machinery until later. But also when building ahead of demand (or ahead of supply of inputs needed for full-scale operation of the project in question) is justified by the monumental size of the indivisible unit, such a policy can still be carried too far in terms of properly discounted future social benefits, if the said demand (*viz.*, supply) is particularly sluggish in coming forward—a situation which can reflect poor coordination between complementary industries and/or a state of general hypertension. As our earlier discussion has shown, both contingencies would be far from hypothetical with regard to the Soviet economy.

not attain its full growth potential, it was clearly better off in terms of growth (although worse off in terms of investment productivity) than if it had been operating in the neighborhood of *B* either on the solid curve or on a not significantly superior dotted curve. The same would be true a fortiori for the comparison with the position in the neighborhood of *A*, except that in this case, the *D* alternative would be better not only in terms of growth but (with reference to the points on the same curve, at any rate) in terms of investment productivity as well.

A similar diagram could be used to show various economies with different rates of investment and different levels of allocative and organizational efficiency, with each economy represented by a separate family of curves. Here, too, it would be plausible to place the Soviet economy to the right of *C* on the solid curve; the advanced "Western-type" economies could be assumed to operate in the neighborhood of *B*, lying closer to the highest attainable curve; and the underdeveloped market economies would be in the neighborhood of *A*, lying on one of the lower curves. In such a situation, given appropriate values of respective investment rates and investment productivities, it would be entirely possible for the Soviet economy to grow faster than most of the Western-type economies, not to speak of the underdeveloped market economies. As the discussion of the opening section of "The Development Strategy," above, has shown, this was, in fact, the case.<sup>42</sup>

#### "TIME FOR A CHANGE"

There can be little doubt that the Soviet system's directors would be highly pleased to see their economy operating near the highest of the attainable *C*s. It is equally certain that the massive inefficiencies which prevented this from happening frequently made them feel uncomfortable, to say the least; and it is quite likely that they were genuinely in-

<sup>42</sup> In my view, a hypothetical socialist economy broadly resembling the Lange-Lerner model could be assumed to operate on the highest attainable curve, owing to full utilization of the advantages of the market mechanism plus the absence of monopolies and better allowance for external effects of economic decisions. For the same reasons, it could be expected to maintain the rate of investment at a relatively high level; and it could go further than a standard "Western-type" peacetime economy in overruling the time preferences of individuals. Yet such an economy (or, indeed, *any* economy in which optimization of growth is a matter of social concern) would have no compelling reasons to move all the way toward the peak of the curve. In fact, it would be well advised to stop short of it because the marginal time preferences of individuals in the neighborhood of *C* would be quite high while the incremental productivity of investment would be low, particularly after the risk of obsolescence had been allowed for. (For a full and illuminating discussion, see Amartya Kumar Sen, *Choice of Techniques*, Oxford, 1960, Chap. VIII.) In his quoted article, Dr. Horvat takes the opposite view.

clined, at any rate in the early stages of the process, to expect the impossible from the combination of modern technology, authoritarian discipline, and fiery exhortation. Yet after all is said and done, it remains true that the chosen pattern of growth and planning, seen in retrospect, constituted for Stalin and his lieutenants a sturdy second-best in economic terms and an unquestionable first-best from the viewpoint of noneconomic preferences. It seems high time to say a few words, trite as they may sound, about the latter. The commitment to the principles of social ownership and central planning was obviously important. But it played its part as a necessary but not a sufficient condition for the policy actually adopted, and even this in a qualified sense; there is nothing "in Marx" (or even "in Lenin," for that matter) to justify forcible obliteration of peasant farming by a socialist regime—indeed, one can find there a good deal to the contrary. Sweeping collectivization, with its shattering impact on living standards, centralization pushed to the extreme, and attempts to impose on the economy a rate of growth defying basic human and technological constraints added up to a peculiar sort of "socialism" and a not very efficient way to increase the productive potential of the country. But they certainly made good sense when interpreted as part and parcel of an all-out drive to crush the nuclei of independent decision-making, to extend the range of totalitarian controls as far as possible, and to enhance the system's directors' sense of security with regard to the outside world.<sup>43</sup> It was wholly in accord with the spirit of the undertaking that some of the most stunning accomplishments were achieved not by following the initial blueprint but through an escalatory sequence of attack, resistance, and retribution. Moreover, not only the objectives but also the ways in which they were being attained would represent "something of value" in such a situation. The overstrain, the all-pervading tension, the never-quite-absent risk of partial breakdown that might spread, the atmosphere of smoldering resentment and conflict—all this could be used as a potent device for keeping the society, and above all, its more articulate groups, in a state of constant quasimobilization and *la patrie en danger* mood which

<sup>43</sup> We speak of system's directors' *sense* of security because we do not subscribe to the view that combination of beating-the-clock industrialization, over-centralized planning, and searing repression, involving the wholesale purge of the army leadership, represented the most effective way of increasing the military potential of the Soviet Union. But it is, of course, incontrovertible that the Soviet military potential has greatly increased just the same. Here, too, a policy which was no more than "second best" from the viewpoint of meaningful objective criteria, could still be regarded as "first best" in broader terms of reference, given the extent of fear and mistrust of any diversity and autonomy that were inherent in the basic Stalinist attitude toward society.

would help to smother independent thinking, brand every nonconformity as treason, and justify the refusal of the dictators to "wither away." The economics whose spirit was epitomized in such propositions as "Perish or forge full speed ahead," or "There are no fortresses which the Bolsheviks cannot take," was dubious not merely from the *natura non facit saltum* point of view. But it filled a need.

It is understandable that the system's directors have not been eager to abandon the setup which served them well in the past and which undoubtedly still appeals to them in important respects. But they know that modify it they must in order not to be put in a position of generals fighting the last war, because the situation has changed significantly and irreversibly. The powerful expansion of the Soviet economy brought forward not only a vast increase in the productive potential, but also, as was shown earlier, a much stronger pressure of conflicting claims for its services. The consequences of this state of affairs are manifold. Costly mistakes on the macroeconomic or microeconomic level can no longer be papered over after a fashion by throwing in more manpower or cutting down on the traditional low-priority sectors, because the first is no longer abundant and the latter are in the process of being upgraded at considerable cost. The old-style capacity reserves were filled long ago, and the new ones are of little immediate help since they are, more often than not, due to bottlenecks in complementary lines rather than to inadequacy of demand. The rough-and-ready nature of investment decisions is becoming a matter of greater concern than before. As the technological frontier draws closer for many established areas, it becomes increasingly difficult to assume that the striking superiority which new ways of doing things exhibit, over a wide range of scarcity relationships, will make even a fumbling but bold move toward the new frontier not infrequently preferable to a cautious groping along the old one. At present a wrong step is more likely than previously to mean a plain and simple net loss to the economy.<sup>44</sup> But even a "second-best" gain would not be good enough as further progress

<sup>44</sup> The above proposition could be put in terms of a familiar production function diagram. The striking superiority of the new technology would then be reflected in a sharp downward shift of the equal-product curve. In such a case even factor combinations lying to the right or left of the point of tangency between the equal-cost line and the lower equal-product curve, and therefore sub-optimal, could be an improvement over any factor combination located along the higher equal-product curve because the equal-cost lines corresponding to the new combinations would in all likelihood lie *below* any equal-cost lines corresponding to the old combinations. The situation would obviously be quite different with regard to a less spectacular change in technology and an accordingly smaller downward shift of the equal-product curve.

increasingly depends on maximization of such gains rather than on throwing huge amounts of new resources into the hopper: The juxtaposition of "growth" and "choice" is becoming fatuous at this stage.

On the other hand, whenever new technological frontiers do appear, they are likely to be, in an important sense, more difficult to approach than in the old days, since they now compete for resources with some of the well-established high-priority industries, and the institutional as well as physical resistances to rapid and extensive shifts are strong. But as blunders of all sorts tend to become less tolerable, they are also getting harder to avoid, since complexity and specialization within industry are growing by leaps and bounds, while the methods of economic administration and of information processing remain basically unchanged. Moreover, the outside world is not what it used to be. Although the capitalist economies taken as a whole have not been expanding during the last decade at anything like the peak of their growth potential, some of them seem to have come quite close to it, and in others the performance is visibly better than during the thirties, when the stark contrast between the Western depression and the Soviet rapid advance made allocative efficiency appear irrelevant from the viewpoint of "catching up and overtaking."

Last but not least, the system's directors themselves have not remained entirely impervious to developments that have been occurring in their society since Stalin's death. They have, to be sure, not the slightest intention of presiding over the liquidation of their power structure. But they do realize that in order to keep the rate of economic expansion at a level acceptable to them, and to prevent tensions from becoming rampant, they must, with most of the old backlogs gone, turn to the one that still remains, and make use of the stupendous opportunity for improvement in the quality of decision-making in their economy.

It is this combination of reluctance to change and bowing to the inevitable which presumably accounts for the uncertain pace of the economic reforms thus far. While Soviet economic science "has recovered its wind" to a truly amazing extent, and the public discussion of the fundamental issues has been growing steadily bolder, little has transpired in the realm of action. Indeed, the numerous organizational reshufflings that have occurred during the post-Stalin decade seem like elaborate attempts to avoid the necessity of genuine reform; the well-known industrial reorganization of 1957 which transferred authority from all-union ministries to regional economic councils without affecting in the slightest the relation between the planning agencies and the plant managers is the leading example. The slowdown after 1958, and, possibly, a growing



restlessness among the forward-looking elements of the managerial and professional intelligentsia have made such a temporizing attitude hard to maintain; the recent reforms in the consumer goods industry are a straw in the wind. It would be rash to make specific predictions at this stage. The forces of the *ancien régime* are still firmly entrenched. Some of its more sophisticated spokesmen are hoping to steal their opponents' clothes: While professing disdain for "bourgeois" theoretical foundations of input-output analysis and linear programming, they strongly advocate use of mathematical computer techniques as an alternative rather than a complement to decentralization—a position which leading men of Soviet mathematical economics have been vigorously opposing. There is no doubt that a dramatic increase in international tension could mean a grave setback to the new trends, and the road ahead cannot be smooth and easy in any case. But barring catastrophic developments and taking all in all, one can feel certain that more changes will come—and that they will bear watching.

#### COMMENT

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In his very thoughtful paper, Professor Erlich touches on a host of interesting questions, but unhappily for me in my capacity as critic, I find that I am generally rather likeminded with him. Instead of recording my reactions to different points, therefore, I shall try to elaborate somewhat on a cardinal theme to which he refers briefly: the Soviet policy on centralization versus decentralization of decision-making, particularly the nature of the policy, how sensible it has been economically, and its rationale.

As to the nature of the policy, completely to define this might call for a detailed and comprehensive description of the Soviet planning system, but it will suffice simply to underline the familiar fact, referred to by Professor Erlich, that throughout the period of chief interest, that is, the period of the five-year plans, the planning system has been notably centralized by any standard.

I refer especially to three related features:

1. The determination of resource use almost everywhere administratively through a complex of bureaucratic structures.
2. The relatively limited use by superior agencies in these bureaucratic structures of prices and related financial controls as a means of coordinating and directing activities of agencies immediately responsible

for operations, and by the same token the marked degree in which the superior agencies enter directly in one way or another into the determination of the physical process.

3. The tendency of superior agencies even at the highest level to concern themselves not merely with general goals and principles but with details, often of a quite concrete sort.

These features have prevailed under the five-year plans generally. I refer primarily, however, to facets of resource use other than the acquisitions of consumers' goods and offerings of labor by different households. While during protracted intervals in the past these matters too have been dealt with more or less bureaucratically, recourse being had to rationing in one case and to labor compulsion in the other, for some time such procedures have been employed only to a very limited extent. Also, in agriculture, centralized decision-making did not really obtain until after the completion of collectivization, and even since then it has not obtained as fully as elsewhere.

It sometimes is suggested, however, that even since collectivization the degree of centralization has varied markedly in the course of time. Thus, some of the organizational reforms carried out under Khrushchev, particularly the liquidation of industrial ministries in 1957, are said to have entailed a significant decentralization.

Khrushchev's organizational reforms were complex, and are not easy to analyze from the standpoint of centralization. Possibly on balance there was some decentralization, but if so it was not very dramatic. Immediately before Khrushchev's retirement, however, the government took some steps toward a more radical reform, and his successors apparently have now determined to continue along this line. I refer to the recently announced decision to establish new working arrangements for some 400 enterprises in consumer goods branches. Under these arrangements, which stem (though perhaps not quite to the extent often assumed) from proposals of the Kharkhov economist, E. G. Liberman, profitability is to be stressed to a greater extent than hitherto as a criterion of success for managerial personnel. At the same time, such personnel are to be allowed more autonomy for the conduct of the enterprise's affairs. Among other things, they are to be encouraged to negotiate directly with retail trade outlets in respect of the qualities and assortment of goods to be supplied them. Reportedly the new arrangements will later be extended to additional consumer goods enterprises, while similar changes are also contemplated for heavy industry.

As to how sensible the government's policy has been economically, this question is potentially as stupendous as the last, but perhaps I shall

have done my duty if I record my agreement with the general impression that the Soviet planning system is often inefficient economically, and that the resultant waste must be quite consequential.

How economically efficient a system is must depend on the end taken as a standard. Waste in the USSR is sizable, I believe, not only from the standpoint of the end usually stressed in the West, "consumers' welfare," but from the standpoint of any "planners' preferences" that we might plausibly impute to the Soviet system's directors, if I may join Professor Erlich in using a phrase I have found convenient elsewhere. I include here planners' preferences in which a cardinal concern is with "growth."

Difficult as it is, we must gauge the extent of the waste under Soviet planning primarily by inquiry into the nature and operating principles of this system. I have recently published such an inquiry, and rely here on its findings.<sup>1</sup> For purposes of gaining further insight into economic efficiency I also tried to calculate the comparative net national product per unit of labor and capital in the USSR and the United States in 1960. Depending on the nature of the measurement, the Soviet net national product per unit of labor and capital turns out to vary from 29.1 to 46.6 per cent of that of the United States. I refer to net national product and labor and capital inputs after the exclusion of certain final services, particularly government administration, health care, education, and military services, for which the type of comparison made is infeasible. For various reasons, I also omit housing services.<sup>2</sup>

Factor productivity as so calculated is, of course, not the same thing as economic efficiency, and I shall not bore the reader with a recital of all the sources of divergence between the two. But I argued previously and still believe that my comparison is illuminating regarding economic efficiency.

Interestingly, despite the Russians' access to the latest Western technology, their factor productivity in 1960 is of the same order as that of the United States sixty years ago during the decade 1899-1908: The latter was 36 per cent of that of the United States in 1960.

The foregoing characterization of Soviet economic efficiency in no way divides me from Professor Erlich, for clearly he holds the same somber view as I on this matter. Indeed, at many points he contributes new insights into it.

<sup>1</sup> *The Economics of Soviet Planning*, New Haven, Conn., 1964.

<sup>2</sup> *Ibid.*, pp. 340 ff. I have revised somewhat the figures derived in this study so that the data considered on output refer to *net* national product, as they were supposed to. In my study, I inadvertently referred to data on the gross national product.

Granting that the Soviet planning system has been wasteful, it does not necessarily follow that, given conformity to the imperative of pervasive public ownership, any other system of planning would have been less so. We are concerned especially with the degree of centralization of decision-making. Hence of special interest is the question of whether and to what extent a less centralized system might have been more efficient.

This is also a question which the reader will wish to judge for himself. I take it as almost self-evident that even within the general framework of a basically more or less centralized system the actual degree of centralization in the USSR, involving as it has extensive and often *ad hoc* intervention even by supreme authorities into activities of agencies immediately engaged in operations, has often been economically excessive. Whether and to what extent the Soviet planners might have been able to gratify their preferences better under an alternative system involving heavy reliance on price and related financial controls admittedly is another and more complex matter. Professor Erlich apparently believes that from the planners' standpoint such "market socialism" would have been economically inferior to the system actually employed in the earliest years. Perhaps he is right, though by all accounts the centralized system was flagrantly inefficient in these years.

Professor Erlich stresses particularly the possible advantages of centralization in enabling the system's directors to cope with the structural changes that occurred, and no doubt there were such advantages: The structural changes under the early plans certainly were violent. Even in Western societies, there is usually a shift toward bureaucratic, as distinct from market, controls when a sharp change in structure is required, as in wartime.

In the early years under the five-year plans, it is often said, centralization was also indicated by the scarcity of managerial talent. There must be some truth in this also, but this particular argument could easily be overstressed. While limiting responsibilities of the less competent many, centralization, if carried at all far, easily becomes unduly onerous for the more competent few. The upshot, therefore, may only be to replace many small mistakes by a few big ones. This might occur even if superior posts should indeed fall into the hands of the more competent. It is not at all clear that standards for promotion in the USSR have been such as generally to assure this.<sup>3</sup>

<sup>3</sup> While in Professor Erlich's view the highly centralized system had its virtues for the planners in the earliest years, he considers that a mixed economy in which direct physical controls are employed on some scale along with market processes might also have met the needs of the time. Space does not permit me to pursue this interesting theme.

The violent structural change of the early five-year plans has proved to be a unique episode in peacetime, and managerial talent can no longer be the very scarce factor it was initially. Moreover, the economy in the course of time has become steadily more complex as a result of the increase in the number of interconnecting plants, the ever-expanding variety of products, and the like. The system's directors, who before sought essentially for steel and then more steel, have come to have preferences that also are more complex, and they are now more concerned than they were formerly to cater to the demands of consumers, who themselves have become more choosy. In the circumstances, however effective economically centralization was initially, it surely must be less so now.

To what extent the Russians will gain economically from the sort of reform that they are now initiating, however, is less clear. We still do not know much about this reform. As reported, the new arrangements still seem complex and cumbersome, and the fact that for the present they affect only a limited sector may also prove to be a source of difficulty. While the new arrangements supposedly met with success when employed experimentally for two enterprises in the clothing industry, what will be achieved when they are used on a mass scale, and with managers not so circumscribed as under a highly publicized experiment to be on their best behavior, is another matter.<sup>4</sup>

Coming finally to the rationale of the Soviet policy, I can be brief, for curiously the Russians themselves until recently have had little to say on this very important theme. Indeed, one is led to think that in opting in favor of a notably centralized system the system's directors probably never seriously considered any alternative. Of course, for a time from March 1921 decision-making in the USSR was markedly decentralized, but the government's approach to economic organization during this period of the so-called New Economic Policy reflected in part a decision on a more basic matter: its determination for complex reasons temporarily to limit the scope of nationalization and "cooperatization." Still there was some administrative decentralization even within the public sector, and this represented to some extent a reaction to the extremes of centralization under War Communism. But it is doubtful if

<sup>4</sup> On the planning system as it is on the eve of the reform, see *ibid.* On Liberman's proposals, see Marshall Goldman, "Economic Controversy in the Soviet Union," *Foreign Affairs*, April 1963. The experiment with the Maiak and Bolshevikka enterprises has been discussed extensively in the Soviet press in the past year, and some discussions have been translated in *The Current Digest of the Soviet Press*. See, for example, the issues of November 4 and 11, 1964. On the decree extending the experiment, see *Trud*, January 13, 1965.

anyone was prepared to urge that such decentralization should persist long after the economy has passed through the acute crises into which it has been plunged by world war, revolution, and civil war—after it had been possible to extend once again the scope of public and cooperative ownership and after the government had found the opportunity and acquired the capacity to deal systematically with the great and novel task of creating a planning system appropriate to such ownership.

Interestingly, as the period of the NEP drew to a close, Soviet officials and economists vigorously debated many questions of economic policy. They debated the tempo of industrialization, and they debated the policy to be pursued on agriculture. Especially in the latter context, where the future status of the independent peasant was a cardinal issue, the proper role of market institutions necessarily was in question. But this was considered only secondarily. As for the question of the degree of centralization that was to obtain within the public sector, this seemingly was not debated at all.<sup>5</sup>

If there was always a predisposition toward highly centralized planning, it is not difficult to imagine its possible sources. Even if they have not always been observant Marxists, the system's directors must have been influenced by Marxian views of capitalism, particularly the stress on anarchy of competitive markets. For the government to act to supplant the market with bureaucratic controls thus must have seemed the inevitably right thing to do. And there was little reason, either, to hesitate because of any fear of the complexity of the task. Marx and his followers had had little to say about the problem of resource use under socialism, but they manifestly considered it to be not especially formidable.<sup>6</sup> In the circumstances, it is perhaps not surprising that the Soviet founding fathers often had only an extraordinarily naive and oversimplified view of their economic task; a view which, after all due allowance for possible rhetorical excesses, is clearly exemplified in these famous words of Lenin: <sup>7</sup>

Accounting and control—these are the *chief* things necessary for the organizing and correct functioning of the *first phase* of Communist society.

<sup>5</sup> On economic organization under NEP, and the great debates which brought this period to a close, see Alexander Baykov, *The Development of the Soviet Economic System*, New York, 1947; V. N. Bandera, "The New Economic Policy (NEP) as an Economic System," *Journal of Political Economy*, June 1963; Alexander Erlich, *The Soviet Industrialization Debate, 1924–1928*, Cambridge, Mass., 1960; Nicolas Spulber, *Soviet Strategy for Economic Growth*, Bloomington, Ind., 1964.

<sup>6</sup> See Oscar Lange and Fred M. Taylor, *On the Economic Theory of Socialism*, Minneapolis, Minn., 1938, pp. 130 ff.

<sup>7</sup> *State and Revolution*, New York, 1932, pp. 83–84.

. . . The accounting and control necessary for this have been *simplified* by capitalism to the utmost, till they have become the extraordinary simple operations of watching, recording and issuing receipts, within the reach of anybody who can read and write and knows the first four rules of arithmetic.

It is often said that the system's directors were also influenced by the Germans' experience in organizing their economy in World War I. They were familiar with and obviously were impressed by this experience.<sup>8</sup>

The predisposition toward centralization, however, can hardly have been only of economic origin. As Professor Erlich has stressed, centralized decision-making represents an enhancement in the authority of the system's directors which must be congenial to them. At the same time, their own special status in society only seems the more justifiable in view of the onerous responsibilities they bear.

As explained, the government at long last seems to have begun to decentralize in a consequential way. The ruling circles may not be quite as obsessive as they once were about their own political status, but for reasons already suggested the economic waste of centralization may also be increasing. Such costs must also be more difficult to accept now that the economy is no longer as buoyant as it was formerly, for as even the inflated official statistics show the tempo of economic growth has tended lately to fall. In the circumstances, the system's directors have seen fit to permit propagation of a more sophisticated view of the problem of socialist resource use, and this view now must itself be a source of pressure for decentralization. Yet, for reasons suggested, the system's directors may be disappointed with the results of the decentralization now being introduced. Moreover, as a result of the progress in economics, proponents of centralization paradoxically have now been armed with new weapons to defend their approach, new weapons in the form of mathematical techniques which may facilitate centralized decision-making. And the new techniques are being explored at the same time as a revolution is occurring in methods of information processing which is itself favorable to the use of such techniques. It will be fascinating to observe how in the years ahead these diverse forces make themselves felt on the organization of planning in the USSR.

<sup>8</sup> Bergson, *Economics of Soviet Planning*, p. 173.