<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Author</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Martin Weitzman</td>
<td>&quot;Soviet Industrial Production&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Gertrude E. Schroeder</td>
<td>&quot;Consumption&quot;</td>
</tr>
<tr>
<td>3</td>
<td>D. Gale Johnson</td>
<td>&quot;Agricultural Organization and Management in Soviet Society: Change and Constancy&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Edward Hewett</td>
<td>&quot;The Foreign Sector in the Soviet Economy: Developments Since 1960, and Possibilities to the Year 2000&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Robert Campbell</td>
<td>&quot;Energy in the USSR to 2000&quot;</td>
</tr>
<tr>
<td>6</td>
<td>Joseph Berliner</td>
<td>&quot;Planning and Management&quot;</td>
</tr>
<tr>
<td>7</td>
<td>Abram Bergson</td>
<td>&quot;Soviet Technological Progress: Trends and Prospects&quot;</td>
</tr>
<tr>
<td>8</td>
<td>Seweryn Bialer</td>
<td>&quot;Politics and Priorities in the Soviet Union: Prospects for the 1980s&quot;</td>
</tr>
<tr>
<td>9</td>
<td>Douglas Diamond, Lee W. Bettis, Robert Ramsson</td>
<td>&quot;Agricultural Production&quot;</td>
</tr>
<tr>
<td>10</td>
<td>Leslie Dienes</td>
<td>&quot;Regional Economic Development&quot;</td>
</tr>
<tr>
<td>11</td>
<td>Murray Feshbach</td>
<td>&quot;Population and Labor Force&quot;</td>
</tr>
<tr>
<td>12</td>
<td>Daniel L. Bond and Herbert Levine</td>
<td>&quot;The Soviet Economy to the Year 2000: An Overview&quot;</td>
</tr>
</tbody>
</table>
REGIONAL ECONOMIC DEVELOPMENT
Leslie Dienes

Summary

The simultaneous squeeze on all factors of production, which has begun to affect the Soviet economy, is destined to last well into the 1990's. This stubborn and general supply constraint, however, is understandable only in the context of concrete geographic space. The article examines the role of the diverse regional components of the U.S.S.R. in the growth of the whole economy, particularly industry, in the recent past and through the forthcoming years. Resource exhaustion, labor shortages, obsolescence, etc., in different combinations, have acted as a break on the development of the historic centers of Soviet manufacturing and reduced their relative importance. At the same time, these factors magnified the significance of resource-rich Siberia (including North-Kazakhstan) and of the rural periphery along the west and the south. Labor, transport and infrastructural bottlenecks and the differential mobility of various mineral resources, however, greatly affect the sequence and scale of energy and raw material exploitation in Siberia, the degree of their processing and the industrial structure in general. Similarly, regional differences in the quality and cultural ethos of manpower reserves have a crucial impact on the integration and function of the internally diverse rural periphery in the Soviet economy.

The author argues that, at least through the next decade and a half, the most urgent task of the Soviet economy will be the procuring of energy and mineral resources to keep its industry plus a good part of that in East Europe running and to earn the amount of hard currency planners consider essential. This means that Soviet regional policy will accord priority to Siberia. This priority, however, will focus even more strongly on the exploitation of reasonably transportable resources, on those which can be syphoned out of the East with little or no processing for the needs of the European U.S.S.R. or export.
The lopsided, unbalanced industrial structure of Siberia, therefore, most probably will not improve. And even this development strategy is likely to have serious setbacks due to transport and other bottlenecks, the increasing capital intensity and labor demand of the region.

In the past 20 - 25 years, the advantages of suitable manpower reserves, accessibility to East Europe and, by Soviet standard, reasonable infrastructure, accelerated industrial growth in the formerly neglected western periphery of the European U.S.S.R. In recent years this surge began to spill over into Transcaucasia as well, which though non-Slavic, is on a more advanced socio-economic level than Central Asia and is much more accessible to the European core. Subject to a number of caveats (much increased role of the illegal economy; upsurge of anti-Russian sentiment producing a backlash, etc.). Transcaucasia could play a very significant role in labor intensive development for the rest of this century and become an extension of the European U.S.S.R.

This will not happen to Central Asia! While in the demographic limelight, the vexing issues of this region are, in the author's view, on an economic backburner today. Aside from the shortage of capital to undertake a decisive development program together with the huge Siberian projects, concerted attention to Central Asia would not yield the immediate economic benefit that crash exploitation of transportable Siberian resources are likely to do. Nor would it provide the ethno-cultural and emotional rewards to a Russian-dominated leadership that emphasis on the country's slavic triangle can produce. This is all the more true, since the primary resource of that Moslem periphery, namely labor, would be extremely difficult, costly and even dangerous to marshal for projects which have priority for the leadership. Pro-European and pro-Siberian lobbies and the non-Russian European nationalities should find themselves in agreement on that point. Therefore, minor investment efforts, combined with control of any incipient discord, should be in store for Central Asia, at least for the next decade.
REGIONAL ECONOMIC DEVELOPMENT

CONTENTS

Summary 1
Introduction 1
The Regional Framework 2
Developed Industrial Regions—Declining Productivity 5
Resource-Rich Pioneer Regions—Problems of Accessibility 7
Development of the Rural Periphery 11
  The Western Periphery—Past Neglect and Present
    Growth in Non-Russian Parts 11
  Impact of Foreign Trade 14
  Stagnation in Russian Parts 17
The Southern Periphery 19
  The Caucasus: Potential Workshop in a Stagnant
    Economy? 20
  Central Asia: Uneasy Prospects 24
Siberia 32
  Investment Growth and Productivity 34
  The Problems of Industrial Structure 37
  Recent Population Trends and Prospects 42
The Transport Bottleneck and the Growing
  Transport Burden 44
  The Railroads and the Prospects of Siberian
    Development 45
  The Pipeline Bottleneck 47
Conclusion 50
Tables 59

1. Growth of Industrial Output in Regions and Republics
   and Indices of Per Capita Industrial Production
2. Selected Economic Data on Soviet Regions and Repub-
   lics (Industry, Transport-access, and Export)
3. Industrial Fixed Capital per Employee and Marginal
   Productivity by Regions and Republics
4. Regional Distribution and Per Capita Levels of
   Investment
5. Distribution of Capital Investment in Regions of
   the Soviet North
6. Industrial Structure of Soviet Regions in 1972
7. Dispersion of Settlements and Density of Transport
   Infrastructure by Regions

References
REGIONAL ECONOMIC DEVELOPMENT

Introduction

Geographic space is almost everywhere a cardinal factor in economic development. Ideological and strategic concerns also have a manifest regional aspect. The spatial dimension may be brought into economic research implicitly, by disaggregating to the regional level national income and growth analysis and the models used therein. Such sub-national macroeconomics concentrates on interregional differences in economic structure, in levels of living, and in population characteristics; it attempts also to assay the efficiency and equity of interspatial movement of goods and production factors. Geographic space may also form an integral part of economic analysis much more explicitly. A detailed areal distribution of current and potential resources and markets, environmental amenities, and barriers now form dynamic building blocks in the evolution of the spatial structure itself. And in the longer run, locational change itself becomes a central component of the space economy (Richardson, 1969, pp. 5-7).

While attempting to treat the entire geographic space of the Soviet economy, this paper is something of a hybrid, picking eclectically from both the regional disaggregation and the areal distribution approaches, though with somewhat greater stress on the latter. The paper also emphasizes industrialization, including the exploitation of minerals and their primary processing. The Soviet leadership has always viewed industrialization as the principal vector of economic growth and military strength. Even the modernization of agriculture, so much emphasized now for over a decade, and the development of some service activities, are thought to be achievable only through massive industrial inputs. Finally, it is the industrial sector (broadly interpreted), with its tangible material inputs and commodity flows, which most readily lends itself to the kind of locational inquiry undertaken in this paper.
The regional framework for this analysis had essentially been set by the close of the 1950's. By then, the impact of the massive easterly displacement of Soviet industry produced by World War II had been fully digested, the worst dislocations of the Virgin Land Campaign absorbed, while the pre-war economic potential of the ravaged western areas was restored and surpassed. At the same time, novel conditioning factors presented Soviet planners with far more complex locational choices and opportunities than those which confronted them in earlier decades. Among these factors were the lifting of war time restrictions on labor movements, the beginning of a massive shift to more mobile and versatile hydrocarbon fuels and feedstocks, the appearance of new growth industries and the first tentative efforts to turn COMECON into a functioning organization.

At the end of the 1950's, the USSR contained all the regional types, with widely different resource endowments and problems, that regional policy planning has ever addressed in any country. One could readily recognize (1) older economic cores in need of modernization and/or diversification; (2) environmentally harsh pioneer regions, possessing vital industrial resources for future growth but not yet fully integrated into the national economy; and (3) heavily rural, populous areas either left behind or never reached in the geographically selective march of industrialization. (Figure 1) These underdeveloped rural regions really fell into two groups (with some shading between them), a distinction which has proved crucial to the timing and sequence of their development and will continue to prove so into the 1990's. On the one hand, were those areas with a European population and rapidly declining birth rates, on the other those inhabited by peoples of non-European traditions experiencing a demographic explosion (Figure 1).
An examination of industrial and urban growth rates since the late 1950’s confirms the well-documented deceleration of industrial expansion in the USSR. Within this general slowdown, however, regional variations appear significant (Table 1). An outstanding feature of this development has been the decreasing relative importance of the historic hearths of Soviet manufacturing: of the Central (Moscow) and Leningrad regions, the Donets-Dniepr (all major centers even before the Bolshevik era), the central Urals and the Kuzbas. In the reannexed Baltic Republics, two of which were quite developed already as parts of Imperial Russia, growth remained above the average until the seventies, but has declined sharply since. Labor shortages, the increasing claim of service activities on the constricted labor pool, resource exhaustion, obsolescence and social-environmental costs in different combinations have taken their toll.¹

Opposed to the industrial slowdown in these old established centers, one finds a continuation of above average growth in resource-rich Siberia (outside the Kuzbas-Altai complex) and the adjoining parts of northern Kazakhstan. The relative decline in the Far East during the first half of the seventies most likely has been reversed, given the huge construction projects underway in the region. The novel feature of the past 20–25 years, however, has been the surge of industrialization in the formerly backward rural periphery of the European USSR occupied by non-Russian republics, a surge which recently has begun to spill over into Transcaucasia as well. By contrast,

¹Industrial growth would have been slower still without the radical change in these regions’ fuel supplies, chemical and synthetic raw material base in the past two decades, particularly the sixties. Efficient hydrocarbon fuels and feedstocks became available on a large scale, resulting in much modernization and improved labor productivity (Dienes, 1959). A general lack of hydrocarbons and, until recently, the total absence of natural gas from Kemerovo Oblast, were major factors in the particularly poor performance of industry in the Kuzbas.
the Great Russian parts of the periphery, with minor exceptions, have continued to stagnate. Very adverse demographic developments, combined with an unfavorable settlement structure, most likely will prevent any turning of the tide in this century.

The growth and economic fortunes of regions depend, to a large extent, on the mix of activities within their borders. In the USSR the impact of the "industry mix" is likely to be even more important than in market economies. The Soviet leadership, in Koropeckyj's words, attempts to maximize not total GNP, but GNP of a predetermined structure (Koropeckyj, 1970, p. 258). Prices are not used as investment criteria; profitability does not serve as an instrument of resource allocation among sectors. Indeed, products of high priority branches historically have been underpriced and often subsidized, while receiving preferential allocation of capital and labor. Regions dominated by such industries, consequently, tend to show low productivity of investment and generally also of labor. Yet, they may be growing at rates above the national average, especially if their natural resources are not yet fully tapped. The tangible and intangible advantages of location, accessibility, levels of infrastructure and labor skills, of course, should not be denied, and these factors operate in the USSR as strongly as elsewhere. But given the Soviet price structure and the dominance of material balances in an economy managed along branch lines, these factors are very difficult to assess for Soviet decision-makers and still more for Western researchers.

An analysis of the performance and prospects of regions, therefore, must place great stress on the latters' place in the centrally planned economic structure. For each region, productivity indices ideally should be assessed and aggregated from branch data, but these are very scanty for republics and wholly unavailable for the diverse areal units of the vast RSFSR.
Nor can production functions be derived on a regional basis even for total output. The average and incremental ratios of output to fixed capital (Tables 2-3) are greatly influenced not only by the "industry mix" but, via that mix, also by the differential availability and quality of manpower and natural resources and their very uneven rates of change among Soviet regions. One would expect constraint in manpower or resource supplies and/or insufficient improvements or deterioration in their quality to affect adversely the output-capital ratios.

Developed Industrial Regions

Declining Productivity

Developed, traditional centers of industry have early Soviet, indeed, pre-Revolutionary foundations. They fall into two distinct groups: (1) citadels of heavy industry with a substantial, though diminishing resource base for such an economic profile, i.e., the Donets-Dnepr, Kuznets-Altaï and Ural areas and (2) diversified manufacturing regions with much more skill-demanding, higher value-added specialization, i.e., the Central Region, with part of the Volgo-Viatka, Leningrad and the two northern Baltic republics.

The three heavy industrial citadels noted above still contained a quarter of all fixed assets of Soviet industry in 1972 but accounted for only 21 percent of its output, suggesting low returns to capital (Table 2 and Belorusov et al., 1976, pp. 191-92). The stress on bulky goods with high resource but low skill content is shown by the high volume-to-value ratio of their metal fabricating, engineering and chemical branches (Dienes, 1977, pp. 6-7 and Belorusov et al., 1976, pp. 192-92). In these regions, such volume-to-value ratios for engineering products ranged from 22 percent to more than 50 percent above the Soviet average during the 1960's (Evstigneev,
1972, pp. 93-94) and I find no evidence of improvement since. As a consequence of such specialization, the Ural and Donets-Dnieper regions and the southern zone of West Siberia handled almost half of all railway loading for the USSR in 1970, with the last two showing a huge and swiftly growing dominance of outgoing over incoming freight (Transport i sviaz' SSSR, 1972, pp. 68-69).

Exactly the opposite applies to the main historic centers of diversified manufacturing: much higher shares in output than fixed capital, a discrepancy especially pronounced in the Center and Latvia (Table 2), low volume-to-value ratios, lower freight tonnage and dominance of incoming over outgoing freight. Nevertheless, these centers share with the first group a problem of increasing obsolescence in their industrial base, a sharply constrained labor supply, resulting in much commuting and heavy pressure on transport infrastructure, as well as growing environmental woes. To compound the manpower shortage, labor productivity has grown little faster than the Soviet average (Nar, khoz. SSSR and RSFSR v 1975 godu) and data available for the sixties, though unfortunately not for later years, show surprisingly low incremental ratios of output and fixed capital (Table 3). Clearly, even though they have developed in a very different institutional milieu, these regions in the Soviet Union suffer from some of the structural ills that beset the manufacturing belt in the United States. The very large share of the country's infrastructure, industrial capital and, especially in the second group, research and scientific base, all require

2 Of the 700 large scientific institutes and universities, 140 or one-fifth are found in Moscow and Leningrad alone. These two cities, the Donets-Dnieper region and the Baltic Republics concentrate over a third of the total. One fourth of all Soviet scientific personnel and 35 percent of Doctors of Sciences work in the city of Moscow (Andrew, 1978, p. 446; Hoffman and Kamerline, 1979, pp. 436-39 and Lappo et al., 1976, p. 81).
solution to their problems. Yet, given past investment and accumulated skills, the momentum built into their industry should be sufficient to carry these regions forward through the next decade without special attention. Their structural ills, in my judgment, do not yet rate the same priority as the securing of energy and raw materials from the resource-rich hinterland or the resolution of the geographic and ethnic maldistribution of the labor supply. The latter are already impacting on the performance of the Soviet economy and will increasingly do so during the 1980's. Therefore, it is these two issues which, in their spatial dynamics, constitute the regional problem for the Soviet leadership in the forthcoming years. Soviet regional policy in the eighties must, therefore, focus on two sets of key issues: (1) the strategy, speed and cost of developing resource-rich Siberia-North-Kazakhstan and (2) the further industrialization of the rural periphery, which enjoy manpower reserves ranging from adequate to ample but which differ greatly in demographic and cultural characteristics and geographic linkages. The rest of the paper will confine itself to these regions and issues.

Resource - Rich Pioneer Regions

Problems of Accessibility

These provinces comprise the vast stretch of land between the Urals and the Pacific, north of the Aral Sea, Lake Balkhash and the Chinese-Mongolian border. The Kuzbas-Altai area, having been agriculturally settled since Imperial times and developed into one of the heavy industrial bastions of the Soviet state before World War II, is more akin to the Urals or even the Donets-Dnepr, though sharing many common problems with the rest of Siberia. About three-fourths of this land is north of the zone of agriculture and
associated continuous permanent settlement. With the rather more developed European North, this raw, pioneer zone comprises over two-thirds of the Soviet landmass but is the home of only 40 million people. Of these a mere 7 million live in the Northland and only half of them east of the Urals (Nar. khoz. RSFSR v 1975 godu, p. 28 and Aparin and Krinitskaia, 1979, pp. 3 and 11).

Although Soviet economic performance in the eighties will be decisively linked with the fate of this resource-rich hinterland, the latter's critical role in the country's history is nothing new. Through Imperial and early Soviet times, "waves of resource exploitation have spread out from the European core area, channeled by transport routes" (North, 1977, p. 126). The sequence of resource development has been greatly influenced by the transportability and per ton value of commodities sought. Thus precious metals and tin have long been mined in northeast Siberia for the European market, while rich coal reserves remain untouched and hydrocarbon potentials barely scratched; but in the much better located European North and the less forbidding southern belt of Siberia—North Kazakhstan coal is now extensively produced. By contrast, the feverish development of oil and gas in the uninhabited wilderness of Tiumen Oblast (North-West Siberia) proceeds overwhelmingly for the markets of the European regions and for exports beyond the western frontiers. National needs, the relative transportability of hydrocarbons and distances manageable with current technology have all combined to accord this province the highest priority in Soviet resource exploitation today.

Spatial orientation and accessibility clearly mark off the eastern half of the Trans-Ural territories from their western half. The location of the Pacific and Trans-Baikal provinces prevents domestic and European demand
to serve as the major stimulus for resource exploitation, except in the case of rare and precious metals. Strategic factors, especially along the Chinese border and export opportunities to the Pacific Basin must provide the main incentives for development east of Lake Baikal. The peripheral position of the Far East is well illustrated by the total transport effort required to reach metropolitan centers of all major Soviet regions. The 148,000 km of transport effort to do that from the geographic center of population of the Far East is double that which would be required to reach the metropolitan centers of all regions from East Siberia, Kazakhstan and Central Asia (Column 7-8, Table 2). And it is 2.4 times greater than from West Siberia or Transcaucasia.

The relatively high export (foreign trade) index for East Siberia (Table 2) and much lower ones for West Siberia are at first surprising. However, they are explainable by the commodity structure of these regions' export plus the time period they refer to. The high export index of East Siberia is due mostly to aluminum, a high value, relatively transportable metal serving as the vehicle of indirect resource export, in this case cheap hydroelectricity. The hydrocarbon fuels of West Siberia barely began to enter international trade during the 1972-76 period, since depletion of the better located European deposits was not yet very severe. As for the Far East, potential export stimuli clearly had no time yet to be turned into reality. While the growth of export from the Trans-Baikal regions clearly will be tied to resource development, the creation of the Trans-Siberian Land Bridge may provide some additional stimulus to foreign trade. By the

3Nevertheless, with questionable economic logic, some heavy machinery exports also originated from East Siberia. Krasnoiarsk's claimed to be one of the main exporters of heavy cranes (North, 1980, p. 40).
late 1970's, the Siberian overland route had captured a quarter of the Japan to Europe containerized trade and 15 percent of such trade between the entire Pacific basin and Europe. In 1975, the Landbridge earned $140 million for the Soviet treasury (Miller, 1978, p. 224 and Mote, May 1978, pp. 13-14).

Even more than the heavy metallurgical, metal and machinery centers of the country (supra), the pioneer hinterland accounts for a much larger share of the nation's industrial fixed assets than its industrial output on a value basis (Table 2). Of all major economic regions, Siberia, the Far East and Kazakhstan showed the lowest ratios of output to fixed capital in 1972, though both gross value data and the relative under-valuation of resources in the Soviet price system bias their performance downward. If the Leningrad area could be separated from the North-West, the latter would also suffer from much lower capital productivity.

Yet, because of mounting resource dependence on this hinterland, reinforced by perceptions of national security and Great Russian nationalism, the efforts to develop these provinces have not slackened. While Table 4 shows virtually constant shares of investment from 1965 to 1975 in Siberia and the Far East as a whole (as well as in Kazakhstan and the North-West), the picture changes when the Northlands, that comprise some 86 percent of the Trans-Ural parts of the Russian Republic, are separated out. The quantity of investment in the Asiatic North quadrupled between 1965 and 1975 and its share in the Soviet total grew from less than 2.6 percent to almost 4 percent (Table 5), with strong indications of a further relative increase since. Similarly, the aggregate for Kazakhstan conceals mounting investment in North-Kazakhstan, which today is part of both the Russian economic and demographic realm and of the pioneer resource hinterland. (AN Kazakskoi SSR, 1976, Dolgosrochnye ..., pp. 15-17).
Development of the Rural Periphery

As the depletion of accessible natural resources, particularly of energy, has magnified the importance of Siberia for the Soviet economy, the exhaustion of manpower reserves and/or its insufficient mobility has enhanced the economic significance of the rural periphery. Already in the past two decades, a novel feature of development has been a surge of industrialization in a widening circle of these rural backwaters. All signs indicate that regional differences in the quantity and quality of labor will pay an increasing influence on economic growth and industrial location in the labor-short eighties.

The Western Periphery: Past Neglect and Recent Growth in Non-Russian Parts.

This vast tract of land may be delimited as the arc around the western and northern flank of the developed industrial Moscow and Donets-Dnepr regions, exclusive of Leningrad, Estonia and Latvia (Figure 1). This large territory was the cradle of the Eastern Slavs and is steeped in a memorable historic past. Since the rapid development of large scale industry, however, it has badly fallen behind economically. Poverty of resources for heavy industry and, after the Revolution, economic isolation from world trade, have discouraged investment by the government, which greatly contributed to the depressed conditions. A large section of the region was lost to the USSR during the interwar years, while the south-western Ukraine (Galicia) has never been part of the Russian political realm before World War II. Neglect by other governments and regimes thus contributed to depressed conditions, to which must be added the devastation during the conflict. The area of this western periphery (the west and north of the
European USSR within the continuous belt of agricultural settlement) is almost as large as that of the nine member European Community. It had a population of 47-48 million in 1960, or 23 percent of the country in 1960. Yet it could muster a mere 13-14 percent of the country's industry in terms of employment and output and less by way of industrial fixed assets. Moreover, about a quarter of this employment and a third of output was concentrated in 6-8 large cities which almost completely monopolized the technologically more advanced growth industries, such as engineering. The abysmally low per capita consumption of electricity was yet another indication of economic underdevelopment. Primarily, it reflected the low level of industrialization of these western peripheries, but to a degree the neglect of personal and farm demand as well.

The rapid industrialization of the non-Russian parts of this European periphery since the late 1950's is certainly among the notable features of

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6 Per capita electricity consumption in Belorussia and the South-West Economic Region reached less than one-third of the Soviet average in 1960, while in Moldavia and a number of oblasts of the Western Ukraine it came to less than one-fifth. Such low consumption levels were unequalled even in Moslem Central Asia (Palamarchuk et al., 1966, p. 78 and Neporozhnyi ed., 1972).
the recent spatial development of Soviet manufacturing. Between 1960 and
the end of 1979, the combined industrial output of Belorussia, Lithuania,
Moldavia, and the South-West Economic Region of the Ukraine grew by 4.9
times, compared to much less than 4 times for Soviet industry as a whole
(see Table 1 for comparative growth rates). The lag in per capita output
has been either overcome or greatly reduced. This growth was accompanied
by significant diversification and a move towards a more balanced and some-
what more modern industrial structure. Some of these provinces also
experienced noticeable improvement in their energy and power supply (Dienes,

Not surprisingly, the emphasis through most of this developing peri-
phery is on a labor-intensive light engineering goods and consumer durables,
demanding only moderate skills. While primary and semi-finished metals
have to be brought in, the accessibility of this region to both historic and
newly emerging steel centers of the European USSR, which are responsible for
most of the growth in Soviet steel capacity, is excellent (Figure 1). So
is accessibility to the great bulk of the national and entire COMECON market
(Columns 7-8 of Table 2 and Harris, 1970, pp. 220-25). This allows even
such a steel short province as Belorussia, with heavy metal consuming, though
still labor intensive, machinery industries to enjoy a highly "competitive"
location for a wide range of engineering branches (Evstigneev, passim).

7 The share of engineering products, durables and chemicals greatly expanded
and the preponderance of food and light industries lessened (See columns
3-4 and 7 in Table 6; Borodinoi et al., eds., 1978, pp. 11-17; Kotyk and
Bondarev, 1976, pp. 34-39). Such a change, however, is somewhat deceptive,
since both the engineering and chemical industries represent very varied
groups. Many of their branches established in these provinces represent
traditional, outdated, manufacturing, which have long ceased to be techno-
logically advanced even in the Soviet Union.
The Impact of Foreign Trade

Strengthening economic ties with the rest of COMECON and increasing participation in world trade have clearly provided added stimuli for the growth of this western zone. They should continue to do so in the future. The impact includes the creation or expansion of production facilities at least partly for export and the strengthening of transport infrastructure from and through these regions. Even though these western provinces are poor in minerals, resources and resource processing industries are playing a major role in this export orientation. Proximity to East Europe has proved enough of an advantage to counteract the disincentive of low quality and entice COMECON credits and participation in the Soligorsk potassium and Kingisepp phosphate mining and enrichment projects. 8 Similarly, the construction of western oil refineries, such as Mozyr, Novopolotsk and Mazeikiai, including some petro-chemical units associated with them, were initiated both with the local and the East European markets in mind. 9 Despite the scarcity of local fuel-energy resources, the L'vov area and Moldavia are also heavily involved in electricity export, both transmitting some 30 percent of their mid-1970 output to Eastern Europe (Shabad, 1979,

8 Already by 1975, over 30 percent of Soligorsk potassium output was exported, primarily to Poland and Hungary (Borodinoi et al., eds., 1978, p. 52 and Shabad, 1979, pp. 247-28) and the volume of export increased appreciably since. By 1980, Poland had planned to satisfy about two-thirds of its potassium consumption from Soviet imports, overwhelmingly from Soligorsk, Belorussia. Polish credit for the project totals 70 million rubles (Ptashek, 1974, pp. 130-31).

9 The Mazeikiai, Lithuania, refinery has been designed specifically for the East European, particularly Polish market, with Polish workers laying a pipeline from Novopolotsk to Mazeikiai (Shabad, 1979, p. 235). At the Novopolotsk refinery an ethylene shop was set up with East German assistance under a compensatory agreement (North, 1979, p. 26).
p. 240, p. 20). With more large projects completed and agreed upon since then such exports should continue to expand very significantly. 10 Without foreign trade and participation, some of these projects would have been constructed on an appreciably smaller scale. And one big chemical work at least (Kalush in the Western Ukraine), would not have been built at all. 11

The impact of foreign trade on the expansion of engineering and consumer industries across this western periphery is much more difficult to separate from other, frequently more important, factors. Exports constitute only a few percent of most factories' output that produce for trade and such sales bring no extra income to the plant above domestic sales. On the factory and local level, therefore, the incentive to trade is non-existent or slight, while on the national level the locational advantage of the western provinces may be entirely submerged in a host of other consideration. Be that as it may, export activities and COMECON ties can be identified as important factors in the rapid growth of manufacturing activities in

10 Through the recently completed Vinnytsa-Albertirsa (Hungary) 750 kv high tension line, the Soviet Union guaranteed the delivery of an additional 1200 MW of power, half of that to Hungary. With the supplementary saving from peak exchange, this will enable East Europe to forego 1500 MW of new capacity. With 66.6 percent availability, the new 1200 MW delivery capacity is equivalent to an incremental 7 billion KWH. Soviet export of power in 1978 amounted to 12 billion KWH. (Szili Géza, 1979, p. 396 and Vneshnaiia torgovlia SSSR v 1979 g., pp. 61-62). The USSR also agreed to the construction of two new 4000 MW nuclear stations in the Western Ukraine jointly with East European states. The first to be started at Khmelnitskii, at an estimated cost of 1.5 billion transferable rubles, will be 50 percent financed by Poland, Czechoslovakia and Hungary (Bajbakov, 1978, p. 1197 and DIW, Wochenbericht, No. 35, 1979, p. 365).

11 Kalush, in the western Ukraine, furnished almost half of all increment in vinyl plastic output during the 9th Five Year Plan (Shabad, March, 1975, p. 198). Only very close cooperation, initiated by the Hungarians, with the large ethylene project at Lentváros made the location in that peripheral region of high energy costs viable (North, 1980, pp. 25-26. The cooperation involves an ethylene pipeline between the two centers and the exchange of intermediates and products.
a number of western cities, such as Minsk, L'vov and Novovolynsk. (Borodin, 1978, p. 34; North, 1980, p. 40).

Finally, increased foreign trade, the bulk of which is through western border cities and ports, generated a great deal of new construction (pipelines and port facilities) as well as improvements of the existing network and transshipment points. Between 1955 and 1976, the tonnage of foreign shipment by sea grew more than 11 times, by pipelines (oil and gas) over 10-fold and by rail 3.2 times. More than 90 percent of the rail movement and nearly 80 percent of the pipeline traffic is with Eastern Europe, all of it moving through this western periphery, which also forms much of the hinterland for several ports. In 1976, about 90 million tons of railway freight moved across the western frontier (Shabad, 1980, pp. 48-49), roughly 60 percent of that through the Polish and Hungarian borders alone (Ptashek, 1974, p. 134 and Shanina, 1978, p. 62). Despite the extension of three broad-gauge lines beyond the frontiers into East Europe, "much transshipment and gauge changing is still necessary - a boost to the economies of these border regions. . . . The heavy westward traffic has also forced the upgrading of Soviet railways and the construction of new lines." (North, 1980, p. 46).

Investment in these western border regions in the broad sense (pogranichnye raiony as opposed to the immediate border oblasts or prigranichnye raiony where rapid development may not be the rule\(^\text{12}\)) on the main show high return, though the relatively large share of food processing and

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\(^{12}\) According to North, this distinction is clearly made by Soviet writers. "Whereas extra growth of the pogranichnye regional economies can readily be seen, the prigranichnye raiony often remain little more developed than they were when border locations were basically unattractive. In other words, relative location at this scale is not a major force. In addition, while individual republics can build up discretionary funds, on the oblast level such authority is entirely absent." (North, 1980, p. 51).
and consumer products in their industrial structure may be the principal cause. Yet, these areas evidence not only high output per unit of fixed capital but also very high incremental ratios of the two. The latter are much more favorable than found not only in most Trans-Ural provinces but also Latvia, Estonia, the Central and North-West regions, where the industry mix should similarly favor above average capital productivity. Though their influence cannot be measured, the tangible and intangible advantages of accessibility and, by Soviet standard, well developed infrastructure, combined with reasonably skilled manpower reserves must be given credit. The gradual weakening of the early dependence on the external economies of initial concentration and the accelerating centrifugal movement of industry from the U.S. Manufacturing Belt have been well appraised (in the last decade, even California experienced a negative relative shift in earnings and a negative industry mix effect on manufacturing growth. (Beyers, 1979, pp. 38-40 and Rees, 1979, pp. 48-51. See also, inter alia, G. Sternlieb and G.W. Hughes, Revitalizing the Northeast, New Brunswick, N.J.; Rutgers University, 1978 and B.R. Weinstein and R.E. Firestine, Regional Growth and Decline in the United States. New York: Praeger, 1978). This process appears to operate in the USSR as well.

Stagnation in Russian Parts.

This diffusion of economic growth, however, appears to miss most parts of the RSFSR belonging to that western-north western periphery. Here stagnation is the rule, with most oblasts experiencing below average industrial expansion. Even those few (Novgorod, Pskov, Kaluga, Smolensk) which had seen an upsurge during the 1960's lost that new-found vitality in the following decade (Nar. khoz. RSFSR v 1969 g., pp. 39-41 and ... v 1975 g., p. 49).
Since the agricultural resource base here is worse than in the non-Russian parts of the western USSR, while ethnic barriers to outmigration are absent, this non-black-earth belt of European Russia has been a classic zone of Flucht throughout the postwar years. Most provinces in that zone have been losing population or experiencing virtually no growth for two decades. The age and sex distributions have become so distorted that by the early seventies two oblasts and several raions were experiencing a natural decrease of population, with the number of deaths exceeding births (Rybakovskii ed., 1976, pp. 132-33).

The unfavorable settlement structure impedes the modernization of this zone, limits amenities and their accessibility, especially to the rural population. Only 1.5 percent of rural settlements here contained more than 1000 persons (accounting for a mere 20 percent of the rural population) and 95 percent of them have less than 500 inhabitants. Average distance between villages of over 1000 persons and even between those of over 500 are much greater than elsewhere in the European USSR (Table 7). If one considers only the provinces south of the 61° parallel and therefore within the agricultural belt, the mean distance between villages of 1000 population and over in this non-chernozem periphery of the RSFSR is almost 14 km. Even between villages of over 500 the mean distances reaches almost 8 km.

13 The great number and frequency of khutors (individual farmsteads) in the Baltic republics distort comparisons of this region with the rest of the USSR. In Latvia, where khutors are most numerous, 347,100 or almost nine-tenths of rural settlements had 10 or less inhabitants. However, the small size of the Baltic republics and their dense network of paved roads practically obviates the problem of inaccessibility for any segment of the population.
(Calculated from Vestnik statistiki, No. 5, 1971, pp. 80-81 as 
\[ \sqrt{\text{area} \div \text{No. of settlement in the relevant category}.} \])

There are no clear signs so far that a resurgent Great Russian nationalism or the specific Non-chernozem Program, which at least in part was a response to the former, have turned around the fortunes of this historic land, dear to Russian hearts but increasingly marginal to the economy. With the exception of Novgorod and Pskov oblasts, the accessibility of the Russian parts of this western periphery to East Europe and the world at large is also signally worse than that of the western border republics. Convenient location in an era of increased COMECON ties thus cannot be expected to help counterbalance the cumulative losses suffered since the early Five Year Plans. It may be that economic decline and demographic distortion has gone too far. During the rest of this century, at least, with many pressing, competing problems, with simultaneous labor, capital and even energy shortages facing the leadership, the long secular decline here is most unlikely to be reversed. 14

The Southern Periphery.

South of the Slavic heartland of the European USSR and its eastward extension beyond the Urals lies a good portion of Western Asia. Its place in the Soviet regional system is mostly a result of Imperial colonial conquests and it remains an undigested and undigestibly separate realm of the USSR. Not only is this realm overwhelmingly non-Slavic but, because of

14 Though his brush may have been too wide, David Hooson seems to have been correct in writing about this north-western zone of the RSFSR some 15 years ago: "... it seems likely that its most distinctive function ... will be that of a partly fossilized shrine of Russia's heroic past." (Hooson, 1966, p. 247).
much higher rate of native population growth, the share of the Slavic colonists decreased sharply since the late 1950's, with an especially rapid decline over the past decade. South of the Caucasus, Aral Sea and Lake Balkhash, Slavs today comprise only 14 percent of the population as against almost 20 percent in 1970 (Sheehy, March 27, 1980, p. 16 and April 8, 1980, p. 5; Itogi vsesoiuznoi perepist . . ., 1970, Vol. IV).

The Caucasus: Potential Workshop in a Stagnant Economy?

Although pointedly distinct from the Slavic world to the north, this southern arc is internally even more diverse than the western periphery. Most specifically, Transcaucasia is in a more advanced stage of demographic transition and socio-economic development than Central Asia. It is geographically much more accessible to the European core area, to the national market as a whole (Table 2, Column 7-8) as well as to seaports, a location which has made it more of an extension of the European USSR through much of its economic history than a part of Soviet Asia. Male rates of higher education for the three main Caucasian nationalities in 1970 well exceeded those for Russians nationwide, though the figures may be somewhat inflated, while east of the Caspian these rates, not to mention those for women, were much lower (Andrews, 1978, p. 455 after data in the 1970 census).

Male rate of higher education for Georgians was 90 percent above that for Russians and 62 percent above that for Armenians in 1970, casting some doubt on the reliability of these figures. It would be surprising if the flourishing "second economy," especially vigorous in the Caucasus, did not extend to the field of education. At any rate, according to emigré opinions, the purchasing of diplomas here is quite widespread.
Throughout the Soviet period, Caucasians have been strongly represented in the Party and government, a position which has also brought the region unquestionable economic benefit.

Industrial growth rates in Armenia have long been exceeding the Soviet mean, but in the two other republics of Transcaucasia they have lagged behind until recently (Table 1 and Promyshlennost; SSSR, 1964, pp. 50-52). During the last decade, however, a turnaround has clearly taken place. Industrial development in Transcaucasia declerated only slightly, compared to the precipitous decline nationwide, and in the 1975-79 period output in the region as a whole grew some 10 percent faster than Soviet industry. At the same time, the whole area, even Moslem Azerbaidzhan, has entered the last phase of the demographic revolution, with birth rates dropping rapidly almost to the USSR average today, resulting in improving per capita levels. The rates of improvement in labor productivity show a similar reversal relative to the national trend: lagging behind during the 1960's surging ahead of the Soviet average in the following decade (Nar. khoz. SSSR v 1970 g., p. 163 and ... v 1978 g., p. 128).

This industrial turnaround is all the more interesting because Transcaucasia failed to increase its share of investment received from the Soviet state. Instead, a more reasonably trained and ample labor force seems to have made good use of incremental capital (Table 3). As in the western

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16 The low average output to fixed capital ratios in two of the Transcausian republics in 1972 (Table 2) reflect the legacy of the historic dominance of petroleum production in Azerbaidzhan, now in sharp decline, and the unfortunate Sevan project built in the 1950's and early sixties that saddled Armenia with a white elephant for many years to come. In 1972, the fuel industries still accounted for 45 percent of Azerbaidzhan's industrial fixed assets (Gillula, 1980, pp. 74-75, Tables B2-B3). In Armenia, the threatening drop in the level of Lake Sevan led to the complete revision of the project after the bulk of hydrocapacity was completed. "Electrical output . . . was cut back sharply, as the flow through the dams was limited solely to irrigation needs." (Shabad, March, 1977, p. 207.)
Peripheral, the industrial structure of Transcaucasia has greatly broadened away from the preponderance of resource-based food processing, fuel and mineral production and smelting to embrace the whole range of manufacturing (Abramov, 1977, pp. 75-98). Today the relative importance of a fairly diversified engineering complex is not very much less than in the country as a whole and that of the chemical industries is significantly greater.

At the same time, the region retains a comparative advantage in light industries, particular food processing branches (Table 6; Kobakhidze, pp. 128-29 and Adamesky et al., eds., 1973, pp. 58-82 and 116-35), hydroelectric power for peaking (Shelest, 1975, p. 295, and Ryl'skii et al., 1974, pp. 161-69) and specialized recreations and health-resorts in which a fifth of the nation's assets are concentrated in the Caucasus (Adamesky, 1973, p. 14, and 166-73).

It is my view that Transcaucasia, where today 45 percent of a reasonably skilled population is in the 10-35 age group versus 40 percent in the RSFSR and 37 percent in the Ukraine (Baldwin, 1979, pp. 92, 103 and 112), will probably play a similar role in industrial development for most of the remainder of this century as was played by the western periphery in the past two decades. The level of urbanization in Transcaucasia slightly exceeds the national mean, but industry is very heavily concentrated in the three republic capitals, with almost 63 percent of gross output and 59 percent of industrial employment (seven cities hold three-fourths of all industry. Adamesky, 1977, p. 158 and Silaev, 1967, pp. 230-31), that leaves a large underutilized labor pool in the rest of the ca. 140 cities, well over a third of which had over 15000 inhabitants. 17 Although Transcaucasia still

17 In January 1974, 48 cities - excluding the three capitals - had over 15000 people. The 1970 census listed 131 cities, 39 of which - excluding the three capitals - were over 20000 and 18 exceeded 10000 in 1970 (USSR. Administrativno-territorial'nye delenia..., 1974, pp. 636-50 and Itogi...Vol. 1, p. 112).
lags well behind the European USSR and the Soviet average in infra-structural development and government provided communal services,\textsuperscript{18} (Abramov, 1977, pp. 99-114), the disparity in the latter is largely counter-balanced by a widespread network of cooperative service and repair shops and the especially vigorous second economy. All in all, the region today is probably not worse off in amenities and supporting activities for a broadly-based industrial expansion of all-Union significance than was the western periphery in the 1960's. Despite low export coefficient as yet (Table 2)\textsuperscript{19}, the accessibility needed for a vigorous participation in foreign trade is also present.

In forecasting such a role for the Caucasus in the forthcoming years, however, three caveats are in order. One of these relates to the relative importance and scope of the "second economy," which has always been exceptionally vigorous in these republics. Given the decreasing family size, illegal and semi-legal activities may prove an even more attractive alternative to the official economy in the future, providing a still higher share of personal income. More resources could thus be siphoned away for a sector, which benefits only the local population and is beyond the pale of national planning. This would most likely dampen official growth rates and

\textsuperscript{18} These are also badly concentrated geographically, especially in Azerbaidzhan. Eighty-six percent of the sewage network in the latter republic is found in Baku, Kirovabad and Sumgalt. Similarly, slightly over half of all everyday services and repair (bytovye uslugi) is enjoyed by the Apsheron peninsula on which Baku is located (Abramov, 1977, pp. 135 and 186).

\textsuperscript{19} Another source, however, claims a much higher index for 1971 (Avdeichev et.al., eds. 1976, p. 135).
lower economic indicators, though the region itself and certainly its population may well be better off.

Secondly, we cannot predict the impact of nationalism and rising anti-Russian sentiment on economic development either directly or indirectly through a possible backlash expressed as reduced investment allocation. It is significant that the Russian population in Georgia has been declining since 1959 at an accelerated rate, with the outflow linked by some emigré opinion to the inimical attitude of the Georgians. Over the last decade, Azerbaidzhan experienced an even larger outmigration, in this case more likely oil-workers shifted to Siberia. The Transcaucasus as a whole lost 56,000 Russians (Sheehy, 1980, p. 16). If increased national restlessness produces a backlash of reduced capital investment, economic performance is certain to be affected. Finally, investment in the region may fail to rise or be even cut back simply because of the sheer shortage of funds. In 1979, for example, the commissioning of new capacity in the country remained essentially stagnant and total investment grew by only one percent (Ekonomicheskaia gazeta, No. 5, January 1980, p. 8). At a time of extreme capital stringency, investment in Transcaucasia may well be reduced absolutely to a significant degree, preventing the region from taking full advantage of its ample, reasonably skilled manpower and relative proximity to the European core areas.

Central Asia: Uneasy Prospects

While part of that southern periphery, Central Asia - Southern Kazakhstan presents much more intractable problems than the Caucasus. The overwhelmingly Muslim population has barely begun to limit its birthrate, which still...
exceeds 3 percent by a substantial margin.\textsuperscript{20} (Nar. Khoz. SSSR v 1978 godu, pp. 26-27.) Given the massive size of young cohorts in the under 20 age group, rapid population growth is destined to continue for the rest of this century. Central Asians so far have also been poorly represented at the highest levels of Party and government and even among the technicel elite and industrial labor force within the region itself.\textsuperscript{21}

The economy of Central Asia is in large measure still colonial. It has, by far, the least manufacturing per capita, with the relative level actually declining in every republic because of the burgeoning population increase and, recently, sagging industrial growth rates (Table 1). At the same time, the region's resources of cotton, natural gas and metals, especially gold, are shipped overwhelmingly to the European USSR and for export in virtually unprocessed form. With nine-tenths of the Soviet and about one-sixth of the world's cotton fiber output in the mid 1970's, Central Asia produced a mere 5 percent of all cotton textiles and 4.4 percent of

\textsuperscript{20}Among the nationalities of this area the Kazakhs have gone farthest in limiting the size of their families. Yet birthrates in Kazakhstan actually rose from 23.4 per 1000 in 1970 to 24.4 per 1000 in 1978. In addition, the republic contains almost 6 million Russians of low fertility (41 percent of the total population) most of whom reside in the northern half of the republic, where the native population comprises only a rather small minority. Between 1970 and 1979, the Kazakh population increased by almost 24 percent, or 2.4 percent per annum. Assuming that the death rate among them is no higher today than among the population of Kazakhstan as a whole, birth rates must exceed 2.5 percent even among the Kazakhs (Nar. khoz. SSSR v 1978 godu, p. 27 and Sheehy, 1980, pp. 10 and 13).

\textsuperscript{21}In Uzbekistan, the most advanced and by far the most populous of all the Central Asian republics, less than one-third of the labor force in light industry consisted of indigenous ethnic groups during the mid 1970's. Yet the 1979 census lists the share of indigenous Moslem groups in the population as over 80 percent. Large textile kombinati in Tashkent, Fergana, Ashkabad and Dushanbe employed the local nationalities for only 9 percent to 16 percent of their total labor force. In more skill demanding occupations the participation of native groups must surely be lower still (Afanas'evskii, 1976, p. 216).
all sewn garments in the USSR, shares unchanged since 1960. These shares are far too small to satisfy even half the demand of the region itself let alone allow for exports of such goods (Afanas'evskii, 1976, pp. 208, 211 and 226). Nor are these republics even self sufficient in food products, with the per capita output of the food industries being less than half the Soviet average and less than the mean for every major branch (Zakumbaev, 1977, p. 185). Similarly, for many years now, Central Asia has been piping to the RSFSR more than three-quarters of the gas withdrawn from its reservoirs, with Turkmenia, the largest producer, exporting 97 percent (Mun'ko, 1977, p. 54 and Dienes and Shabad, 1979, pp. 70-71 and 80-84). The contribution of machine building to the region's industrial structure is negligible, a mere 1.3 percent, by far the lowest among all economic areas of the USSR (Table 6).

The economic indicators of Central Asian industry seem less than satisfactory. While in recent years, average and incremental ratios of gross output to fixed capital approximated the Soviet mean (Tables 2 and 3), this is explained by the high material intensity and consequent double counting, notable for its distortions on branches with high resource content. The share of net output appears to be much smaller than that of gross production.

22 Products of the food industries comprised almost a fifth of all inter-regional imports into Central Asia in 1972, while this group represented only a negligible portion of exports (Popadiuk, 1979, p. 61.)

23 In gross output, Uzbekistan accounted for 59 percent and Kirgizia for 16 percent of all Central Asian industry in the early 1970's (Table 2). Their respective shares in net output, i.e. value added, were estimated as 61 and 17 percent (Zakumbaev, 1975, p. 65).
in all Central Asian republics (Table 2). Even in such technically simple and low skill demanding industries as textiles and apparel, capital productivity in Uzbekistan during the 1960-1975 period reportedly reached only half of the Soviet average. Labor productivity in these branches is similarly lower by 17 to 30 percent throughout the four republics, despite the fact that the work force in them is highly capitalized (Afanas'evskii, 1976, pp. 219-220). Nor did the region show any relative improvement: the productivity of industrial labor, in fact, has been rising slower than the national average (Nar. khoz. SSSR v 1976 g., p. 163 and . . . v 1978 g., p. 128). Although cost allowances for new construction in Uzbekistan are officially set 10-15 percent above those in other, better located, regions and cost of equipment 6 percent higher, a recent Uzbek study finds these coefficients too low. A shoe factory built in Fergana in 1969 cost a shocking 41 percent more than an analogous plant that went on stream in Abakan, Krasnoiarsk Krai, East Siberia, a year earlier (Khikmatov et. al., 1978, pp. 111-12).

Central Asian development is also hindered by the increasing shortage and cost of water. The more easily accessible water resources have all

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24 Although the warm climate reduces construction costs slightly, this is more than counterbalanced by adverse factors such as seismic characteristics and the relatively underdeveloped state of construction organizations. For the 1972/73 revaluation of fixed capital Gosstroi used coefficients of 1.07-1.10 for Central Asia but apparently this applied to fixed capital already in place (Gillula, 1980, p. 19).
been tapped, even if inefficiently with great losses, and irrigation costs have been increasing rapidly in recent years. Mounting irrigation expenses must have been the chief cause of the much faster growth of costs relative to increments of net output in the agriculture of Uzbekistan during 1970-1976 when compared to Soviet agriculture as a whole for the same period. At the same time, major water projects of the 10th Five Year Plan, such as the lengthening of the Kara-Kum Canal and expansion of the Karshi Steppe, Golodnaia Steppe and Fergana Valley systems demanded large new doses of investment. For the longer term, water diversion from West Siberia are being most seriously considered and evaluated (Micklin, 1978, pp. 15-22).

Given all these constraints to even maintaining previous economic growth rates, the problem of what to do with the burgeoning population in these Moslem republics will loom increasingly large. The probability of large scale outmigration from Central Asia as well as the alternative of

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25 In the low flow years of 1970-72, almost 79 percent of the surface flow to the Aral Sea was withdrawn, only one-third of it being returned. The diminution of the basin discharge, therefore, ranged around 50 percent. By 1980, total withdrawals from the Amu and Syr Daria, the two rivers supplying nearly all the water to the Aral Sea, could reach 97 percent of their surface flow and consumptive losses 64 percent. (Micklin, 1978, p. 16). Some of the smaller rivers of Central Asia are even more heavily affected. In the region as a whole, three-fourths of all the water consumed is for irrigation and, according to Soviet experts, "if more water is not available by the 1990's further development will cease." (Gustafson, 1980, p. 1343). Improper practices, exacerbating soil salinity is a pervasive problem, resulting in land abandonment, which in some periods equalled the area of newly irrigated land (Micklin, 1978, p. 15).

26 Between 1960 and 1970 the growth rates of gross agricultural output in Uzbekistan exceeded that of net output by almost the same margin as in the USSR as a whole. After 1970 the difference between the two growth rates in Uzbekistan was much greater, indicating escalating costs (Popadieuk, 1979, pp. 48-49). And the 1970-76 period included two years of very poor harvest which depressed net output for the USSR much more than for Uzbekistan without affecting costs. During that period, the rate of increase in the delivery of fertilizers was much slower in Central Asia than in the USSR (or the RSFSR and the Ukraine), which therefore cannot be responsible for the more rapid rise in costs in the former region (Narkhoz SSSR za 60 let, p. 327).
using migrant workers from the region for specific projects and durations have been thoroughly analyzed by Western researchers. Lewis and his associates maintain that "socioeconomic, demographic and ethnic processes in the Soviet Union are fundamentally very similar to these same processes in all multinational states". Neither birth control nor accelerated economic development can be expected to relieve the mounting population pressure in Central Asia. Universal experience thus suggests considerable outmigration and redistribution of indigenous ethnic groups into the labor-short Slavic republics, with attendant nationality conflicts in the forthcoming decades (Lewis, Roland and Clem, 1976, pp. 343-83). Others, attributing much greater role to inhibiting cultural, religious, linguistic and climatic barriers for large-scale outmigration, question that hypothesis. And given substantial additional income from the private plot, subsidiary activities and transfer payments, plus the lower living costs than in most Slavic provinces, the critics of this view consider the "push factor" of declining living standard insufficient to initiate such an exodus (Feshbach, 1979, pp. 656-709; Hodnet, 1974, pp. 65-88). Still others maintain that selective relocation of Central Asians for fixed terms of service to European rural areas, combined with somewhat greater efforts at regional development, seems the most likely scenario (Weinbush and Ponomareff, 1979).

This writer agrees with those who believe significant outmigration to be both unfeasible and highly improbable and thinks that even Gastarbeiter type movements will be practicable only on a very limited scale. Yet he doubts that the Soviet leadership will have the resources and the consensus of purpose to embark on a forceful, comprehensive program for the region over the next decade, perhaps even longer.
A developmental strategy suitable for Central Asia requires dispersed investment in large number of small and medium scale plants, particularly in small towns and rural areas, both to soak up the surplus labor and to provide continued upward mobility for native cadres (Burg, 1979, p. 76). Some effort does seem to be made today towards such dispersed industrialization, while the beginning of commuting from rural villages to towns is also observable, a practice particularly suited for the region "in view of the demonstrated reluctance of rural residents to shift to urban living conditions." (Shabad, 1979, pp. 121-22). Such dispersed industrialization, however, entails still higher capital costs than the construction of a few large plants of the same capacity. Yet, according to data for the footwear and silk industries, investment requirements per factory floor space in the region well exceeds those in West Siberia and is much above those in the European USSR on account of the low level of construction organization and supporting services (Afanas'evskii, 1976, pp. 118, 154-59).

Under these circumstances it is questionable whether current efforts will be anywhere near enough to draw into production the accumulating labor surplus. A recent Western study cogently argues that the structural, institutional and functional constraints in the Politburo, combined with a rising tide of Great Russian nationalism, will prevent the channeling of

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27 A 1973 source claims that 5 million are needed to be drawn into production in Uzbekistan alone," and therefore almost 10 million in Central Asia - Southern Kazakhstan as a whole," in order to maintain the (then prevailing) labor force participation rate of 44-45 percent (Feshbach, 1979, p. 666)
enough investment in a focused, coordinated fashion to provide for a sufficient rise of employment and standard of living in these republics. On the one hand, the power of those Politburo members "with territorial constituencies in the relatively underdeveloped and demographically growing republics" is still fairly weak (only the Kazakh first secretary is presently a full voting member) and is more than counterbalanced by "those members with constituencies in the more developed but demographically static territories of Leningrad, Moscow, Belorussia and the Ukraine." On the other hand, members with functional constituencies (major industries, transport, defence, etc.) also will probably resist accelerated investment in Central Asia. Instead, they are "highly likely to view the development of Siberian raw materials and energy resources as essential to the continued expansion of the bureaucratic domains" which compose their bailiwicks. (Burg, 1979, p. 77.)

In addition, "members with territorial and functional constituencies in the RSFSR undoubtedly view development of Siberia as essential for the Russian Republic," besides the mystic importance and ethnic meaning the Siberian frontier may hold for Great Russians. "Consequently, substantial capital investment in Siberian development not only offers potentially greater economic benefits to the Russian members of the Politburo responsible for functional constituencies than investment on an equivalent scale in Central Asia . . . [but also] promises them important ethno-national benefits. [It] allows them to accommodate Russian national sentiments in a way which is highly utilitarian and which does not increase disproportionately the power of any one of them." (Burg, 1979, p. 78).
The leadership's sensitivity to any potential threat to domestic stability, however, should moderate somewhat that institutional bias against the accelerated development of Central Asia. Led perhaps by the General Secretary and the member responsible for security (at present the Chairman of the KGB), a consensus may therefore emerge for limited development of the Central Asian economy. While possibly somewhat more vigorous than that of the recent past, such a strategy would not threaten the priority accorded to what Hooson called "effective national territory" (Hooson, 1972, p. 539), and within it Siberia in particular. It also cannot provide employment on a scale to "solve" the Central Asian problem. Yet it is the only strategy on which, barring radical changes in the composition and orientation of the Politbureau during the succession struggle, the Soviet leadership in the absence of large external sources of capital is likely to be able to agree (Burg, 1979, p. 80).

It may be that the above explanation is just too "pat," the pragmatism of a basically Anglo-Saxon discipline applied beyond its limits. Yet the reasoning that, from its own resources, the Soviet leadership will be unable to channel enough funds into Central Asia to sharply boost its economy seems to me sound. Irrespective of the Byzantine intricacies of Soviet decision-making, the quantities of investment capital relative to needs will be severely limited and its lumpiness increased. Mounting

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Burg's conclusions that the Central Asian problems and the Soviet leadership's attempts to solve them present the political leadership of the West with a remarkable opportunity to influence the course of Soviet domestic and foreign policy, even to the extent of linking "the provision of Western capital with the reduction of military expenditure" certainly appears dubious (Burg, 1979, p. 82).
energy and raw material requirements have pushed Siberian development irreversibly to the front for the 1980's. The capital demands and lengthening lead times of these projects, together with the need to keep the aging physical plant of the European USSR functioning on at least current technological levels, will put Central Asia on an economic back-burner. Barring a major Moslem upheaval which, if it comes, is very unlikely before the end of the decade, the primary focus of Soviet regional policy for the next 10-15 years will be Siberia. Briefly considered in a previous section, Siberia must be the subject of closer scrutiny.

Siberia
(Including the Far East and North Kazakhstan)

Besides sheer size, the most salient feature of Siberia is its environmental harshness, resulting in low population densities, lack of infrastructure and very high investment requirement for any strategy of development. Half of that vast territory (an area as large as the US west of the Mississippi) experiences more than 120 days with mean daily temperatures of below 5°F. Close to half of the remainder, with higher temperatures, must contend with a severe wind-chill factor and/or the quagmire of primeval swamps which make conditions only marginally better than in the first zone (Mote, 1978, especially pp. 19-36). Almost 70 percent of the area (four-fifths without North-Kazakhstan) is underlain with permafrost, which extends all the way into Mongolia and China east of the Enisei. And because so much of this permafrost has formed on sedimentary strata, the presence of ice complicates construction still more than in corresponding areas of Canada.
Table 7 shows eloquently the sparseness of settlement network and transport routes. The relative supply of other types of infrastructure and services, such as housing, household services and nursery schools, also fall well below those in the European areas (Vitebskii, 1978, pp. 48-53 and Mil'ner, 1979, p. 63). This lag, however, simply cannot be remedied soon. Compared to the European Plain, primitive conditions and the natural environment boost full construction costs in south-west Siberia by perhaps one-third, in the Tiumen oil and gas province by some 100 percent and in the north-east by three to nine times (Figure 2).

Finally, the physical environment sets limits to the extent of agricultural land and is the chief factor in determining its value. Only 2.34 percent of Siberia is arable and no more than 5.1 percent is agriculturally utilizable in any way. With Kazakhstan added, these shares rise to 4.9 and nearly 20 percent respectively, the big jump in the utilisable category resulting from the inclusion of vast expanses of poor pasture land in the Kazakh desert. (Nar. khoz. SSSR v 1975 g., pp. 20 and 344; Nar. khoz. RSFSR v 1975 g., p. 162 and ... v 1973 g., pp. 9-10). East of the Enisei in particular, large stretches of arable land are found only in the Amur-Ussuri Valleys. Low fertility aggravates the shortage. The average per hectare value of agricultural land falls below 60 percent of the Soviet mean in both East Siberia and the Far East and barely exceeds

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29 Altogether per capita consumption allocation from the state budget are about 70 percent of the RSFSR average, although private consumption lags by only 5 percent (Legkostup et al., 1979, p. 10).
one-third of the mean in Kazakhstan (Zemel'nyi kadastr SSSR, 1967). The poor land quality, combined with rural depopulation, reduces returns to land to levels lowest in the USSR outside the poorest oblasts of the European non-chernozem belt (Zamkov and Valeshko, 1975, pp. 41-61.) Only the wooded steppe zone of West Siberia is endowed with land of roughly average fertility and the only Siberian region with an agricultural surplus. Siberia, as a whole, cannot feed itself and the provisioning of new industrial nodes thus becomes a major added cost of development.

In recent years, the deficit has apparently worsened for animal products, most probably also for vegetables and barely improved for food grain (Kopach and Novoselov, 1979, pp. 76-77).

**Investment Growth and Productivity**

While Soviet pronouncements on regional issues have long shown a positive bias towards the vast Asian hinterland, the share of total investment channeled to Siberia until 1975 changed very slowly, with the only noticeable jump registered in Krushchev's Seven Year Plan. As shown earlier, however, allocations to the Trans-Ural Northlands quadruplied between 1965 and 1975, reaching 4 percent of the total (Table 5). Equally significant is the fact in every five years period between 1960 and January 1976, the proportion of Siberia in capital investment consistently exceeded the region's share of new fixed assets commissioned. While the latter

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30 Average land value by economic regions reproduced in Kovalenko, 1972, p. 32.

31 Even the Bratsk complex, located in the more favorable cis-Baikal zone on the same latitude as Gor'kii and Riga, has managed to achieve self-sufficiency solely in potatoes and that only in good years (Tarasovym, 1979, p. 53). The problem is complicated by the large number of newborns on the big new construction projects lacking any agricultural base, more than 30,000 infants on the BAM alone since the mid-1970's (Kopach and Novoselov, 1979, p. 76).
excludes dry holes in the oil and gas industry, imparting a small downward bias to Siberia's claim to the nation's fixed assets, it still appears that relatively more investment is squandered here or frozen in unfinished projects than elsewhere.  

Given the harsh environment and the grossly inadequate state of infrastructure and services, the continuing low priority accorded to so-called "non-productive" (infrastructural and service) construction is a perpetual bane of Siberian development. The problem is reflected with monotonous regularity in Soviet literature. From 1960 through 1975, the percentage of non-productive outlays in total investment was lower in Siberia than in the USSR as a whole (Aganbegian et al., 1974, p. 210 and 1979, pp. 30-40). In the first half of the 1970's, per worker allocation for social infrastructure in the West Siberian oil extraction industry actually suffered a drastic absolute decline—from almost 33 rubles to 12.5 rubles per year and only marginally exceeded the branch average for the USSR as a whole (Guzhnovskii, 1977, p. 42). A recent source claims further decrease since that time (Pravda Ukrainy, May 23, 1979, p. 2). And in the Tiumen' swamps, of course, a given ruble of such investment results in a far smaller total of housing space and fewer service facilities than in most other provinces of petroleum extraction.

Regional figures for new fixed assets are available only without those put on line by collective farms, but these are of small importance in Siberia. Shares in capital investment, therefore, were also computed without the contributions of collective farms. Nar. khoz. SSSR v 1970 g., pp. 471-78; Nar. khoz. SSSR v 1975 g., pp. 495-502; Nar. khoz. RSFSR v 1970 g., pp. 313-320 and Nar. khoz. RSFSR v 1975 g., pp. 318-329). Because of the exclusion of dry holes only about 81 percent of the oil and gas industries' fixed assets show up in the published statistics versus 93 percent for industry as a whole.
The problem is clearly exacerbated by the well known production bias of branch ministries. It is also aggravated by the lack of lateral cooperation in an economy organized and managed along vertical lines. Not only do housing and service facilities bear the brunt of any shortfall from planned construction goals (being the first to be skimmed on), but they are grossly underplanned to begin with. And the situation is getting worse. A recent scathing article, for example, reveals that in city planning calculations for the new South Sakhalin coal mining complex the posited ratio between families and singles was 20 to 80 percent "in pursuit of an imaginary cheapness." In contrast to these wholly unrealistic assumptions, the actual ratio is turning out to be the exact reverse, with cumulative consequences on the activities of the entire complex (Sotsialisticheskaiia industriia, Jan. 21, 1979, p. 2). As to departmentalism, it "has penetrated even deeper" in the zone of the BAM than was the case so far in West Siberia.

Given the harsh environment and the rudimentary infrastructure, the

33 Altogether more than 150 separate vertically managed organizations (branch ministries and departments) are today involved in the planning and management of the Soviet economy (Kazanskii, 1979, p. 11).

34 "Whereas in Surgut, for example, the 'underlings' of different ministries carefully kept aside from one another (geologists from petroleum engineers, they and others from power engineers, and so on), on the BAM this fragmentation can be observed on the industrial association level, even among people subordinated to the same ministry. Take any of the settlements along the line and you will see 'subsettlement' within them: . . . the construction and erection team, . . . the engineering column, and over there somebody else again." (Komsomolskaia pravda, Jan. 18, 1977).
economic development of Siberia demands vast investment resources and a long pay-back period. Correspondingly, capital and labor productivity, on the average, is lower than in western regions or the RSFSR as a whole. The share of zadely, defined as all types of preliminary and preparatory work done for investment in forthcoming Five Year Plans, reached over 17 percent of total outlays during the 1966-1970 period rising to 18.5 percent in the first half in the 1970's. Labor productivity, though growing somewhat faster than the Soviet average throughout the 1960-75 period still fell substantially below the Soviet mean in 1975 (Nar. khoz. SSSR v 1975 g., p. 113; Nar. khoz. RSFSR v 1969 g., pp. 50-53 and Nar. khoz. RSFSR v 1975 g., pp. 53-56 and Legkostup et.al., 1979, p. 4). Capital productivity, on the other hand, improved more slowly than the Soviet average, at least during the second half of that decade, with Siberia thus dropping farther behind (Aganbegian, 1978, p. 129).

The Problem of Industrial Structure

In the economically more rational post-Stalin climate at least, theoretical work on regional growth by Soviet scholars also has focused attention on the nature of principal, region-forming industries, associated supporting activities and those that meet purely local needs. Region-forming industries "determine the place of a region in the national and international division of labor" and are said to be those "that make the most efficient use of natural and economic conditions for the production

35 During the 9th Five Year Plan, more than 5 billion rubles of capital investment and preparatory work was laid out in Siberia for basic construction that began only during the 10th Five Year Plan (Aganbegian et.al., 1978, pp. 74 and 79).
of a commodity (or commodities) for the national or international markets." (Nikol'skii, 1972, p. 17). Given the system of output targets for all major products and a traditional sellers market under taut planning, locational criteria for "most efficient use" imply not profitability, but an oversimplified yardstick of least production cost. (In addition, of course, "most efficient use" in the USSR has never been judged solely by economic measures). With such an oversimplified locational yardstick, accessibility, demand linkages and the market factor in general are easily neglected in favor of volume and low production costs at mine and factory sites. In the process, rapid regional growth leads to severe imbalances in the economic structures of many areas, problems of employment are created and the transport network becomes overstrained.

This conclusion clearly applies to much of Siberian development to date. Thanks to the hydroelectric, fuel and mineral riches of the Trans-Ural area, an unsophisticated least production cost measure could frequently be used to reinforce the location principle, "bringing industry closer to sources of raw materials." Thus large centers for extractive and other primary industries have been created, but processing activities and the industrial market in general remained concentrated in the European USSR. In addition, World War II and the resulting evacuation has left its legacy in a substantial heavy machinery concentration, particularly in and around the Kuzbas. Such a onesided industrial structure depressed capital productivity in the Siberian economy (Table 2) and contributed to the chronic transport bottlenecks east of the Urals. In the extreme case of electric power (with its exclusive dependence on a unique transport medium, which can span only moderate distances and is unsuitable for the transport of other products), such a location bias had periodically led to large unused capacities, idling for want of consumers.
As Table 6 shows, the heavy dominance of fuel and mineral extraction, power production, heavy chemicals, forest and wood processing activities east of the Kuzbas is strikingly clear. West Siberia is also strong in fuel processing, metallurgy and machine building (almost all of it heavy engineering and agricultural machinery), but even these branches are very poorly represented in the rest of the Trans-Ural RSFSR. The percentage of light and food industries falls well below the Soviet average except in the Far East, where fishing accounts for about a fifth of the region's total industrial output and over a third of the entire Soviet fish catch (Gladyshev et al., 1974, p. 11 and Shabad, June 1978, p. 426). The food industries, as also agriculture, however, are prominent in Northern Kazakhstan, which is part of the Siberian realm.

Also striking is the rather weak development even of the primary stages of manufacturing, such as refining and metallurgy, or of the chemical industry, especially east of the Enisei. As highly energy-intensive branches, ferrous metallurgy and chemical synthesis have long been regarded by pro-Siberian officials as proper specializations for the Trans-Ural territories. Pro-Siberians have long argued that despite the existence of huge, high grade iron-ore resources and of large refinery complexes west of the Urals, the development of metallurgy, petrochemicals and synthetic polymers should be accelerated in southern Siberia and stopped in the European regions in order not to aggravate the energy problem.

Although in Table 6, the author was forced to lump chemicals with two unrelated industries, another source dealing only with Siberia, indicates that chemicals and petrochemicals contribute only 6.7 percent to the region's industrial output or hardly more than in the country as a whole, and a mere 1.1 percent to that of the Far East (Aganbegian et al., 1974, p. 38).
Yet such a reorientation so far has not happened and one finds no evidence of it in the current Five Year Plan. Energy, which itself is not a homogeneous category, is not the only, or even the distinctly preponderent input in these industries, which also profit from agglomeration, locationally associated production linkages and access to market. In addition (as a Soviet critic himself observed), while per unit of output manpower input in metallurgical and heavy equipment production does not appear dominant, total labor requirements per plant are large because of the high economic threshold of modern integrated facilities. And given the conditions east of the Urals, it is the total labor and associated population requirement per optimum sized plant, not per unit man-hour input, which becomes the relevant criterion.\(^{37}\)

Not surprisingly, the eastward movement of metallurgical and associated steel consuming industries had petered out by the end of World War II and the relative contribution of the trans-Ural RSFSR to Soviet machinery production declined steadily through the 1950's and 1960's with no sign of a reversal in the past decade either (Aganbegian, 1978, p. 215; Nekrasov, 1979, p. 59; Shabad and Mote, 1977, p. 54 and Shabad, April 1978, pp. 289-93).\(^{38}\) Nor did Siberia succeed in accelerating the

\(^{37}\)With a 10,000-15,000 labor force and 30,000-45,000 aggregate population requirement, large iron and steel and steel intensive, heavy equipment manufacturing plants would hardly find Siberia an attractive place (Evsitgneev, 1976, pp. 318-19).

\(^{38}\)Even the limited blast furnace capacity is partly fed by iron ore from outside Siberia, surely ironic for a region whose comparative advantage is in resources. Iron ore pellets today are shipped to the Kuzbas from both Kazakhstan and the Kursk Magnetic Anomaly (KMA), south of Moscow. The KMA, in addition, already supplies more than a quarter of all ferrous ore requirement of the Urals (Sovietskaia Rossiia, June 7, 1978 and Shabad, April 1979, p. 270).
development of its chemical and petrochemical industries, and the province's contribution to the national output of these branches dwindled from almost 12 percent in 1965 to 8.4 percent ten years later (Gramoteevoa, 1979, pp. 139-40).

Though no longer advocating complex, full-scale development for the Asian RSFSR, pro-Siberian planners and officials continue to agitate for the expansion of a relatively broad range of industries in the southern belt of the region. The recent sharp attacks leveled against Gosplan and the Ministries of Ferrous Metallurgy, Chemical Industries, and Agricultural Machinery, reflect, in part, local Siberian interests, in part, a valid fear that the very unbalanced nature of industrialization east of the Urals endangers the success of the ambitious plans for rapid economic growth in these pioneer areas. Thus, in the words of the secretary of the Amur Oblast Party Committee, both Gosplan and the Ministry for Agricultural Machine Building have been avoiding the implementation of authoritative decisions obliging them to plan the construction and commissioning of an agricultural machinery plant in the Amur Region (Mavrin, 1978, pp. 68-69). Similarly, the reconstruction of the old Kuznetsk Metallurgical Combine, "a keystone to the industrialization of Siberia" is obstructed by the Ministry of Ferrous Metallurgy, while the huge Tomsk petrochemical combine, badly behind schedule, "has become just another building site." The appropriate ministries lack interest in these projects and resist being "driven" to Siberia (Aganbegian, 1978, pp. 101-127; Nekrasov, 1979, pp. 54 and 58-59; Pravda, April 7, 1978).

The narrow and unbalanced economic structure of the Trans-Ural RSFSR has aggravated the problems of manpower and transport, both of which are
critical bottlenecks in the development of Siberia. In specialized regions only specialized labor can find employment, and as a rule, such labor will be unstable. Similarly, specialized regions that depend heavily on resource extraction must cope with a heavy transport burden. In particular, pioneer provinces in continental interiors must send their freight to distant markets (or ports) overland through a sparse rail and road network.

Recent Population Trends and Prospects

The problems of population and labor force in the development of Siberia have been well documented and only the most recent trends are discussed here. The most obvious broad change of the last decade has been the reversal of the relative population loss (resulting from a turnaround in net outmigration) that characterized the Trans-Ural RSFSR during the 1960's. Yet, a closer look reveals that the population upsurge was largely limited to the Far North and to the Baikal-Amur lands along the Mongolian-Chinese border, in both cases augmented by the high age-specific birth rates of sizeable indigenous nationalities in certain provinces. The more populous

39 Between 1959 and 1970, population growth in Siberia remained well below the Soviet average, only marginally exceeding that for the RSFSR or the other two Slavic republics of the USSR. The small net migration gain of the Far East could not balance the heavy losses from East and, still more, West Siberia (Itogi perepisi . . ., 1970, vol. 1, pp. 10-21 and Malinin and Ushakov, 1976, pp. 42-43). Since the 1970 census, population in the Trans-Ural RSFSR increased faster than the Soviet average and almost twice as fast as in the three Slavic Republics. In the first three years of the 1970's the migration flow reversed itself, resulting in a substantial net migration gain for the Asiatic RSFSR during the rest of the decade (Shabad, September 1979, pp. 441-42 and Malinin and Ushakov, 1976, pp. 2-43).
The forest-steppe zone eastward to Lake Baikal (and even Chita Oblast in Transbaikalia) increased its population at a slower rate than the country as a whole and much more slowly than during the previous decade. The West Siberian steppe, in particular, registered very sluggish growth, below the rate of natural increase for the province during 1970-75, pointing to continued outmigration (Bond and Lydolph, 1979, pp. 464-65 and 476-78). 40

Nor does in-migration represent long-term or permanent settlement any more than it did during the 1960's, when population mobility exceeded that in the European USSR by two to four times and even more (Lydolph, 1979, pp. 151-53). In fact, given the much increased role of the "tour-of-duty" and "expedition" methods of employment, every sign points to even greater labor turnover and instability. Such methods entail flying workers into northern, makeshift settlements from southern base cities (in the former case from within Siberia; in the latter, all the way from the European USSR) for a predetermined period and then returning them for rest and recreation before their next tour. By Soviet estimates, more than 210,000 persons are so employed today in geological work and the oil, gas and forest industries, the overwhelming majority in the Trans-Ural RSFSR. In 1978, over

40 A 1979 source clearly states that net outmigration from Altai Krai, Kemerovo and Chita Oblasts did not cease, while in Novosibirsk, Tomsk, Omsk and Sakhalin Oblasts and the Buriat ASSR the positive migration balance during the 1970's was was insignificant (Mil'ner, 1979, p. 63).

41 According to a very recent source, for example, only 4000 of the 18,000 people at Novy Urengoi live in wooden buildings, themselves poorly suited to the local climate. The rest stay in trailers and makeshift huts. Only one-third of the laundries and baths and only 13 percent of kindergarten accommodations required by the population is in existence (Sotsialisticheskaya industriya, January 23, 1981, p.2.)
30 percent of all those working on pipeline construction in West Siberia were transients from other economic regions and their numbers alone were expected to swell to 70-80,000 in the future (Khaitun, 1979, p. 48). In the spring of 1980, Soviet planners announced a three year plan for accelerated housing construction in Tiumen Oblast, with a total of some 1.5 million sq. meters of new housing by 1983. Assuming 10 sq. meters per person, the plan would settle 150,000 persons, but its fulfillment, requiring a tripling of housing construction capacity in Tiumen Province in three years, is open to doubt (Sotsialisticheskaia industriia, April 17, 1980).

Perevedentsev, the noted demographer and sociologist, declared forcefully in 1979 that the rate of population growth for the North, which "swallowed" 11 percent of the total increment during the 1970's is too rapid and cannot be maintained. (The rate of increase was four times the national average). Compared to its output, the North is really overpopulated and major efforts are needed to reduce its requirement for additional labor resources (Zhurnalist, August 1979, pp. 36-37).

The Transport Bottleneck and the Growing Transport Burden

By all evidence, Soviet planners' traditional view of transport as a service provided grudgingly and only when and to the degree of absolutely necessary continues to hold today. The Baikal-Amur Mainline Railway may be the only partial exception, but in its case the strategic-military role

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42 In the face of such expert opinion, extreme statements that eventually 2-3 million people will live and work in the north of Tiumen Oblast alone appear foolish (Fainburg, 1978, pp. 113-114).
seems as strong as the economic one. In new regions of resource exploitation, transport facilities are provided primarily and sometimes exclusively for the product, when exploitation is ready to begin or has been underway for a number of years. Roads and railways, even communication lines, remain primitive or entirely non-existent throughout the preparation and developmental phase (Altunin, 1979, p. 22). Several recent sources support the frustrated judgment of F.G. Arzhanov, chief of GLAV-TIUMEN'NEftegaz (the Tiumen' Oil and Gas Trust) that West Siberian oilmen must habitually arrive to and develop new deposits in the mud, swimming through marsh, to leave the nearly worked-out fields gaily and with ease on freshly completed hard surface roads (Arzhanov, 1979, pp. 26-27). The Party Secretary of Tiumen' Province declares in equally strong language: "To build fast, one must be able to transport swiftly. But we must haul as if by oxen." (Altunin, 1979, p. 20)

The Railroads and the Prospects of Siberian Development.

Since the days of the Ural-Kuznetsk Combine, the rail lines leading to the Urals from the east have been the most overworked in the country. From 1940 to 1970 they accounted for 16-17 percent of all Soviet freight turnover in peace time (and much more during World War II), as against some 10 percent in 1928. (North, 1979, p. 303). Since the late sixties, traffic over these lines appears to have grown at a rate well above the national average and especially so in recent years. According to the Minister himself, in 1977, for example, more than two-fifths of the total increase in the volume of work by Soviet railroads was accounted for by the Sverdlovsk, Southern Urals, Virgin Lands, West Siberian and East Siberian lines, which
have the greatest difficulty in assimilating new freight traffic (Pravda, March 29, 1978, p. 2).

Even more than those in other regions, the railways listed above are dominated by a few bulk commodities which move primarily westward, resulting in a severe imbalance of flow. The accelerated exploitation of resources east of the Urals will further choke these lines and accentuate the imbalance. During the second half of the 1960's, coal, coke and ores were responsible for 55 percent of all the loadings on the railroads of West Siberia and North Kazakhstan, with the principal direction of their flow being westward. Adding petroleum products and grain, these few commodities made up at least two-thirds of all the loadings (North, 1979, pp. 286-87). The sharp growth in coal shipment on these railroads during the past decade is especially striking (Dubinskii, 1977, p. 48). Kuzbas and Ekibastuz coals, in fact, accounted for over nine-tenths of all the increase in the ton-kilometer freight turnover for coal from 1970 to the end of 1975 (Dienes, 1979, pp. 41-44). Earlier enthusiasm for massive coal hauls from Siberian and Kazakh fields, both through the existing railways and through a new "super-trunkline," has given way to much greater caution and fuller appreciation of the costs and problems involved. Perhaps during the 1980's the Soviets will be able to handle some 50 million tons of extra freight, mostly coal, with the improvements under way. However, when one adds

43 A recent work, produced in Siberia, claims that a new 3,000-3,200 km. long single track railway could handle 80-85 million tons of extra coal, if restricted entirely to solid fuels. It also admits that such heavy use would require the replacement of the rails in less than a decade (Popov ed., 1978, pp. 206-207). All this coal would, of course, be equivalent to the calorific content of only 40 million tons of oil. A study by Gosplan arrives to the unequivocal conclusion that the long distant rail shipment of Kansk-Achinsk and Ekibastuz coal is "irrational." Only Kuzbas coal should be considered transportable to the European USSR (Troitskii, 1979).

all other commodities that must move to European Russia and beyond, it becomes clear that the speed and success of economic development will depend on a very substantial expansion of transport capacity.

Despite some piece-meal improvements, the author seriously doubts that Soviet planners can open the severe railway bottleneck sufficiently to speed up development in the Ural-Baikal zone through the next decade. In contrast to the 1930's and 1950's, relatively cheap technological innovations will not suffice and, at any rate, are not in sight. Large expansion in carrying capacity today can be achieved only by a major construction effort. At present, however, the Soviet economy is already struggling with two gigantic railway and several pipeline projects besides other prodigious tasks and is entering a period of sustained squeeze on its capital and labor resources. It cannot conceivably undertake another Ural-Baikal railway until, at best, the late 1980's, with little chance of completion before the following decade.

The Pipeline Bottleneck

Pipeline transport represents the most dramatic growth in Soviet freight movement in the past two decades. If natural gas piped through long distance lines is counted at its calorific equivalent in standard tons, the transport work by pipelines multiplied 20 fold in less than 20 years. It reached over 26 percent of all domestic freight turnover during 1977 as against less than 4 percent in 1960. (Furmann, 1978, p. 14 and Nar. khoz. SSSR v 1977 g., p. 305). Pipelines, however, are far too specialized carriers to spur extensive development in pioneer areas. Once pipelines are in place, hydrocarbons also move with ease, at very low operating costs
and, despite the high fixed investment for transport, at lower total costs than most other resources. This means that associated production complexes and consuming industries tend to agglomerate at great distances from the often isolated and harsh regions of hydrocarbon extraction. Since all increment of Soviet oil and gas today is coming from North-West Siberia, the growth of pipelines in and from the province is critical to the nation's economy, but except during the construction phase, will have little impact on Siberia itself.

The pipeline bottleneck applies mainly to natural gas. Crude oil today suffers from little transport difficulties, though, especially in West Siberia, some temporary worsening of the situation is likely as average size and accessibility for new fields decrease during the 1980's. The lack of product pipelines also will continue to be a problem, adding to the burden of the overtaxed railways, especially east of the Urals. But the major constraint is on natural gas whose transport overland is exclusively dependent on pipelines, many more of which are needed to move the same amount of calories in the form of gas than oil.\(^{45}\) Since the gas industry today depends on the huge fields of Northwest Siberia for all its increment (and increasingly also to compensate for declining output elsewhere), the rate of delivery of North-Tiumen' gas will have a crucial and direct impact on the economic performance of more than half a dozen Soviet regions, accounting for a full half of the country's industrial production.

\(^{45}\) In addition, gas pipelines are subject to more stringent quality requirements than oil pipelines, since they operate at increasingly high pressure.
The tremendous inter-industry demand for rolled steel, non-ferrous metals, compressors, cement etc. from the West Siberian gas industry is placing immense strain on the Soviet economy and represents severe constraints on continued rapid expansion. Planned increments of 100 billion cubic meters from these fields in every 2-3 years require 20-30 percent capacity expansion in some key supplying industries during the next decade (Dienes, 1977, pp. 48-49 and Dienes and Shabad, 1979, p. 255). Recently, one of the foremost Soviet experts on the gas industry, stated that 30,000 kilometers and 20 million metric tons of top grade, large diameter pipes, requiring 22-25 billion rubles of capital investment would be needed to transport an additional 300 billion cu. meters per year into the European USSR. The official admits that "it is virtually impossible for us to allocate such large amounts" to that branch. (Bokserman, 1978, p. 19); in addition, pipeline quality and long delays in the installation of compressor stations remain chronic problems. Despite the mortgaging of the entire 1976-1980 gas export for pipes and compressors already received, the original 1980 pipeline target is only 55 percent fulfilled (Ekonomicheskaia gazeta, No. 6, February 1977, p. 2 and T. Shabad, "News Notes," Soviet Geography, April 1981).

46 Many breaks, noted in the Soviet press, occur at pressures as low as 20-50 atmospheres, when modern, large capacity lines operate at 75 atmospheres, and Soviet plans call for still higher pressures. The Tiumen' Oil and Gas Trust was, in fact, forced to establish an entire factory in the West Siberian wilderness for the repair of defective pipes (Arzhanov, 1979, p. 30; The Oil and Gas Journal, April 2, 1979, p. 42). Fewer than half of the compressor stations are generally installed at the time the gas pipelines are completed (Gazovaia promyshlennost', No. 4, 1977, p. 5 and The Oil and Gas Journal, April 2, 1979, p. 42).
A deeper understanding of all these constraints is leading to greater caution among gas industry officials and functionaries of Tiumen' Oblast', the linchpin in the Soviet gas drive. In an unusually frank interview, a former chief of the Tiumen gas industry and now Secretary of the Province's Party Committee, reveals the spirited struggle waged against Gosplan's attempt to force the industry prematurely to fields yet farther north (150-300 miles beyond the Arctic Circle), because it is technologically unprepared for pipeline and field construction on the ice-saturated permafrost, far worse than experienced to date (Altunin, 1979, p. 22).

In my view, the pipeline bottleneck and constraints on field development in the north-Tiumen' wilderness will prevent the gas industry fully to compensate for the serious shortfalls in coal and oil production and to satisfy, at the same time, the increase in fuel demand in the forthcoming decade. Together with the oil, the gas resources of Tiumen Oblast represent the centerpiece of the Soviet energy system during the 1980's. Their performance will have a decisive economic impact, both direct and indirect, on the prospects of the entire Soviet geographic space and most of its constituent regions.

CONCLUSION

Among a galaxy of economists, a geographer should not attempt to be one. This paper makes no pretense of being an economic analysis; nor does it focus on the process of development or the factors controlling it in the USSR, since these have been treated exhaustively by other participants of this conference. Rather, it is the very different regional characters and profiles of economic-geographic space that formed the subject of this
inquiry and provided the organizational framework for the study. Yet the system of regions examined is far more than a set of passive containers for the operation and growth of the economy, since the textbook definition of economics, "the allocation of scarce resources to given ends", is a spatial process as much as a temporal one.

The Soviet economy today is on the threshold of a new era. Despite all exhortations, it has not yet succeeded in moving from an extensive to an intensive pattern of growth. As a result, for the first time in years of peace, it is at the beginning of a concurrent sustained squeeze on all the factors of production, i.e. accessible natural resources (land), labor and capital. The widely known slowdown is in a major way a function of that squeeze and will be still more clearly so in the forthcoming years.

Yet only in the context of geographic space does that constriction on production factors have real meaning. With one sixth of the earth's surface and a late start in industrialization, the natural resource base of the USSR as a whole is very far from exhausted or even fully catalogued. This is especially true of energy and industrial materials. While population growth has clearly slowed, the Soviet Union over the next decade is still expected to add some 7.7 million to the 15 to 39 age group, estimated to be 101 million in 1980 (Baldwin, 1979, p. 91). This represents an almost 8 percent increase in this youthful age category for the 10 year period, certainly adequate for a modern economy, especially if augmented by labor saving technology among those already employed.\footnote{Still less can the already visible problems of labor supplies during the seventies be attributed to constriction on numbers. "Only since 1978/79 have the entry of 16 year olds into the labor force and the annual net increment to the population of able bodied ages begun to diminish. Moreover, per unit of GNP, the USSR uses from 1.3 times to 2.8 times as much labor as Italy, Japan, West Germany and the US" (Block, 1979, p. 131).}
USSR has always overinvested, judged at least by Western standards. Total investment and new fixed investment between 1950 and 1978 increased on the average by 7.7 percent per year. and the share of investment (in the GNP) rose from 14.8 to 31 percent (Block, p. 130). Despite the recent slowdown, new investment during 1976-79 still grew by an average rate of 4.1 percent (Bush, 1979, p. 3). The 1980 Plan calls for a further 5.4 percent increase, to a grand total of 135 billion ruble (Ekonomicheskaya gazeta, No. 1, 1980, p. 2), which in the purchasing price equivalents of investment goods appreciably exceeds the amount the US invests today in its much larger economy.

Yet once considered in the concrete world of sheer distances, physical environment, resource distribution and its quality variations, that squeeze on production factors becomes very real indeed. As this paper made clear, through the vast Soviet territory, resources (in their broadest meaning) are distributed in an exceedingly lopsided, contradictory fashion. Varied and divergent regional endowment can, of course, promote regional specialization and trade, a multifaceted economy and vigorous growth. But distances, physical geography, cultural and ethnic heterogeneity, especially when coupled with distinct geographic subunits within the confines of a single state, can also present obstacles to economic development and national cohesion. Economic growth in the USSR increasingly involves the successful linking of the European core with a vast, raw

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48 Planned growth rate refers to state investment which is to represent 88.2 percent of total investment (Ekonomicheskaya gazeta, No. 1, 1980, p. 2).
hinterland plus a broad arc of non-European periphery. Each of these three worlds shows great diversity within itself. Yet broadly speaking the first possesses the established industrial capacity, infrastructure and skill and the location for foreign trade, the second the great bulk of natural resources, the third all future increments to the labor force for the next 10-15 years. Combining the increments in production factors from these incongruous worlds across the breadth of a land one-sixth of the earth surface would surely tax the ingenuity even of the most flexible and imaginative leadership.

During the next decade the most urgent task of the Soviet economy will be the procuring of natural resources, particularly energy and minerals, in order to keep its industry plus a good part of industry in the rest of COMECON running and to earn the amount of hard currency planners consider essential. This means that Soviet regional policy will accord priority to Siberia, but this priority will focus on the exploitation and transport of natural resources even more strongly than in the past. Because of the physical obstacles and inaccessibility, this policy requires an intensification of investment bias in favor of that region. While observable since the beginning of the Five Year Plans, that bias, with the exception of the creation of the Ural-Kuznetsk combine, had not been overpowering in the past. During the last few years, however, a number of signs point to an appreciable rise in Siberia's share in investment allocation, though apparently the Trans-Ural provinces of the Russian Republic also have not escaped the impact of slower investment
growth in the Soviet economy as a whole.

The pressing and inescapable dependence of the Soviet economy on Siberian resources through the next decade is indisputable. So is the urgency of the problem. Nor can it be denied that with current and foreseeable world prices for minerals, especially hydrocarbons, the enormous investment program in Siberia resources seems fully justified. Academician Aganbegian pointed out in 1979 that the 1700 million tons of hydrocarbons (in oil equivalent) that West Siberia was expected to produce during the 1976-1980 Plan was worth no less than 150 billion rubles to the national economy at 1979 world prices for oil and gas, valued at over 100 foreign trade rubles per ton. The roughly 25 billion domestic rubles (equivalent to some $60 billion in 1976 ruble-dollar ratios for investment. Edwards et al. 1979, p. 379) funneled directly into the West Siberian oil and gas complex during that five year period, therefore, has repaid itself many times (Aganbegian, No. 3, p. 8, 1979). The respected economist, A. G. Granberg, calculates that because of the immense and increasing role of Siberia in the supply of crucial, basic

Table 4 shows that between 1966 and 1975 the investment share of Siberia and the Far East as a whole increased minimally, the very substantial rise for West Siberia being almost entirely counterbalanced by declines in the shares of East Siberia and the Far East. Since 1975, the Soviets have stopped releasing investment data below the republic level, but figures show that allocations for the RSFSR have grown faster than for the USSR as a whole and still more than for the non-Russian republics combined (Nar. khoz. SSSR v 1978 g., p. 338 and Nar. khoz. RSFSR v 1978 g., p. 183). Given the number of huge construction projects in the harsh environment of Siberia (10 of the 15 "territorial-production complexes" whose development is presently under way are in Siberia and the Far East), these Trans-Ural territories must be responsible for most of the above average increase enjoyed by the RSFSR.

Still more indicative of the growing stress on Siberian resources in Soviet investment allocation is the crash program on fuel development approved by the December 1977 CPS Plenum. In 1978, more than one third of all increment in total investment went to the three primary fuel industries, while the 1979 plan direct 85 percent of all new fixed investment in the Soviet economy to these same branches (US, CIA, The World Oil Market ..., 1979, p. 39). Given the geography of incremental fuel production in the USSR, the overwhelming share of that new capital is clearly funneled into the Trans-Ural territories, especially West Siberia.

For 1976, Treml calculates the ratio of domestic to foreign trade prices for Soviet commodity exports as 0.89, which is very close to that implied by Aganbegian (Treml, 1980, p. 187).
inputs, Siberian development has an immediate and large multiplier
effect on the entire Soviet economy. Because Siberia still accounts for
less than one-tenth of Soviet GNP, such a multiplier effect leads Granberg
to conclude that the optimum rate of expansion for the region, that which
maximizes national growth, lies between 1.2 and 1.4 times the national
rate. A deviation from that ratio upward results in a minor negative
impact; a deviation downward retards national expansion to a very sub-
stantial degree (Granberg, 1980, pp. 102-103).

On the other hand, even pro-Siberian scholars admit that this whole
argument may be vitiated if the capital and labor costs of Siberian
development are not kept within bounds. During the past 15 years, the
capital intensity of Siberian industry rose by one-third, as against 24
percent for Soviet industry as a whole. Continued relative growth in
that capital intensity and a substantial rise in Siberia's share in
investment allocation, could well lead to an absolute reduction in outlays
for other regions, especially west of the Urals. This in turn would retard
the country's expansion both directly and via its impact on Siberian
development, since it is the European core which is the main provider of
capital goods, scientific innovation and skill for the rest of the USSR
and not the least to the new energy-mineral complexes of Siberia (Granberg,
1980, pp. 97 and 101). In a similar vein, Perevedentsev warns that the
recent precipitous growth of population in the North-lands which since
1970 "swallowed up" 11 percent of all increments and stood at four times
the national rate, simply cannot be kept up and is becoming self-defeat-
ing. Major efforts must be made towards a relative reduction in the
North's requirement for additional labor resources. "Opening of the
North is a great achievement, but great achievements are possible and
needed in established regions as well" (Zhurnalist, No. 8, August 1979,
p. 37).
It is clear therefore, that despite the undeniable complementarity between the country's eastern and western parts, the competitive relationship between them is equally strong. The rival pressures for energy and materials, investment and human resources between these two halves of the Slavic realm (the "effective national territory" in Hooson's fitting phrase) continue to exert a strong influence on planning and may even be on the rise. Regional and institutional rivalries have long been manifest concerning the development priorities of Siberian resources, their degree of processing in and out of the region, the nature and location of supply bases and the choice of transport modes (North, 1972). In the most recent years, the growing strain on Soviet investment resources, combined with the drastic slowdown in the expansion of the labor force, has strengthened those forces that seek to subordinate the development of Siberia and the Far East to the needs of the European economic core. The advocates of this strategy press for the priority exploitation of locationally mobile, transportable energy sources and materials that can be syphoned out of the East with little or no processing for the needs of the European USSR or export. The clearest example of the dominance of this strategy since 1970 has been the crash development of the Tiumen oil and gas fields (continuing today), and of the Ekilhasruz and South Yakutian coal deposits versus the delays and very sluggish growth of the long-heralded energy complex in the Kansk-Achinsk Basin whose products are not transportable or can be moved only at very great expense.

The vexing issues of the southern periphery, especially Central Asia, are willy-nilly on an economic backburner today. Judging from recent scholarly writings, Soviet scholars are aware of the sensitive and
potentially explosive nature of the problems there. Concerted attention to Central Asia, however, would not yield the immediate economic benefit that crash development of transportable Siberian resources or modernization and reequipment in the European provinces are likely to do. Nor would it provide the ethno-cultural and emotional rewards to a Russian-dominated leadership that emphasis on the country's Slavic triangle can produce. Both the pro-European and the pro-Siberian lobbies in the planning hierarchy should find themselves in agreement on that point. Moreover, even the non-Russian nationalities west of the Urals, such as Ukrainians and Balts and even those of the Caucasus, are very unlikely to be supporters of a vigorous Central Asian economic strategy.

Only in case of a major Moslem upheaval perhaps, would these perceptions change. But relative to the Slavic regions, income levels in Central Asia are not that much lower and population pressure on resources, while growing, is still some way from reaching the flash point. Nor has Moscow's control slipped enough, if at all, to make such an upheaval likely, certainly in the present decade. In a decade of increasing resource shortages and capital stringency, Soviet planners will likely follow a development strategy that concentrates on the crash development of energy and material supplies indispensable to the economic and military might of the Slavic core. This is all the more true since the primary resource of the Moslem periphery, namely labor, would be extremely difficult, costly and even dangerous to marshal for projects which have priority for the leadership. Minor investment efforts, combined with control of any incipient discord (in which the leadership has practice, sophistication and reasonable confidence) will be in store for Central Asia for the next decade.
Geography is not destiny. I make no claim that with an imaginative leadership and radical economic reforms, especially if combined with foreign investment and some degree of participation in key projects, the powerful, stubborn constraints of the geographic dimension examined in this paper could not be loosened or even overcome. But aside from the fact that I perceive no such changes on the horizon, these issues are for others to analyze. I have taken the present structure and management of the Soviet economy as given. The performance, efficiency and prospects of that system I considered only insofar as these were inseparable from the spatial dimension. Assuming no fundamental changes in economic management and political relationship with the world at large over the next decade, I expect the constraints and forces of geographic space to channel development in the manner described and to act as a major break on the rate of growth of the Soviet economy.
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**Notes:**

- Estimated as proportionately 4th year expectation from 5 Year Plan targets. Abramov, 1977, p. 226.

**Sources:**
- Columns 1-3: Standard statistical yearbooks of the USSR, RSFSR and the Ukraine. To compute growth rates for the respective regions, the Baltic, Transcaucasan and Central Asian republics are combined according to 1960 and 1970 weights. The 1960 industrial output figures can be computed from regional labor productivity ratios applied to the Soviet average. Data from G. Abramov, Sovetskoe khoziaistvo, Sovershennost planirovaniia...
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### Table 3

**Industrial Fixed Capital per Employee and Incremental Output-Capital Ratios**

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<th>Incremental Output-Fixed Capital Ratios (Growth of Output ÷ by growth of fixed capital)</th>
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*These figures apparently are in current prices and not comparable to the rest of the table which are in 1955 constant prices. However, this discrepancy should not affect the comparability of the marginal productivity ratios very significantly. Data for 1960 are given in AN SSR, Inst. ekon., Preryvashchennost v khoziatestv ennom kompleks ekonomicheskikh ralions SSR (Moscow: "Naika," 1964), p. 8; for 1968 in Telegko, 1968, p. 81.


***Marginal capital productivity for the 1970-75 period.

Sources to Table


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Because of rounding and small amounts of geographically undistributed funds, percentages may not add up.

* For these periods, the shares and per capita levels of investment in regions of the RSFSR could be computed only without outlays made by collective farms. Relative to corresponding figures in the right showing all investment, they are thus slightly underestimated for regions where agriculture is important (e.g., North Caucasus, Central Chernozem) and overestimated for those where agriculture is much less significant (e.g., Center, Urals, East and West Siberia and the Far East).

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**SOURCE:** Dogaev, 1975, p. 52.
### Table 6
Industrial Structure of Soviet Regions in 1972
(\% of gross output. Row totals: 100)

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* Calculated as a residue.  
** Apparently includes fishing.  

Table 7
Dispersion of Settlements and Density of Transport Infrastructure by Regions 1970

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<th>Average Distance Between Rural Settlements Under 500 Souls</th>
<th>Average Distance Between Rural Settlements Over 500 Souls</th>
<th>Average Distance Between Rural Settlements Over 1000 Souls</th>
<th>Length of Transport Infrastructure sq. km (in km)</th>
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* Average distance computed as \[
\sqrt{\frac{\text{Area}}{\text{No. of Settlements}}}\]


Columns 2-3 computed from data in Vestnik statistiki, No. 5, 1971, pp. 80-95.

Columns 4-6: A.D. Danilova et.al, eds., Ekonomicheskaya geografija SSSR (Moscow: "Vysshaya shkola," 1971).
Figure 1: Regions Discussed in Text

A Developed Industrial Regions
A1 Heavy industrial center
A2 Diversified manufacturing - high value added
a1 Emerging iron and steel center
B Resource-rich Pioneer Regions
B1 Zone of continuous settlement
B2 The North

C Slavic Rural Periphery
D Non-Slavic Rural Periphery
D1 Caucasus
D2 Central Asia - Southern Kazakhstan

Figure 2: Regional Coefficients of Extra Construction Costs in the Siberian North

*Extra costs due to surface conditions only
Central (Moscow) Region = 1.0
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