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**ECONOMIC INTELLIGENCE REPORT**

**REGIONAL SURVEY  
OF POST AND TELECOMMUNICATIONS SERVICES  
IN THE USSR:  
THE TRANSCAUCASUS (REGION V)  
1950-58**



**CIA/RR 59-30**

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**CENTRAL INTELLIGENCE AGENCY**

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IN THE USSR: THE TRANSCAUCASUS (REGION V)  
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FOREWORD

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This report on Region V (the Armenian, Azerbaydzhan, and Georgian SSR's) is the second of a series designed to measure the distribution of public post and telecommunications facilities and services of the USSR, by economic region.

Special emphasis in these reports is given to the relationships of the development and distribution of post and telecommunications facilities and services to the geographical characteristics of these regions and to the USSR as a whole.

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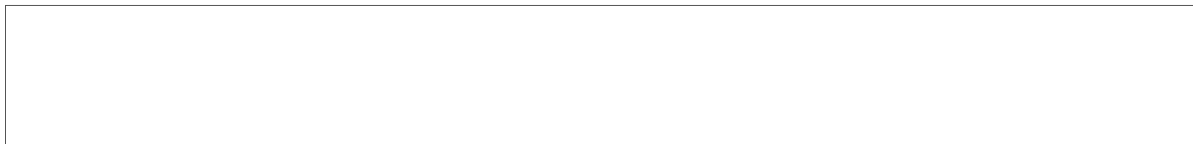
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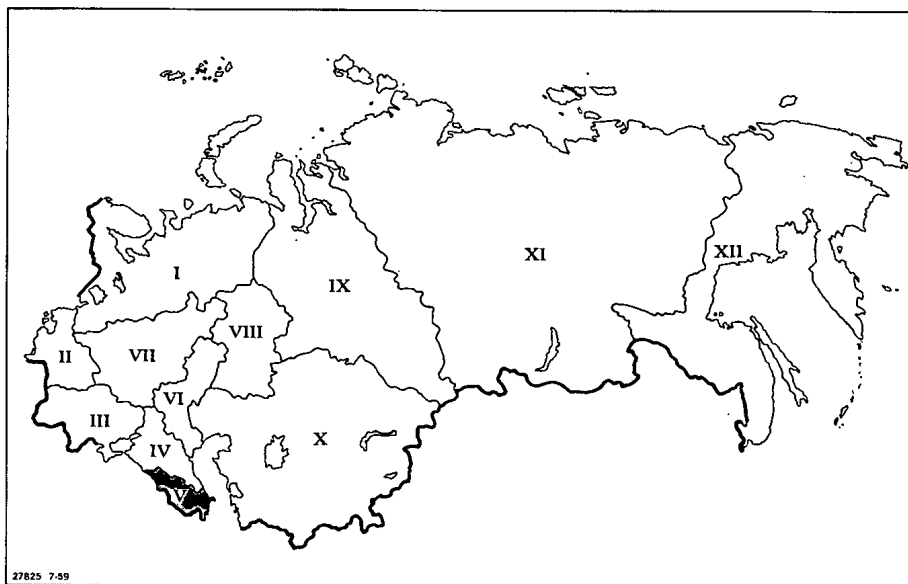
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REGIONAL SURVEY OF POST AND TELECOMMUNICATIONS SERVICES  
IN THE USSR: THE TRANSCAUCASUS (Region V)\*  
1950-58



Summary and Conclusions

The public\*\* post and telecommunications system in Region V, operated by and under the control of the Ministry of Communications of the USSR and the various republic ministries of communications,\*\*\* has attained a level of development comparable to that of the country as a whole. As in the case of the USSR, services provided in Region V are inadequate to meet expanding economic needs. This inadequacy has been aggravated by demands for lateral services consequent to the economic reorganization of the country in 1957.

\* The estimates and conclusions in this report represent the best judgment of this Office as of 15 June 1959. Technical terms are defined in Appendix A, Glossary of Technical Terms.

The term region in this report refers to the economic regions defined and numbered on map 27052, 7-58, USSR: Political-Administrative Divisions and Economic Regions, March 1958. The insert above shows the location of Region V.

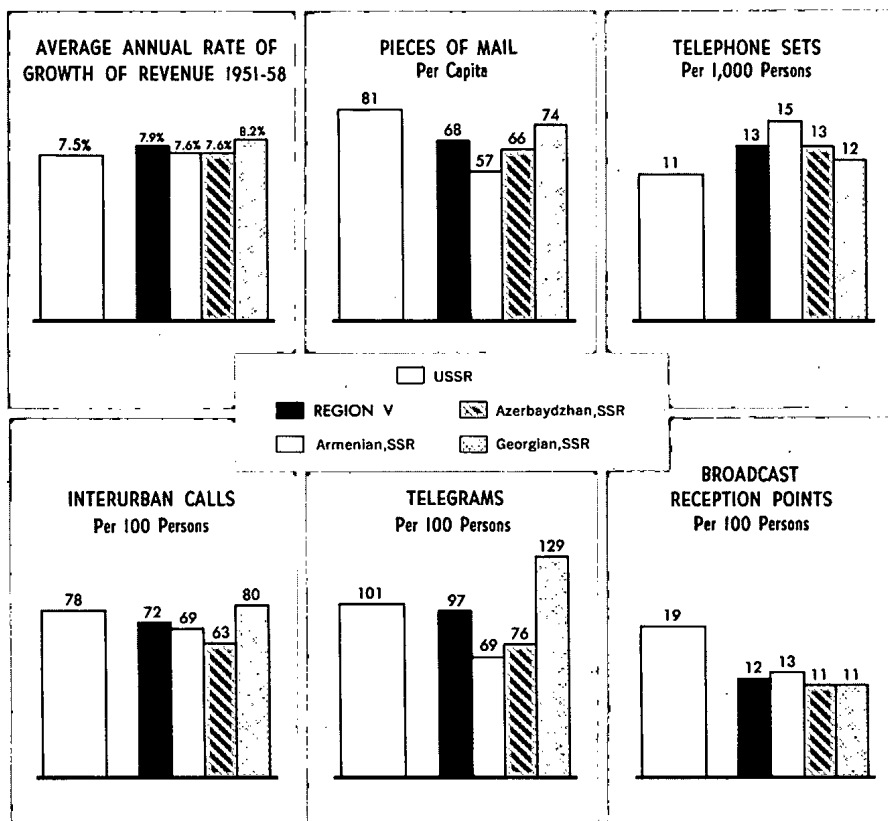
\*\* The term public in this report refers to the facilities and services under the control of and operated by the Ministry of Communications of the USSR and the various republic ministries of communications. It does not refer to functional systems such as those serving the Ministry of Defense and the Ministry of Railroads.

\*\*\* The republic ministries of communications are those in the Armenian SSR, Azerbaydzhan SSR, and the Georgian SSR, the three republics which compose Region V.

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The average annual rate of growth of revenue for 1951-58 and the per capita use of post and telecommunications services in 1958 in the USSR and in Region V are summarized in the accompanying chart. Region V compares favorably with the USSR as a whole in most of the measurements shown here. The average annual rate of growth of revenue in the region exceeds that of the USSR as a whole. The per capita number of



telephone sets indicates a slightly higher level of development of telephone service in Region V. The low level of development of the rural radiobroadcasting network in Region V accounts for the low per capita number of broadcast reception points compared with that of the country as a whole. The Georgian SSR has attained a higher level of development of post and telecommunications than that of the other republics of the region. The level of interurban telephone and telegraph services in the Georgian SSR is even higher than that in the entire country.

The major weakness in post and telecommunications in Region V is the shortage of interurban circuit capacity. This weakness is aggravated by the inability of local communications units to obtain adequate amounts of equipment and technical assistance from the Ministry of Communications of the USSR. For example, telephone and telegraph exchange facilities, both automatic and semiautomatic, are in short supply.

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Under the Seven Year Plan (1959-65) the major effort to expand post and telecommunications services in Region V will be placed on improving existing facilities. Planned improvements include the installation of automatic and semiautomatic telephone exchange equipment and the more extensive use of channel multiplexing apparatus. Some expansion of facilities, such as the completion of the microwave radio relay network interconnecting the capitals of each of the republics of Region V and the installation of frequency modulation (FM) broadcasting stations, is also planned.

The successful completion of these targets of the Seven Year Plan, which appear to be attainable, will greatly improve the post and telecommunications resources of Region V. In addition, these regional improvements will contribute to the over-all effectiveness and efficiency of post and telecommunications services in the USSR.

---

I. Introduction\*

Post and telecommunications facilities provide an economic service in response to demands from all sectors of an economy. The quantities and types of post and telecommunications services as well as the quality of service provided are influenced by geographical characteristics. Some of these include the size of the area served, the distribution of the population, and topographical features.

Region V, the Transcaucasus, is composed of three republics, the Armenian, Azerbaydzhani, and Georgian SSR's. The region is bounded by the Greater Caucasus Mountains on the north and by Turkey and Iran on the south. The Black Sea and the Caspian Sea form the western and eastern boundaries of the region, respectively, so that the region forms an isthmus between these two important seas. The total area of Region V is 71,853 square miles, less than 1 percent of the total area of the USSR. Azerbaydzhani SSR is the largest of the three republics, with 33,436 square miles; the Georgian SSR is next, with 26,911 square miles; and the Armenian SSR is the smallest, with 11,506 square miles. In total economic activity, Region V contributed 3 percent of the industrial output and 1 percent of the agricultural output of the USSR in 1956.

About 10 million people live in the Transcaucasus -- about 4.2 million in the Georgian SSR, 3.8 million in Azerbaydzhani SSR, and 1.9 million in the Armenian SSR. Population density, shown in Figure 1,\*\* ranges from areas with more than 260 persons per square mile around 50X1 industrial centers (see Figure 2\*\*\*) to virtually uninhabited areas in

\*\* Following p. 4.

\*\*\* Inside back cover.

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the Armenian highlands and in the Caucasus Mountains. The physical geography of Region V, which in the main is responsible for this distribution of population, is highly varied. It includes humid subtropical lowlands, high arid plateau lands, and rugged mountains and foothills (see Figure 3\*).

II. Ministry of Communications

The Ministry of Communications (Ministerstvo Svyazi) of the USSR is organized as a union-republic ministry,\*\* and it is charged with the responsibility of providing all domestic and international public post and telecommunications facilities and services for the USSR. To carry out this responsibility, the Ministry of Communications exercises direct control over post and telecommunications activities having national significance and, theoretically, it has delegated to the various republic ministries of communications the responsibility for the control of post and telecommunications activities having local significance. Interurban telephone service is an example of an activity of national significance, and local telephone service is an example of an activity of local significance. In practice, however, it is believed that republic ministries retain little control over local post and telecommunications activities and instead serve primarily as focal points for liaison and coordination of activities of the Ministry of Communications of the USSR.

Evidence exists that the Ministry of Communications is attempting to delegate more authority to republic communications organizations for controlling local activities. For example, authority for planning, acquiring, and expending investment funds in order to meet local needs for increased telecommunications services recently has been delegated to the republic ministries.

Although further delegation of authority for local post and telecommunications activities is expected, the necessity for centralized control of a national service such as post and telecommunications precludes any substantial changes in the present organization of the Ministry of Communications of the USSR. 4/

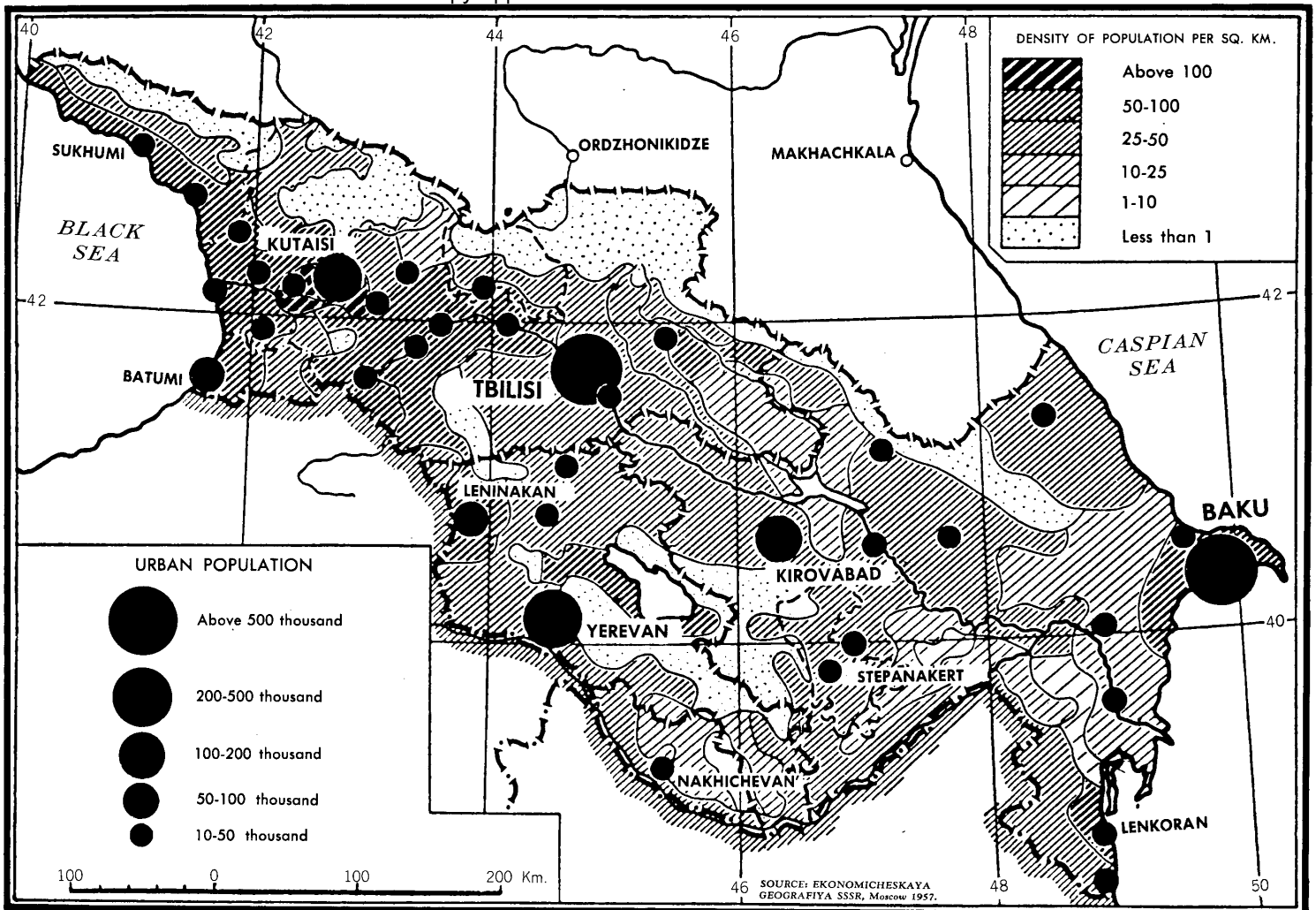
A. Revenue

Revenue from public post and telecommunications services of Region V, as shown in Table 1,\*\*\* has grown from approximately

\* Inside back cover.

\*\* A union-republic ministry directs its affairs through corresponding or counterpart ministries organized on republic levels.

\*\*\* Table 1 follows on p. 5.



**POPULATION DENSITY IN THE TRANSCAUCASUS**

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Table 1

Estimated Total Revenue of the Republic Ministries  
of Communications of the Transcaucasus (Region V) a/  
1950 and 1955-58

	Million 1955 Rubles				
	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Region V	<u>250.8</u>	<u>380.6</u>	<u>401.0</u>	<u>427.8</u>	<u>460.6</u>
Armenian SSR	40.3	58.5	62.4	66.1	71.9
Azerbaijdzhan SSR	81.7	123.3	129.1	136.9	146.1
Georgian SSR	128.9	198.8	209.5	224.8	242.5

a. Revenue was computed by multiplying post and telecommuni-  
cations service volumes by their estimated average unit revenue  
and by estimating other sources of revenue that are not re-  
flected by service volumes. Detailed revenue figures for each  
of the years shown are available in the files of this Office.  
A breakdown of total revenue for 1958, by type of service, is  
shown in Table 2 (p. 7, below). All data are rounded to the  
nearest hundred thousand. Totals are derived from unrounded  
data and may not agree with the sum of their rounded compo-  
nents.

250 million rubles\* in 1950 to more than 460 million in 1958, at an  
average annual rate of growth of about 8 percent.\*\* This rate is com-  
parable to the rate of growth in post and telecommunications revenue  
for the USSR as a whole (see Figure 4\*\*\*). The rate of growth in  
Region V is lower than that of the European USSR but higher than that  
of the Asian USSR.

The telephone and postal networks contributed 71 percent of  
the total post and telecommunications revenue of Region V in 1958,  
and the telegraph and broadcasting networks contributed the remaining  
29 percent. Total revenue from post and telecommunications services  
in Region V in 1958, by type of service and by republic, is shown in  
Table 2.\*\*\*\*

\* Except where otherwise indicated, ruble values in this report  
are expressed in 1955 rubles and may be converted to US dollars at  
the official rate of exchange of 4 rubles to US \$1. This rate of  
exchange does not necessarily reflect the true dollar value.

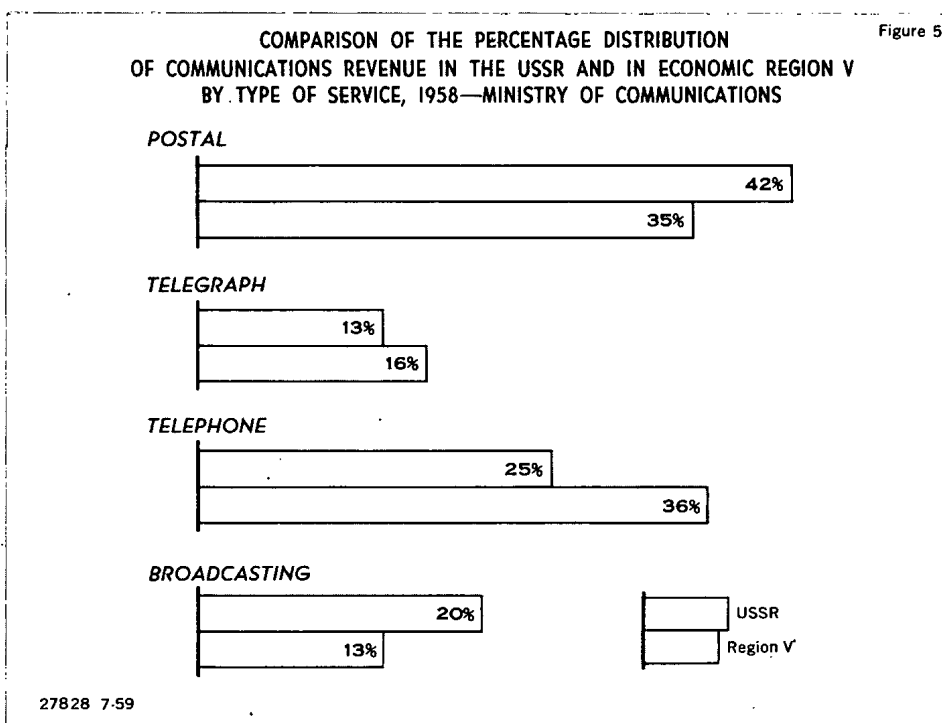
\*\* All average annual rates of growth expressed in this report  
were computed on a compound interest basis.

\*\*\* Following p. 6.

\*\*\*\* Table 2 follows on p. 7.

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Telephone service in Region V has attained a higher level of development and is a more important source of post and telecommunications revenue for the region than is telephone service for the country as a whole. In 1958, for example, telephone service in Region V contributed 36 percent of the total post and telecommunications revenue of the region, whereas telephone service in the entire country contributed only 25 percent of the total post and telecommunications revenue for the USSR. Postal service was the converse, supplying only 35 percent of total post and telecommunications revenue for Region V but 42 percent for the USSR. Other comparisons of the percentage distribution of revenue, by type of service, for Region V and for the USSR as a whole are shown in the accompanying chart, Figure 5.



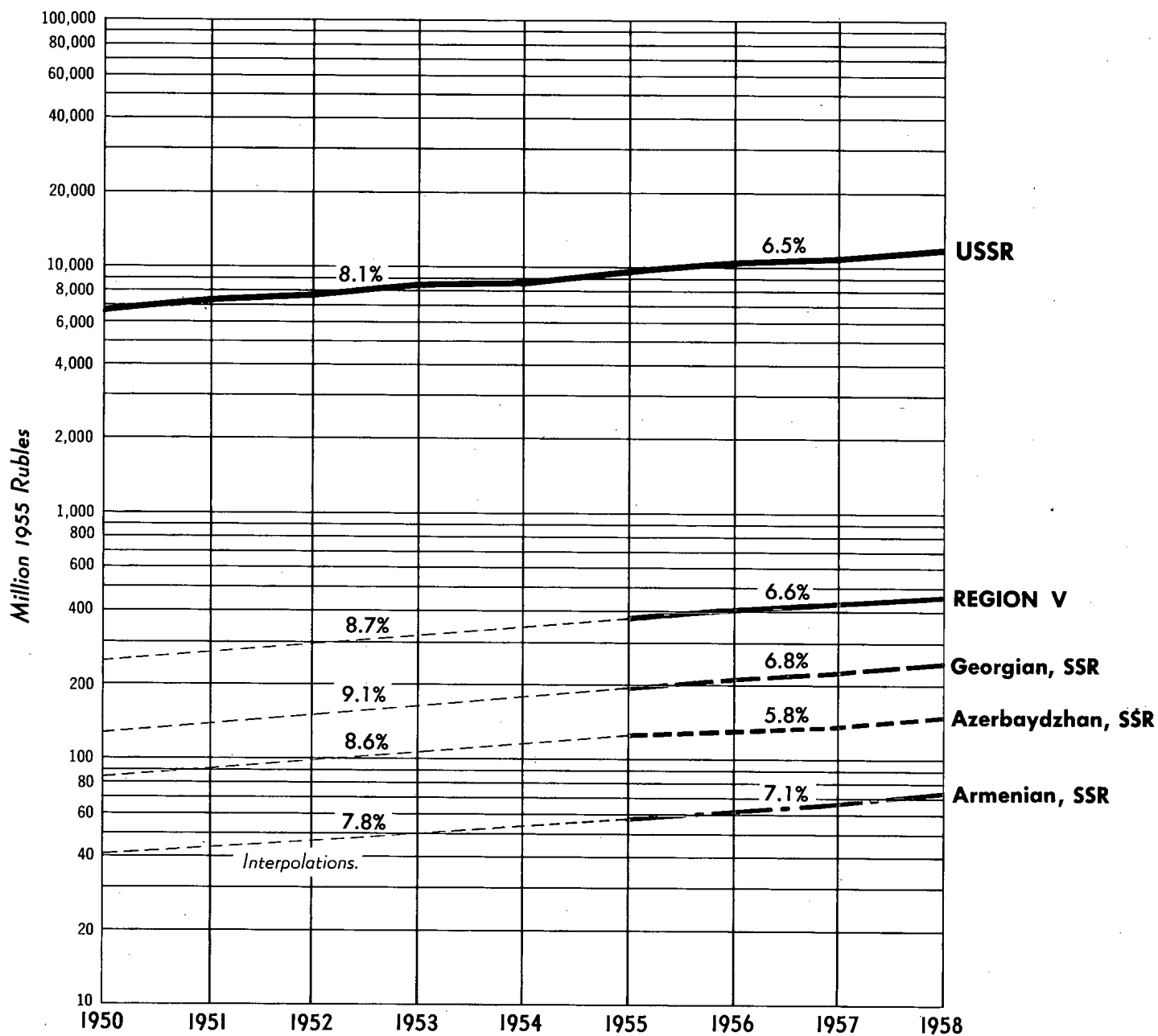
In view of the plans for a considerable increase in public post and telecommunications facilities and services contained in the Seven Year Plan, revenue in Region V can be expected to increase substantially during the next 7 years.

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### COMPARISON OF THE RATES OF GROWTH OF COMMUNICATIONS REVENUE IN THE USSR AND IN ECONOMIC REGION V, 1950-58 MINISTRY OF COMMUNICATIONS



Percentages represent the average annual rate of growth for the period shown.



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Table 2

Estimated Revenue of the Republic Ministries of Communications  
of the Transcaucasus (Region V), by Type of Service a/  
1958

Million 1955 Rubles

	Telephone				Telegraph <u>e/</u>	Broadcasting <u>f/</u>	Total Revenue
	Postal <u>b/</u>	Urban and Rural <u>c/</u>	Interurban <u>d/</u>	Total			
Region V	<u>159.7</u>	<u>110.2</u>	<u>56.8</u>	<u>167.0</u>	<u>75.1</u>	<u>58.8</u>	<u>460.6</u>
Armenian SSR	26.0	13.4	10.4	23.8	10.1	12.1	71.9
Azerbaijdzhan SSR	57.4	24.7	19.2	43.9	22.6	22.3	146.1
Georgian SSR	76.4	72.1	27.2	99.3	42.5	24.4	242.5

a.  All data have been rounded to the nearest hundred thousand. Totals are derived from unrounded data and may not agree with the sum of their rounded components.

b. Postal revenue was derived by multiplying the estimated average unit revenue received for letters, money orders, packages, and periodical publications by their volumes. Total postal volume is shown in Table 4 (p. 12, below).

c. Computed by multiplying the annual business and home subscription fee by the midyear number of urban business and home telephones. The annual number of new urban home and business subscribers was multiplied by the installation fee for new telephones, and allowances were made for miscellaneous sources of revenue such as public telephone booths and fees for special service and for rural telephone revenue. The total number of urban and rural telephone sets is shown in Table 6 (p. 15, below).

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Table 2

Estimated Revenue of the Republic Ministries of Communications  
of the Transcaucasus (Region V), by Type of Service a/  
1958  
(Continued)

- 
- d. Computed by multiplying the number of interurban telephone calls by the estimated revenue per call. An allowance was made for revenue derived from the lease of interurban telephone circuits. The total number of interurban telephone calls is shown in Table 8 (p. 17, below).
- e. The number of telegrams sent was multiplied by the estimated average revenue per telegram. An allowance was made for revenue derived from the lease of telegraph circuits. The total number of telegrams sent is shown in Table 9 (p. 19, below).
- f. Computed by multiplying the midyear number of urban and rural wired loudspeakers and the midyear number of radiobroadcast receivers by their respective license fees. The number of wired loudspeakers added was multiplied by an installation fee. Revenue received from television and other sources was estimated to be a portion of total broadcasting revenue.

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B. Manpower

A labor force with a wide variety of skills is necessary for the growth of a modern public post and telecommunications system and for attaining a high level of labor productivity in that system. As shown in Table 3,\* the post and telecommunications labor force of Region V numbered 23,800 in 1958. This amount is about 4 percent of the total labor force of the Ministry of Communications of the USSR.

The average annual rate of growth of the labor force in Region V from the base year 1950 to 1958 was somewhat higher than that for the USSR as a whole, as shown in the following tabulation:

	<u>Percent</u>
USSR	2.2
Region V	3.1
Armenian SSR	3.9
Azerbaijdzhan SSR	3.7
Georgian SSR	2.4

The higher rate of growth for the Armenian SSR and probably for Azerbaijdzhan SSR compared with the Georgian SSR reflects the recent emphasis on the development of public post and telecommunications facilities and services in these republics.

The success of the development of a modern post and telecommunications system is heavily influenced by the amount of training given its personnel. Communications institutes and technical schools are maintained in most major cities of the USSR for this purpose. Technical schools are believed to be located in the capitals of each of the three republics of Region V to provide training for post and telecommunications personnel of these republics.

The rate of growth of labor productivity of post and telecommunications employees of Region V from the base year 1950 to 1958, which averaged 4.7 percent annually,\*\* is slightly less than the average annual rate of growth of labor productivity of all public post and telecommunications employees in the USSR. With the introduction of

\* Table 3 follows on p. 10.

\*\* Computed on the basis of the average annual rate of growth in revenue per employee derived from Table 1, p. 6, above, and Table 3, p. 10, below.

Table 3

Estimated Average Annual Number of Employees of the Republic Ministries of Communications  
 of the Transcaucasus (Region V) a/  
 1950 and 1955-58

	Persons				
	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Region V	<u>18,700</u>	<u>21,900</u>	<u>22,600</u>	<u>23,200</u>	<u>23,800</u>
Armenian SSR	3,100 <u>b/</u>	3,800 <u>b/</u>	3,900 <u>c/</u>	4,100 <u>c/</u>	4,200 <u>c/</u>
Azerbaydzhan SSR	6,800 <u>d/</u>	8,200 <u>e/</u>	8,500 <u>d/</u>	8,800 <u>f/</u>	9,100 <u>f/</u>
Georgian SSR	8,800 <u>g/</u>	9,900 <u>g/</u>	10,100 <u>e/</u>	10,300 <u>c/</u>	10,600 <u>c/</u>

a. All data are rounded to the nearest hundred. Data include rural mailmen. Totals are derived from unrounded data and may not agree with the sum of their rounded components.

b. 6/

c. Extrapolated by applying the average annual absolute growth from 1950 to 1955 to each of these years.

d. Computed by applying the average ratio of employees to population in Armenia and Georgia to Azerbaydzhan for each of these years.

e. Interpolated by graphic analysis.

f. Extrapolated by applying the average annual absolute growth from 1950 to 1956 to each of these years.

g. 7/

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modern post and telecommunications facilities called for in the Seven Year Plan, it is expected that labor productivity will continue to increase.

III. Postal

Postal services in Region V, consisting of letters, packages, periodical publications, and money orders, must be improved if expanding economic needs are to be met. The number of pieces of mail per capita\* in 1958 in Region V, as shown in the following tabulation, is less than that in the USSR as a whole.

	Pieces of Mail Per Capita (1958)
USSR	81
Region V	68
Armenian SSR	57
Azerbaijdzhan SSR	66
Georgian SSR	74

This low use of postal service may be attributed to the poor transportation system in Region V and the limited demand for postal service by the various minority ethnic groups of this region.

Total postal volume in Region V is shown in Table 4.\*\* Periodical publications made up 70 percent of this postal volume, letters 28 percent, and packages and money orders the remaining 2 percent in 1958. The number of postal, telephone, and telegraph enterprises is shown in Table 5.\*\*\*

In view of increasing needs of the government and of the general public for postal service in Region V, expansion of this service is necessary. Before any substantial expansion can be achieved, however, several steps must be taken to modernize the postal system. These include more mechanized mail-handling equipment, increased use of motor vehicles and airplanes for transportation of mail, better buildings for postal enterprises, and more full-time employees.

\* All per capita relationships presented in this report are based on projections through 1958 of announced population statistics for 1950 and 1956, using the average annual rate of growth for these years.

\*\* Table 4 follows on p. 12.

\*\*\* Table 5 follows on p. 13.

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Table 4

Estimated Total Volume of Postal Service  
in the Transcaucasus (Region V) a/  
1950 and 1955-58

	Million Units				
	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Region V	<u>302.0</u>	<u>533.0</u>	<u>578.7</u>	<u>624.8</u>	<u>670.9</u>
Armenian SSR	47.4 <u>b/</u>	78.6 <u>b/</u>	91.7 <u>b/</u>	99.1 <u>c/</u>	106.5 <u>c/</u>
Azerbaijdzhan SSR	109.2 <u>d/</u>	200.5 <u>d/</u>	216.3 <u>d/</u>	234.1 <u>c/</u>	251.9 <u>c/</u>
Georgian SSR	145.4 <u>b/</u>	253.9 <u>b/</u>	270.7 <u>b/</u>	291.6 <u>c/</u>	312.5 <u>c/</u>

a. Total volume of postal service is composed of letters, packages, periodical publications, and money orders. A breakdown of the volume of postal service by these categories is available in the files of this Office. All data are rounded to the nearest hundred thousand.

b. 8/

c. Extrapolated by applying the average annual absolute growth shown from 1950 to 1956 to each of these years.

d. Figures for periodical publications for Azerbaijdzhan SSR were computed by applying the same average ratio of periodical publications to population as in the Armenian and Georgian SSR's. 9/

Inasmuch as K. Ya. Sergeychuk, Deputy Minister of Communications of the USSR, has stated that one of the main tasks of the Seven Year Plan is to shorten the delivery time of postal correspondence, many of the problems retarding the expansion of postal service probably will be solved during the next 7 years. Postal service in Region V therefore is expected to attain a level by 1965 adequate to meet fully the needs of all sectors of the economy.

#### IV. Telephone and Telegraph

##### A. Telephone

Telephone service in Region V is provided by urban, rural, and interurban telephone networks. The important industrial centers of Baku, Tbilisi, and Yerevan are the hubs of these networks, each maintaining telephone communications with all populated points in its respective republic and, through other republic capitals, with most cities of the USSR. Because of its central location, Tbilisi

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Table 5

Estimated Number of Postal and Telephone and Telegraph Enterprises  
in the Transcaucasus (Region V) <sup>a/</sup>  
1950 and 1955-58

	Units														
	1950			1955			1956			1957			1958		
	Urban <sup>b/</sup>	Rural	Total	Urban <sup>b/</sup>	Rural	Total	Urban <sup>b/</sup>	Rural	Total	Urban <sup>b/</sup>	Rural	Total	Urban <sup>b/</sup>	Rural	Total
Region V	397	1,130	1,530	472	1,220	1,690	500	1,240	1,740	528	1,270	1,800	556	1,290	1,850
Armenian SSR	62	200	262	72	210	282	78	212	290	84	214 <sup>c/</sup>	298 <sup>c/</sup>	90	216 <sup>c/</sup>	306 <sup>c/</sup>
Azerbaijan SSR	181	383	564	186	412	598	202	415	617	218	418 <sup>c/</sup>	636 <sup>c/</sup>	234	421 <sup>c/</sup>	655 <sup>c/</sup>
Georgian SSR	154	551	705	214	597	811	220	616	836	226	635 <sup>c/</sup>	861 <sup>c/</sup>	232	654 <sup>c/</sup>	886 <sup>c/</sup>

a. All totals are rounded to three significant digits. Totals are derived from unrounded data and may not agree with the sum of their rounded components.

b. Total minus rural.

c. Extrapolated by applying the absolute growth from 1955 to 1956 to each of these years.

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acts as the center of the telephone network in Region V. Yerevan maintains facilities for international telephone connections with cities of the Sino-Soviet Bloc and with France, Belgium, the UK, and the US. Expansion and improvement of interurban, urban, and rural telephone facilities will have to be emphasized in order to meet the expanding needs of the economy for telephone service. These needs were heightened by the economic reorganization of the USSR in 1957 which created demands for more lateral, as well as mainline, services.

The need for telephone service in Region V is heavily influenced by economic factors in the region. Densely populated industrial areas create heavy demands for extensive telephone service, but in the more mountainous areas and in the relatively uninhabited rural areas, the demand for telephone service is much less. Although transportation facilities are poor and the terrain of Region V is highly irregular, these factors present no serious barriers to the provision of telephone service in the region.

The quantity of urban and rural telephone service available in Region V is limited, in spite of the fact that there are more telephone sets per 1,000 persons in Region V than in the USSR as a whole -- there were 13 telephone sets per 1,000 persons in Region V in 1958 compared with only 11 telephone sets per 1,000 persons in the whole country. The very low level of telephone service in much of the USSR accounts for this difference rather than a high level of development of telephone service in Region V. The total number of telephone sets in Region V is shown in Table 6.\* The number of agricultural units, by type of unit, having telephone service with their rayon centers in Region V in 1956 is shown in Table 7.\*\*

The efficiency of telephone service in Region V as well as in the USSR as a whole may be judged by the small percentage of telephone exchange capacity that is serviced by automatic telephone exchanges. Only 54 percent of telephone exchange capacity in Region V was serviced by automatic exchanges in 1958, and in the USSR as a whole, 52 percent of telephone exchange capacity was so serviced. The low level of automatic exchange capacity in Region V and in the entire USSR is highlighted by a comparison with the US, where 94 percent of all telephones are serviced by automatic exchanges. 11/

The quantity of interurban telephone service also is limited. About 7 million interurban telephone calls were made in Region V in 1958 (see Table 8\*\*\*), or only 72 interurban calls per 100 persons\*\*\*\*

\* Table 6 follows on p. 15.

\*\* Table 7 follows on p. 16.

\*\*\* Table 8 follows on p. 17.

\*\*\*\* Text continued on p. 17.

S-E-C-R-E-T



S-E-C-R-E-T

Table 6

Estimated Number of Telephone Sets Connected to Exchanges Subordinate  
to the Republic Ministries of Communications  
in the Transcaucasus (Region V) a/  
1950 and 1955-58

	Thousand Units														
	1950			1955			1956			1957			1958		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Region V	69.0	7.8	76.8	93.0	11.9	104.9	101.0	12.6	113.6	109.0	13.5	122.5	117.0	14.4	131.4
Armenian SSR	14.0	1.9	15.9	19.0	2.8	21.8	21.0	2.8	23.8	23.0 b/	3.0 c/	26.0	25.0 b/	3.2 c/	28.2
Azerbaijdzhan SSR	26.0	2.3	28.3	37.0	3.7	40.7	40.0	3.9	43.9	43.0 b/	4.1 b/	47.1	46.0 b/	4.3 b/	50.3
Georgian SSR	29.0	3.6	32.6	37.0	5.4	42.4	40.0	5.9	45.9	43.0 b/	6.4 b/	49.4	46.0 b/	6.9 b/	52.9

a. All data are rounded to the nearest hundred.

b. Extrapolated by applying the rounded absolute growth shown from 1955 to 1956 to each of these years.

c. Extrapolated by applying the average annual absolute growth shown from 1950 to 1956 to each of these years.

50X1

S-E-C-R-E-T

Table 7

Estimated Telephone Service in Rural Areas in the Transcaucasus (Region V)  
by Type of Agricultural Unit a/  
1956

	<u>Village Soviets</u>		<u>Sovkhozes</u>		<u>Machine Tractor Stations</u>		<u>Kolkhozes</u>	
	<u>Units b/</u>	<u>Percent c/</u>	<u>Units b/</u>	<u>Percent c/</u>	<u>Units b/</u>	<u>Percent c/</u>	<u>Units b/</u>	<u>Percent c/</u>
Region V	2,281	98.8	204	95.3	246	96.6	3,060	66.5
Armenian SSR	450	99.8	57	98.3	52	98.1	886	98.5
Azerbaijdzhan SSR	896	97.8	54	100.0	99	93.0	735	49.0
Georgian SSR	935	99.5	93	91.2	95	98.0	1,439	65.4

a. Including only those agricultural units which have telephone service with their rayon centers.

b. 13/

c. 14/

S-E-C-R-E-T

Table 8

Estimated Number of Interurban Telephone Calls Made  
 in the Transcaucasus (Region V) a/  
 1950 and 1955-58

	Million Units				
	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Region V	<u>3.9</u>	<u>5.5</u>	<u>6.0</u>	<u>6.6</u>	<u>7.1</u>
Armenian SSR	0.9	1.2	1.2	1.2 <u>b/</u>	1.3 <u>b/</u>
Azerbaijdzhan SSR	1.3	1.8	2.0	2.2 <u>c/</u>	2.4 <u>c/</u>
Georgian SSR	1.7	2.5	2.8	3.1 <u>c/</u>	3.4 <u>c/</u>

a.

All data are rounded to the nearest hundred thousand. Totals are derived from unrounded data and may not agree with the sum of their rounded components.

b. Extrapolated by applying the average annual absolute growth shown from 1950 to 1956 to each of these years.

c. Extrapolated by applying the absolute growth shown from 1955 to 1956 to each of these years.

50X1  
50X1

in the region compared with 78 interurban calls per 100 persons in the USSR as a whole. The reason for this low level of development of the interurban telephone network in Region V is the lack of interurban circuit capacity and of interurban exchange equipment.

In addition to the public telephone service provided in Region V, many industrial enterprises have in the past maintained their own functional telephone networks. The total exchange capacity of these functional telephone networks in 1955, along with that of the Ministry of Communications of the USSR, is shown in the following tabulation:

	Telephone Subscribers	
	<u>Functional</u>	<u>Ministry of Communications</u>
Region V	<u>50,400</u>	<u>111,900</u>
Armenian SSR	8,600	25,100
Azerbaijdzhan SSR	22,300	45,100
Georgian SSR	19,500	41,700

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The present status of these functional telephone networks is unknown. In the economic reorganization of the USSR in 1957, many industrial enterprises were to turn over control of their telephone facilities to the Ministry of Communications of the USSR. It is believed that up to the present time no substantial turnover of these facilities has taken place.

The over-all expansion of telephone service in Region V is not keeping pace with needs of the economy of the region. Many telephone stations are in unsatisfactory technical condition and do not provide 24-hour service. In addition, available telephone circuits are overburdened, and the installation of semiautomatic exchange equipment is proceeding slowly.

The interurban, urban, and rural telephone networks in Region V will be expanded during the next 7 years. Efforts to expand the interurban network will include the construction of microwave radio relay lines for increased circuit capacity, the installation of semiautomatic telephone exchange equipment, and the installation of multichannel high-frequency apparatus on existing open wirelines and cable facilities. Expansion of urban and rural telephone service will be accomplished primarily by the installation of 10-number automatic telephone exchanges and by the development of a simple channel-multiplying apparatus for use on low-capacity wirelines. The over-all expansion of urban telephone service in Region V probably will parallel the expansion planned for the Georgian SSR. It has been announced that the capacity of the Tbilisi city telephone network will increase 3.5 times and the capacity of remaining city networks in the republic 3 times during the next 7 years. 16/

B. Telegraph

Regular telegraph service in Region V, although in need of expansion and improvement, comes closer to satisfying the requirements for rapid electrical communications than other telecommunications services. All republic, oblast, and rayon centers, as well as most populated points, act as telegraph centers and maintain telegraph service with each postal and telegraph enterprise in the region. The Georgian SSR, through its capital city of Tbilisi, acts as the center for telegraph service in Region V.

Expansion of telegraph service in Region V has been slow. Approximately 9.7 million telegrams were sent in Region V in 1958, only 0.7 million more than were sent in 1955 (see Table 9\*). This slow expansion may be explained by the fact that, up to the present

\* Table 9 follows on p. 19.

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Table 9

Estimated Number of Telegrams Sent  
in the Transcaucasus (Region V) a/  
1950 and 1955-58

	Million Units				
	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Region V	<u>6.60</u>	<u>9.00</u>	<u>8.90</u>	<u>9.28</u>	<u>9.66</u>
Armenian SSR	0.90	1.20	1.20	1.25 <u>b/</u>	1.30 <u>b/</u>
Azerbaijdzhan SSR	2.10	2.90	2.70	2.80 <u>b/</u>	2.90 <u>b/</u>
Georgian SSR	3.60	4.90	5.00	5.23 <u>b/</u>	5.46 <u>b/</u>

b. Extrapolated by applying the average annual absolute growth shown from 1950 to 1956 to each of these years.

50X1

time, the low efficiency of the existing network has discouraged intensive use of the system. The main reason for the low efficiency of the network is the radial nature of the telegraph system. In many cases, telegrams are relayed through two or more centers before being delivered, making for slow and unreliable service.

In order to improve telegraph service in Region V, the republic ministries of communications are striving to increase the number of direct telegraph circuits between rayon and oblast centers. The need for this type of lateral telegraph service has been heightened by the economic reorganization of the USSR in 1957, which created a demand for direct uninterrupted telecommunications among sovnarkhozes (councils of national economy) and between sovnarkhozes and their rayon centers.

The more modern telegraph services, phototelegraph and subscriber telegraph, are available to a limited degree in Region V. Phototelegrams may be transmitted from Baku, Tbilisi, and Yerevan to Moscow and probably to other major cities of the USSR. Although the extent of availability of subscriber telegraph service in Region V is not known, it is almost certain that this service is used by the more important industrial enterprises of the region.

It is believed that telegraph service in Region V will expand in the next 7 years at a somewhat more rapid rate than in the past. This expansion probably will be accomplished by expanding both subscriber telegraph and phototelegraph services, by replacing manual

S-E-C-R-E-T

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telegraph equipment with automatic facilities, and by reorganizing existing telegraph circuits so as better to fill the need for direct telegraph circuits. 18/

## V. Broadcasting

Broadcasting service in Region V is provided by radiobroadcasting, wire-diffusion, and television networks.\* By providing a medium for the dissemination of propaganda for the government and entertainment for the general public, these networks perform an important politico-social function. Amplitude modulation (AM) radiobroadcasting transmission and reception facilities in urban areas are considered to be adequate by Soviet standards to meet present needs, but facilities in rural areas remain inadequate. Television, frequency modulation (FM) radiobroadcasting, and wire-diffusion networks are also inadequate.

### A. Transmission Base

Radiobroadcasting stations, wire-diffusion centers, and television broadcasting stations make up the transmission base of the broadcasting system in Region V. The locations of radio and television broadcasting stations are shown in Figure 6.\*\* Wire-diffusion centers are located throughout the region, each servicing an average of about 500 wired loudspeakers. Radiobroadcasting transmission facilities provide an adequate quantity of radiobroadcasting coverage in Region V. Television broadcasting has expanded rapidly since its relatively late start in 1956, but main centers still are found only in the capitals of the republics of the region.

Domestic AM radiobroadcasting stations in Region V broadcast national programs originating from Moscow and regional programs originating from Baku, Tbilisi, Yerevan, and Sukhumi. These broadcasts can be received in all populated points of the region. One important development in the radiobroadcasting system in Region V has been the introduction of FM broadcasting stations. Such stations have been constructed in Baku, Tbilisi, and Yerevan and provide dependable high-quality broadcasts to these areas. Plans call for FM broadcasting stations to be constructed in most major cities of Region V during the next 7 years. Other plans for improving the transmission base of

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\* The republic ministries of communications of Region V are responsible for the operation and maintenance of the broadcasting facilities in their respective areas. The responsibility for program content and over-all supervision of the broadcasting system is vested in the state committee for radiobroadcasting and television of each republic. Each committee in turn is responsible to its republic council of ministers.

\*\* Following p. 20.

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the radiobroadcasting system include increasing the program output of existing facilities and using common telecommunications facilities for the transmission of radiobroadcasting programs over long distances.

International radiobroadcasting programs are transmitted from stations located in Baku and Yerevan to Europe and the Middle East. These international stations were established in Region V because of the favorable location of the region in relation to target areas.

The transmitting base of the wire-diffusion network in Region V is to be improved during the next 7 years. Present equipment of the network allows only one program to be broadcast at a time from the wired radio center to each wired loudspeaker. The Seven Year Plan calls for the introduction of equipment which will enable up to three programs to be broadcast at a time. This improvement will not destroy the "captive audience" advantages of the wire-diffusion network but will afford listeners an increased choice of programs. Other plans for improving the network include the retransmission of FM broadcasts by wired radio centers and the remote control of wired radio centers.

Main television stations were in operation in Baku, Tbilisi, and Yerevan at the end of 1958. These stations are equipped with mobile pickup stations which enable programs to be originated from various parts of the cities. To extend the area of coverage of main television stations, low-powered relay stations are being constructed. These relay stations enable residents normally beyond the zone of dependable reception (approximately 100 kilometers) to receive television programs.

Television broadcasting is expected to expand rapidly in Region V during the next 7 years. One of the most important steps being taken to aid this expansion is the construction of microwave radio relay lines. Such lines are under construction among the republic capitals of Baku, Tbilisi, and Yerevan and will enable the exchange of television programs among these cities. Plans call for the exchange of television broadcasts between major cities in Region V and cities located in the European portion of the USSR, Central Asia, and Siberia by the end of 1965. Plans to improve television broadcasting in Region V also include modernizing existing television stations, increasing the number of broadcasting and relay stations, and introducing color television in the republic capitals. 19/

B. Reception Base

There were approximately 1.2 million reception points (radiobroadcast receivers, wired loudspeakers, and television receivers) in Region V in 1958. Radiobroadcast receivers made up approximately



S-E-C-R-E-T

37 percent of these reception points, wired loudspeakers 59 percent, and television broadcast receivers about 4 percent. The proportion of radiobroadcast receivers to total reception points in Region V is higher than that in the USSR as a whole. Whereas radiobroadcast receivers were 37 percent of the total in Region V, they were only about 24 percent of the total in the entire country. This diversity is explained by the low number of wired loudspeakers in Region V -- only 72 per thousand persons in 1958. In the entire USSR, there were 131 loudspeakers per thousand persons in 1958. See Table 10\* for the total number of wired loudspeakers in Region V, by republic.

There are a number of limitations that must be overcome if the broadcasting effort in Region V is to be improved. One of the most important of these limitations is the existence of the many linguistic minorities living in the region. The dispersion of these minorities makes broadcasting target areas difficult to define, and, as a consequence, many programs are not received by the people for whom they are intended. The problem is compounded by the fact that each radiobroadcasting station engaged in providing programs for minority groups must devote a part of its broadcast time to national and regional programs in the Russian language.

The distribution of radiobroadcast receivers per 1,000 persons in urban and rural areas of Region V and of the USSR in 1958 is shown in the following tabulation:

	<u>Radiobroadcast Receivers per 1,000 Persons</u>		
	<u>Urban</u>	<u>Rural</u>	<u>Total</u>
USSR	78	20	46
Region V	87	14	45

The higher number of radiobroadcast receivers per 1,000 persons in urban areas of Region V compared with urban areas of the USSR as a whole and the converse situation in rural areas suggest that emphasis during the next 7 years will be primarily on expanding radiobroadcasting facilities in rural areas. The total number of radiobroadcast receivers in Region V, by republic, is shown in Table 11.\*

\* Table 10 follows on p. 23.

\*\* Table 11 follows on p. 24.

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Table 10

Estimated Number of Wired Loudspeakers  
in the Transcaucasus (Region V) a/  
1950 and 1955-58

	Thousand Units														
	1950			1955			1956			1957			1958		
	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total
Region V	164	66	230	259	213	472	280	283	563	308	325	633	338	378	716
Armenian SSR	30	22	52	49	44	93	52	56	108	55	65 <u>c/</u>	120 <u>c/</u>	58	74 <u>d/</u>	132 <u>d/</u>
Azerbaijdzhan SSR	63	14	77	97	70	167	103	101	204	117	116 <u>e/</u>	233 <u>f/</u>	132	130 <u>e/</u>	262 <u>g/</u>
Georgian SSR	71	30	101	113	99	212	125	126	251	136	144 <u>c/</u>	280 <u>c/</u>	148	174 <u>c/</u>	322 <u>c/</u>

a. Total minus rural. All data are rounded to the nearest thousand.

b. Total minus rural.

c. 21/

d. Extrapolated by applying the absolute growth shown from 1956 to 1957.

e. Extrapolated by applying the average annual absolute growth shown from 1950 to 1956.

f. Interpolated, using arithmetic progression, between 1956 and 1958.

g. 22/

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S-E-C-R-E-T

Table 11  
Estimated Number of Radiobroadcast Receivers  
in the Transcaucasus (Region V) a/  
1950 and 1955-58

	Thousand Units														
	1950			1955			1956			1957			1958		
	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total	Urban <u>b/</u>	Rural	Total
Region V	<u>91</u>	<u>9</u>	<u>100</u>	<u>254</u>	<u>43</u>	<u>297</u>	<u>298</u>	<u>55</u>	<u>353</u>	<u>334</u>	<u>67</u>	<u>401</u>	<u>369</u>	<u>79</u>	<u>448</u>
Armenian SSR	11	3	14	46	17	63	59	22	81	73	27 <u>c/</u>	100 <u>d/</u>	87	32 <u>c/</u>	119 <u>e/</u>
Azerbaijdzhan SSR	52	4	56	121	17	138	134	21	155	137	25 <u>c/</u>	162 <u>f/</u>	139	29 <u>c/</u>	168 <u>g/</u>
Georgian SSR	28	2	30	87	9	96	105	12	117	124	15 <u>c/</u>	139 <u>d/</u>	143	18 <u>c/</u>	161 <u>e/</u>

- a. All data are rounded to the nearest thousand.  
 b. Total minus rural.  
 c. Extrapolated by applying the absolute growth shown from 1955 to 1956 to each of these years.  
 d. 24/  
 e. Extrapolated by applying the absolute growth shown from 1956 to 1957 to each of these years.  
 f. Interpolated, using arithmetic progression, between 1956 and 1958.  
 g. 25/

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During the next 7 years it is planned to improve the technical quality of transmissions over the wire-diffusion network and to expand the number of wired loudspeakers in rural areas. Some of the problems to be overcome in carrying out this improvement and expansion include the present limitation of the wire-diffusion network to single-program broadcasting and the necessity for substantial capital and material expenditures per receiving installation in thinly populated areas.

There were only 50,000 television broadcast receivers in Region V in 1958, a negligible part of the total number of broadcast reception points in Region V. This small number of receivers is believed to reflect only a temporary lag in supply and distribution of television receivers, which soon will be overcome. 26/

VI. Common Telecommunications Facilities

Common telecommunications facilities used for the transmission of telephone, telegraph, and broadcasting information in Region V consist of open-wireline, multiconductor cable, and point-to-point radio facilities. No microwave radio relay lines are currently in operation in the region. The wireline, cable, and point-to-point radio facilities are divided into mainline (interrepublic and interoblast) and secondary (intraoblast and intrarayon) facilities according to use. Common telecommunications facilities in Region V are considered to be of limited capacity and of marginal quality. Within Region V, topographical features do not present any formidable barriers to the construction and operations of common telecommunications facilities. The Greater Caucasus Mountains, however, present an extremely difficult barrier to the construction of facilities connecting Region V with the European USSR. Moreover, such facilities, where provided, are extremely vulnerable to the destructive action of weather.

Mainline telecommunications service in Region V is provided chiefly by open wirelines, with some use being made of multiconductor cable and point-to-point radio. As shown in Figure 7,\* open wirelines equipped with channel multiplexing apparatus connect cities of Region V with Moscow and other cities of the USSR. Open wirelines also interconnect most of the important cities within Region V. Multiconductor cable usage is limited to a line between Tbilisi and Baku. This line eventually will be extended to Moscow. Point-to-point radio circuits, providing both regular telegraph and phototelegraph service, are maintained between each of the republic capitals of Region V and Moscow. It is believed that other point-to-point radio circuits connect cities of Region V with cities of other areas of the USSR. These circuits probably are used for emergency and reserve telecommunications.

\* Following p. 26.

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Secondary telecommunications service in Region V is provided by low-quality, open-wireline facilities. In thinly populated areas where construction of open wirelines is not economically feasible, it is believed that point-to-point radio facilities are used.

Mainline and secondary common telecommunications facilities in Region V must undergo considerable increase in circuit capacity and improvement in quality of service if the expanding needs of the economy and the population of the region are to be met. It is apparent that increased circuit capacity will be achieved by the use of microwave radio relay lines (see Figure 8\*). This modern common telecommunications medium affords the advantages of increased circuit capacity and reduced investment and operating costs per channel of information compared with the construction of wirelines or cables.

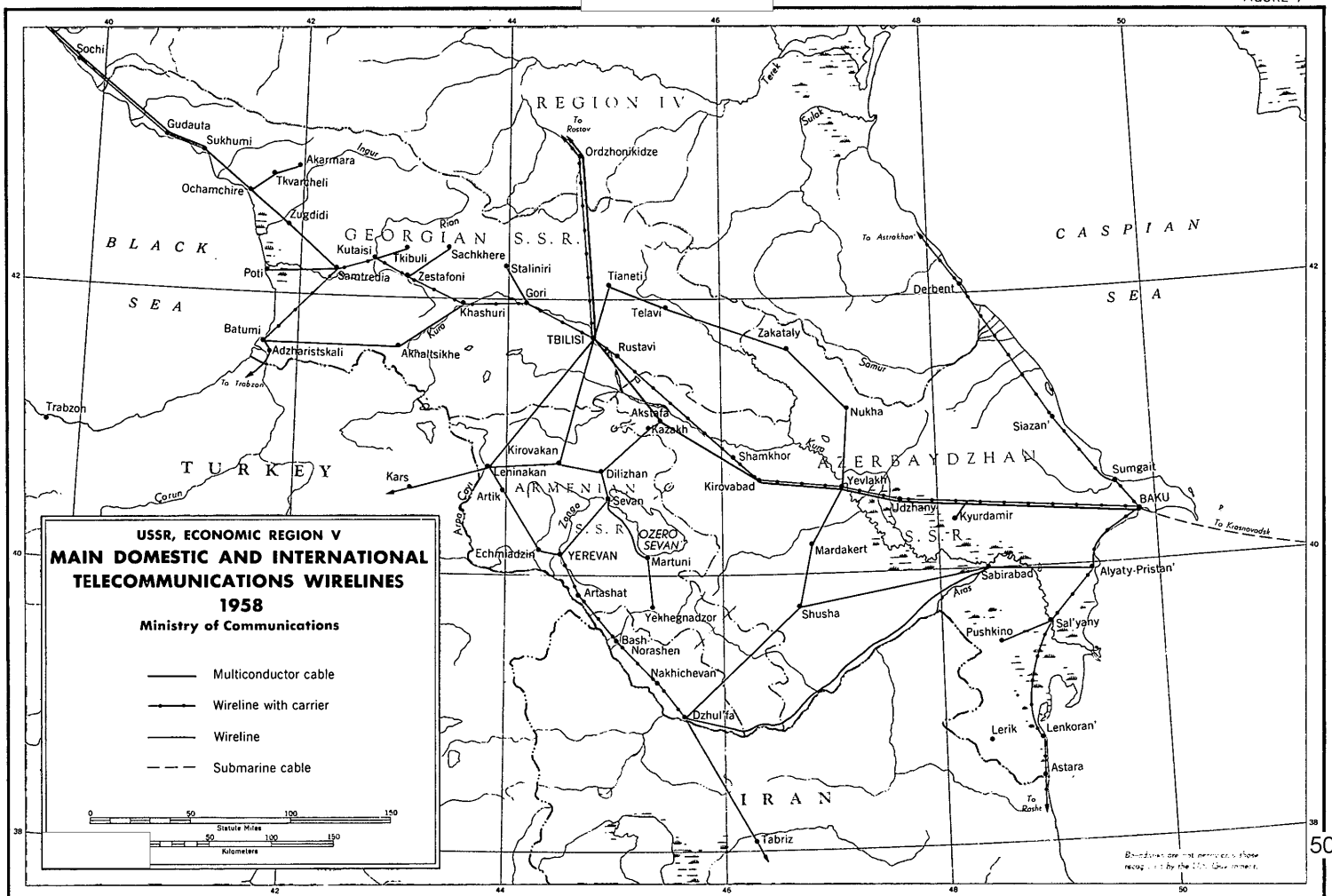
Thus far the construction of a microwave radio relay network in Region V has not been completed. Problems encountered in developing such a network include the inability to procure equipment and technical assistance, the neglect of republic ministries by the Ministry of Communications of the USSR, and poor organization and planning of the construction work. In 1957, Voronin, Deputy Minister of the Ministry of Communications of Azerbaydzhan SSR, stated that the Ministry of Communications of the USSR had not assisted his republic in obtaining equipment and technical assistance, although more than 15 million rubles were allocated for building radio relay lines. Similar complaints were expressed concerning the lack of direction in organizing the construction of microwave radio relay lines and the neglect of local organizations by central organizations in Moscow. The complaints were obviously valid because the important radio relay line between Baku and Tbilisi, planned for construction in 1956, was begun only in the last half of 1958. Current plans call for its completion by 1960.

During the next 7 years, the quantity and quality of mainline and secondary telecommunications facilities are expected to improve in Region V. Planned completion of the radio relay network not only will provide increased circuit capacity for telephone, telegraph, and broadcasting services but also will enable the exchange of television broadcasts among republics of Region V and between Region V and other areas of the USSR. The installation of additional point-to-point radio circuits and the modernization of existing circuits will improve the common telecommunications system by providing facilities for areas where wirelines and cables are not adequately provided. 27/

\* Following p. 26.

FIGURE 7

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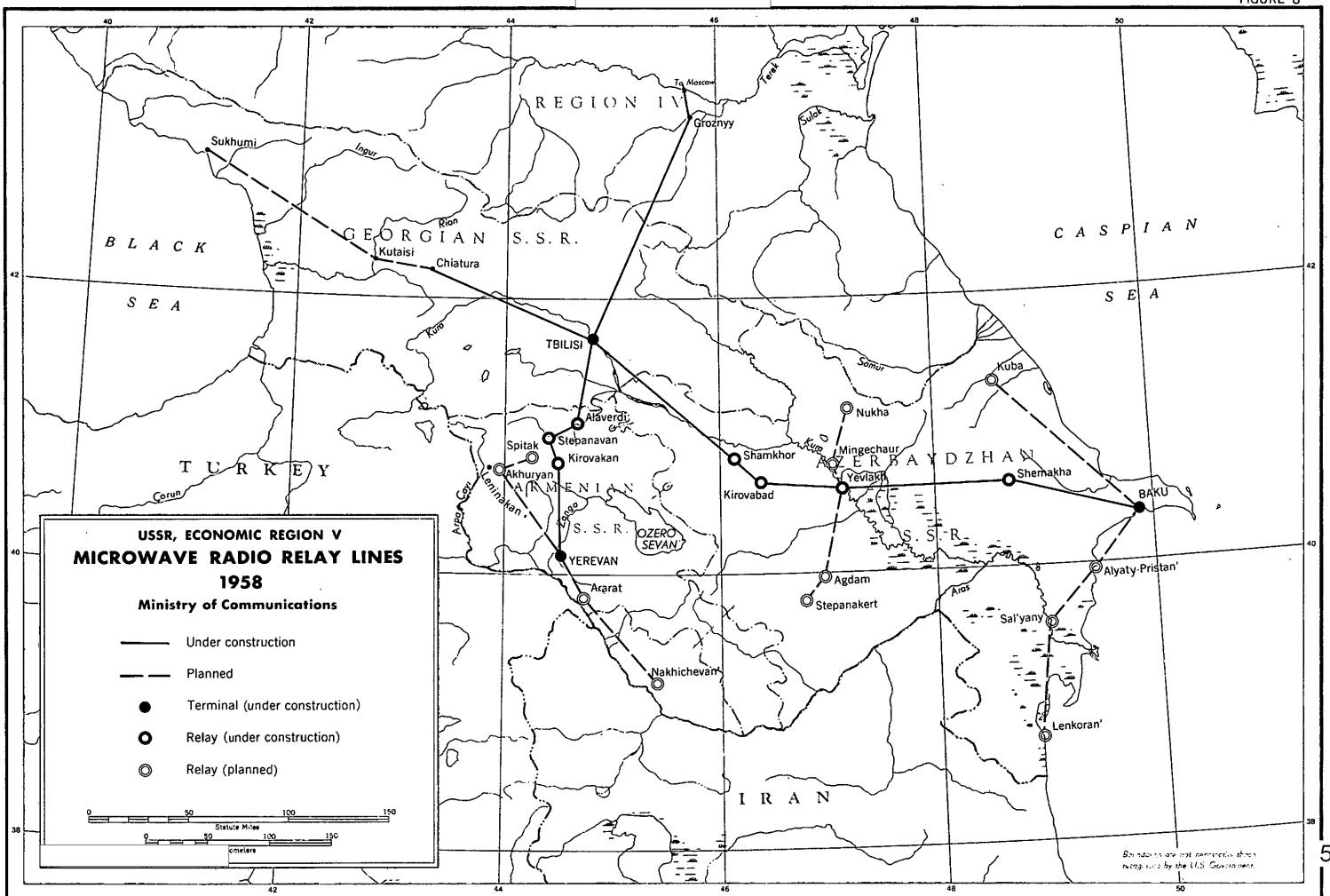


50X1

50X1

FIGURE 8

50X1



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50X1

50X1

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VII. Future Trends

Rapid expansion of post and telecommunications facilities and services in Region V is called for under the Seven Year Plan (1959-65). This expansion will be directed toward the improvement of existing facilities as well as toward the installation of new and original facilities.

Major trends in the development of post and telecommunications facilities and services in Region V during 1959-65 probably will include the following:

1. Rapid expansion of circuit capacity of common telecommunications facilities through the construction of microwave radio relay lines.
2. Rapid expansion of interurban, urban, and rural telephone exchange capacity, primarily through the installation of automatic telephone exchange equipment.
3. Rapid expansion of subscriber telegraph service and phototelegraph service.
4. Rapid expansion of the television reception base.
5. Expansion of television broadcasting facilities and installation of network television service.
6. Expansion of radiobroadcasting facilities in outlying areas.
7. Expansion of postal facilities and services in rural areas and increased use of mechanized postal equipment in large urban areas.
8. Increased responsibility with regard to investment delegated by the Ministry of Communications to republic and local post and telecommunications organs.
9. Probable integration of some functional telecommunications facilities in Region V with those of the republic ministries of communications of the region.

It is believed that these objectives can be accomplished during the next 7 years. In this event, post and telecommunications facilities and services should be adequate to satisfy most of the demands of Region V.

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S-E-C-R-E-T

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

Amplitude modulation (AM): The process by which a selected carrier frequency is varied in magnitude (amplitude) by other frequencies that contain the information to be transmitted in telecommunications. (See Frequency modulation.)

Apparatus: Instruments, machines, appliances, and other assemblies used in providing a telecommunications facility.

Automatic (as an adjective): Of or pertaining to any process involved in producing telecommunications service which does not require direct, immediate human assistance.

Band (of frequencies): The entire range of frequencies between two numerically specified frequency limits. The magnitude of this range is a limiting factor on the amount of information that can be transmitted in telecommunications. With respect to frequencies of the radio spectrum as a whole, the International Telecommunication Union has for convenience divided the whole radio spectrum into eight major bands, as follows:

Frequency Bands		Corresponding Wave*
Range	Type	Band
30 kc** and below	Very low frequencies (VLF)	Myriametric waves
30 to 300 kc	Low frequencies (LF)	Kilometric waves
300 to 3,000 kc	Medium frequencies (MF)	Hectometric waves
3,000 to 30,000 kc	High frequencies (HF)	Decametric waves
30,000 kc to 300 mc***	Very high frequencies (VHF)	Metric waves
300 to 3,000 mc	Ultra high frequencies (UHF)	Decimetric waves****
3,000 to 30,000 mc	Super high frequencies (SHF)	Centimetric waves****
30,000 to 300,000 mc	Extremely high frequencies (EHF)	Millimetric waves****

\* Waves are undulating disturbances: a sound wave is a disturbance in the air, which is an elastic medium, and an electric wave is a disturbance in any medium whatever. The number of waves per second is the frequency of a given wave. Because the speed of wave propagation is considered to be constant, the length of a given wave is in inverse relation to its frequency: the longer the footnotes continued on p. 30

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Cable: A bundle of sheathed; insulated wires and/or coaxial tubes, used as a telecommunications medium. It is sometimes referred to as "multiconductor cable."

Carrier (as an adjective): Of or pertaining to a technique for dividing a circuit, lane, supergroup, group, or channel into portions which can be used independently of and simultaneously with all other portions. Different frequencies or different pulses are selected for each portion to "carry" the information to be transmitted, after alteration by the information frequencies. The carrier itself need not be transmitted.

Channel: A portion, electrical or physical, of a telecommunications circuit, lane, supergroup, or group which can be used to transmit information independently of and simultaneously with all other portions. A channel may be used to provide two or more subchannels.

Circuit: A telecommunications connection between two or more distant points by a wire, cable, or radio medium facility used to carry information. The circuit is the fundamental telecommunications connection between distant points. By the application of appropriate techniques, a circuit may be arranged in many different combinations to meet the need for various kinds and quantities of telecommunications service. In its simplest form a circuit may carry only single telecommunications units in sequence. In its most complex form it may by apportionment carry simultaneously thousands of telephone channels and telegraph subchannels; a number of television programs; and other specialized kinds of service, such as high-fidelity broadcast programs, radar signals, and data-processing signals.

For the most complex application, a circuit is often arranged into lanes, each of which can carry, in 1 direction, 1 television program or 600 telephone channels. In turn, these 600 telephone channels are subdivided into 10 supergroups of 60 telephone channels each. Each supergroup is subdivided into 5 groups of 12 telephone channels each. One or more telephone channels may be further subdivided into three to twenty 60-word-per-minute teletype subchannels. Other specialized kinds of service may be accommodated by combining two or more telephone channels.

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wave length, the lower the frequency, and the shorter the wave length, the higher the frequency. Wave length is usually measured in linear units of the metric system.

\*\* Kilocycles per second, or 1,000 cycles per second.

\*\*\* Megacycles per second, or 1 million cycles per second.

\*\*\*\* It is becoming common usage to refer to waves (frequencies) in these three bands as "microwaves."

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Coaxial (as an adjective): Of or pertaining to a modern telecommunications cable medium technique using one or more tubes (sometimes called "pipes"). Each metal tube surrounds a conducting wire supported concentrically by insulators. The space in the tube usually contains nitrogen gas under pressure. Generally, coaxial cable is used for the transmission of information in complex form, such as radar, computer data, or television signals, and/or for the transmission of telephone channels and telegraph subchannels. A single tube usually carries information in only one direction at a time. The capacity of a tube depends in part upon the distance between repeater stations. In the standard facility, which may have from 2 to 8 tubes in the cable, a single tube carries a lane of 600 telephone channels or 1 television lane, for which the repeater station spacing is about 7 statute miles. In a new developmental coaxial cable facility, a single tube may carry 3 lanes of a total of 1,800 telephone channels or 3 television lanes, for which the repeater station spacing is expected to be about 3 statute miles.

Electronics: A general term used to identify that branch of electrical science and technology that treats of the behavior of electrons in vacuums, gases, or solids. Today, telecommunications makes extensive use of electronic technology.

Facility: An association of apparatus, material, and electrical energy required to furnish telecommunications service.

Facsimile (as an adjective): Of or pertaining to a telecommunications (telegraph) service in which photographs, drawings, handwriting, and printed matter are transmitted for graphically recorded reception. In one method (Type A), images are built up of lines or dots of constant intensity. In another method (Type B), images are built up of lines or dots of varying intensity, sometimes referred to as "telephoto" and "photoradio."

Feeder (as an adjective): Of or pertaining to telecommunications facilities of relatively low capacity which join facilities of relatively high capacity. (See Main.)

Frequency: The rate in cycles per second at which an electric current, voltage, wave, or field alternates in amplitude and/or direction. (See Band.)

Frequency modulation (FM): The process by which a selected carrier frequency is varied in frequency by other frequencies that contain the information to be transmitted in telecommunications. (See Amplitude modulation.)

S-E-C-R-E-T

Functional (as an adjective): Of, pertaining to, or connected with special, unique, or particular telecommunications facilities managed and operated by a single agency, organization, company, department, committee, ministry, or other entity, in contrast to the facilities of a basic system.

Group: A number of channels (usually 12) or subchannels combined (multiplexed) electrically in building up the total capacity of a telecommunications circuit, lane, or supergroup.

Ionosphere: Those layers of the earth's atmosphere occupying the space about 210 statute miles in thickness extending from about 30 statute miles above the earth's surface to the outer reaches (exosphere) of the atmosphere. Reflection from these layers makes possible long-distance transmission of radio signals. The layers, however, are responsible for fading of signals, skip distance, and differences between daytime and nighttime radio reception. They are also used as a scattering reflector for ionosphere scatter-transmission techniques to transmit to distances of about 1,000 to 1,500 statute miles.

Joint facility: A telecommunications facility owned, controlled, or operated by two or more agencies, organizations, companies, departments, committees, ministries, or other entities.

Lane: A 1-way portion, electrical or physical, of a 2-way telecommunications circuit which can be used independently of and simultaneously with all other portions. The largest lane today can handle 600 telephone channels or 1 television program. In some applications the direction of a lane may be reversed.

Leased (as an adjective): Of or pertaining to the direct operation by a user of a telecommunications facility owned by another agency.

Line: A general term used to delineate a telecommunications circuit facility (wire, cable, or radio).

Main (as an adjective): Of or pertaining to telecommunications facilities at and between principal cities and centers which have relatively high capacity compared with feeder facilities. (See Feeder.)

Medium: Any substance or space that can be used practically to transmit a form of electrical energy for the purpose of providing telecommunications service.

S-E-C-R-E-T

Microwave radio relay (as an adjective): Of or pertaining to a radio medium technique in modern telecommunications employing radio frequencies higher than 300 mc. These frequencies do not normally afford practical direct transmission to great distances, principally because they do not bend well around the earth's surface and because they do not reflect well from the ionosphere. They are, however, capable of reliable transmission from horizon to horizon (line-of-sight) by the use of special antennas which concentrate the radio energy and give it desired direction. Great distances can, in consequence, be reached by this technique by the interposition of relay stations along the route of the line with a spacing interval of from 25 to 40 statute miles, depending upon terrain conditions. This technique can be employed practically to carry from a small number of telephone channels and telegraph subchannels to thousands of such channels and subchannels through 2 or more lanes and to carry 1 or more television and other specialized lanes and channels. (See Band.)

Mobile (as an adjective): Of or pertaining to a telecommunications facility which is intended to be operational while in motion or during halts at unspecified points. (See Portable.)

Modulation: The process of altering a carrier frequency or carrier pulses by other frequencies or pulses representing the information being transmitted.

Multiplex (as an adjective): Of or pertaining to the combining of information signals, modulated or unmodulated, of two or more lanes, supergroups, groups, channels, or subchannels for transmission over the same circuit.

Network: An interconnection, electrical or physical, of two or more circuits or portions thereof for the purpose of facilitating telecommunications service.

Point-to-point (as an adjective): Generally, of or pertaining to telecommunications service between fixed points, using the radio medium.

Portable (as an adjective): Of or pertaining to a telecommunications facility which can be readily moved from place to place but is not normally operational while in motion. (See Mobile.)

Private (as an adjective): Belonging to or concerning an individual person, organization, institution, or activity; not public or common.

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Pulse: A spurt of electrical energy of extremely short duration (usually measured in millionths of a second), yet capable of being used in telecommunications to transmit information.

Quad: In a multiconductor telecommunications cable, the physical association of a group of 4 conductors in any one of various arrangements for the purpose of providing 2-way multichannel operation.

Reception base: The aggregate telecommunications receiving facilities employed in providing a broadcast service.

Route: The geographical path followed by a wire, cable, or radio line.

Scatter (as an adjective): Of or pertaining to a radio medium technique in modern telecommunications by which energy in radio frequencies above 30 mc is deliberately scattered into one or the other of two reflecting portions of the atmosphere (troposphere and ionosphere) at a predetermined angle such that a usable portion of the energy arrives at the desired receiving location. This technique is especially applicable to regions in high latitudes (Arctic and Antarctic) where facilities of other media suffer from the rigors of weather and terrain and where the conventional long-distance radio media of the lower frequency bands (200 kc to 30 mc) are subject to serious disruptive propagational anomalies. (See Band.)

Subchannel: A portion, electrical or physical, of a telecommunications channel which can be used independently of and simultaneously with all other portions. An appreciable number of telephone channels can usually be subchanneled to carry from three to twenty 60-word-per-minute teletype subchannels on each telephone channel so employed.

Subscriber: Any customer who directly operates telecommunications apparatus in obtaining telecommunications service.

Supergroup: A number of groups (often five) combined (multiplexed) electrically in building up the total capacity of a telecommunications circuit or lane.

System: All of the facilities and networks managed by a single agency, organization, company, department, committee, ministry, or other entity in rendering either functional or basic telecommunications service.

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Telecommunications: Transmission, reception, or exchange of information between distant points by electrical energy over a wire, cable, or radio medium facility to produce telephone, telegraph, facsimile, broadcast (aural and visual), and other similar services.

Teletype (as an adjective): Of or pertaining to a technique for effecting telegraph service by the use of an apparatus similar to a typewriter in which information is transmitted by keyboard and received by type printer on a roll of paper or a roll of tape, or by perforations on a roll of tape, or by both. (Sometimes called a "teleprinter" or "teletypewriter.")

Transmission base: The aggregate telecommunications transmitting facilities employed in providing broadcast service.

Transistor: A modern device which is capable of performing in a solid (germanium or silicon) many of the functions performed by the conventional electronic tube in a gas or vacuum.

Troposphere: The layer of the earth's atmosphere occupying the space from the earth's surface to a height of about 6 statute miles. This layer is used as a scattering reflector for tropospheric scatter transmission techniques to distances of about 200 to 500 statute miles.

Wave guide (as an adjective): Of or pertaining to a telecommunications medium, now under development in several countries, which may be capable of transmitting extremely large amounts of conventional and complex information. It consists of a circular or rectangular hollow metallic tube in which electrical energy travels in the form of waves, much as do sound waves in a speaking tube.

Wire diffusion: Distribution of broadcast programs by a wire or cable medium to wired loudspeakers.

Wired loudspeaker: A telecommunications loudspeaker which receives from a distribution point one or more broadcast programs by a wire or cable medium.

Wireline: A general term used to identify a line consisting of either an aerial cable (and/or separate wires) or an underground cable, used as a telecommunications medium.

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APPENDIX B

METHODOLOGY

The statistical data on post and telecommunications services in Region V were developed in large part from information in statistical publications of the republics of Region V covering the years 1950 and 1955-56. Population data were used to derive per capita relationships between the USSR and Region V and among individual republics of the region. Specific methodologies used in the determination of each statistical series [redacted] are contained in the table footnotes. [redacted] references used in the preparation of these tables are available for inspection in the producing Office.

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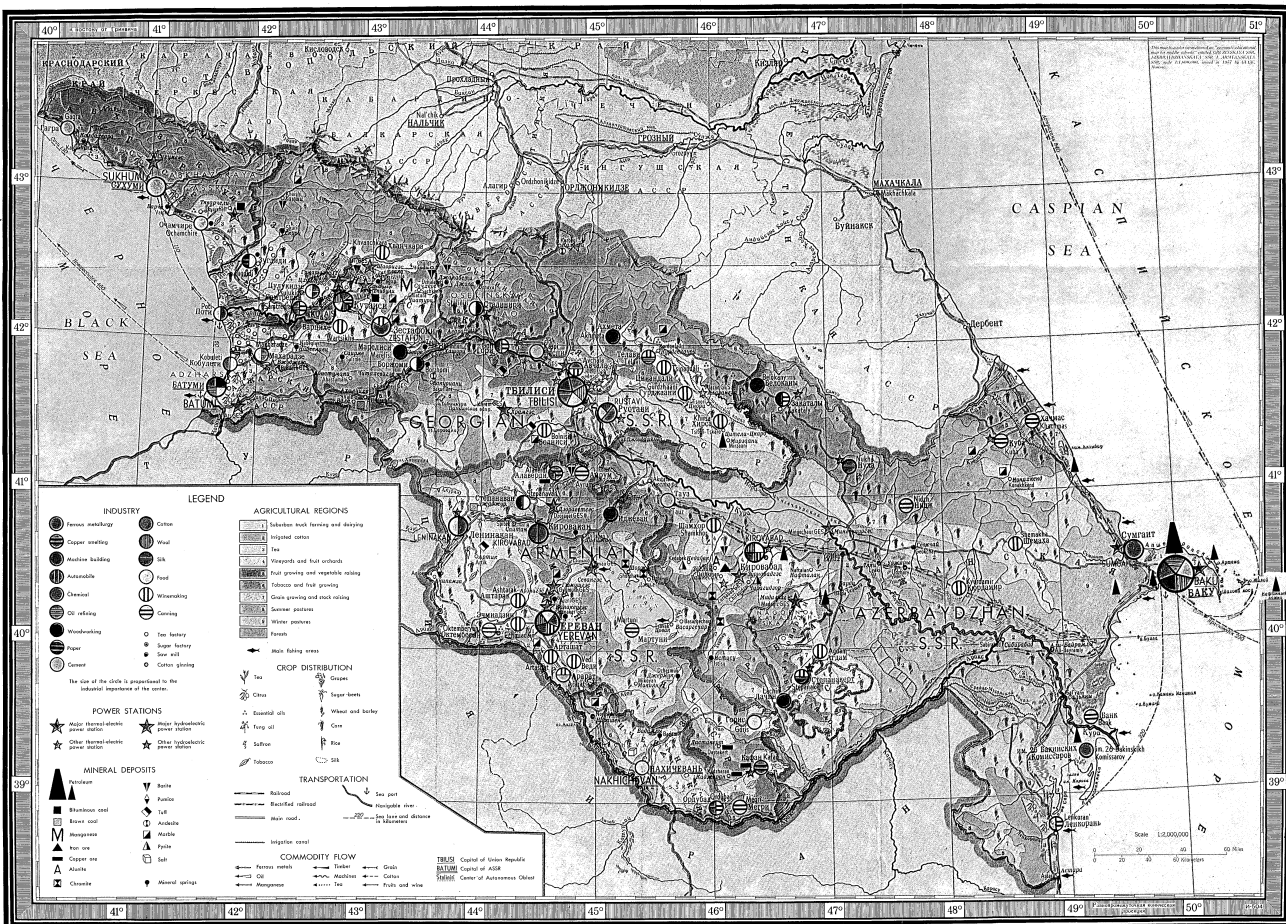


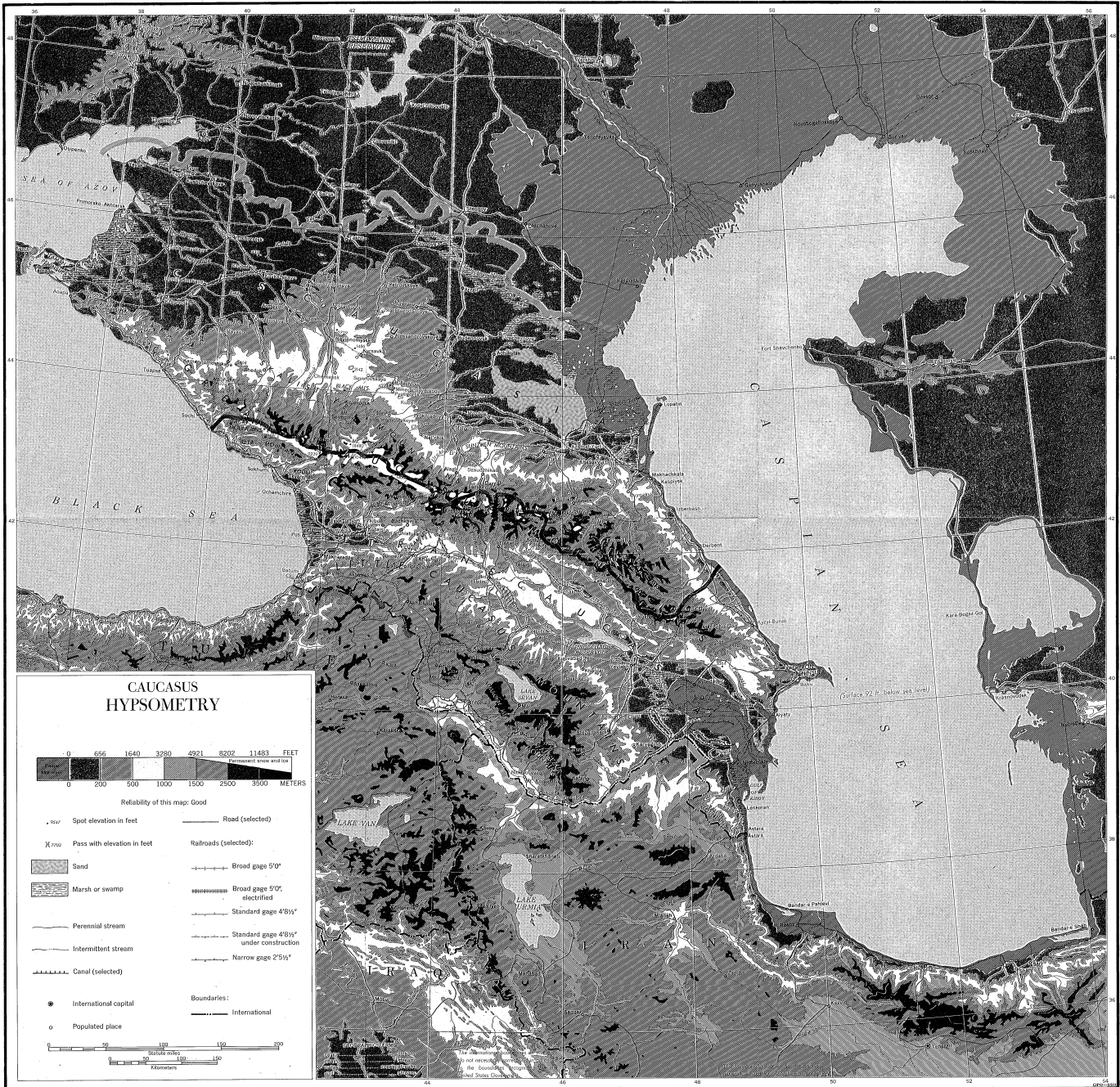
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**ECONOMIC MAP OF THE TRANSCAUCASUS**

FIGURE 2





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