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GEOGRAPHIC INTELLIGENCE REVIEW

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CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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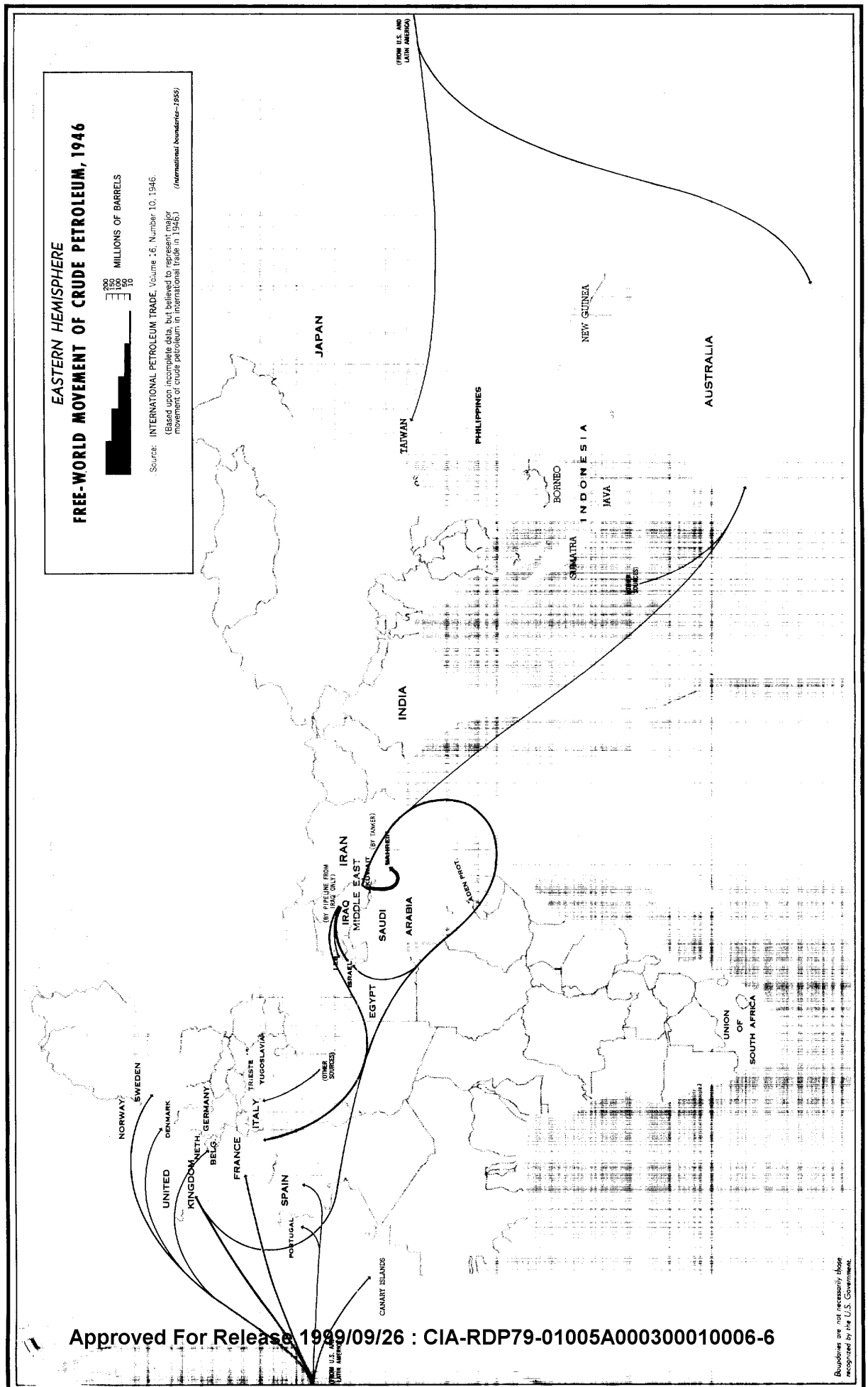

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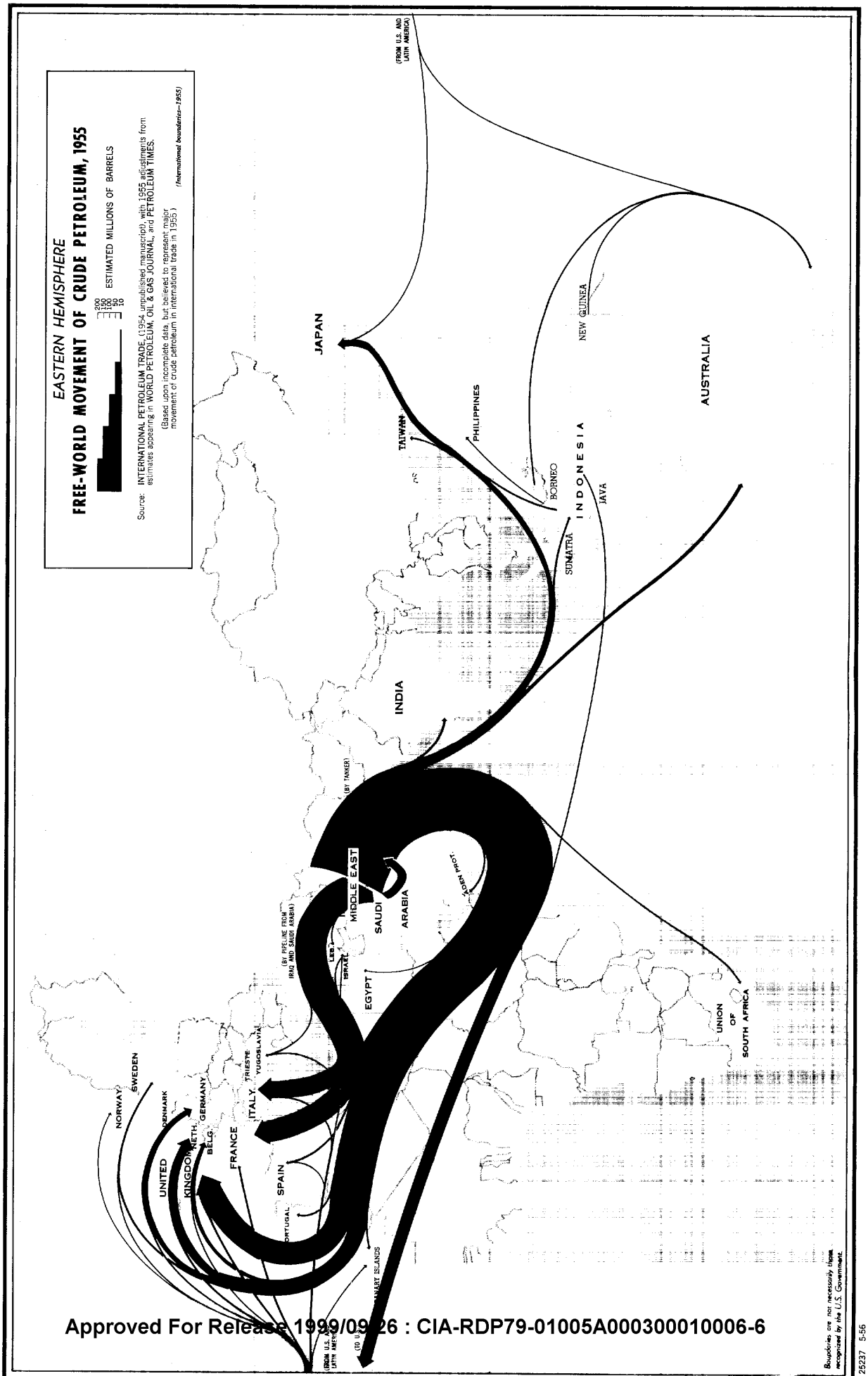

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GEOGRAPHIC INTELLIGENCE REVIEW

CIA/RR MR-50

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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PETROLEUM-REFINERY LOCATION IN THE FREE-WORLD EASTERN HEMISPHERE*

Current Trends

Since the end of World War II a distinct trend has developed in the location of oil refineries in the Free-World Eastern Hemisphere -- those areas whose economics are not dominated by the USSR. Refineries, instead of being built in centers of oil production, are now being concentrated in consuming areas. Refinery capacity has increased most in highly industrialized Western Europe, where the demand for refined products is most urgent. The same trend, however, can be observed in other less industrialized parts of the Eastern Hemisphere -- in areas as widely separated as Aden, India, Australia, and the Philippines. Although the refinery capacity of some oil-producing areas has been increased, this is the exception rather than the rule.

The current trend in refinery location has several advantages. A major power gains in terms of strategic considerations, efficiency of operation, and shipping costs. A small nation realizes a saving in foreign exchange, increases its level of employment, and in some instances partly appeases a strong nationalistic desire for economic independence. Furthermore, advances in the field of refinery design since World War II make the operation of a small refinery increasingly practical in countries with limited demands for petroleum products.

*This article has been coordinated with the Petroleum Branch, Materials Division, ORR.

The movement of crude petroleum in international trade not only points up the changes that have occurred in the petroleum industry since World War II but also demonstrates that the Eastern Hemisphere is practically independent in terms of both crude petroleum and refined products at the present time. With the increased production of crude petroleum in the Middle East and the expanding refinery capacity of Europe and the Far East, only a small proportion of Eastern Hemisphere requirements is now being imported from North and South America. In 1954 the estimated demand of the Free-World Eastern Hemisphere for petroleum exceeded 25 percent of the world total. This amounted to less than one-half of the requirement of the Western Hemisphere (9,400,000 barrels per day) but more than three times the estimated domestic demand of the USSR (1,150,000 barrels per day).* All but a small percentage of the crude petroleum for the multibillion-dollar petroleum industry of the free areas of the Eastern Hemisphere is produced in the Middle East. If Middle Eastern oil were lost to the Free World, a tremendous strain would be placed on the petroleum resources of the Western Hemisphere.

The current trend in refinery location has not extended to the Soviet-controlled parts of the Eastern Hemisphere, where refining capacity continues to be centered in oil-producing areas. Since this situation is closely related to problems of ownership, management, and

*"World Supply and Demand," World Oil, Vol. 141, No. 3, 15 August 1955, pp. 158-159.

transportation, all of which are dominated by the state, it is not comparable to that in the Free World.

Advantages of Consumer-Area Refineries

For the industrial nation the location of refineries near at hand has both economic and strategic advantages. Shipping costs are reduced, because crude petroleum can be transported at a lower cost in terms of containers and safety measures required. Furthermore, a refinery can operate more efficiently in an area with an adequate supply of skilled labor than in an area where skilled labor would have to be imported and large numbers of unskilled native laborers would have to be employed. An industrial location is also favorable for the installation of new facilities. Site surveys are cheaper, the expense of shipping building materials is reduced, construction costs are lower, and construction delays are minimized. From a European viewpoint, production from a domestic refinery is more dependable than from one subject to xenophobian whims of an ambitious small nation.

The relative permanence of a local refinery, combined with its independence of a single source of oil, is of particular advantage to a great power in a time of national crisis. Should the normal source of oil be cut off, the refinery could draw its crude petroleum from a different part of the world without incurring much loss of time for plant redesign or reconstruction.

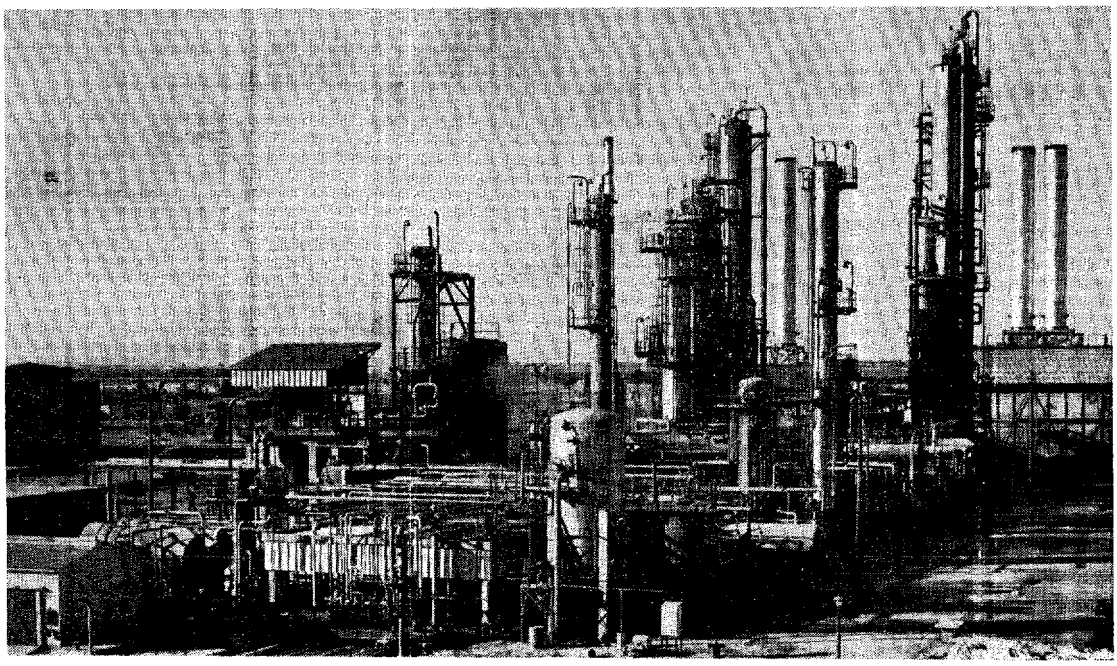
Smaller nations, anticipating further industrialization, share with the great powers some of the advantages of having domestic refineries, such as elimination of dependence on other nations for refined products, reduced shipping costs, and savings in foreign exchange. Other advantages apply particularly to the smaller nations. The construction and operation of refineries provide new opportunities for employment, and the possession of their own refineries fosters patriotic pride. Furthermore, with the increased tempo of exploration for oil, some of the currently underdeveloped nations hope to find local sources of crude petroleum and eventually to attain complete oil independence. These hopes may or may not have their origin in a wave of nationalism that transcends economic practicality.

Technical Changes

Advances in technology, changes in the petroleum-demand structure, and the increased rate of oil exploration are making it more feasible for countries with a low level of industrial development to support refining activity.

Before World War II, a complete refinery capable of producing a variety of products was necessarily a large plant with a capacity far in excess of the needs of small countries with relatively low petroleum consumption. As a result of postwar technological advances, such large plants are no longer necessary. The complete range of petroleum products can now be produced in refineries of a size that can be constructed and operated economically by small nations. Countries such as Syria

and Jordan, which have access to crude petroleum from major pipelines, are in a position to take immediate advantage of this development.



The combination unit of the Daura refinery, 15 miles south of Baghdad, Iraq. This 24,000-barrel-per-day refinery, which began operation in 1955, was designed to provide a full range of products at minimum cost.

The need for greater quantities of fuel oil is becoming a major consideration in the production from Eastern Hemisphere refineries. Because of the heavy demand for gasoline immediately after World War II, refineries were geared to gasoline production. Later the heavy demand shifted to fuel oils, and low-octane gasoline is now in surplus supply. One installation in the Middle East is even reported to be pumping straight-run gasoline back into the ground at the rate of 20,000 barrels per day.* Since the demand for fuel oil both in Europe

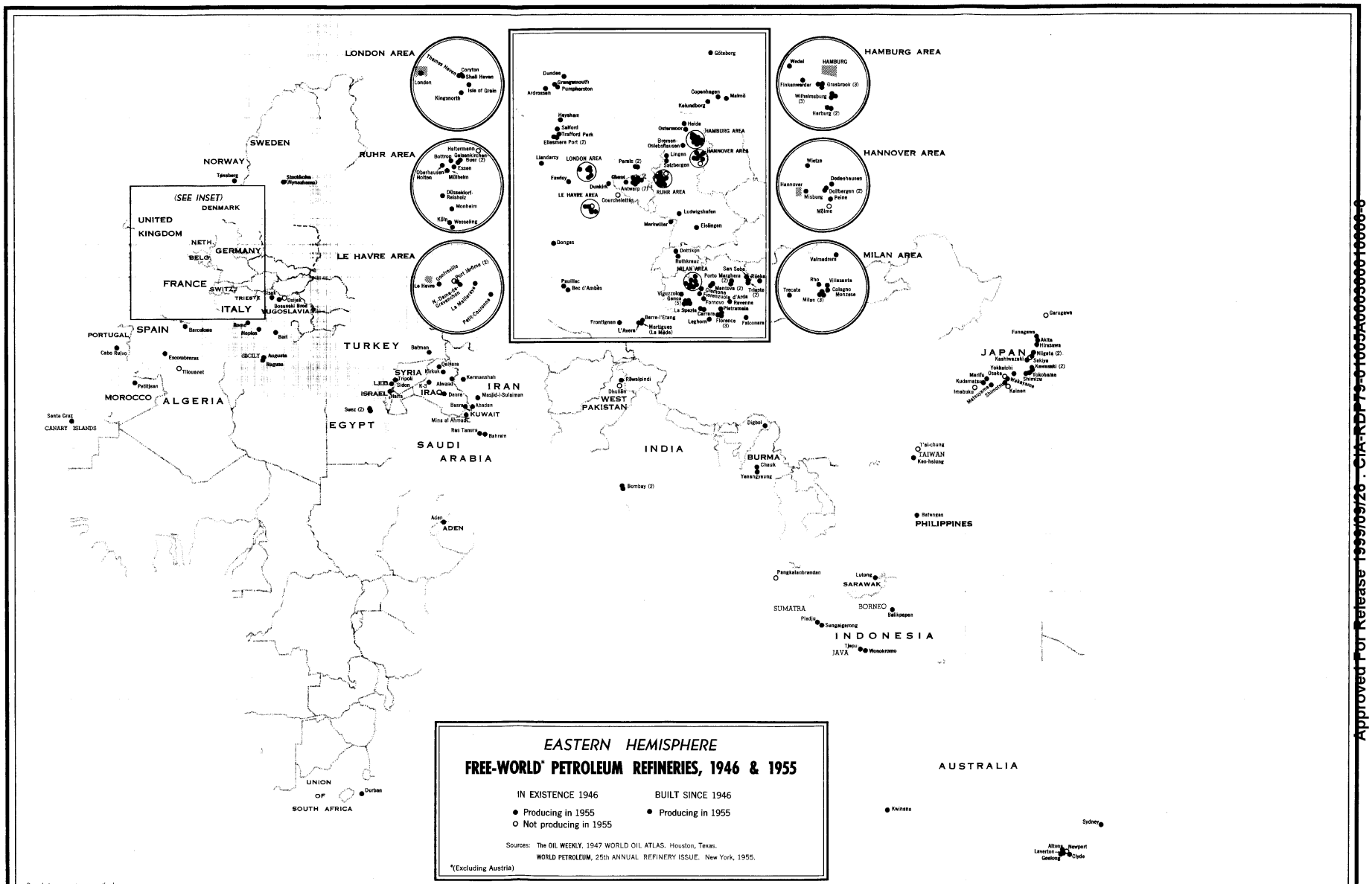
*Petroleum Week, Vol. 2, No. 20, 25 November 1955, p. 35.

and in less industrialized areas continues to grow more rapidly than the demand for gasoline, interest in increasing the proportion of fuel oil derived from crude petroleum has been intensified. With modern refining processes, however, even a small nation can produce a range of products suited to its needs without the burden of a large surplus of gasoline. Furthermore, the modern integrated refinery that makes the wide range of products possible also reduces both capital outlay and operating expense.

Intensified petroleum exploration during the postwar years has encouraged hopes for savings in foreign exchange and for eventual self-sufficiency in petroleum products in countries that are not now producing adequate supplies of crude petroleum, such as Tunisia, Libya, Ethiopia, and Greece. As a result, refineries are now being constructed in locations heretofore thought unlikely or even undesirable.

Comparison of 1946 and 1955 Refining Capacity

The trend toward a concentration of refining capacity in consuming rather than producing areas is illustrated by a comparison of 1946 and 1955 figures (see Map 25238). Europe's share of the total refining capacity of the Free-World Eastern Hemisphere rose from approximately 26 percent in 1946 to 53 percent in 1955. During the same period, Middle East capacity decreased from about 59 percent to



EASTERN HEMISPHERE

FREE-WORLD* PETROLEUM REFINERIES, 1946 & 1955

IN EXISTENCE 1946	BUILT SINCE 1946
● Producing in 1955	● Producing in 1955
○ Not producing in 1955	

Sources: The OIL WEEKLY, 1947 WORLD OIL ATLAS. Houston, Texas.
WORLD PETROLEUM, 25th ANNUAL REFINERY ISSUE. New York, 1955.

*(Excluding Austria)

Boundaries are not necessarily those recognized by the U.S. Government.

25238 4-56

30 percent of the total, and Far East capacity increased from 15 percent to 16 percent.*

Although the same trend is indicated by a comparison of absolute refining capacities, it is less pronounced. In the first place, consumption of refined products has increased enormously since the end of World War II, and some of the required refining capacity could be expected to be added at existing refining centers in producing areas. Furthermore, new outlets for refined products have developed within the Middle East, which is generally regarded as a producing rather than a consuming area.

The absolute capacity of Free-World Eastern Hemisphere refining installations increased from approximately 1,250,000 barrels per day for 134 plants in 1946 to 4,500,000 barrels per day for 186 units in 1955.** The rated throughput of 80 European plants in 1946 was approximately 328,000 barrels per day, as compared with some 735,000 barrels per day for 11 installations in the Middle East and 181,000 barrels per day for 37 refineries in the Far East. The remainder of the

*Capacity figures for 1946 from "1947 World Oil Atlas," The Oil Weekly, 30 June 1947, Section 2; figures for 1955 from World Petroleum, 25th Annual Refinery Issue, Vol. 26, No. 8, 15 July 1955.

**Figures refer to rated capacity in barrels per calendar day. In 1946, most war-damaged refineries had not regained their rated throughput; some were never rebuilt. By 1955, a number of European refineries designed in anticipation of future demand were producing less than their full capacity.

production came from small refineries in Africa and the Canary Islands. In 1946 Iran's capacity of slightly over 400,000 barrels per day, which came largely from the Abadan refinery, was greater that that of all of Free Europe.

By 1955 the refining capacity of Europe had increased to approximately 2,400,000 barrels per day from 128 refineries, the capacity in the Middle East had increased to 1,337,000 barrels per day from 18 installations, and Far Eastern capacity had reached about 705,000 barrels per day from 36 refineries. It is significant that major refineries that have been constructed in Africa, the Middle East, and the Far East are in areas with a deficit of crude petroleum -- at Durban, South Africa; Aden; Kwinana and Altona, Australia; and two at Bombay, India. Other new refineries that must rely on imported crude petroleum are under construction or projected in Angola, Greece, Turkey, India, Thailand, Australia, the Philippines, and Japan.

Between 1946 and 1955 the Middle East almost doubled its refining capacity, but its share of the total production of the free areas of the Eastern Hemisphere declined about 50 percent. The percentage decline is in line with the current trend toward the location of refineries in petroleum consuming rather than producing areas. A portion of the new construction was undertaken to fill the void created by the closing of the Abadan refinery. The Aden refinery, for example, was established to provide bunker fuel at a major

distribution center and relies completely upon imported crude petroleum. At present the refinery at Mina al Ahmadi, Kuwait, which is one of the largest tanker terminals in the world, falls far short of supplying the demand for bunker fuel. Plans are currently being made to increase production of middle distillates to fill this need and to supply the fuel-oil demands of markets east of Suez and in Europe, where current demand is high. It is anticipated that, in the future, the products of the Mina al Ahmadi refinery will be absorbed by increasing shipping activity from Kuwait and by increased demand in Asia. Other new construction within petroleum-producing areas can be attributed to pressure applied by local governments for political reasons. In the case of Iraq, the Government pushed for the construction of a refinery to promote self-sufficiency in petroleum products.

The Position of Abadan

The closing of the world's largest refinery at Abadan in 1951 brought about a curtailment in the supply of refined products that was of great concern in some quarters. The shortage, however, proved to be of relatively short duration. The rapid recovery of the British Petroleum Company -- formerly the Anglo-Iranian Oil Company -- to its earlier position as a supplier of refined products in spite of the closing of the Abadan refinery was a result of the availability of increasing quantities of crude petroleum from Iraq and Kuwait, combined with an existing company program for refinery expansion in areas

of petroleum demand. At the time of the expropriation, blueprints that were already being prepared for additional new refineries in Europe, at Aden, and in Australia were advanced overnight from the planning stage to the construction stage. Until the new facilities could begin producing, the requirements of markets that customarily depended on the 500,000-barrel-per-day* Abadan refinery were for the most part met through purchases from the Western Hemisphere.

When the Abadan refinery reopened under the direction of a Consortium consisting of British, American, Dutch, and French concerns, it did not regain its dominant position in the refining industry. By September 1955, the throughput of the refinery had reached only 158,000 barrels per day. Reliable estimates indicate, however, that the Abadan production may eventually level off at about two-thirds of its capacity of 500,000 barrels per day. Markets that formerly depended on Abadan are now being supplied by new refineries in Europe, South Africa, India, and Australia and at Aden. Markets are no longer readily found for the relatively high-cost, low-quality product of Abadan.

Major interest today is no longer in the refined products from Abadan but in the future of Iran's crude-petroleum production. The production of the refinery has been prorated among the companies that comrpise the Consortium. A number of these companies cannot market

*Throughput of the Abadan refinery had been increased to 500,000 barrels per day by 1949.

the Abadan refined products economically, but they are in a position to profit from the use of Iranian crude petroleum in their own refineries. Consequently, the companies are willing to sustain a loss on the share of refined products that they are required to take in order to insure continued receipt of Iranian crude petroleum. They are even trading refined products for additional crude petroleum to be refined in their plants in the United States.

Movement of Crude Petroleum

The pattern of movement of crude petroleum in the Free-World Eastern Hemisphere reflects the marked increase in European refining capacity and the high rate of crude-petroleum production in the Middle East (see Maps 25236 and 25237). The proportion of crude petroleum supplied to Europe by the Middle East increased from 37 percent of the total petroleum imports in 1946 to 93 percent in 1954, and the total number of barrels shipped increased 44-fold to approximately 600,000,000.* During the same period the proportion of crude petroleum from the Western Hemisphere dropped from 63 percent of the total to 7 percent, although the number of barrels shipped increased from 24,000,000 to 47,000,000. These shipments are more than offset by United States imports amounting to an estimated 100,000,000 barrels of crude petroleum from the Persian Gulf area in 1955. Movement

*1946 movement figures from International Petroleum Trade, United States Department of the Interior, Bureau of Mines, Vol. 16, No. 10, 1947, p. 238; figures for 1955 from unpublished manuscript for International Petroleum and estimates from petroleum trade publications.

figures for 1954 and 1955 also indicate an increase in shipments from the middle East to the Far East as Indian and Australian refineries began operation. Proportions of Eastern Hemisphere crude petroleum originating in Europe, the Middle East, and the Far East have remained relatively constant. In 1954, approximately 87 percent originated in the Middle East, 9 percent in the Far East, and 3 percent in Europe.

Interhemisphere shipment of crude petroleum is expected to increase in the coming years. In addition to stepped-up imports of Middle Eastern crude petroleum at North American ports, there is a strong possibility that Venezuelan crude petroleum will be carried to Europe as backhaul cargo for tankers returning to the Middle East.

The flow of petroleum products through the Suez Canal provides an interesting register of petroleum activity in the Free-World Eastern Hemisphere. Before the nationalization of the Iranian petroleum industry, appreciable tonnages of refined products and of crude petroleum from Iran moved from south to north through the canal. Immediately after nationalization, south-to-north movement from Iran ceased, whereas north-to-south movement of refined products increased sharply. The reopening of the Abadan refinery and the completion of additional refineries east of Suez brought about a marked decline in the north-to-south movement of refined products in late 1954 and 1955. The loss of Iranian crude petroleum in south-to-north movement was quickly offset by increased shipments from other Persian Gulf countries. In general the postwar movement of crude petroleum from south

Scarcely had the Sikang-Tibet Highway been opened when press releases announced that many sections were to be "renovated and reconstructed." A June despatch from Lhasa mentioned that 41 bridges of various sizes were being constructed and that workers were striving

Figure 2. A scene in the Ch'iao-erh Shan, a high mountain range through which the eastern sector of the Sikang-Tibet Highway passes. The peaks in the background are probably 16,000 to 19,000 feet high.

to finish them "before the arrival of torrents." The Chinese press lauded the "advanced experience" of the Soviet Union and announced that Chinese construction teams were adopting Soviet surfacing techniques so that the Sikang-Tibet road could be used during the rainy season. Other reports indicate that road widening, filling, drainage repairs, and similar reconstruction activities are being

undertaken. Much of this activity has been reported to be on the sector west from the Pomi area, one of the last to be finished and probably hurriedly done. There have also been reports that additional maintenance work has been done on some eastern sections of the highway.

Tsinghai-Tibet Highway -- In mid-November 1954 the Communist press announced that the Tsinghai-Tibet Highway had reached the town of Nagchhu Dzong (Hei-ho) in northeastern Tibet. It also stated, surprisingly, that the road was via Ka-erh-mu (Golmo), a remote locality in central Tsinghai (see Map No. 25119). Previous reports had implied that the Tsinghai-Tibet road was an improvement and extension of a road and caravan trail that led southwest from Hsi-ning, capital of Tsinghai, to the trading center of Yü-shu (Jyekundo). The present Chinese Communist geological explorations in the Tsaidam Basin may have been a factor in routing the road through Ka-erh-mu rather than Yü-shu.

The initial 500 miles of the road west from Hsi-ning generally follow a previously constructed road, which probably needed only slight maintenance to make it usable for trucks. From Ka-erh-mu, however, the road veers south across the eastern ramparts of the great Tibetan Plateau with only a caravan trail for an alignment guide. Central and southern Tsinghai is an extremely barren, high, desolate plateau, broken only by occasional east-west oriented mountains and streams. Although this route is generally free of

difficult passes and mountains, ravines, and deeply entrenched streams, the high elevations (the plateau at about 15,000 feet and the mountains rising to 20,000 feet), coupled with intense cold, frozen soil, and severe gales, greatly handicap construction work. Also, there are practically no inhabited places in the area; no wood is available; and food supplies are limited to wild game and occasional herds of sheep and yaks that are tended by wandering Tibetan groups.

The 550-mile section of road from Ka-erh-mu to Lhasa was hurriedly built. The Communist press stated that work south of Ka-erh-mu began in June 1954 and that by 15 November road builders had reached Nagchhu Dzong. The remaining 190 miles to Lhasa were to be finished by late December to meet the Chinese Communist "target," but obviously such a task could not be accomplished in so short a time. This was as much as acknowledged by the State Council report of 9 March 1955 on Tibetan transportation, which said:

> The Tsinghai-Tibet Highway must carry out further repairs in a planned manner, selectively improve the sectors where traffic is difficult and build bridges which are necessary. Road repairs must follow the principle of economy and utility and the policy of procuring materials locally and making improvements step by step, by sectors and at different periods. For the present, repair should be carried out on the Heho [Hei-ho]/Lhasa sector of the Tsinghai-Tibet Highway.

On 21 November the Chinese press reported that improvement of this 190-mile sector, which was started in mid-July, was "basically completed" and that efficiency of the highway had been doubled.

Although the caravan trail from Nagchhu Dzong to Lhasa leads nearly due south as it winds through the high passes of the Nyenchhen Thanglha and associated ranges, the Chinese have chosen a slightly different alignment for the southern sector of the road, probably to avoid the rugged terrain north of Lhasa. As far as the Kyogchhe Pass the road probably follows the general alignment of the trail, but from there it swings southwest, probably along the valley of the Iha Chhu (headwater stream of the Kyi Chhu), crossing one comparatively low pass before reaching the Tolung Chhu valley. Press reports have mentioned a Yang-pa-ching, which is probably either the locality or the district where the road turns southeast. This location is near a place called Zamsar, mentioned by Harrer* as an important caravan trail junction. From Yang-pa-ching to Lhasa, a distance of 56 miles, the road follows the Tolung Chhu valley, and terrain obstacles do not appear difficult.

Lhasa-Zhikatse-Gyangtse Highway -- Most recently the Chinese Communists have opened a 265-mile road within Tibet that links Lhasa with the important centers of Zhikatse and Gyangtse. Work on this road was begun in May and presumably finished in October.

The stretch of road from Lhasa to Yang-pa-ching is known to use the Tsinghsi-Tibet roadbed, but the alignment of the section from

*Heinrich Harrer, Seven Years in Tibet.

Yang-pa-ching to Zhikatse has been in doubt.* Comments by the Communist press suggest that from Yang-pa-ching the construction teams followed a small stream that rises in the Kang-ti-ssu Mountains to the southwest. The climb to the Hsü-ko Pass (possibly at 29°47'N, 90°15'E), which presumably crosses these mountains, is probably difficult; the elevation of the pass has been reported to be 17,500 feet. Reports state that "picks and drills could not pierce the frozen earth and ice-covered rock." From the pass it is likely that the route follows a tributary of the Tsangpo (Brahmaputra) to the main river. Assuming this alignment, the descent does not appear very difficult, and maps indicate that for the final 25 miles the drop in elevation is only 1,000 feet. Since construction workers have been reported about 60 miles east of Zhikatse, it is probable that the Tsangpo crossing (now via ferry) is somewhere in the vicinity of 90°00'E to 90°10'E. The 55-mile-long Zhikatse-Gyangtse sector follows the Nyang Chhu valley and, other than building numerous small bridges and culverts, no serious construction problems appear to have been encountered. Probably much work remains to be done on this road,

*Fragmentary information in Communist press reports indicates that the section is 155 miles long; that it crosses the Kang-ti-ssu Mountains via the Hsü-ko Pass; and that the pass is 80 miles (presumably air miles) from Lhasa. The alignment shown on accompanying map No. 25118 was calculated on the basis of this information, using a map measurer on the largest scale maps available.

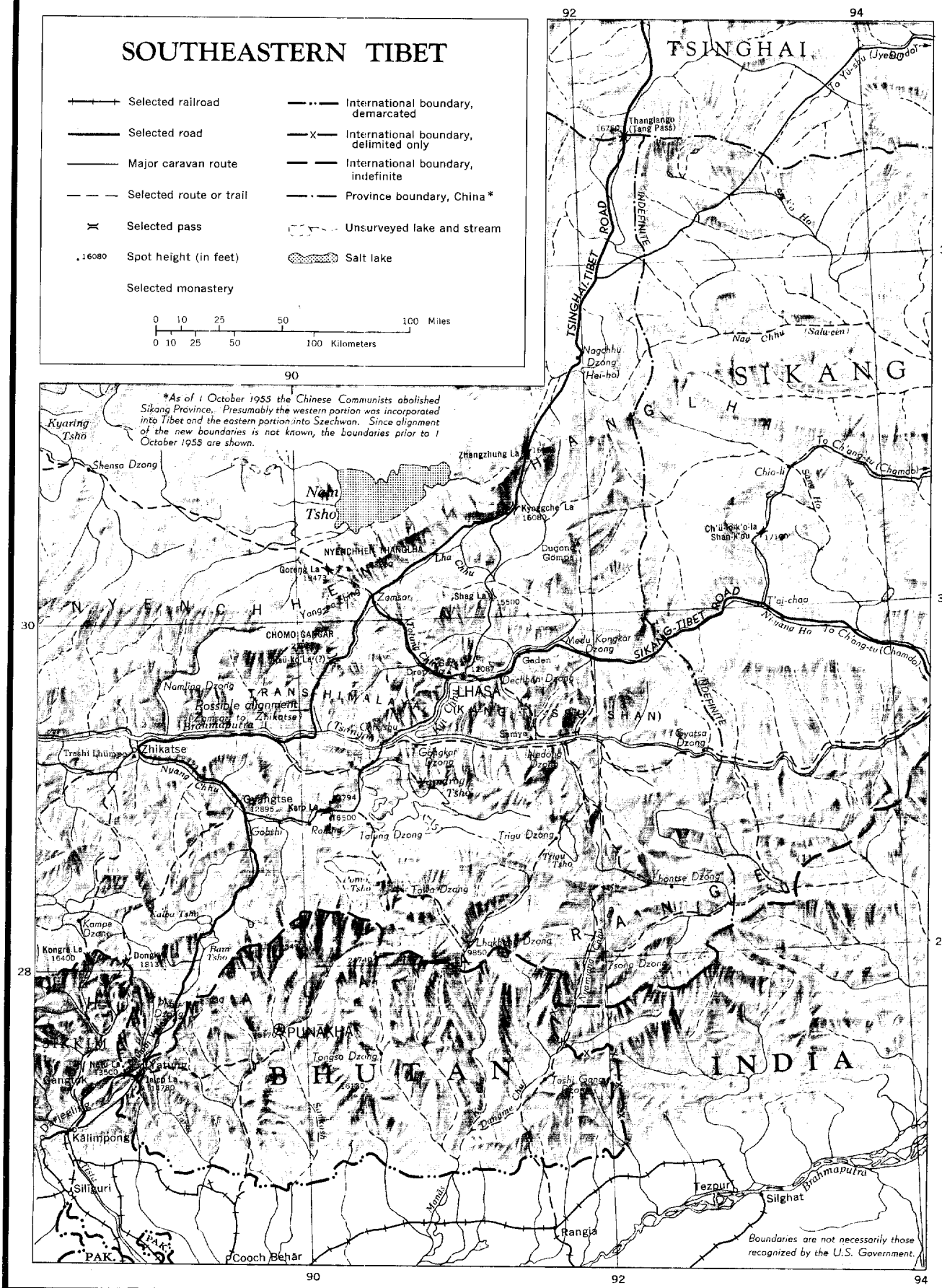
since the aforementioned State Council report stated that the Lhasa-Zhikatse-Gyangtse Highway should be built in 1955 "according to crude standard."

Additional road projects to improve the transportation network within Tibet have been proposed or are underway. The caravan route south from Gyangtse to Phari Dzong was opened to traffic in November; a southward extension to Yatung, a trading center only a few miles from the Indian border, is reportedly under construction; and the east-west caravan route across southern Tibet is expected to be improved and extended to Sinkiang Province.

Significance and Conclusions -- There are several possible reasons why the Chinese Communists spent considerable amounts of time and manpower to construct long roads to and within Tibet.

(1) Politically, improved transportation facilities will allow more complete Communist control over Tibet, which throughout most of its history has remained outside the pale of Chinese authority. Significantly, the long-awaited announcement concerning regional autonomy for Tibet was made in March 1955, when a preparatory committee for Tibetan autonomy was organized. In the Alice-in-Wonderland terminology of the Chinese Communists, the grant of "autonomy" normally indicates that Communist domination over an area is virtually complete.

(2) Militarily, the road connections from Tibet to China Proper will enhance Communist capabilities against the nations of South Asia.



A possible lever for military and political pressure against Tibet's neighbors to the south is the fact that most of Tibet's international boundaries are undemarcated and along certain sectors conflicting border claims exist. (Cf. "Nagaland -- Area of Dissidence in India," pp. 20-25 in this Review.)

(3) Economically, Tibet has little of value other than limited quantities of wool, hides, medicinal herbs, and a few other minor products. The Chinese Communists, however, have been sending geological survey teams to Tibet during the past few years, and it is quite possible that mineral discoveries may necessitate road links with China's industrial interior.

(4) As a byproduct, experience and prestige were gained from these road-building ventures. The wide coverage given these roads by the international press has undoubtedly caused some people to be considerably impressed by the fact that the Chinese Communists have constructed not one but two roads in a region where previously the lowly yak had been the principal means of transportation. Within China much has been written about the "heroic" workers who prevailed over "icy torrents, biting winds, and 5,000-meter mountains."

The publicity given the "opening" of roads to and within Tibet has obscured their substandard quality and extremely limited traffic capacity. Assuming that the roads are traveled by day only and that the Sikang-Tibet and Tsinghai-Tibet roads have a 6-inch gravel base, the present capacity is estimated to be no more than 120 tons each

way per day. Press information on the tonnage carried has been sketchy, but the initial convoy that reached Lhasa using the Sikang-Tibet route reportedly carried only 35 tons. Because of the distance involved and the severe operating conditions, probably a third of a

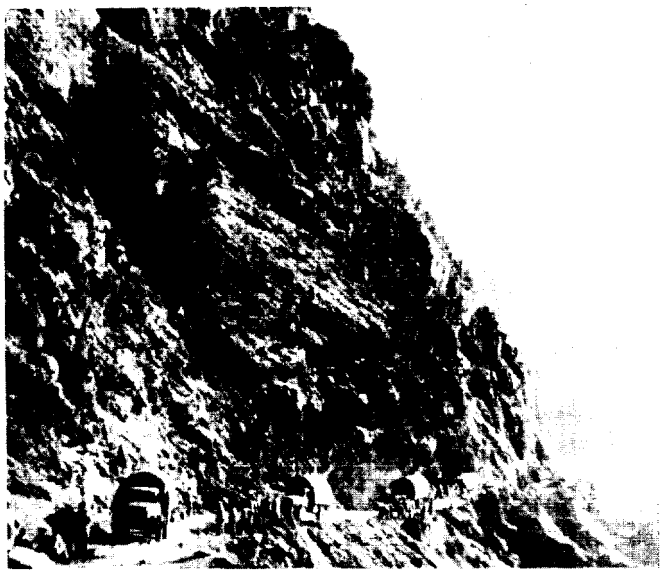


Figure 3. An unlocated sector of the Sikang-Tibet Highway. Note the narrowness of the road and the precipitous terrain.

truck's load consists of fuel. Because numerous passes are at elevations of 14,000 feet and higher, truck engines are nearing their operational limits; some of the highest passes might even necessitate reloading, and certainly overloading would not be possible.

Although the Tsinghai and Sikang routes are considered to have equal traffic capacity, probably little tonnage has thus far moved

over the Tsinghai road. One reason is the condition of the hurriedly built Ka-erh-mu to Lhasa section, particularly from Nagchhu Dzong to Lhasa. Also the type of goods sent to Tibet -- tea, clothing, rice, and construction materials -- would more logically originate in Szechwan than in the Tsinghai-Kansu area.

In addition to the extensive bridging, widening, surfacing, and minor realignments needed on many sections of the Tibetan roads, the Chinese face a very difficult problem of maintenance. Winter storms and snow will probably block the higher passes and cause traffic interruptions. Reports of heavy rains and bridge reconstruction during the summer of 1955 indicate that it is problematical whether the Sikang route can be kept open at all times during the rainy season. A very serious hazard of this route is the frequency of landslides and earthquakes (Figure 3), which could force rerouting and realignments and cause stoppages of traffic for periods up to several weeks. (CONFIDENTIAL)

NAGALAND -- AREA OF DISSIDENCE IN INDIA

The infiltration and conquest of Tibet by the Chinese Communists in 1950-51 shook the complacency with which India had regarded her long mountainous northern border.* Either because the rugged terrain was considered a safeguard against invasion, or because traditional British policy of leaving peaceful tribes alone was being followed, some of the territory south of the MacMahon Line** was not brought under the administration of the Government of India until 1950, when Indian forces occupied Towang in the Kameng Frontier Division.

India is now engaged in an urgent program to consolidate her hold in this strategic area, both physically and psychologically. The Naga tribes in the isolated northeast, led by the Naga National Council (NNC), are agitating for an independent "Nagaland." The resulting incidents of violence are a definite embarrassment and problem to the Indian Government, which has been obliged to send troops into the area. Attainment of the goal of Indian unification is deferred by such occurrences, which also aid Communism in its efforts to spread its influence in South and Southeast Asia.

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*Cf. "Chinese Communist Road Development in Tibet," pp. 8-19.

**India's frontier with Tibet in the area extending from the northwestern corner of Yünnan to the northeastern corner of Bhutan. The line was marked on a map but not demarcated on the ground at the time of the Simla Convention in 1914.

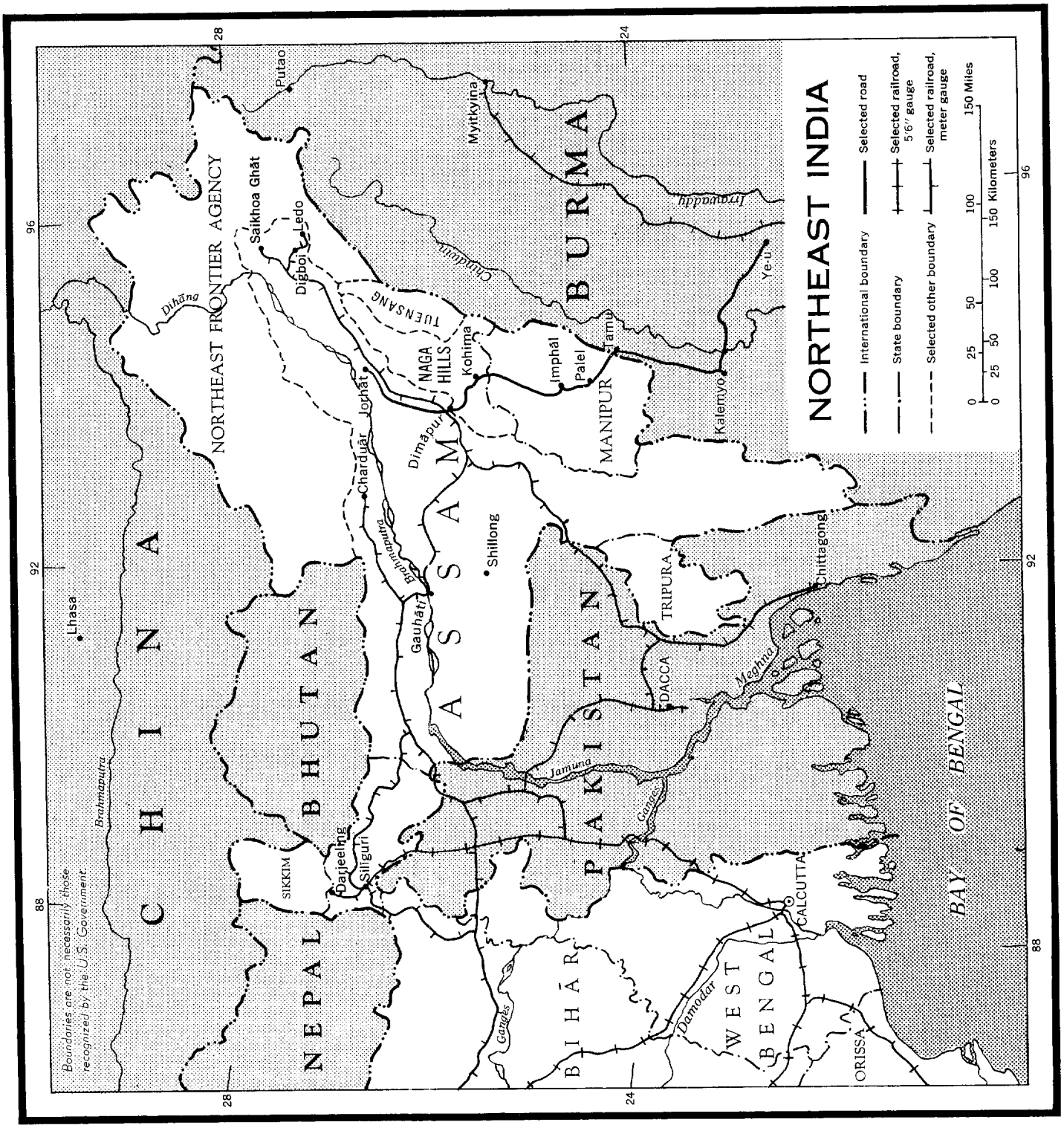
During the era of their rule in India, the British often had to resort to military action to enforce law and order, particularly in isolated hill or mountain areas. The Naga tribes were probably even more persistent in their rebellious actions than the more famous Pathan tribes near the Khyber Pass. The British sent 18 armed punitive expeditions against the Nagas in the periods 1832-49 and 1866-87, and this use of force was among the colonial misdeeds of which the Indians accused the British in pre-Independence days. Historic precedent, therefore, indicates that the current independence movement of the Nagas may be wholly indigenous and free of foreign influence. What is actually happening in the Naga area, however, is beclouded by the sensitivity of the Government of India to these "hill incidents" and the resulting restrictions the Government has placed on news and travel in the area. U.S. service attachés, for example, have been refused permission to travel through or fly over Naga territory.

The area inhabited by the Naga tribes lies between the Brahmaputra and Chindwin Rivers and extends northwestward from Imphal to about 27°N. The largest concentrations of the tribes are in two areas: the Naga Hills District of the state of Assam, and the Tuensang Frontier Division of the North East Frontier Agency (NEFA) (see accompanying map No. 25213). The first, with 4,276 square miles and a population (as of 1951) of 205,950, is administered by the Government of Assam; the second is one of six divisions of the NEFA,

which is constitutionally part of Assam but is administered by the Governor of Assam as an agent of the President of India.

The Naga areas follow the long curve of hills that extends from the northeastern corner of Assam to Cape Negrais in the southwestern part of Burma. The crests are rarely over 7,000 feet in elevation, but the parallel arrangement of the long unbroken ridges makes much of the region inaccessible and communication between valleys difficult. Furthermore, because the region as a whole lies in the track of the main Bengal current of the monsoon and the hills generally lie athwart of or slightly oblique to the normal direction of the winds, the rainfall is very heavy -- normally up to 80 to 100 inches annually. The resultant vegetation is dense tropical evergreen forest at the lower elevations and deciduous forest with some pines at the higher elevations. Some of the high crests are covered with grass. The native slash-and-burn agricultural practice, called "jhuming" in this area, has resulted in very dense secondary scrub jungle. A similar jungle farther south provoked Wingate's famous order, "No jungle is to be reported impenetrable until it has been penetrated."

Lack of transportation facilities into the area increases its inaccessibility. The only paved road, which runs from Jorhat to Palel and passes through Kohīma, was built by the U.S. Army during World War II. This road is in poor to fair condition, and during



the rainy season is subject to landslides. Most of the other "roads" of the region are actually only paths, although a few may be jeepable in dry weather. The immediate region is without any rail line, although the old Assam-Bengal Railway, now part of the North-eastern Railway, parallels the Brahmaputra River to the oilfield at Digboi, with a spur to Ledo. World War II airstrips at Kohīma and Dimāpur are both in usable condition, but that at Kohīma is not being used at all, and the 4,000-foot concrete runway at Dimāpur, which accommodates medium-weight planes, is used scarcely more than three or four times a year.

The term "Naga,"* applied to many of the hill tribes of this area, is a generic term and does not mean that all groups so designated are in any way related. It is comparable to the general terms "Moi" and "Kha," which are used in Vietnam and Laos, respectively, to designate various relatively primitive mountain tribes. The five chief Naga tribes are the Angami, Ao, Lhota, Sema, and Rengma. The many differences among the tribes provide evidence that this area has been the scene of many migrations from various directions. Examples of the divergences are dialect and physical appearance. Dialects vary so greatly that Assamese is often used as a lingua franca; and whereas the Angami is tall, has straight eyes, and may have an aquiline nose, the Sema is typically Mongolian, with a flat

*Naga is a corruption of the Assamese Năga, probably meaning "a mountaineer," from Sanskrit Năg, a mountain or inaccessible place.

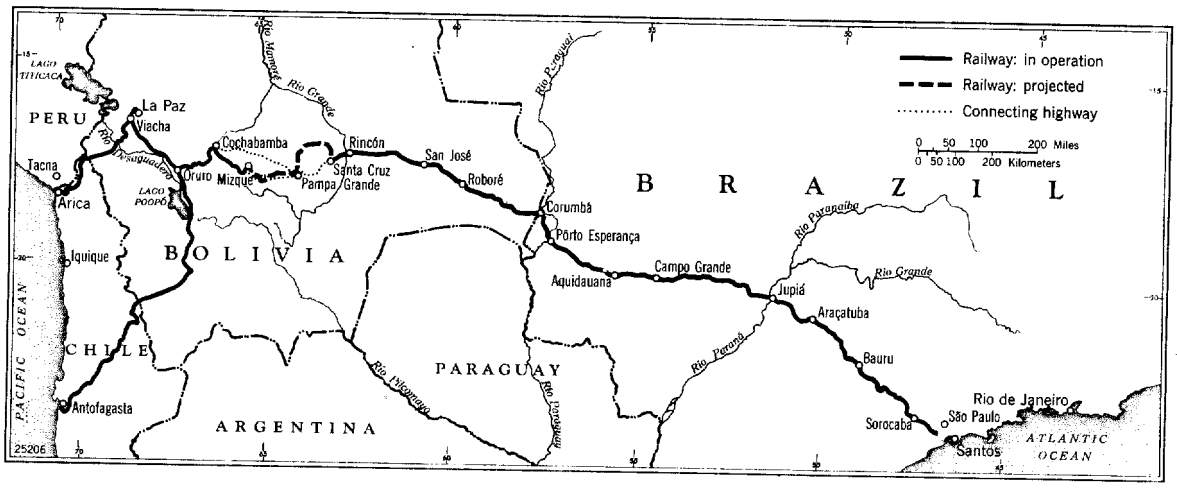
nose and oblique eyes. Another point of distinction is in methods of agriculture. The Angamis, for instance, use terraced cultivation, whereas most of the other tribes practice the primitive shifting jhuming.

The difficulties facing the Indian Government in its attempts to unify this area and gain the loyalty of the natives are obvious when viewed against the background of the physical and cultural factors. To achieve its purposes, the Government is increasing the scope of its program. An allotment equivalent to about $20,000,000 has been authorized for the NEFA under the Second Five-Year-Plan. Among its various development projects, the Plan provides for construction of 700 miles of jeepable fair-weather roads; building of small airports for light aircraft; improvement of agricultural methods and health facilities; and reduction of illiteracy. Complementing these efforts is the psychological approach, which includes visits and speeches by major officials. Nehru himself, in an attempt to mitigate tensions, has recently made several speeches in the area. Hammering on one of his main theses, "unity," he has said that both hill and plains people belong to the same country and that "geography compels us to live together." In his speeches, Nehru has attempted to ingratiate himself with the hill tribes and, referring to his Kashmiri heritage, has described himself as "a child of the hills."

In spite of these efforts, NNC leaders have continued their demands for independence, although recently they have indicated

willingness to settle for an independent state within India. This suggestion having been ignored in the recommendations of the States Reorganization Committee, the Nagas will probably react with more "hill incidents." It has been rumored that such outbreaks are to some degree Communist inspired. The president of the NNC and most of its leaders are Christians and reportedly will have nothing to do with Communism; but in view of the failure to gain independent-state status for the Nagas, the NNC may conceivably be tempted to flirt with the Communists. Certainly, the isolated character of the area, the primitiveness of its inhabitants, and its proximity to Tibet and China would make it a logical target for Communist subversive activities. (CONFIDENTIAL)

NEW TRANSCONTINENTAL ROUTE ACROSS SOUTH AMERICA



A new transportation route between the Atlantic and the Pacific -- the third transcontinental route to cross South America and the only one north of Argentina* -- is now in operation across Brazil, Bolivia, and Chile. The Brazil-Bolivia Railroad inaugurated on 5 January 1955 opened up traffic between Corumbá in western Brazil and Santa Cruz de la Sierra in east-central Bolivia, thus filling in the last gap in a rail-highway system from coast to coast. One major bridge, spanning the Río Grande at Rincón about 44 kilometers east of Santa Cruz, remains to be completed; currently, freight and passengers are carried across this river by ferry. Before rail service will be available for the entire length of the route, further mileage must be constructed between Santa Cruz and

*Two transcontinental routes originate in Buenos Aires and terminate at Antofagasta (via northern Argentina) and Valparaíso, Chile.

Mizque along the route westward to Cochabamba. At present, a recently completed road connects Santa Cruz with Cochabamba. Other improvements, such as reinforcement of the rails east of Santa Cruz, will be needed to make the roadbed capable of carrying loads heavier than can currently be handled.

The construction of the Corumbá-Santa Cruz line is the ultimate result of a treaty signed at Petrópolis, Brazil, in 1903. To compensate Bolivia for the annexation of Acre Territory, Brazil agreed under the provisions of the treaty to build a connecting railroad between Bolivia and a navigable tributary of the Amazon River, thus giving Bolivia access to a port on the Atlantic Ocean. Only one small segment of this line was ever constructed -- a 366-kilometer (227-mile) stretch completed in 1912 that connects the Brazilian towns of Pôrto de San Antonio on the Rio Madeira and Guajará-Mirim on the Rio Mamore near the northern tip of Bolivia. The extension of this line into Bolivia was abandoned, and a different route to the Atlantic was proposed in two complementary agreements signed in 1938. Under the first of these agreements, Brazil was obligated to build the railroad to Santa Cruz, which was inaugurated in January 1955. The second agreement provided that additional mileage be built by Brazil from Santa Cruz to Cochabamba, which would enable Bolivia to export much-needed oil to Brazil in repayment for the construction. This second line, 490 kilometers (304 miles) long and not yet constructed, will connect with the current Bolivian railroad

system at Mizque, thereby completing a 4,000-kilometer (about 2,500-mile) transcontinental railroad between the Brazilian port of Santos on the Atlantic and the Chilean port of Arica on the Pacific.

This international route in its present form consists of segments of several meter-gauge railroad systems and one stretch of road. Beginning in Santos, Brazil, the Estrada de Ferro Sorocabana (Sorocabana Railroad) runs for 478 kilometers (297 miles) through the highlands of São Paulo state to Bauru. From Bauru, the Estrada de Ferro Noroeste do Brasil (Northwest Railroad of Brazil) continues westward over more level terrain for 1,352 kilometers (840 miles) to Corumbá, crossing en route a major bridge over the Rio Paraná near Jupiá and another over the Rio Paraguai at Pôrto Esperança.

At Corumbá, 1,830 kilometers (1,130 miles) from Santos, the Estrada de Ferro Brasil-Bolivia (Brazil-Bolivia Railroad) begins its 680-kilometer (422-mile) run to Santa Cruz. Until further construction has been completed, trucks must be used to connect Santa Cruz with the Bolivian railroad at Mizque, or at Cochabamba farther west.

The lines across the Altiplano and the Andes in Bolivia and Chile are all under the administration of the Antofagasta-Bolivia Railway Co. Ltd. Segments of this system run from Mizque to Cochabamba (154 kms.; 96 mi.), Cochabamba to Oruro (206 kms.; 128 mi.), Oruro to Viacha (202 kms.; 125 mi.), and Viacha to Arica, Chile (418 kms.; 260 mi.); and another line runs southward from Oruro to the Pacific coast at the port of Antofagasta, Chile (930 kms.; 578 mi.)

The establishment of a route to the east opens up potentialities for the economic development of parts of Bolivia that have hitherto been retarded because of isolation. Santa Cruz, an old colonial town with a current population of 35,000, is situated in the center of a rich agricultural region that previously had no good connection with distant markets except by air. Imports of Brazilian manufactured goods, pharmaceuticals, textiles, and certain agricultural produce could be readily absorbed by the expanding markets of this area. Likewise, Bolivia will be able to ship eastward mineral products, salt, cattle, and timber, and the products of newly developed agricultural lands. Markets will be found in the vast areas of western Brazil, and in Paraguay, Argentina, and Uruguay via the Rios Paraguai and Paraná. Overseas markets may be reached either via this river system or by crossing Brazil to Santos. Of most immediate and outstanding importance is the transportation of products from the rapidly expanding Bolivian oil industry, centered in the area south and west of Santa Cruz. Current deliveries of gasoline and kerosene to Brazil from the refinery in Cochabamba represent only a small fraction of the proposed shipments, but further development of Bolivia's large oil reserves should result from recent moves on the part of the Bolivian Government to modify the 1938 agreement with Brazil.

With proper management and some needed improvements in facilities, the newly opened railroad will provide Brazil with much-needed

oil, stimulate the growth and expansion of new enterprises in eastern Bolivia, and contribute materially to a more stable economy for that country as a whole. (UNCLASSIFIED)

URANIUM MINING IN FRANCE

Among the nations of the Western World, France ranks next to the United States and the United Kingdom in raw-material and pile technology for the development of atomic energy. One indication of French interest in the atomic-energy program was provided at the Geneva exhibition of peaceful uses of atomic energy, where France had 49 exhibits. Geological surveys, prospecting for ore, development of raw materials, and techniques for ore processing are making slow but steady progress in France.

The French atomic-energy effort is planned around a series of 5-year nuclear research and development programs aimed at economic atomic power. It should be noted, however, that the French military are interested in developing both nuclear weapons and nuclear propulsion, with research on the latter already underway. Availability of raw materials is not likely to be a limiting factor to fulfillment of current French plans.

The major activity centers in and around the Massif Central. Seven concessions for exploitation of radioactive minerals have been granted, and exploration is being pushed in several widely scattered areas. Locations and limits of concessions, mine sites, operating division headquarters, and concentration plants are shown on six medium-scale maps available in the CIA Map Library under Call No. F 251-18 94563. A textual description of the concessions is on file in the Geography Division of CIA.

The oldest uranium-mining concession in France, dating back to 1929, is the 1,966-hectare Lachaux concession. Deposits in this concession provided uranium for the Commissariat à l'Energie Atomique (CEA) experimental pile, but they are now practically exhausted except for a small deposit at Bigay.

The Bois Noirs (St. Priest) deposit, about 20 kilometers southeast of Lachaux, was discovered in 1951 and a 6,340-hectare concession was granted in July 1954. When machinery becomes available in early 1956, this deposit may provide a large proportion of French uranium production. Mining activity is also underway at Viaduc des Peux and Limouzat, just northwest of the St. Priest concession, and at Arfeuilles and Noirétable. Within the 177-square-kilometer Grury concession, which was granted in January 1953, there are several areas of activity. Near La Faye, north of the old Crot Blanc mine, a series of galleries and shafts has been dug in a lode containing concentrations of chalcocite. Near Les Vernays, boring and surface research continue on a deposit of primary ore. Little is known of the low-grade vein near Les Brosses. A deposit of primary pitch-blende, with secondary deposits near the surface, is located at Bauzot near Issy-l'Évêque. During the preliminary work at this site three lodes were located. Small secondary deposits have also been found near Batou. North of the Grury concession, at Outeloup near Château-Chinon, is another mine, details of which are unknown.

The original La Crouzille concession of 134 square kilometers was approved in December 1950. In February 1954, a contiguous northern concession of 193.5 square kilometers was granted, so that the two concessions cover the entire area between Ambazac and Le Cerveix. The number of radioactive indices indicates that the entire North Limousin is rich in ore and that the resources are extensive enough to be exploitable over a long period of time.

Two concessions in northern Vendée were granted in September 1954; one near Clisson covers 20 square kilometers and the other near Mortagne totals 289 square kilometers. Both concessions contain extensive deposits of low-uranium-content ore.

Prospecting is especially active near Bonnat, in Creuse Department; Le Montet and Montmarault, in Allier; Ardillats, in Rhone; Barjac, in Lozère; Kruth and Lièpvre, in Haut-Rhin; Golinhac, in Aveyron; and in northern and southern Brittany and the Pyrenees. (CONFIDENTIAL)

RECENT ACQUISITIONS OF SOVIET MAPS

Among the Soviet map publications recently acquired by the CIA Map Library that are of significance to intelligence analysts are three political-administrative maps dated 1955, a 1955 general geographic map, a 1954 soils map, a 1953 ethnic map, a new edition of Atlas SSSR, and the index to the 1954 Atlas Mira. All were published in Moscow by GUGK (Glavnoye Upravleniye Geodezii i Kartografii).

The administrative structure of the entire USSR is shown on Soyuz Sovetskikh Sotsialisticheskikh Respublik (Union of Soviet Socialist Republics) at 1:8,000,000 (CIA Call No. 96685). This is the most recent available map showing territorial-administrative divisions for the whole country. It differs little from the 1954 edition, however, since the divisions given are those of 1 October 1954. Boundaries and centers of republics, ASSR's, oblasts, krays, autonomous oblasts, and national okrugs are given. The base information includes selected railroads and roads and some physical features such as sand and marsh areas, but relief is not indicated. Of particular value is the large number of place names.

Similar in design to the 1:8,000,000 map but more detailed is Yevropeyskaya Chast' SSSR (European Part of the USSR) at 1:4,000,000 (CIA Call No. 96686). This map, also, shows all administrative units above the rayon level, along with their centers, as well as a

greater number of place names. Cities and towns are differentiated according to six population categories, and generalized shading gives some impression of relief. The administrative boundaries of the same categories are shown on SSSR, Yevropeyskaya Chast', Politiko-Administrativnaya Karta, a four-sheet map at 1:2,500,000 (CIA Call No. 96683). This is strictly a wall map, however, vivid in color and extremely generalized, with few place names. Despite its larger scale, it is far less useful for research purposes than Yevropeyskaya Chast' SSSR.

The three administrative maps described, although the most recent available, are already out of date in some respects. Two of the more important administrative changes that have occurred since they were issued are (1) an alteration in the boundary between the Georgian SSR and the RSFSR and (2) the abolition of two oblasts in the Tadzhik SSR.

The most detailed general geographic map in its scale range showing the USSR as a whole is the four-sheet Soyuz Sovetskikh Sotsialisticheskikh Respublik at 1:5,000,000 (CIA Call No. 97769). In design and amount of physical and cultural detail it closely resembles some of the plates in the Atlas Mira. Relief is shown by tints, contours, and spot heights; and hydrographic features are given in considerable detail. In addition, the map shows administrative boundaries down to the oblast level, main roads

and railroads, many place names, and cities differentiated according to six population categories.

The best soils map available for the entire USSR is the six-sheet Pochvennaya Karta SSSR (Soil Map of the USSR) at 1:4,000,000 (CIA Call No. 96986), prepared by the Pochvennyy Institut imeni V. V. Dokuchayeva Akademii Nauk SSSR (Dokuchayev Soil Institute of the Academy of Sciences USSR) for use by higher educational institutions. This represents a considerable advance over the previous large-scale wall maps of soils. It divides soils into two large groups: (1) soils of the plains, broken down in turn into 47 types, differentiated by solid colors and patterns; and (2) soils of mountainous areas, in 16 types, represented by lined color. The result is a more detailed soils map than any previously received. For example, 10 types of chernozem soils on plains are differentiated. The mechanical composition of soils and soil-forming materials is shown by superimposed patterns.

The ethnic map recently received, Karta Narodov SSSR (Map of the Peoples of the USSR) at 1:5,000,000 (CIA Call No. 93633), is also a substantial improvement over previous maps on the subject. Although it is similar to the small ethnic map at 1:30,000,000 in the recent Geograficheskiy Atlas, the larger scale made certain refinements possible. Whereas 63 ethnic groups are differentiated on the atlas map, 81 are given on Karta Narodov SSSR; for example, in the ethnically complex North Caucasus area 11 groups are distinguished,

in contrast to 6 on the atlas map. An attempt has also been made to show the percentages of the various ethnic groups in the total population of a given area. It appears, however, that the percentage of Great Russians in several of the SSR's has probably been minimized for propaganda purposes. Boundaries are given only for national administrative units -- SSR's, ASSR's, A.O.'s, and N.O.'s -- and relatively few cities are located.

The second (1955) edition of the Atlas SSSR* is more up to date in several respects than the first edition of this small atlas, published in 1954. The series of changes in oblast boundaries that took place in December 1953 and early 1954 are included in the later edition. Also shown are a number of additional railroad lines -- for example, the line from Tayshet to Ust'-Kut west of Lake Baykal and the Novoalekseyevka-Genichesk-Valok line on the Arabatskaya Strelka in the Crimea. Some new place names appear, and two new reservoirs, the Kama near Molotov and the Mingechaur Reservoir in the Azerbaydzhan SSR, are shown.

Of particular value is the recently received Atlas Mira gazetteer-index, which was published several months later than the atlas proper. This substantial volume of some 572 pages containing more than 205,000 geographical names will greatly facilitate the use of the atlas. (CONFIDENTIAL)

*See "Evaluation of Recent Soviet Atlas and Map Accessions," Geographic Intelligence Review No. 46, June 1955, for a more complete discussion of this and other Soviet atlases.

CENTENNIAL EDITION OF THE COSMOPOLITAN WORLD ATLAS

A new, expanded edition of Rand McNally and Company's Cosmopolitan World Atlas* has been published to commemorate the 100th anniversary of the founding of the firm. The volume, dated 1956 although it first appeared late in 1955, does not differ radically from the atlas carrying the same title that was first published in 1949 and revised in 1951 and 1953. The centennial edition, however, includes new features and improvements of old ones that will make it a valuable aid for American map users.

The most noteworthy innovation is a 16-page section of continent maps, which includes general coverage as well as maps for such topics as natural vegetation, climate, and population density. The main regional and country maps are basically the same as their vividly colored, hachured counterparts in the earlier editions, but many changes have been made in political boundaries and place names. The place-name adjustments went far toward bringing the spellings into general agreement with the forms preferred by the U. S. Board on Geographic Names. Corrections were also made in the single-sequence index of place names, which now includes some 83,000 entries. The numerous useful tables ("World Political Information," "World Climatic and Economic Table," etc.) in the earlier editions have

*CIA Map Library Call No. aA000.R3 1955. The 400-page volume measures 11 1/2" x 14 1/2" x 1 1/2".

been corrected to reflect the findings of the many censuses taken throughout the world about 1950.

The coverage of foreign countries is cartographically inferior to that of several European atlases of comparable scope. The Rand McNally volume, however, has substantial compensating advantages in its treatment of place names, extensive index, and wealth of current statistical data. It is believed that the new atlas will be widely used for general reference because of these and other favorable features. (UNCLASSIFIED)

to north has shown a steady upward trend, interrupted by fluctuations that reflect the opening of the Trans-Arabian Pipeline in 1951 and the opening of the Iraq Petroleum Company pipeline to Banias, Syria, in 1952.

The circumstances surrounding operation of the Suez Canal may well affect adversely the prominent position it has held in the petroleum transit trade. Pipeline transit fees on crude petroleum to Syria have been increased recently, but Suez transit fees have been reduced and further decreases have been proposed. This economic competition could place Egypt in an unpopular position among its non-petroleum-producing neighbors at a time when it is posing as the leader of the Arab nations. On the other hand, interference in canal traffic would be viewed dimly by oil-producing Arab countries. In spite of anticipated increases in tanker traffic, pilot service through the canal is below required strength as a result of agreement between the operating company and the Egyptian Government to increase the percentage of Egyptian nationals employed as pilots. Although the number of qualified Egyptian pilots is limited, visa conditions imposed by Egypt are making it increasingly difficult to recruit or train pilots other than Egyptian nationals. The position of the canal after 1968, when operation reverts to Egypt, is open to speculation. Recent launchings of supertankers for service around the Cape of Good Hope, however, may indicate that the grasp of the canal on the petroleum trade is not so strong as it was once thought to be.

Conclusion

The expansion of refinery capacity in the years following World War II has centered in areas of increasing demand for petroleum products. Before World War II, two-thirds of Europe's refined petroleum requirements were imported; at the present time Europe is virtually self-sufficient in refined products, and the need for very rapid expansion is past. The value of a domestic refining industry has become apparent to small nations as well as to industrial powers. In the last few years, refineries have been established in a number of relatively underdeveloped areas that do not produce crude petroleum in significant quantities. In the future the greatest increases in demand for petroleum products may be expected from countries that today are considered underdeveloped but are searching for the means to economic independence. Small refineries constructed in response to this demand will play an increasingly important role in the economic and political life of the Eastern Hemisphere. (UNCLASSIFIED)

Kurdistan is an area of ethnic unity divided among four nations -- Turkey, Syria, Iraq, and Iran. Despite this division the Kurds, who are mostly Sunni Muslims, have managed to retain their identity and their propensity to revolt against government authority in the face of repeated defeats. This is in no small measure attributable to the difficulty of supervising the tribes in their native mountain retreats. In all of the countries except Syria the Kurds are a dissident element that might be swayed by propaganda or promises of assistance from a foreign country. Kurdish aspirations for autonomy have been nurtured by the Soviet Union, which is preparing the groundwork for possible employment of Kurds in any Middle East struggle.

Most of the Kurds are scattered throughout what they themselves consider to be "Ethnic Kurdistan" (see map). In Turkey the core of Kurdistan is the Lake Van Basin, an area of interior drainage rimmed by steep mountains. Other major concentrations of Kurds lie to the west and south of Lake Urmia in Iran and in the mountains of Iraq between the Great Zab and Diyālā Rivers. In the Syrian Jazīrah, a string of solidly Kurdish villages inhabited chiefly by forced migrants from Turkey stretches along the frontier between Syria and Turkey. Although some Kurds live within Soviet territory south of the Caucasus, this area is not considered a part of ethnic Kurdistan.

The Kurds are essentially a mountain or hill people who live by a grazing economy that requires careful utilization of mountain and valley pastures. Rainfall decreases progressively from a high of 60 inches south of Lake Van to a low of 10 to 15 inches in an area extending from the Jazīrah of northeastern Syria southeastward through Mosul and Kirkūk in Iraq and into Iran. Both the nomadic and sedentary Kurds have adapted themselves successfully to dry conditions. Some of the nomadic Kurds, however, are now turning to agriculture, notably in the Jazīrah, which is fast becoming the breadbasket of the Middle East.

The Kurdish population in Turkey is estimated at 1,000,000 to 1,500,000; in Iraq at 800,000 to 1,000,000; in Iran at about 600,000; in Syria at perhaps 200,000; and in the USSR at 50,000. Possession of a common language, customs, and way of life has offset the effect

of different dialects and lack of political cohesiveness among the Kurds to the point where hope for a separate nation or autonomous state is now paramount.

Provision for a Kurdish state was actually incorporated in the unratified Treaty of Sevres in 1920, but never activated. Instead, the autonomy won by the Kurds in the twilight of the Ottoman Empire was abolished by Kemal Atatürk. Thereafter the Kurds revolted repeatedly against the Turks -- in 1925, 1929, and 1937. The last revolt was ruthlessly crushed. To this day, the density of police posts in the Kurdish area of eastern Turkey is double that elsewhere in the country. The Kurds of Iraq also were restive and resented the neglect that has persistently characterized Iraqi policy towards them. In 1945, some of the Iraqi Kurds revolted under the leadership of Mulla Mustafa Barzani, but were again defeated. Barzani fled to neighboring Iran, where he was given the rank of "marshal," was provided with a Soviet uniform, and identified himself with the newly formed Soviet-sponsored Kurdish People's Government. This was the first of the "People's Governments" to be established in southern Asia with Soviet aid. Although the regime was short lived and Barzani and others were forced to flee to the Soviet Union for sanctuary, the idea of a People's Government has not only survived, but it has also been nurtured and is capable of being reactivated.

The Kurds have given some attention to the economic viability of the proposed state. For example, in presenting a proposed boundary

to the United Nations in 1946, they included international boundary corridors stretching southward to the Persian Gulf and westward to the Mediterranean. Their idea of what constitutes ethnic Kurdistan encompasses the grain-raising region of northern Syria, including the Jazīrah, and the oilfield-refinery-pipeline complex of northern Iraq. Under Kurdish domination, part of the revenue from the oilfields, which now finds its way into Iraqi coffers, would contribute to sustaining the new state. The Kurdish plan also provided for an economic outlet to the USSR. The idea of Soviet aid in many forms has not escaped attention and becomes more attractive with the growing feeling that Kurds are being neglected by the central governments that now rule them.

The transportation pattern, although adequate for present needs of the Kurds, would pose a problem for a new state. A united Kurdistan would have to rely on outlets in the surrounding states. In this respect, Kurdistan would resemble Austria after the breakup of the Austro-Hungarian Empire.

Basically the Kurds feel that they must rely on either the United States or the USSR for help. The British are tied to the Iraqi, who neglect the Kurds. [redacted] In Iran the meager livelihood of the Kurds often depends on the whims of the army. The USSR, on the other hand, has not only helped them in the past but also nurtures their hope for autonomy.

25X6

25X6oved For Rele [redacted]

To many Kurds, therefore, the Soviet Union appears to be the only nation whose help they can rely upon in the future.

Soviet interest in the Kurds reveals a serious effort to defeat the Baghdad Pact. One means of accomplishing this goal would be to encourage an increase in the tempo of Kurdish lawlessness, thus giving the impression that key defensive areas in Pact countries were unstable. Kurdish sheiks in Iraq have recently been approached by Kurdish Communists carrying anti-Pact propaganda and supporting the idea of "Kurdistan for the Kurds." Any mistakes made by the central governments in dealing with the Kurds could again be seized upon by the Communists to instigate apparently spontaneous uprisings that might cloak Soviet intentions.

A less obvious attempt to place the Kurds within the Soviet camp might be made by using the autonomous-area device. The Kurds would be encouraged to achieve autonomy while remaining within the present national boundaries. Once autonomy was achieved the Soviets would be able to function more freely under the guise of appeasing Kurdish nationalism while they were subjecting groups to Communist domination. This actually was the case in 1945 when the Soviets activated their version of autonomous areas in southern Asia by setting up the Autonomous Government of Azerbaijan within Iran and at the same time setting up a Kurdish regime farther south, popularly called the Republic of Mahabad. The Soviet-style ending to the Republic's

manifesto -- "Long Live Kurdish Democratic Autonomy" -- has long been noted, but its significance as fitting into the Communist administrative pattern for gaining control of peripheral areas has been ignored. Mahabad established a pattern that is still evolving. This particular Soviet experiment failed soon after the departure of Soviet troops from northern Iran in 1946, but the idea of Kurdish autonomy has prospered and by many Kurds is credited to the Soviet Union.

The abandonment of the plan for a united Kurdish state or autonomous states within present national boundaries might still be realized if the present governments improved economic conditions and paid greater deference to the Kurdish culture. These are the advantages currently being offered by the Soviets.

25X1C

In spite of the increasing importance of the Kurds in the Middle East the flow of intelligence on their area is overgeneralized and meager. [redacted] 25X1C

[redacted] Consequently it is increasingly difficult to obtain a well-rounded understanding of Kurdistan's problems as the area again faces a Soviet threat. (SECRET)

FURTHER CHANGES IN THE ADMINISTRATIVE MAP OF COMMUNIST CHINA

During 1955 the Chinese Communists again revised the territorial-administrative structure of China by abolishing the provinces of Jehol and Sikang, establishing Sinkiang Province as a full-fledged "autonomous region," adjusting the Kwangtung-Kwangsi and the Anhwei-Kiangsu provincial boundaries, and changing one provincial capital. The internal administrative pattern of Communist China as of January 1956 is shown on the accompanying Map 25333.*

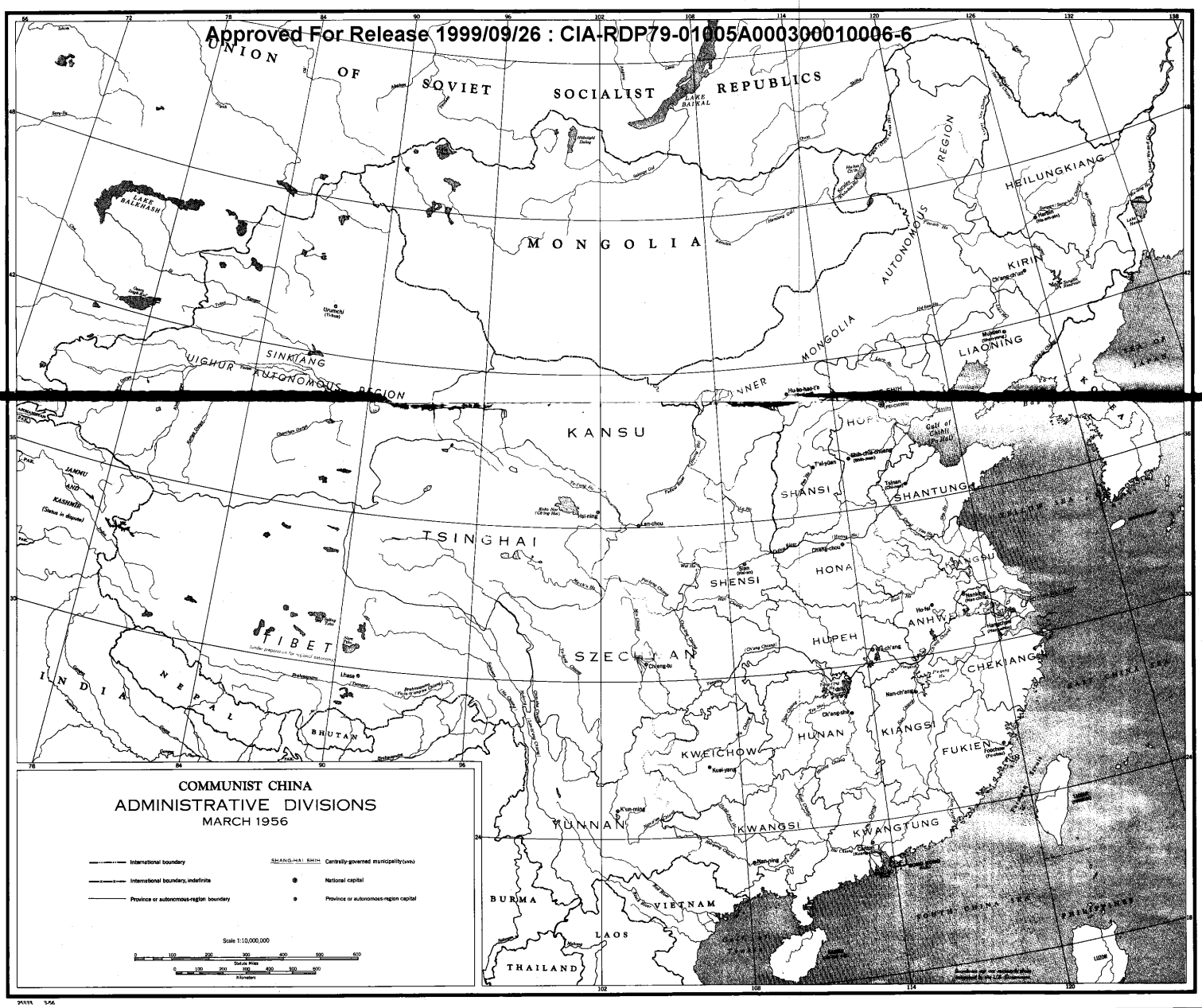
The abolition of Sikang and Jehol continues the practice begun in 1952 of eliminating those provinces that were of small size, comparatively small population, or relatively recent origin. Furthermore, with the exception of the short-lived Pingyüan, all of the provinces eliminated to date have been located north of the Great Wall or in the frontier regions of western China. As a result of the most recent changes, China now consists of 22 provinces plus the Inner Mongolia Autonomous Region, the Sinkiang Uighur Autonomous Region, and Tibet (which is in the initial throes of becoming an "autonomous region"). The present provincial alignment of China is essentially the same as that which existed just prior to 1911.

*This map supersedes CIA Map No. 13516, Communist Administrative Divisions (December 1954), which accompanied an article entitled "Recent Territorial-Administrative Changes in Communist China" in Geographic Intelligence Review No. 44, February 1955, pp. 34-36.

Announcements that Sikang and Jehol were to be abolished were made in June 1955, but their dissolution did not take place until 1 October 1955 and 1 January 1956, respectively. Sikang Province -- an area of high mountains and windswept plateaus, with limited areas of arable land and a predominantly Tibetan population -- was created in 1928 from parts of Szechwan and Tibet as an outgrowth of the dispute between Tibet and China. Although Sikang officially extends west almost to 92°E, actual Chinese authority was restricted to the area east of the Chin-sha Chiang (upper Yangtze) until the recent Chinese Communist advance into Tibet. The western portion of Sikang, called the Ch'ang'tu (Chamdo) area by the Chinese Reds, will be incorporated into the future Tibet Autonomous Region. The portion of Sikang east of the Chin-sha reverts to Szechwan.

Jehol Province, like Sikang, was officially organized in 1928. In area and population, Jehol ranked as one of the smaller of the Chinese provinces. Most of its territory consists of barren, jagged mountains that merge with the Mongolian Plateau in the northwest. This northwestern area, which has a scattered Mongol population, has now been incorporated into the Inner Mongolia Autonomous Region. Southwestern Jehol has been united with Hopeh and the remaining eastern portion with Liaoning.

The inauguration of the Sinkiang Uighur Autonomous Region on 1 October 1955 marked the culmination of a long program designed to bring the various non-Chinese ethnic groups of Sinkiang under more



effective Communist control. Only 5 percent of Sinkiang's approximately 5 million inhabitants are Chinese, whereas approximately three-fourths are Uighurs, Turkic people who are followers of Islam.

With the return of four hsien (counties) from Kwangsi to Kwangtung in May 1955 the Kwangtung-Kwangsi provincial boundary has reverted to its pre-1952 alignment. This transfer leaves Kwangsi without access to the sea.

The second boundary adjustment shown on CIA Map No. 25333 involves the provinces of Anhwei and Kiangsu. Either in late 1954 or early 1955 -- the exact date is not definitely known -- two hsien of Anhwei were transferred to Kiangsu and two hsien of Kiangsu to Anhwei, resulting in a realignment of their common boundary. Transfer of the two hsien from Anhwei to Kiangsu possibly was made in order to place flood-control installations along the Hung-tse Hu under one provincial administration. There is no obvious reason for the shift of two hsien from Kiangsu to Anhwei.

The capital of Hopei has been removed from Pao-ting (Ching-yüan) to Shih-chia-chuang (Shih-men), 80 miles to the southwest. The new location is at the junction of the Peking-Hankow railway with the lines that go west to Shansi and east to Shangtung. (CONFIDENTIAL)

RECENT DEVELOPMENTS IN GEOLOGICAL RESEARCH IN COMMUNIST CHINA*

Shortly after the first of this year, Chou En-lai called for a special 12-year program to "organize science" in China by the end of the Third Five-Year Plan (1967). In so doing, he focused attention on Peiping's difficulties in developing geologic research capabilities adequate for the task of providing the natural resources required to support the industrial program of the Communist regime. Although most of the industrial-development programs outlined in the First Five-Year Plan (1953-57) are based primarily on mineral reserves proven prior to the Communist take-over, the regime continues to press one theme recurrently -- the "rational" geographical distribution of industrial enterprises throughout China, especially in the currently underdeveloped areas of the interior.

To support this objective, geological surveying and exploration teams have been sent to nearly every province of China during the past few years, and periodic reports have been made of mineral discoveries in the less-industrialized regions of China. Some of the more ambitious claims have concerned a "large copper deposit" in Kansu that is said to compare with the best deposits in Yünnan; a discovery in Northeast China advertised as "certainly one of the largest known molybdenite deposits in the world"; and the confirmation

*This article has been coordinated with the Office of Scientific Intelligence.

(also made a decade earlier by the Japanese) of "two huge deposits" of iron ore near Pao-t'ou. Discoveries of phosphorus have also been reported in Kiangsu and Szechwan, manganese in Kweichow and Hunan, oil in Tsinghai and Sinkiang, and coal in nearly every province.

Despite these claims, Chou's recent directive suggests that the Chinese geologists are not achieving the goal of discovering the right resources at the right time and in the right place. He has, therefore, turned sorcerer and has decided to whip his scientific apprentices into line for the ambitious plan of "approaching the most advanced world level in a number of scientific fields ... by the end of the Third Five-Year Plan [1963-1967]." He maintains that a "long-term scientific development plan must be mapped out, the annual plans for implementing this long-term plan in 1956 and 1957 must be formulated, and the initial groups of scientists which must be immediately mobilized in the implementation of the long-term plan and the two annual plans must be determined."

Every year since the initiation of the First Five-Year Plan, pressure for geological research in support of industrialization has been increased. At a recent geological conference the decision was made to increase the amount of geological surveying in 1956 beyond the total for the 3 years from 1953 through 1955. Priority will be given to the search for new deposits of iron ore, manganese and nonferrous metals, and oil and oil-shale. Emphasis is being placed on the resources needed for the new iron and steel centers

scheduled to be built in Southwest and Northwest China. The current location of research institutes in the coastal areas of China is condemned as "irrational," and a new distribution is planned that will conform with the proposed western orientation of industry.

Geological research and the training of technical cadres is being carried out by a large number of scientific and technical organizations in China. A nationwide reorganization of geological and geophysical surveys and research institutes was begun in 1952, and the system of research organizations developed by early 1953 remains substantially unchanged. The research effort is carried on through three channels: (1) the Academy of Sciences and its research institutes, (2) the research institutes and experimental stations supervised by the various ministries under the State Administrative Council, and (3) the scientific departments of universities and colleges throughout China.

The forced draft under which the Chinese scientific effort has been operating can be gauged by the increasing number of research institutes under the supervision of the Chinese Academy of Science. The number of research institutes of the Academy was increased from 17 in 1950 to 23 in the following year. By late 1953 the Academy had 36 research institutes with 1,725 "research" workers. In 1955, Kou Mo-jo, President of the Academy, announced that it had 41 research institutes and 2,063 workers, and that 60 additional research institutes under the various ministries had more than 3,000 workers.

Although research workers in the Academy's Department of Biology, Geology, and Geography totaled only 764 in 1955, it is perhaps significant that two-fifths of the research program of the Academy was at that time assigned to the Department.

Research organizations under the Ministries of Water Conservation, Geology, Fuel Industry, and others have greatly expanded their secondary technical-school programs in response to the need for research workers. Early in 1955, the Ministry of Fuel Industry (abolished in July 1955) reported 29 schools with about 15,000 students specializing in studies relating to hydroelectric power, coal mining, thermoelectric power, and petroleum. The Ministry of Water Conservation claimed to have 2,600 students in 8 schools, and the Ministry of Geology announced it had 1,800 students in 5 schools. Other ministries operating schools include the Ministry of Heavy Industry, the First Ministry of Machine Industry, the Ministry of Railways, and the Ministry of Engineering and Construction.

Geologists are also being trained in the higher educational institutions of China. Five-year geology courses are offered in the geology departments of Nanking and Peking Universities and of at least 5 engineering or technical colleges: Chungking University, Central-South Mining and Metallurgical College, Northeast Geology College, Peking Geology College, and Peking Petroleum College.

The immediate need for mineral resources to meet the requirements of industrialization has apparently led the Chinese Communists to place

increasing emphasis on short-term training. Because 4 or 5 years are required for training top-grade geologists, they cannot be turned out as rapidly as they are needed. Consequently colleges and universities, such as Peking Geology College and Nanking University, as well as technical schools under the various ministries, are giving "special" courses with the limited objective of training medium- or low-grade technicians. Such training is usually concentrated on specific skills such as surveying, prospecting, drafting, and bore analysis -- skills that can be put to immediate use. Even during their training period, students are assigned to field-practice projects to assist in the actual work of prospecting or general surveying. "Over 60 percent of the existing geological prospecting and surveying teams," says a young geologist in China Reconstructs, "consist of young workers and students who are continuing their training in the field, in spare-time study courses run by qualified technicians and experts. Some have entered the work after perhaps a 3-month training course following their graduation from secondary school ...."

Despite their large numbers, the scientists and special technicians have thus far been unable to fulfill their quotas for the "planned discovery" of mineral resources, and the projected industrial developments have lagged. In a report issued in the summer of 1955, the Minister of Heavy Industry attempted to rationalize the slow progress of industrialization. After emphasizing the dependence of

the ferrous-metals industry on an adequate supply of raw materials and noting the large-scale geological prospecting undertaken since the initiation of the first Five-Year Plan, the Minister complained of the low technical quality of past geological work. "Although deposits of some metals have been discovered in quantity in the coastal areas," he points out, "in those areas in which we wish to set up factories, resources have not yet been found in sufficient quantities." Despite the effort of the Ministry of Heavy Industry to organize an efficient geological prospecting force, he concludes that "because of the low scientific and technical level, the quality of the work has also been low."

The attention given in Chou's directive to the treatment of intellectuals suggests that the poor living and working conditions, low salaries, and lack of opportunities for promotion and public recognition in the past have probably contributed to the "positionalism"* and lack of research effectiveness that Chou now decries. Scientists, on the other hand, have apparently countered increasing political indoctrination and regimentation with substantial passive resistance. Chou warns against the "estrangement" that has developed between some intellectuals and the Party and notes that certain intellectuals have taken a conservative or even antagonistic attitude

*Positionalism: the fear of losing personal status characterized in part by an ultraconservative adherence to the status quo, suspicion of fellow workers, and unwillingness to work cooperatively.

toward Socialism. To this, Kou Mo-jo adds that such backward elements possibly comprise 13 percent of the intelligentsia. Scientists have also been attacked repeatedly for their failure to combine theory with practice and to gear research work to national needs. Critics also complain of a lack of congeniality between some veteran scientists and young scientists. "The younger generation," they claim, "often demands too much of the veterans in too great a haste, or unilaterally stresses the practical application value of science and the future prospects of individuals." As for the veteran scientists, "those deeply influenced by positionalism may even have apprehensions about the overall planning by the leadership," and may "like to do things alone and dislike to work with others, keeping busy for nothing and becoming narrowminded." During Chou's 12-year program, these morale problems will evidently be dealt with -- and probably aggravated -- under the decision of the Communist regime to raise the level of political reliability by further regimentation of scientific personnel.

China's research personnel can hope for little relaxation in the crash program for training technical cadres. Kou Mo-jo was quick to follow Chou's lead in calling for the intensification of the training program. Pointing to the past successes of shock cadres among production workers and soldiers, he exhorts intellectuals to develop similarly their latent powers. For example, although experience has shown that an instructor can handle at most 4 or 5 apprentices, he suggests that the training of 10,500 postgraduates within the next

12 years under the Academy program could be doubled simply by doubling the number of apprentices. To this he adds that "within certain limits increased burdens for the instructors are good for the instructors themselves, ... it is necessary to think harder ... and consequently the teachers' abilities increase more rapidly."

The 12-year scientific program is the most recent move to mobilize Chinese scientists to serve national production goals. It represents a continuation, with even greater intensity, of a period in Chinese technical science that has been marked since 1950 by increasing restrictions on independent research, by reducing the administrative control exercised by scientists over their own research activities, and by insistent criticism that scientists are not ideologically enlightened as to the importance of making the training of young cadres their major long-term task. At least during the current Five-Year Plan, Chinese Communist scientists are not likely to have time to add much to the basic or theoretical aspect of economic geology. Nevertheless, planners evidently hope to make good their pre-conditions of time and place for the discovery of new resources by pressing the geologists' noses more firmly to the grindstone and turning the wheel faster. (CONFIDENTIAL)

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COLLABORATION IN GEOGRAPHIC RESEARCH
Review of a Regional Study of the Venezuelan Andes

For more than a decade, geographers have been emphasizing the need for collaboration among the various disciplines within the social sciences in the preparation of regional reports. Doubts concerning the value of this approach or its practical application should be dispelled by a recently published study of the Venezuelan Andes.* In preparing the study, social scientists from two nations and government and private agencies pooled their resources. The result is an outstanding regional study. Though primarily of interest to those having a professional need for information on Venezuela, the volume is well worth the consideration of anyone interested in regional studies generally or in an interdisciplinary approach to the solution of social and economic problems.

The authors have collected and analyzed a great mass of data on an area about which relatively little has been written. The study, therefore, helps to fill a sizable gap in our basic intelligence on a major part of Venezuela, but it is the interdisciplinary approach and the manner of presentation that are the highlights of the book. By combining their methodologies and observations, the authors have produced an integrated study of broader scope and greater depth of

*Problemas Económicos y Sociales de los Andes Venezolanos, Parte I (Economic and Social Problems of the Venezuelan Andes, Part I), published by the Consejo de Bienestar Rural, [1955], 331 pp. (in Spanish).

understanding than would have been possible within any one of their individual disciplines. The scores of ground and aerial photographs, the graphs and charts, and the many finely executed maps add immeasurably to the worth of the volume.

The study has been divided into two parts. Part I is primarily a description of the physical and cultural characteristics of the region, but it also presents analyses, conclusions, and recommendations concerning economic problems. Part II, to be published later as a separate volume, will consider human relations and social and demographic problems.

The Consejo de Bienestar Rural (CBR -- Council of Rural Welfare) which published the work, is jointly financed by various agencies of the Venezuelan Government and by the Asociación Internacional Americana, a philanthropic organization founded by Nelson Rockefeller and aided financially by a group of foreign oil companies having interests in Venezuela. Six principal authors, with the active collaboration of at least 19 research workers and 18 government and private organizations, pooled their talents, energy, and methodologies in this undertaking. The authors are Dr. Henry Sterling, professor of geography at the University of Wisconsin, who directed the work; Dr. Milton Barnett, professor of anthropology at the same university; Dr. Bertram Ellenbogen, rural sociologist of the state of Wisconsin; Dr. Roberto Lizarralde, geographer; Dr. Louis Heaton, agricultural economist of the CBR; and Dr. Miguel Almiñana, CBR economist. The

other collaborators, most of whom were Venezuelans, included agricultural and forestry engineers, agricultural economists, anthropologists, sociologists, statisticians, cartographers, translators, and photographers.

The ambitious objective of this study is to present the historical development, geographic background, and present status of the economic and social problems of the rural zones of the Andean states of Táchira, Mérida, and Trujillo -- an area of about 30,000 square kilometers containing 800,000 inhabitants. In the last chapter of the study, the authors suggest additional investigations that need to be undertaken.

Methodology

The methodologies used in this study constitute a noteworthy contribution to the social sciences. Since the investigation had geographic, economic, and sociological aspects, which though interrelated are usually treated separately, certain procedures were devised to assure adequate compilation and comparison of the data. These procedures, combining the techniques of general reconnaissance and intensive investigation, were tested in an experimental study of one small part of the Andean region. Another purpose of this pilot study was to evaluate the basic statistical data previously compiled.

After the results of the pilot study were analyzed, the work on the whole area began. The geographers undertook an extensive reconnaissance, the delineation and explanation of the patterns of

distribution of both physical and cultural elements of the landscape, and the compilation of general and detailed maps. More than 10,000 aerial photographs were used in the cartographic work.

The two economists, the sociologist, and the anthropologist made relatively intensive surveys in various representative zones, visiting all areas accessible by vehicle and some that could be reached only on muleback. Questionnaires and individual interviews were used in establishing representative samples for the quantitative analysis of predetermined factors.

In the final compilation, each specialist prepared the sections relating to his own discipline. Because of the interdisciplinary character of the work, however, all of them participated in the discussion and extensive revision of the text and illustrative materials.

Content

The first chapter presents a concise history of the Venezuelan Andean area from the pre-Conquest period to the present. The authors trace the penetration by conquerors and colonizers of this vast mountainous area and briefly discuss the political evolution of the three Andean states. The emphasis throughout is on the economic life of the Andean people -- landholding systems, principal crops, trade, the search for mineral deposits, and the founding of cities and towns. The authors also dissect some widespread but false notions concerning the Andes, and succinctly present what they believe is the true situation. Some of the exploded ideas are: "The Andes are

excessively eroded;" "The Andes are overpopulated;" and "The Andes are able to feed all of Venezuela."

Chapter II is concerned with physical and cultural aspects, including the configuration of the terrain; the climate; the soils; the density, distribution, and mobility of the population; the transportation network; the political subdivisions and their significance; and the land-use pattern. Here the approach and techniques of the geographers become most evident.

This chapter is lavishly and effectively illustrated with photographs and maps that have been compiled with meticulous attention to detail by cartographers with a flair for original design. One of the most effective and meaningful is entitled Routes of Communication and Degree of Accessibility to the Highways. The map, in addition to showing the usual road and railroad network, illustrates travel time in mule-days between isolated zones and the highways. This simple but unusual device boldly emphasizes one of the more difficult problems of the Andean area -- the lack of an adequate rural road network. Other principal maps in this chapter portray relief and drainage, "ecological zones" (actually humidity and altitude zones), rural and urban population, population mobility, political divisions, crops, pasture, forests, and areas not being used for agriculture.

Chapter III covers a wide range of information on farms and farming. Opening remarks note that the life of many Andean farmers is difficult, primarily because they do not or cannot use modern

agricultural methods. The land-ownership pattern, which is discussed at some length, is also a major agricultural liability. There are large and small farm holdings, tenant farmers, sharecroppers, laborers, and, in some areas, a heterogeneous mixture of all of these. In an attempt to clarify this complex situation, the authors have included four excellent maps that show the sizes of farms in various parts of the region. Because of the diversity of agricultural methods, land use, and stages of development, the authors have discussed each type of farm individually -- those producing coffee; sugarcane; cattle; and "food crops," such as potatoes, corn, and wheat. Illustrating each discussion is a large-scale map of a representative farm showing the land-use pattern. The maps reveal that even on the specialized farms other crops are grown in addition to the principal one.

In Chapter IV, the agricultural economy of the region as a whole is briefly examined, with emphasis on the overall crop production and the principal agricultural systems. For each system, the problems involved in the accumulation and use of capital are mentioned, as well as labor requirements and the quality of the product. The characteristics, use, and volume of credit are analyzed; and finally the distribution of agricultural products is considered. Maps in this chapter include a series based on the areas devoted to the major crops. One of the original cartographic representations is a map of credit, a subject rarely shown on maps. Another unusual map, bearing the rather cryptic title Structure of the Distribution, indicates the

locations of communication stations, market places, food-processing plants, and commercial establishments such as stores. The final map illustrates the movement of manufactured and agricultural products.

Chapter V presents a brief analysis of the nonagricultural aspects of the Andean economy, thus completing the regional panorama. Extractive industries (forestry and mining), manufacturing, commerce, the industrial and commercial financial structure, and wages and earnings are considered, with emphasis on the effect of each on the rural economy. The single map in the chapter shows the location of mines and mineral resources.

In the final chapter, entitled "Conclusions and Recommendations," the authors note that this study is fundamentally a reconnaissance report, to be used as a point of departure for more intensive studies of land ownership, population mobility, credit, markets, industrial development, and other topics. They recommend that attention be focused on specific problems and on possible corrective measures as necessary steps in the development of programs to alleviate the economic and social ills of the region. (UNCLASSIFIED)

BRITISH ANTARCTIC AERIAL SURVEY*

Details have become available regarding the British 1955-56 aerial survey program in the Palmer Peninsula region of Antarctica.** The work was carried out by Hunting Aerosurveys Limited, a private United Kingdom concern, on behalf of the Governor of the Falkland Islands and Dependencies. Some 60,000 square miles were covered, including parts of the peninsula and adjacent islands. The final selection of areas to be surveyed was, of course, influenced by weather and ice conditions.

The program had three main phases: (1) ground control, (2) aerial photography, and (3) airborne magnetometer survey. Ground-control work was apparently limited to the taking of astro-fixes. The vertical aerial photography, which evidently was flown only for areas for which ground control had been established, will presumably be suitable for use on stereoscopic plotting instruments. The magnetometer survey was to provide data on the intensity of the earth's magnetic field and possible clues to the location of mineral deposits. Most of the ground-control work was apparently completed in January 1956, and the emphasis was then shifted to the aerial photography and magnetometer survey.

*This article has been coordinated with the Office of Scientific Intelligence.

**A brief article on British plans for this survey appeared in Geographic Intelligence Review No. 48, December 1955.

The surveying party consisted of some 50 men, and the equipment included 1 ship (the Oluf Sven, a 950-ton freighter), 2 helicopters, 1 tractor, and 2 "Canso" (Catalina amphibian) aircraft. The aircraft were produced in Canada especially to meet the needs of Polar work. Having a range of 2,000 miles, the Cansos were able to cover the entire survey area from the main base on Deception Island. Helicopters were used in establishing ground control and were particularly effective in overcoming the problems created by shelf glaciers and terminal ice cliffs, which in the past have prevented landings along many sections of the Palmer Peninsula coast.

As far as is now known, the findings of the survey will eventually be published as new or revised sheets by the Falkland Islands Dependencies Survey, which has maintained and may still maintain map series giving incomplete reconnaissance coverage of the Palmer Peninsula area at 1:100,000, 1:200,000, and 1:500,000. (UNCLASSIFIED)

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