CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS
GEOGRAPHICAL BRANCH

INDO-CHINA

A GEOGRAPHICAL APPRECIATION

FOREIGN GEOGRAPHY INFORMATION SERIES
No. 6

PRICE: FIFTY CENTS

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Preface

This report on Indo-China is the sixth in the series of Foreign Geography Information Reports produced by the Geographical Branch under the supervision of George A. Bevan.

The text was written by Marion H. Matheson and the final maps and illustrations were prepared under Paul H. Laurendeau.

Indo-China today holds some considerable attention in Southeast Asia. This report is designed to provide background information on the geographical aspects of the country which may assist the reader in interpreting events there.

Many generalizations and omissions are unavoidable in a report of this nature. Those wishing more detailed information on specific aspects of the country's geography will find additional reference works in the map and textual bibliography of the report.

J. Wreford Watson,
Director, Geographical Branch.

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INTRODUCTION

Indo-China lies on the eastern side of the great peninsula which thrusts southward between China and India (Fig. 1). The location of this peninsula has caused it to be influenced by both great civilizations. However, the physical barriers of the area have prevented an actual political or military meeting of the two countries, so that the peninsula is rather a zone where neighbouring cultures have mingled.

Physical conditions within Indo-China itself have tended to keep Indian and Chinese influences somewhat separated. In fact, prior to French occupation, the Indo-China of today was but a loosely defined group of territories, each influenced to a greater or lesser degree by the impact of Indian or Chinese civilization.

PHYSICAL SETTING

The river courses of Southeast Asia indicate the physical structure of the region (Fig. 1). The complex peninsula has been folded between two ancient, stable, land masses: the Shillong Plateau, in the bend of the Brahmaputra River, and the massif of southeast China.[1] A smaller stable block in southeastern Indo-China tended to deflect the folds farther south.[2] Thus the river valleys running from the heart of Asia are closely spaced and parallel, but fan out in their lower reaches to by-pass the Indo-China block on either side (Fig. 1). The geological structure of Indo-China, as yet incompletely understood, has affected the topography as well as the river systems of the country. The Mekong, rising deep in the heart of the continent, and its tributaries by-pass the block on the west (Fig. 1), but the Red River (Song-koi) and its tributaries by-pass it to the north. Some of the tributaries of the Si Kiang rise in Indo-China and flow northeastwards into China.

Superficially, Indo-China appears to be in a strategic position with regard to southern China and central Asia. Actually the river gorges do not offer ready access to thinly peopled areas of the interior. The valleys of the Mekong, the Red River, and the tributaries of the Si Kiang have not been great avenues of commercial traffic, but the routes used in the slow infiltration of the uplands of Indo-China by primitive peoples from the interior. Land access from China to Indo-China by way of the chain of coastal deltas has proved of greater importance.

Land communication between Indo-China and its neighbours has always been difficult, but access by sea has been comparatively easy. At least as early as the beginning of the Christian era, Indian merchants and others

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[1] Sion, J. Asie des moussons. Tome IX, Quatrième partie, p. 394.

[2] Blondel, F. Etat de nos connaissances en 1929 sur la géologie de l'Indochine française. Tome XVIII, Supplément Bulletin Service géologique de l'Indochine française, Hanoi, 1929.

came along the coasts to southern Indo-China.[1] Sea communication with China began at an even earlier date. The Gulf of Tonkin attracted fishermen from China,[2] and the semi-annual change in direction of the monsoon winds favoured the development of coastal traffic and the navigation of the lower reaches of the rivers.[3]

Indo-China has been in a less fortunate maritime position during recent history. Although she faces the potentially important Philippine and Indonesian Islands across the South China Sea (Fig. 1) she is, nevertheless, owing to be configuration of the southeast coast of Asia, located somewhat off the main trade route between Singapore and Hong Kong. However, Indo-China has proved to have greater strategic value as a centre for air-borne traffic.[4]

Indo-China is situated in that part of Asia dominated by the monsoon climate. The alternating wet and dry seasons greatly influence life, as they do in all monsoon Asia. The rice culture which the monsoon climate favours brings in its train all the social and economic problems common to the region as a whole. As in many other respects, two climatic variations of the monsoon climate, the tropical and sub-tropical types, meet in Indo-China.

The population of Indo-China is concentrated in the valleys and deltas of two great rivers, the Mekong and the Red, and those of many smaller rivers. Communication between these valleys is still comparatively difficult; Indo-China was first administered as a unit under the French.

HISTORICAL SETTING

The history of Indo-China before the coming of the French is that of a few large ethnic groups divided by both their cultural and their physical environments. The most numerous and influential of these groups were the Annamites, strongly affected by Chinese culture, the Cambodians, or Khmers, and the Chams, both of whom had Indian cultural affinities. The indigenous Indo-Chinese and the upland peoples from the interior of China played a smaller part in the history of the country.

In the 2nd Century B.C., Tonkin and a narrow coastal strip of north Annam (Fig. 2) became part of the Chinese Empire,[5] remaining so for about a thousand years. In the 10th Century A.D., the Annamites regained their

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[1] Robequain, Charles. The economic development of French Indo-China. Oxford University Press, London. 1944. p. 14.

[2] Ibid., p. 15.

[3] Masson, André. Histoire de l'Indochine. Que Sais-je? Presses Universitaires de France, Paris. 1950. p. 14.

[4] Robequain. Op. cit., p. 126.

[5] Masson. Op. cit., p. 29.

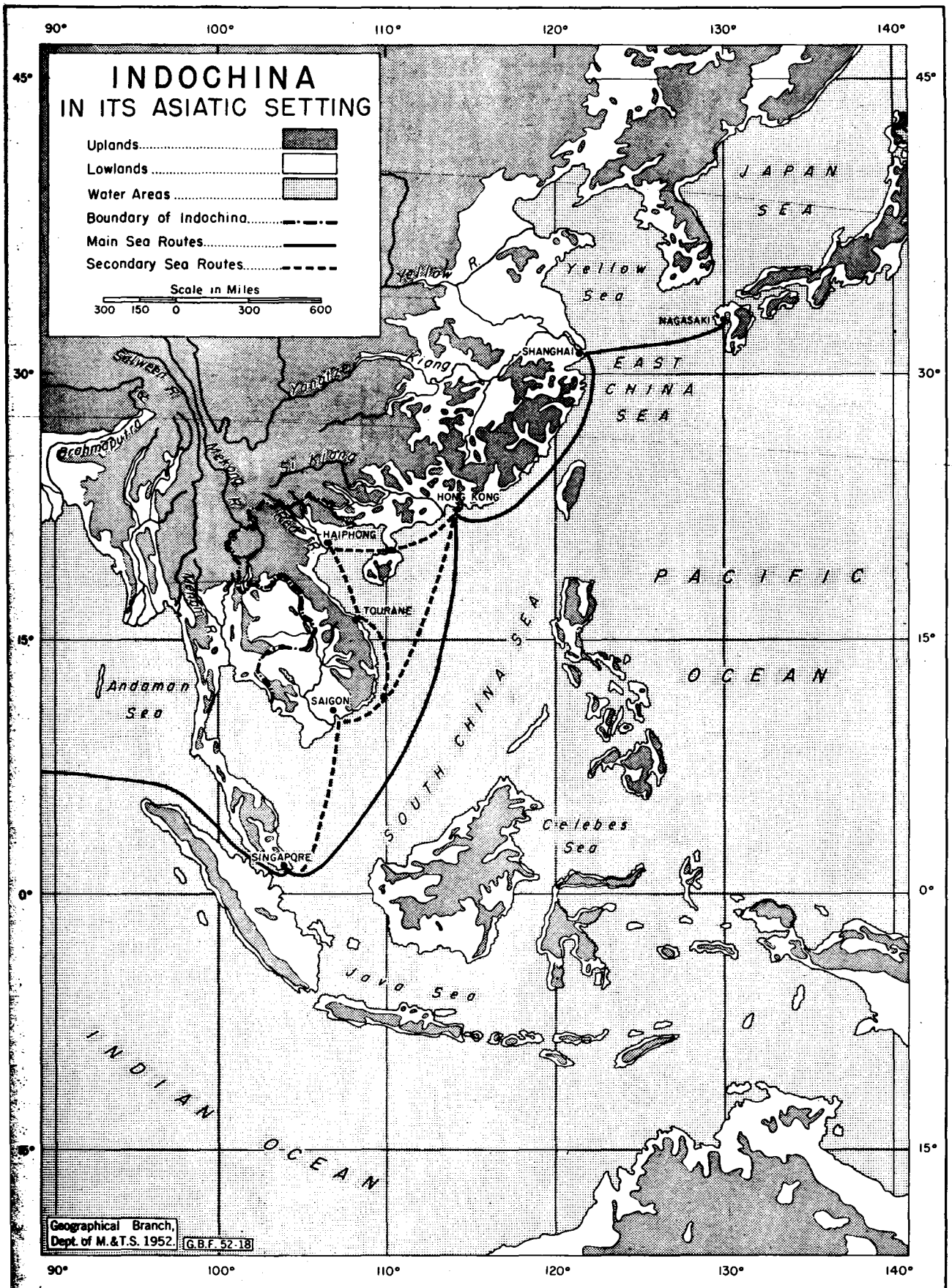
INDOCHINA
IN ITS ASIATIC SETTING
Uplands
Lowlands
Water Areas
Boundary of Indochina
Main Sea Routes
Secondary Sea Routes
Scale in Miles
300 150 0 300 600
90°
100°
110°
120°
130°
140°
45°
30°
15°
0°
15°
JAPAN SEA
Yellow Sea
Yellow R.
NAGASAKI
SHANGHAI
EAST CHINA SEA
Salween R.
Yangtze Kiang
Brahmaputra
Mekong R.
Si Kiang
HONG KONG
HAIPHONG
TOURANE
SAIGON
PACIFIC OCEAN
Andaman Sea
SOUTH CHINA SEA
Celebes Sea
SINGAPORE
Java Sea
INDIAN OCEAN
Geographical Branch,
Dept. of M.&T.S. 1952.
G.B.F. 52-18

FIG. 1

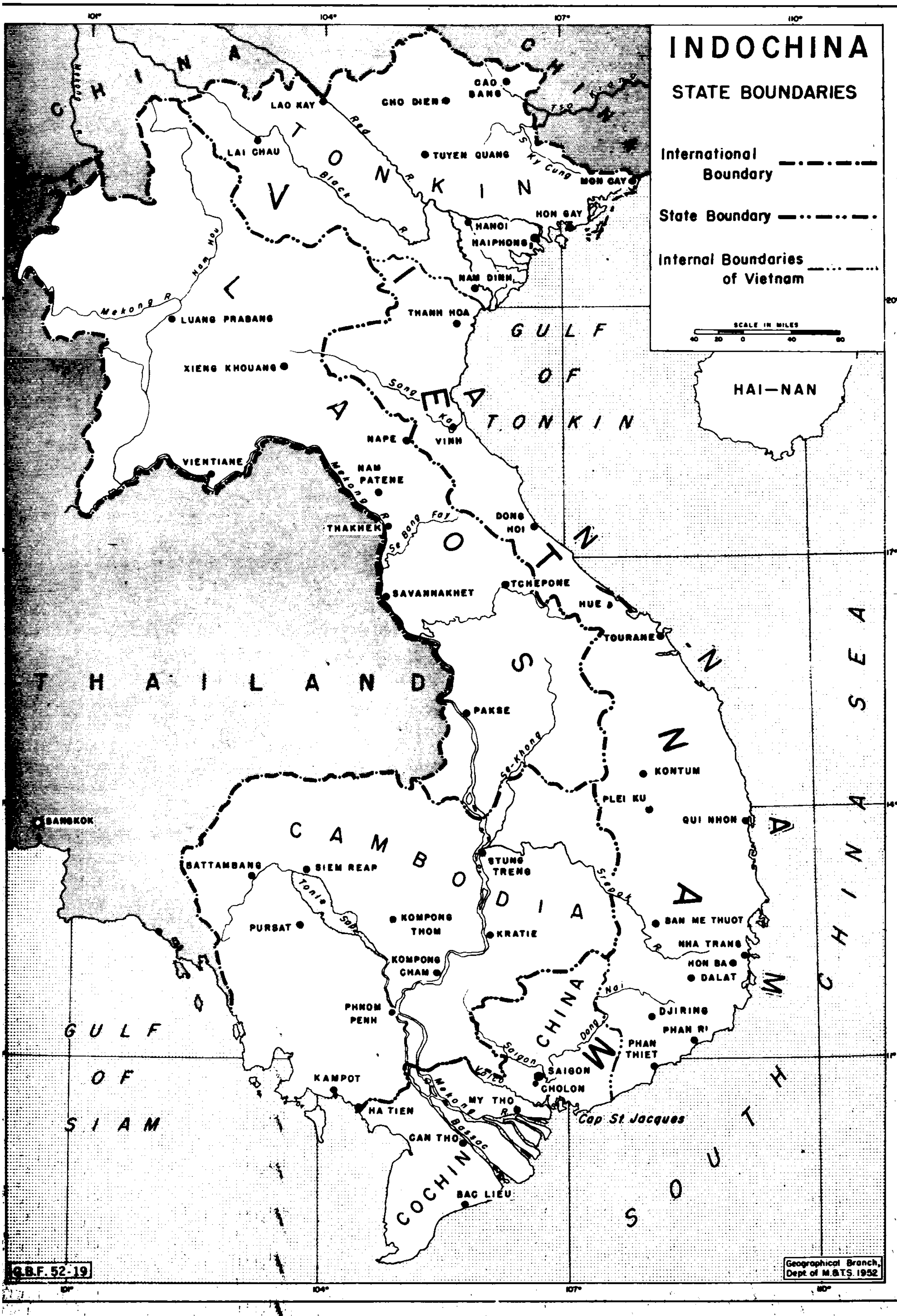
INDOCHINA
STATE BOUNDARIES
International Boundary
State Boundary
Internal Boundaries of Vietnam
SCALE IN MILES
CHINA
TONKIN
VIETNAM
LAOS
CAMBODIA
THAILAND
ANNAM
COCHIN CHINA
GULF OF TONKIN
GULF OF SIAM
SOUTH CHINA SEA
HAI—NAN
LAO KAY
CHO DIEN
CAO BANG
LAI CHAU
TUYEN QUANG
MON CAY
HON GAY
HANOI
HAIPHONG
NAM DINH
THANH HOA
LUANG PRABANG
XIENG KHOUANG
NAPE
VINH
VIENTIANE
NAM PATENE
THAKHEK
DONG HOI
SAVANNAKHET
TCHEPONE
HUE
TOURANE
PAKSE
KONTUM
PLEI KU
QUI NHON
BANGKOK
BATTAMBANG
SIEM REAP
STUNG TRENG
PURSAT
KOMPONG THOM
KRATIE
BAN ME THUOT
NHA TRANG
HON BA
DALAT
KOMPONG CHAM
PHNOM PENH
DJIRING
PHAN RI
PHAN THIET
SAIGON
CHOLON
KAMPOT
MY THO
HA TIEN
Cap St Jacques
CAN THO
BAC LIEU
Red R.
Black R.
Mekong R.
Song Ka
Se Bang Fay
Se Khong
Tonle Sap
Bassac
Saigon
Dong Nai
G.B.F. 52-19
Geographical Branch, Dept of M.&T.S. 1952

FIG. 2

independence, which they maintained, except for a short interval, until the advent of the French. The effects of the millenium of Chinese influence have continued to dominate Annamite culture until the present day.

Independent Annam was a vigorous state. During the 13th Century, a Mongol invasion led by Kublai Khan was successfully repelled.[1] The slow southward expansion of the Annamites, which has marked their whole history, began in the 11th Century. The kingdom of Champa, immediately to the south, was finally defeated by the end of the 14th Century. By the 18th Century, the Annamites had begun to penetrate Cochin-China. These conquests were carried out by military colonists who, when they had driven out the inhabitants, immediately established themselves as farmers.[2] Conquered lands thus became new areas of permanent Annamite settlement. The present boundary between Cochin-China and Cambodia marks the approximate limits of Annamite infiltration at the time of the French intervention.[3]

The kingdom of Champa, which had extended along most of the present Annam coast, was gradually encroached upon from the north, and was finally completely overrun. The Cham people of today form a minor ethnic group scattered throughout southern Annam.

The Khmer kingdom of Cambodia occupied the lower Mekong basin and much of modern Siam. It was most powerful from the 9th to the 13th Centuries, during which time the famous buildings of Angkor was constructed.[4] Each king built himself a new capital; Angkor was the temple erected by one king. Angkor Thom, the fourth of that name, was the capital erected by another king some fifty years later. The Cambodian kingdom was weakened by the southward movement of the Thai people from Yunnan, which began in the 12th Century. Owing to Thai pressure, the Cambodian capital was, near the close of the 15th Century, moved from Angkor to its present site at Phnom-Penh.[5] Indian culture, most evident among the ruling classes, suffered decline. The Cambodian kingdom survived, however, but was tributary to either Annam or Siam previous to its becoming a French protectorate. Had it not been for French intervention in 1863, it is considered that the Cambodian kingdom would have disappeared.[6]

The Thai people began to move out of Yunnan in the 13th Century before the Mongols, who were moving outward from central Asia. For centuries there were internal wars and a long struggle with Burma. Siam (or Thailand) was founded in the 18th Century, having control of parts of Laos and indefinite powers over Cambodia.[7] The rivalry between Siam and Laos was an important factor in the French occupation of these areas.

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1 Masson. Op. cit., p. 31.

2 Ibid., p. 39.

3 Robequain. Op. cit., p. 7.

4 Briggs, L.P. A sketch of Cambodian history. The Far Eastern Quarterly, Vol. VI: 345-363. August, 1947. pp. 351-353.

5 Masson. Op. cit. p. 25.

6 Janse, O.R.T. The peoples of French Indochina. Smithsonian Institution, War Background Studies. No. 19. Washington, 1944. p. 15.

7 Peterson, A.D.C. The Far East. Duckworth, London, 1949. p. 178.

Europeans, in the persons of Portuguese and Spanish merchants and missionaries, became interested in Indo-China during the 16th Century. They were followed by the Dutch, English, and French at various times during the course of the next two hundred years. Although there had been a few French missionaries and merchants in Indo-China since the 17th Century there was little French activity there until the 18th Century.

The first important instance of French intervention in Indo-China resulted from dynastic wars among the Annamite rulers. One of the claimants gained the support of a French missionary in the country, which contributed to his eventual success. This emperor, assuming the name of Gia Long, obtained the approval of the Chinese emperor to found the country of Viet-Nam which comprised the traditional regional divisions of Bac Ky (Tonkin), Nam Ky (Cochin-China) and Trung Ky (Annam).[1] In return for the help he had received, Gia Long established commercial relations with France. His successors, however, were less favourably disposed towards French activity, and it was their increasing hostility which aroused the French to intervene more effectively in 1858.

In the autumn of 1858, a combined French and Spanish fleet captured Tourane. If the hinterland were to be reached, a base was required where supplies could be obtained and access gained to the interior. Tonkin or Cochin-China were the alternative sites and, owing to the onset of the winter monsoon, the fleet moved to Saigon. Thus it was that Cochin-China became the first part of Indo-China to come under French domination.[2] The eastern provinces were ceded in 1862, and in 1867 all of Cochin-China became a French colony.

Cambodia, which had been menaced by both Annam and Siam, became a French protectorate in 1863. French occupation of the Annamite lands, Tonkin and Annam, resulted primarily from the desire to obtain access to Yunnan, because the Mekong Valley had proved impracticable.[3] In 1885, Tonkin and Annam became French protectorates. The capitulation of Annam strengthened Siam's position in Laos. However, the French assumed Annamite claims to the territory on the east side of the Mekong[4] and in 1893 Laos became a French protectorate.

By the end of the 19th Century, these four protectorates and one colony were grouped together as the Indo-Chinese Union. Previously, these lands had not been united by any ties, and as Robequain remarks, "The Indo-Chinese Union is a French creature whose cohesion is assured only by the will and power of France."[5]

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[1] Masson. Op. cit., p. 62.

[2] Ibid., p. 80.

[3] Robequain. Op. cit., p. 4.

[4] Peterson. Op. cit. p. 180.

[5] Ibid., p. 18.

When the power and prestige of France were undermined by events in Europe and the Far East during the Second World War, Indo-China, to some extent, lost its cohesion. After the defeat of the Japanese in 1945, Annamite nationalists formed a government of Viet-Nam, comprising Tonkin, Annam, and Cochin-China. In Cambodia and Laos the governments functioned separately from the Viet-Nam administration.[1] Cambodia and Laos, however, felt greater security against Siam and Annam within the French orbit,[2] and reached agreements with France regarding their future status within the French Union.

Two main points of contention arose between the Viet-Nam group and the French government: the inclusion of Cochin-China with Viet-Nam, and the status of Viet-Nam.

Cochin-China had been controlled by the provisional Viet-Nam government which was set up after the defeat of Japan. In the autumn of 1945, however, the French had removed the Viet-Nam authorities from office and had re-established their administration in Cochin-China. Much of the countryside remained in Viet-Nam hands.[3] As negotiations proceeded, the leaders of the Annamite nationalist party, or Viet-Minh, insisted upon the restoration of "The Unity of the Three Ky",[4] which had some historical precedent (page 4 supra).

In March, 1946, an agreement between the French authorities and Viet-Nam which declared hostilities at an end was signed; it recognized the independence of Viet-Nam within the French Union, and agreed to a referendum on the Cochin-Chinese question. The diplomatic status of Viet-Nam was left for consideration at a later conference.

In April of the same year at a conference held at Dalat in Annam, differences in the views of France and of the Viet-Minh leaders became apparent, particularly those concerning the status of Cochin-China.[5] Negotiations broke down.

The French Commissioner, in June, set up a provisional government in Cochin-China, before a referendum was held. The Viet-Nam leaders asserted this to be a breach of the March agreement.

In July a conference was held in France, but before it was concluded the French High Commissioner in Indo-China called a second conference at Dalat, from which representatives of the Viet-Nam regime were excluded. The only result of the conference in France was a modus vivendi on cultural and economic questions; in Indo-China hostilities broke out during the winter of 1946-47.

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[1] Micaud, C.A. French Indo-China in The new world of southeast Asia, edited by L.A. Mills, University of Minnesota Press, Minneapolis. 1949. p.232.

[2] A.S.B.O. "Trial of strength in Indo-China". The World Today. Royal Institute of International Affairs, London. March, 1950. p. 128.

[3] Micaud. Op. cit., p. 216.

[4] Peterson. Op. cit., p. 188.

[5] S.H. The Nationalist movement in Indo-China. The World Today. Royal Institute of International Affairs, London, June, 1947. p. 274.

On 19th May, 1948, the French-controlled towns elected a provisional Central Government of Viet-Nam with General Nguyen Van Xuan, an Annamite soldier, as Prime Minister. Bao Dai, the former Emperor of Annam, resumed his position. In June of that year an agreement was signed with this provisional government recognizing the independence of Viet-Nam, and in June, 1949, a further agreement was reached in which, among other points, Cochin-China was permitted to enter Viet-Nam if it so wished. The new status of Cochin-China became law in June, 1949. The treaties with Cambodia, Laos, and the Bao Dai government of Viet-Nam were ratified by the French government in January, 1950.

The Viet-Minh party led by Ho Chi Minh claims to be the real representative of the Viet-Nam people, and has been opposing the Bao Dai regime in those parts of the country which it still controls.

ECONOMIC AND SOCIAL DEVELOPMENTS OF THE FRENCH REGIME

The economic life of Indo-China, and its social structure, are predominantly based upon rice culture. The life of the great mass of Indo-Chinese peasants closely resembles that led by their ancestors. Since the beginning of French occupation, however, widespread social changes have occurred. Although all of Asia is passing through a period of social change, Indo-China is, in part, feeling the indirect effects of those economic developments resulting from French administration.

The chief problem of the region is still the unequal distribution of the population with regard to the need of developing the resources, including rice lands. Tonkin is a densely populated, closely cultivated area. Whenever floods or droughts lower the rice production of the area, famine ensues. The chief efforts of the French administration have been exerted towards solution of this problem.

Projects undertaken have included the improvement of farming methods and of seed quality, the opening up of new rice lands, through large-scale irrigation and drainage projects, the introduction of new crops in the hinterlands, the improvement of communication, and the development of mining and manufacturing.[1] The use to which capital has been put in various regions has varied, not because of administrative differences, but owing to the varying geographical conditions of each area.[2]

Not all these projects have been successful. Large new rice areas have been developed in Cochin-China, but in Tonkin the population is increasing at a greater rate than is rice production. On the northern deltas the land has long been cultivated so intensively and traditional methods are so deep-rooted that little improvement has been possible.[3] The development of new crops, of mining, and of industry have not been on a scale sufficient to raise the standard of living greatly throughout the country. The progress of road and railway building has been slow and costly, hindering the movement of the population and the distribution of rice from areas of surplus.

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[1] Micaud. Op. cit., p. 220.

[2] Robequain. Op. cit., p. 11.

[3] Micaud. Op. cit., p. 220.

In spite of the fact that economic development has in itself met with many difficulties it has, nevertheless, effected many social changes in the lives and attitudes of the Indo-Chinese people. Perhaps the most profound change has come about as a result of the impact of European thinking upon the traditional structure of Indo-Chinese life. In speaking of social change in Indo-China, Robequain says:

> "Recognition of the individual's importance has grown at the expense of the two basic units - the family and the village."[1]

The breakdown of family and village ties has been felt most keenly in the Annamite lands. The Cambodians, chiefly for philosophical reasons, never possessed strong village organization.[2] The mountain villages vary greatly in social organization, but, because of their inaccessibility, have been less affected by recent changes.

Annamite village life reflects that of China. Strong religious and social obligations are laid upon the family members, in keeping with the cult of ancestor worship. Each member feels himself a part of the family and village group, because the family is an integral part of the village. In order to fulfil the necessary religious and social obligations involved, it is also necessary to live on the land of one's ancestors, a fact which partly explains the lack of success in making large-scale, sudden transfers of population.

The conflict between individualism and collectivism arose as a result of Western intervention. During the first period of administration, the object of French rule was pacification of the country, but later policies were based to some extent, upon the individualistic trend of French political thought.[3] The concept of the value of individual life has led to the suppression of many old, harsh laws, but has weakened the authority which guided the people.[4] This, together with the physical isolation from the home group imposed by economic changes, has produced in the Annamites a sense of "uprootedness".[5]

This does not mean that the Annamites have not assimilated, superficially at least, many of the aspects of French culture. The adaptability which enabled them to seize upon many elements of Chinese culture has operated upon Western culture as well. It is also possible, so similar is Annamite to Chinese life, that a period of revolutionary change, such as that in China, would have occurred in Annam even without French intervention.[6] The effects of assimilation have been the breakdown of Confucianism and of many superstitions with regard to the soil. Other effects have been the growth of urban communities, the formation of new social classes, and the rise of Annamite nationalism.

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1 Robequain. Op. cit., p. 12.
2 Masson. Op. cit., p. 70.
3 Janse. Op. cit., p. 10.
4 Micaud. Op. cit., p. 226.
5 Robequain. Op. cit., p. 85.
6 Peterson. Op. cit., p. 184.

Before the arrival of the French there were no large towns in Indo-China. There are now several urban centres within the delta areas, such as Hanoi and Haiphong in Tonkin, and Saigon-Cho-lon in the Mekong delta. These cities act as focal points for the further concentration of population in areas already densely peopled.

One class which has grown considerably in Indo-Chinese society is that of the "landless proleteriat" - those who own either no land or insufficient land to provide a living.[1] This group is composed of two types, the wage-earners and the landless farmers, from whose ranks the former emerge. In earlier times, land was not held in equal amounts, but the communal organization of community life lessened the effects of this discrepancy. The breakdown of village organization has removed this source of support from the small land-holder, and, at the same time, the rapid increase in births has reduced the size of family holdings. Even in Tonkin, therefore, where peasant farming was best established, there are growing numbers of large estates and landless tenants.[2] The newly drained lands in Cochin-China were sold, in order to defray expenses, to those best able to develop the land quickly. Large estates grew up, managed by an intermediate group and worked by tenant farmers. The tenants have become involved in a cumulative process of borrowing against future harvests from the landlords, to some of whom interest on such loans has become a major source of income.[3] The French authorities, through the formation of agricultural credit organizations, have attempted to alleviate this situation.[4]

The increased rates of population growth resulting from French medical and engineering projects, the improved transportation facilities, and the growing need for labour in mines, on plantations, and in industry, have combined to bring the wage-earning class into being. Formerly, work was undertaken by the family group. Now there is a demand, especially in the south, for a labour force composed of employable individuals who have left the home and family group. These people enjoy better living and working conditions than at home, but feel themselves to be lacking in moral and social compensations.[5] For this reason, many return home upon the expiration of their contracts, or even earlier. Thus, although the total wage-earning group is small, large numbers must be recruited to fulfil the requirements for labour. The instability of the wage-earning population has delayed the development of a conscious "working class", but the great change from farming to wage-earning has been experienced by a proportionately large group of the population.[6]

Another social class to emerge in Indo-China is that of the wealthy and intellectual "new élite". The impact of western ideas and education, the weakening of traditional hierarchies, and the intellectual traditions of

1 Robequain. Op. cit., p. 85.
2 Ibid., p. 83.
3 Ibid., p. 84.
4 Masson. Op. cit., p. 109.
5 Ibid., p. 109.
6 Robequain. Op. cit., p. 82.

Confucian Annam and Buddhist Cambodia have accounted for the rise of this class.[1] The wealth of these people is founded upon their ownership of rice lands, especially the newly drained areas in Cochin-China. Associated with land ownership is the lending of money to their tenants.[2] Although some have invested in a variety of industrial and commercial enterprises, rice lands continue to form their main source of wealth.[3] It is from the wealthy class that many of the intellectuals appear, because they place great value upon education and Western culture, and have the means to satisfy their wishes. However, many desire greater opportunities for westernized education than they consider to have been provided.[4] Furthermore, those who have received such education find limited opportunity in the administrative system. The highly centralized form of government developed by the French in their home-land has been made the basis of colonial administration in the overseas territories.[5] Since 1938, Indo-Chinese have been admitted to responsible administrative positions, but this did not altogether allay the sense of frustration in the wealthy intellectual class.[6]

Nationalism has flourished in those regions of Indo-China where the Western impact has been strongest, because it is based on Western political concepts. The supporters of the movement originally came from the professional and intellectual classes, which arose as a result of westernization. Prior to the Second World War however, in spite of growing dissatisfaction among the "proletariat",[7] the movement was neither strong nor well-organized.

Indo-China has seen a gradual ascendancy of Chinese over Indian influence. Contact with China commenced at an early date, and has continued ever since, both by the slow infiltration of peoples along the rivers, valleys, and coastal plains, and by the migration of Chinese to the delta areas. Direct Indian cultural contacts were few, and have been lessening since the decline of the Cambodian kingdom. The upsurge of Annamite nationalism since that date marks the further increase of Chinese influence in Indo-China.

In the chapters which follow, the various factors which contribute to the present situation in Indo-China are analyzed in terms of its human and material resources. Finally Indo-China is considered regionally to determine areas of 'natural' cohesion.

1 Masson. Op. cit., p. 108.
2 Robequain. Op. cit., p. 86.
3 Ibid., p. 87.
4 Loc. cit.
5 Micaud. Op. cit., p. 227.
6 Ibid., p. 228.
7 Ibid., p. 235.

CHAPTER I

PHYSICAL GEOGRAPHY

Indo-China, with an agricultural base, is more than usually dependent upon the physical environment. Surface configuration, climate, vegetation, and soils, all determine the limits and the potentialities of rice-growing areas. The extent to which rice culture can be supplemented by other activities is also influenced by these factors, as well as by the presence of such resources as coal, other minerals, and fisheries.

LAND

The surface of Indo-China is the result of a complicated geological history. Areas can be classified on the basis of similar origins or their passage through similar geological processes. From a geographic point of view, Indo-China can be divided into regions in which the life of the inhabitants clearly reflects the influence of the configuration of the land.

Geological History and Structure[1]

There are thought to have been five periods of folding in the geological history of Indo-China. The first occurred in Pre-Cambrian time, and little evidence of it remains. The second, in the early Palaeozoic, produced the metamorphic rocks of Tonkin and Upper Laos.

Throughout much of the Devonian, seas covered the land, but from the late Devonian to the early Carboniferous mountain-building produced the Annam Cordillera. Intrusions took place at the end of this period, which account for most of the granitic rocks in the area.

From the late Carboniferous to the early Triassic, the seas again invaded the land. The Annam Cordillera was eroded and sediments were deposited on the low-lying areas. Limestone beds were laid down in Laos and Tonkin, but in the southern part, the sediments were laid down on dry land or in lagoons.

Near the end of the Triassic period, mountain-building began again. This activity produced the mountain arch northeast of the Red River, in Upper Tonkin. Many of the sediments deposited during the previous period of marine invasion were eroded. Intense folding occurred throughout Tonkin, Northern Annam and Upper Laos, but the sediments in the lower Mekong basin and the Cardamome Mountains were relatively undisturbed. This period marked the final emergence of Indo-China from the sea.

The final period of folding has been called the Himalayan. Ancient surfaces were elevated and exposed to erosion, while, in the west and south, the land was lowered. Along some of the ancient folds, fracturing

[1] The following passages are based on "La structure de l'Indochine" by Charles Robequain. Annales de Géographie, vol. 45: 192-197. Librarie Armand Colin, Paris, 1936. This article is a summarization of numerous studies made in the years immediately preceding 1936.

took place. The Red River now flows in one of these fractures. The movement was accompanied by the outpouring of basalt which, decomposed, has produced the "red earths" of upland Indo-China.

Erosion has played an important part in the development of present surface features. In areas of heavy rainfall, rapid erosion has produced deep gorges and narrow valleys. The great volume of sediments from these areas is contributing to the building up of the modern deltas.

Physiographic Regions

The physiography of Indo-China is dominated by the uplands which cover more than one-half of the total area of the region.[1] These uplands lie all across the northern section and extend southward through the centre of the land (Fig. 3). A second, smaller upland lies close to the southwest coast of Cambodia. There are two lowland regions of great importance: the Red River (Fleuve Rouge, Songkoi) valley and delta, and the Mekong valley and delta. The Annam Cordillera, really an elevated, tilted plateau, slopes abruptly to the east coast with a more gradual slope westward to the Mekong. The Cambodian mountains, of similar structure, also rise abruptly from the Gulf of Siam, sloping gently to the Tonlé Sap lowland. Lowlands and uplands may be further distinguished on the basis of their relief features.

1. The Tonkin-Laos Uplands: (Fig. 4) Within this area are included diverse types of rock and structure, all having as common features the presence of deeply cut river valleys and steep mountain crests.

The mountains in the region have three main structural trends: the trend of the northeast mountains, where the rivers flow to the Si Kiang; the northwest-southeast trend of the central area, as indicated by the Red River and its tributaries; and the northeast-southwest trend in the western part of the region within the Mekong basin.

Detailed surface configuration varies according to the underlying rock materials. Limestone deposits account for very abrupt relief, such as that which extends beyond the coast-line into the Bay of Along (Fig. 3), forming typical abrupt islets notched at the bases by the action of sea-water.[2] The extreme solubility of limestone is shown in the interior by the presence of underground rivers, circular ponds hollowed out by standing water (solution lakes) and other features typical of "karst" topography. Farther inland, the great calcareous plateaux, such as that on the right bank of the Black River (Rivière Noire or Song Bo), are deeply dissected by "cluses", or trenches formed by the tributaries of the main rivers.[3] In areas where schists prevail, the hills are lower and more rounded, but here, also, deep river valleys have been cut. In the northeast corner of the country is a zone of low hills and somewhat broader valleys, owing to the presence of sandstones and slates. Rugged relief, although less abrupt than

[1] McCune. The diversity of Indochina's physical geography. Far Eastern Quarterly, Vol. VI. No. 4: 335-344. August, 1947. p. 335.

[2] Sion. Asie des moussons. p. 418.

[3] Ibid., p. 420.

in limestone, is found in the areas of crystalline rocks, such as the great chains on the right bank of the Red River from Yunnan to its junction with the Black.[1]

2. The Annam Cordillera: The eastern limits of the Annam Cordillera are well defined, both structurally and topographically, for the dissected forefront of the plateau rises steeply from the narrow alluvial plains along the coast. To the west, however, there is not always a distinct separation between the Cordillera proper and the lower plateaux. In the highest part of the plateau, owing to more rapid erosion, increased altitude and relief impose "mountain" conditions upon the inhabitants.

The northern part of the Annam Cordillera is the narrowest. River erosion has attacked both flanks, and the range is broken by passes or "cols" giving access from the Annam coast to the Mekong Valley. This part of the Cordillera comprises the remnants of some of the earlier folded mountains. Farther south, crystalline rocks are found (page 10). The highest parts of the Annam Cordillera are formed by these more resistant materials.[2] However, it is the width of the Annam Cordillera, more than its height which makes it a true regional barrier, a dividing zone for climate, vegetation, and ethnic groups.[3]

3. The Mekong Plateaux: Although the plateaux west of the Nam-hou River in northern Laos are not structurally related to those farther south, which form part of the Annam Cordillera, their physiography is sufficiently similar to permit their being classified with the latter group. (Fig. 4)

Most of the Mekong plateaux are composed of sandstone beds, laid down under water, which suffered little disturbance subsequent to their deposition. In some cases, the plateau character of the surface has been maintained by the resistant qualities of the beds themselves, as in the case of the Tran Minh Plateau, north of Vientane.[4] Many of the plateaux, particularly towards the south, have been formed by level beds of extruded basalt, such as the Bolovens plateau north of the Se-Khong River. Between Dalat and the border of Cochin-China, the plateaux are formed by a series of granite formations descending in steps to the plain. Whatever their structural origins may be, the character of all these plateaux has favoured the development of human activities which differ in some respects from those of the inhabitants of plains and high mountains.

4. The Cambodian Uplands: The upland areas of Cambodia resemble the Annam Cordillera, but on a smaller scale. They, too, are composed chiefly of raised sandstone plateaux and some crystalline massifs, rising steeply from the sea and sloping more gently to the interior. In the crystalline areas and on the higher coastal edges, where precipitation is heaviest, erosion has carved rugged topography. The drier leeward slopes exhibit a more uniform surface.

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1 Dion. Op. cit., p. 421.
2 Ibid., p. 434.
3 Ibid., p. 435.
4 Ibid., p. 438.
5 Ibid., p. 434.

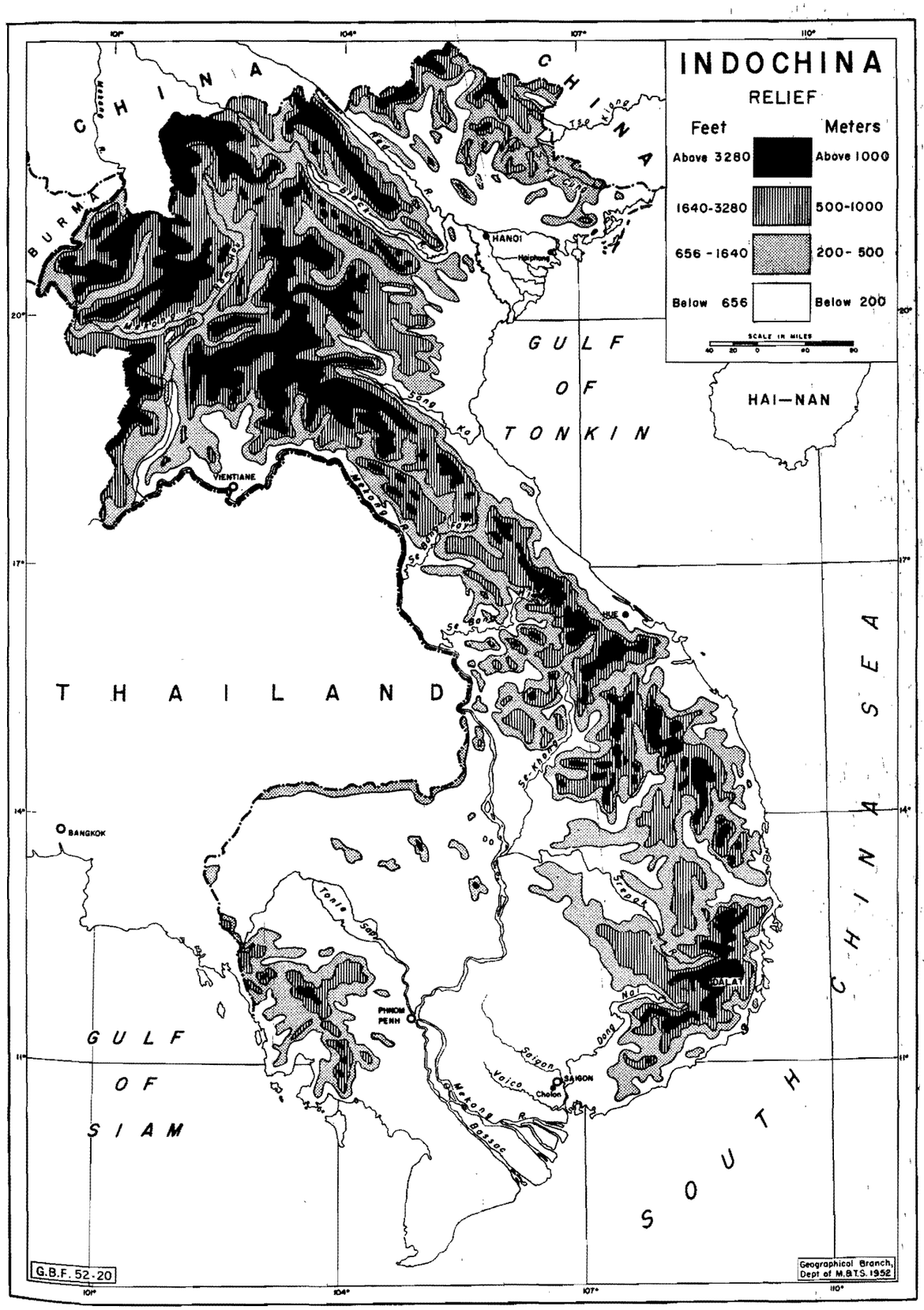

FIG. 3

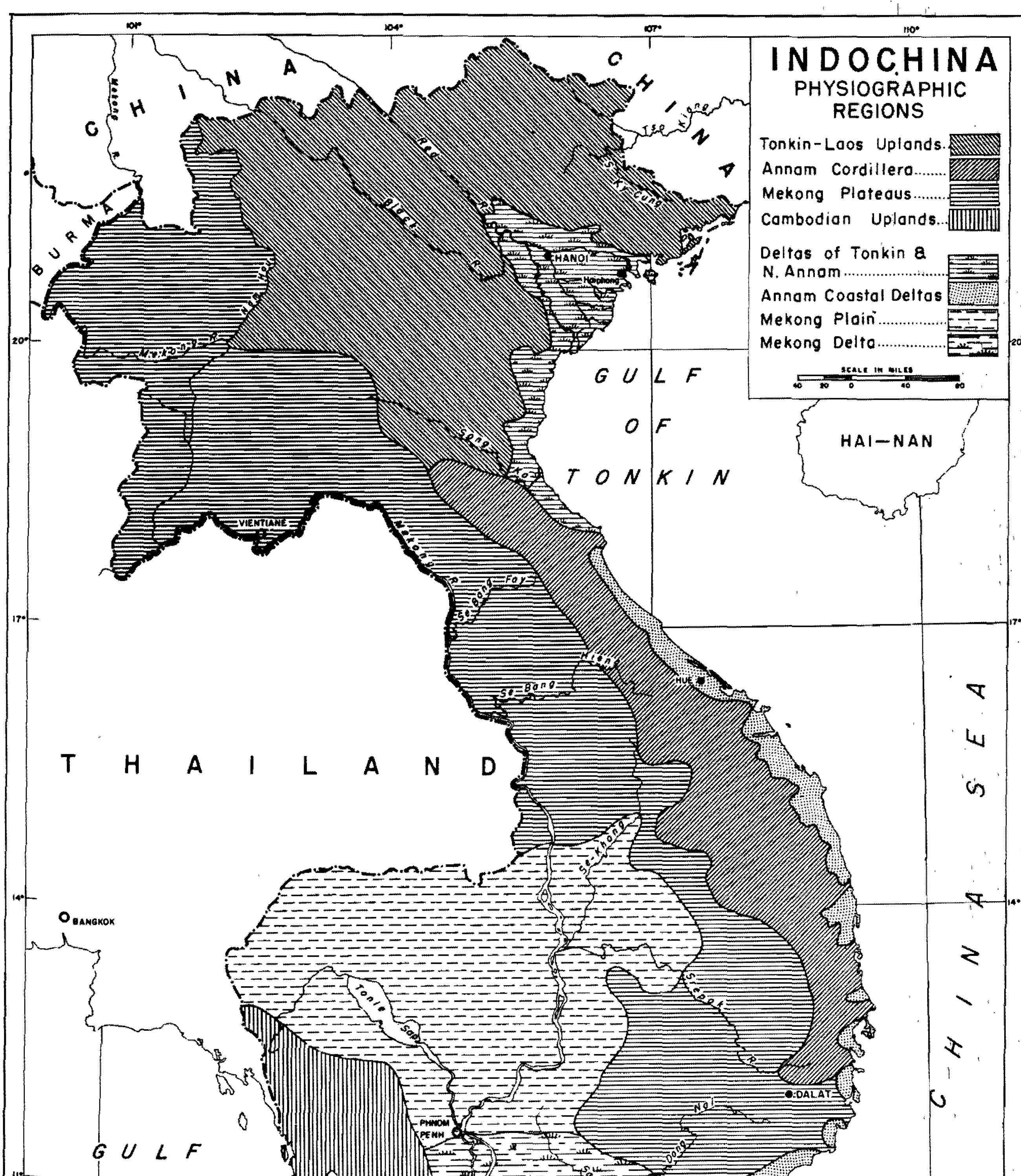
INDOCHINA
PHYSIOGRAPHIC REGIONS
Tonkin-Laos Uplands
Annam Cordillera
Mekong Plateaus
Cambodian Uplands
Deltas of Tonkin & N. Annam
Annam Coastal Deltas
Mekong Plain
Mekong Delta
SCALE IN MILES
CHINA
BURMA
THAILAND
GULF OF TONKIN
HAI—NAN
SOUTH CHINA SEA
GULF OF SIAM
HANOI
Haiphong
VIENTIANE
HUE
BANGKOK
DALAT
PHNOM PENH
SAIGON
Cholon
G.B.F. 52-21
Geographical Branch, Dept. of M.&T.S. 1952

FIG. 4

5. The Deltas of Tonkin and Northern Annam: The deltas of the Red River and of the northernmost Annam rivers form a contiguous area along the Gulf of Tonkin (Fig. 4). In this region, owing to the river regimes, it has been necessary for the people to build embankments along the rivers to protect the fields from floods. Such structures sometimes form the highest land elevations in these areas.

The deltas of Tonkin and northern Annam are divided into three zones. Fringing the uplands are areas of old alluvial deposits, where the surface is slightly undulating. The areas of recent deposition are monotonously flat and are intersected by many embanked waterways, both natural and artificial. The shorelines are lined by sand-dunes. These dunes enclose small bays which eventually become filled with river deposits.

East of the Red River delta in Tonkin, deltas grow very slowly. The rivers carry less alluvium, and also flow into large estuaries, so that tidal action impedes the accumulation of sediments. The Red River at high water, however, carries a greater weight of sediment for its volume than such rivers as the Nile, the Hwang-ho, or the Mekong.[1] In parts of the delta the emergence of new deposits is fairly rapid, and these areas are immediately brought under rice cultivation. In northern Annam, tidal currents have already removed the headlands and filled the coastal bays. On this regular coastline the building up of delta deposits has been completed.

6. Deltas of the Annam Coast: The deltas along the coast of Annam are confined between the steep slope of the Cordillera and the sea, and interrupted by spurs from the main range. The rivers forming the deltas are short, rapid, and have limited drainage basins, none of which factors favour the development of large deltas. The process of delta-building, as opposed to the deposition of sediments on areas already above water, is still progressing in those sections where the coastline has not yet been straightened.

7. The Mekong Plain: The Mekong plain is of structural origin; that is, it owes its lack of relief to the horizontal position of its underlying sedimentary beds. Where these beds are of sandstone, there are small upland areas. Most of the plain is made up of clay deposits. A belt of basalt crosses the plain near the Cochin-China-Cambodia border, forming rapids in the course of the Mekong. The western part of the plain forms the basin of the Tonlé Sap (Great Lake). This lowland, lying between the Annam and Cambodian uplands, may have resulted from subsidence, so that the area was a gulf of the sea. The scattered granitic uplands of today would then have been islands.[3] Deposition of recent alluvial material is proceeding rapidly in the vicinity of the Mekong and the Tonlé Sap.

8. The Mekong Delta: The delta of the Mekong is being built up by alluvial deposits carried by that river, as well as by shorter rivers which reach the sea in the same vicinity. The delta is monotonously flat, and is

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[1] Dion, op. cit., p. 424.

[2] Ibid., p. 424.

[3] Ibid., p. 447.

composed of sticky mud with narrow deposits of sand. Without drainage projects, the delta is marshy and almost uninhabited, because the brackish water is unfavourable to the growth of rice.

River Systems and Lakes:

There are three main drainage basins in Indo-China: the Red River system and some smaller rivers drain into the Gulf of Tonkin; the rivers of eastern Annam drain into the South China Sea; the Mekong and its tributaries also drain into the South China Sea, but the basin of this system lies west of the Annam Cordillera. A few short rivers drain from the Cambodian mountains into the Gulf of Siam (Fig. 3). In northeast Tonkin, the rivers follow the curving land structure and become tributaries of the Si Kiang, which flows into the China Sea.

1. Gulf of Tonkin Drainage System: The Red River, the greatest of the Gulf of Tonkin group, has a total length of about 720 miles. In its upper course, it flows in a deep structural trough. Its tributaries, such as the Black River and the Rivière Claire, flow in deep canyons caused by downcutting of the rivers following uplift of the land surface.[1]

The runoff from the rugged drainage area produces great fluctuations in the river regime. During high water, from June to October, the volume of the river is approximately triple its low-water volume, from March to May. Because of great variability in precipitation, however, the volume of the river fluctuates greatly. Hydrographic projects are mainly for the purpose of flood control. Banks are built to keep back floods, dividing the land into casiers or basins. The embankments decrease in height downstream where the diverging river mouths permit more equal distribution of the flood waters.

The smaller rivers, east of the Red, have much lower volumes and carry a smaller proportion of sediments. Delta building is slower, tidal movements are felt farther upstream and, during the dry season, brackish water penetrates farther inland than in the distributories of the Red.

The rivers of north Annam are connected by old watercourses behind the coastal sand-dunes and bars. Because they also rise in areas of rugged topography, their deltas have to be embanked as a flood-control measure.

2. The Annam Coastal Plain: The rivers flowing east from the Annam Cordillera are short and swift (Fig. 3). Because they are able to cut their valleys more rapidly than the streams flowing west, many of these eastward-flowing rivers have already pierced the "divide" between the Mekong and the South China Sea. In places, this action has been so rapid that short streams have been able to "capture" the head-waters of the slower westward-flowing streams, which are now diverted towards the east.[2] These valleys across the divide facilitate east-west communication in the Cordillera. Many of the Annam rivers are linked by old waterways which cross the deltas.

[1] Sion. Op. cit., p. 418.

[2] Ibid., p. 435.

3. The Mekong System: The Mekong, nearly 2,500 miles in length, is one of the great rivers of Asia. In its upper reaches the Mekong flows in a deep valley, but where it reaches the borders of Indo-China its course is more placid. The Mekong falls less abruptly than does the Red River (Fig. 3), so the process of valley-cutting is less severe than in the upper Red River basin.[1] In its lower course, however, uplift of the land surface has placed barriers of resistant rock in the river bed. The river is cutting through these in a series of rapids which hinder navigation.

The tributaries from the Annam Cordillera to the Mekong flow very gently on the upland plateaux. These uplands are often swampy, and the divides between the rivers are poorly defined. Farther downstream, where they leave the plateaux, the rivers become more entrenched and only regain their placid character on the more level Mekong plain.

The watershed between the Mekong and the Menam, the main river of Siam, is very low. At one time, it is thought, both may have drained into the Gulf of Siam.

The Mekong once drained into the sea in the present vicinity of Phnom Penh. The Tonlé Sap was then an arm of the sea. The land uplift which raised obstructions in the bed of the river cut off the lake from the sea. Species of marine life which have adapted themselves to fresh-water conditions are still found in the lake. This uplift caused the Mekong to build its present delta below Phnom Penh and will cause the lake to fill up in about 200 years.[2]

Tonlé Sap acts as a regulator of the Mekong floods. During June to October, when the water-level of the river is high, the current runs into the lake from the river. From November to June, the low-water period, the lake drains into the river. Tonle Sap doubles its surface area during the high-water period. As a result there are no large permanent settlements in the vicinity of the lake. The rivers flowing into Tonlé Sap from the Cambodian uplands are mere creeks during the dry season.

The regime of the Mekong is less well known than that of the Red River. The maximum high-water period is reached in Laos, in July, but in the lower reaches the high-water period, which commences in June, does not attain its maximum until October. The Mekong does not drain directly from the rugged uplands to the delta, the Tonle Sap acts as a reservoir for the overflow, and the river has more outlets than does the Red. For these reasons, hydraulic projects are more for the purpose of drainage and removal of brackish water than for flood control. Undrained areas still support only a scanty population.

Immediately east of the Mekong delta are those of smaller rivers, such as the Saigon River, which flow from the foot of the Annam Cordillera to the sea. They carry less silt than the Mekong, and are less important

[1] Sion. Op. cit., p. 438.

[2] Ibid., p. 447.

from an agricultural point of view. However, it is this comparative lack of sediment that has permitted the development of the port of Saigon in this area.

CLIMATE

Indo-China is situated in the heart of that vast area of the world known as "Monsoon Asia" which extends around the margins of the continent from India to the Kamchatka Peninsula. Life in all the lands of this great belt is dominated by the annual regime of monsoonal winds and precipitation.

The Monsoon Regime

The monsoon regime is caused by unequal air pressure over the land mass of Eurasia and the seas surrounding the continent. In winter, the air over the central continent becomes very cold and dense, and sinks, to form a centre of high pressure. Over the surrounding oceans the air is warmer and less dense. The winter monsoon period is thus characterized by the outflowing of cold, dry air from the land mass to the oceans. From the prevailing direction of the winds the winter monsoon is often called the North-east Monsoon.

In summer, reversed conditions obtain. The air over the central continent becomes very warm and rises, resulting in the formation of a vast low pressure area. The summer monsoon is marked by moist winds flowing inward from the warm seas to the warmer land and bringing with them the heavy summer rains characteristic of monsoon climates. The summer monsoon winds flow from the southeast, but, upon crossing the equator, the rotation of the earth induces a 90° change in direction. Over much of Monsoon Asia, therefore, the summer monsoon is known as the Southwest Monsoon, although local surface conditions may produce variations in its direction.

Winds

The winter monsoon period in Indo-China lasts from mid-September until March. The northeast winds commence first in northern Indo-China, and are not well established in the south until the end of October. Wind directions vary throughout the land (Fig. 5). In all parts of the country, local topographic variations change, or may even reverse, the direction.

The summer monsoon in Indo-China commences in less pronounced fashion than does the winter. The date of its onset varies considerably, from late April to June. During the summer, wind directions are generally completely reversed to their various winter patterns (Fig. 5). Wind directions in northern Indo-China are less constant than in the south, owing to the passage of shallow depressions. The summer monsoon winds are usually moisture-bearing, but those which cross the Annam mountains and descend to the coast, known as the "Winds of Laos" are dry and hot, having lost their moisture en route.

Temperature

Relief exerts a strong influence upon temperatures in Indo-China. Owing to its proximity to mountainous central Asia, and to the northwest-

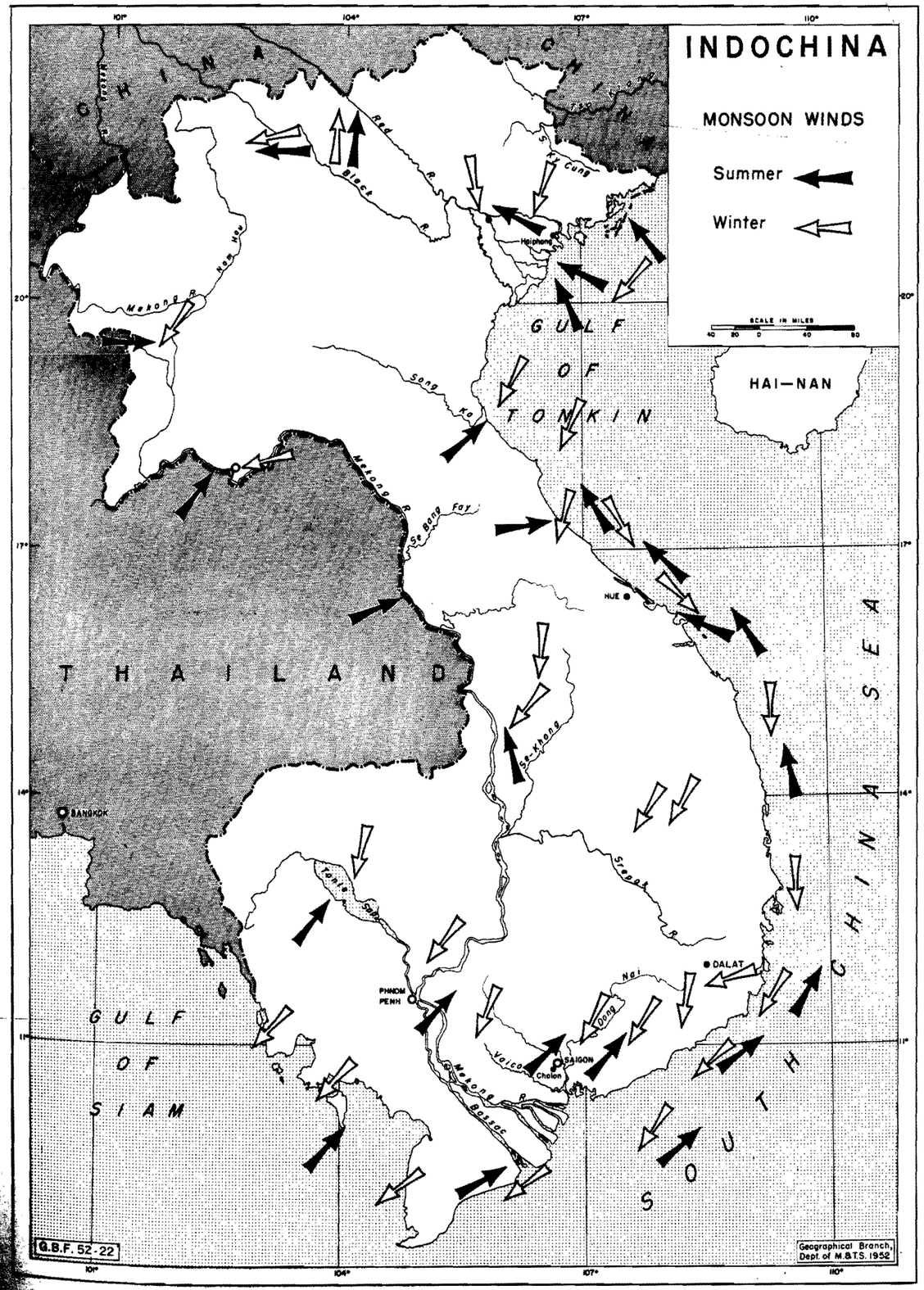

FIG. 5

southeast trend of the great valleys from the interior, Tonkin is much cooler in winter than is typical for its latitude.[1] The Annam Range also acts as a climatic barrier, confining the cooler air to the northeast part of the country. Thus Tonkin, northern Laos, and the higher parts of the Annam Range have temperatures in the coldest month (January) below 65° F. (Fig. 6). These areas do not, therefore, have the "tropical" climates of the other regions. Temperatures are high enough, however, for year-round rice production, and the importance of the cool winters lies chiefly in its effects on human energy.

Spring, and particularly April, is the warmest period of the year in much of Indo-China (Fig. 7). Elevation, latitude, and the influence of coastal position cause the plains of Tonkin and Annam to have temperatures below 80° F., but in the Mekong Valley temperatures are warmer and in the lower portion they rise to over 85° F.

In July, temperatures in Tonkin and in the lower Mekong region are more nearly similar (Fig. 8). The increased cloud cover associated with the monsoon rains decreases temperatures in the Mekong lowlands. On the Annam coast, where summer rainfall is less pronounced, temperatures average over 85° F., so that this region is the warmest in the country in July.

The pattern of the isotherms in October is similar to that of midwinter (Fig. 9), coolest in the mountainous uplands and warmest over the lower Mekong. However, owing to the autumn rains on the Annam coast, the temperatures there in October average about the same as those in the Tonkin lowlands.

Precipitation

Because of the cultivation of rice, precipitation is a vital climatic factor in Indo-China. However, the areas having the greatest rainfall are not the densely populated lowlands, but the mountainous regions.

The wettest part of Indo-China is in the southwest, where the moisture-bearing Southwest Monsoon strikes the mountains bordering the coast of Cambodia (Fig. 10). The Annam Range generally receives a higher precipitation than the surrounding lowlands, in particular the frontal slopes of the Annam Chain north of the Mekong lowlands. The mountains of northern Indo-China receive a greater rainfall than do the lowlands, but less than those further south, owing to their greater distance from the sea.

The lowlands of Tonkin, in the north, receive more rain than the region of Tonlé Sap and the lower Mekong because the latter area is sheltered from the Southwest Monsoon by the Cambodian coastal mountains.[2] The summer monsoon reaches Tonkin without such interruption.

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[1] Tulippe, O. Initiation à la Géographie Humaine. Sciences et Lettres, Liège. 1949. p. 121.

[2] McCune. Op. cit., p. 340.

Rainfall on the Annam coast varies according to the direction of the coast-line. The northeastward-facing coasts have an annual precipitation of over 80 inches, but along the southern coast of Annam, where both summer and winter monsoon winds parallel the coast-line, the rainfall may be less than 40 inches in a year.

Rice requires a constant supply of moisture during its growing season, yet the rice-growing regions of Tonkin and the lower Mekong both have dry periods of considerable length. In addition, annual precipitation totals fluctuate greatly. Even in a normal year, one season may be abnormally dry or wet. As little as 10 days' drought in the growing season may cause a failure in the rice crop,[1] or excessive rainfall may cause floods. All these factors indicate the necessity for hydraulic projects in Indo-China.

Climatic Regions

On the basis of the above factors, Indo-China may be divided into two main climatic regions, and five sub-regions, each having certain characteristics significant to its human occupants.

The basic climatic division in Indo-China is between those areas having an average temperature for the coldest month of less than 64.4° F. (18° C.).[2] Tonkin, northern Laos, and the highlands of Annam have thus a sub-tropical climate as compared to the tropical climate of the rest of the country (Fig. 11). This region has mid-summer maxima in rainfall and precipitation and an annual temperature range of about 20° F. (Fig. 12).

A sub-region within the sub-tropical zone is marked by the crachin period, a season of fine, drizzling rain which occurs from February to the end of April (Fig. 11). In this area, maximum rainfall occurs in summer, but the crachin period is distinguished by the proportionally high number of days with rain in the months of February to April (Figs. 12a and 12b).

The tropical climates are marked by monthly temperatures which exceed an average of 64.4° F. all year. Throughout most of the region, the temperature maxima occur before the high sun period in June (summer solstice) (Figs. 12f, c, e). Some parts of the region have a slight tendency toward a double maximum of summer rainfall (Figs. 12f, c), but not all (Fig. 12e).

The narrow annual temperature range typical of many tropical climates occurs in Indo-China only in the Mekong lowlands (Figs. 11, 12f and e). In the upper Mekong Valley, average temperatures for the year, although high, have a range of more than 9° Fahrenheit (Fig. 12c).

The climate of the Annam coastal sub-region is marked by the dominance of the autumn rainfall maximum (Fig. 11). This maximum is not associated with the winter monsoon, which reaches a climax in January, but with the typhoon period in October and November (Figs. 12g and d).

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[1] McCune. Op. cit., p. 341.

[2] This is the basis of Koppen's division between A and C climates.

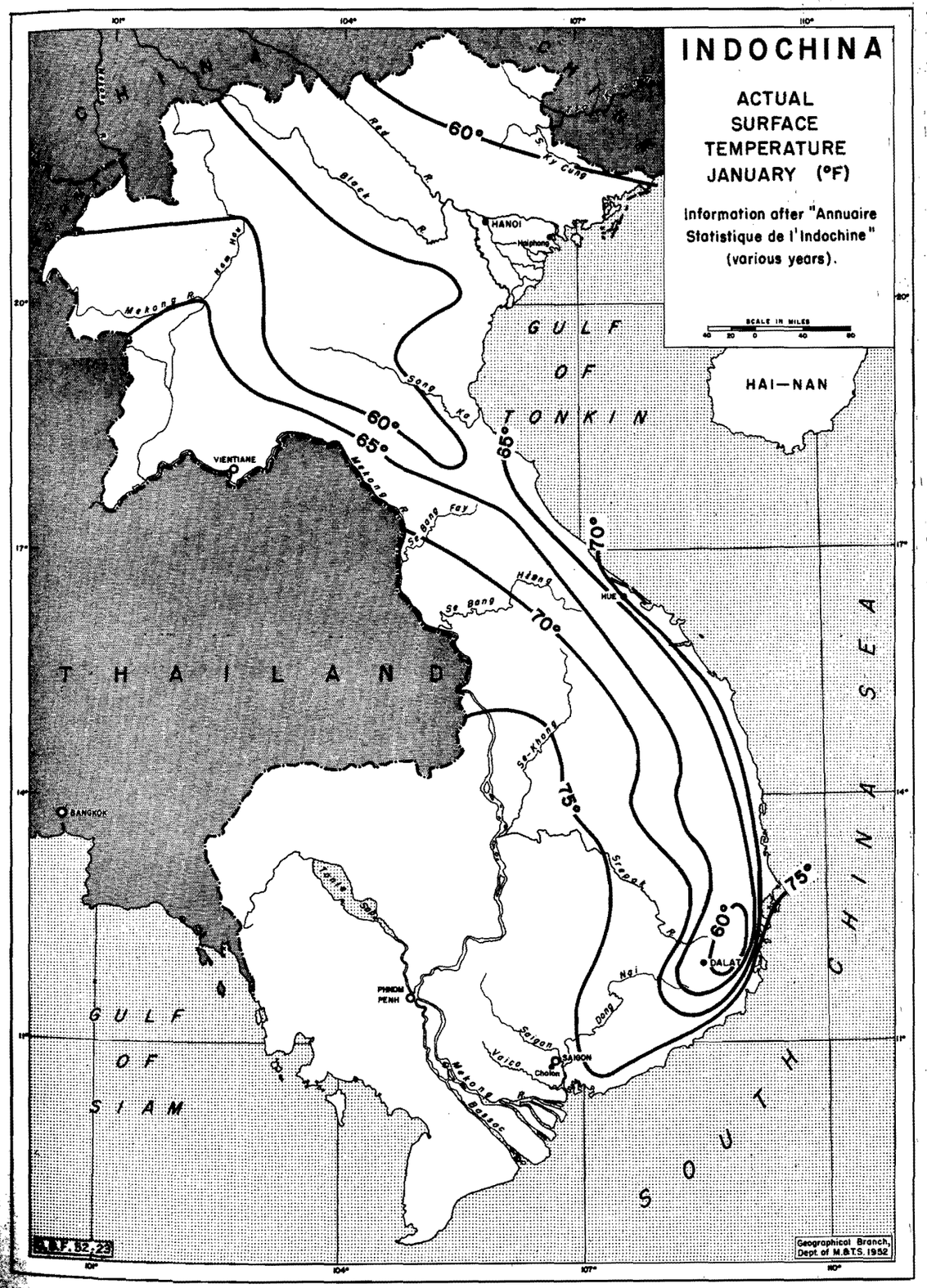

FIG. 6

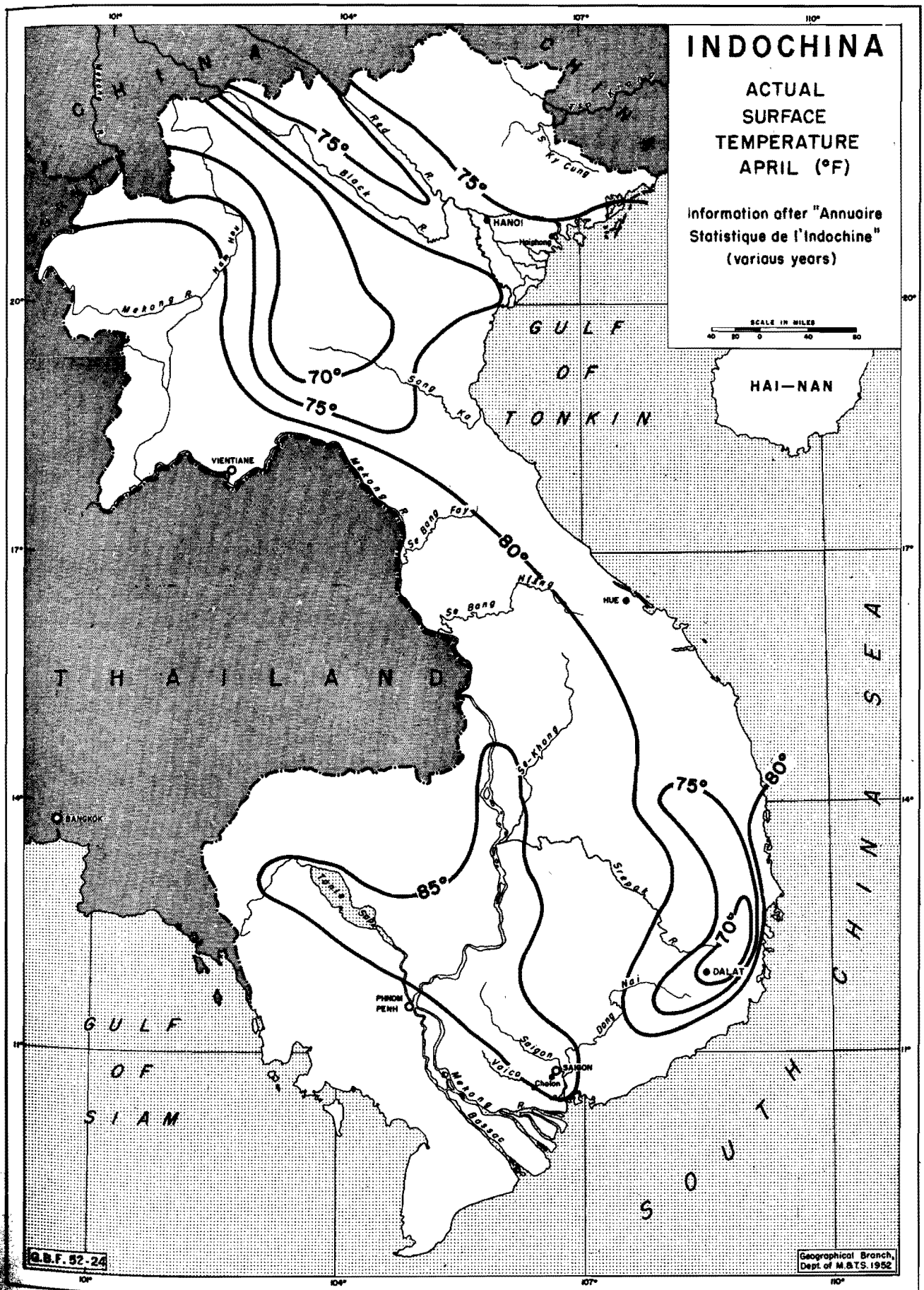
INDOCHINA
ACTUAL
SURFACE
TEMPERATURE
APRIL (°F)
Information after "Annuaire Statistique de l'Indochine" (various years)
SCALE IN MILES
40 20 0 40 80
CHINA
GULF OF TONKIN
HAI-NAN
THAILAND
GULF OF SIAM
SOUTH CHINA SEA
HANOI
Haiphong
HUE
VIENTIANE
BANGKOK
PHNOM PENH
SAIGON
Cholon
DALAT
Red R.
Black R.
Mekong R.
Sang Ka
Se Bang Fai
Se Bang
Se Khong
Srepok R.
Dong Nai
Saigon
Vaico
Bassac
75°
80°
70°
85°
Q.B.F. 52-24
Geographical Branch, Dept. of M.&T.S. 1952

FIG. 7

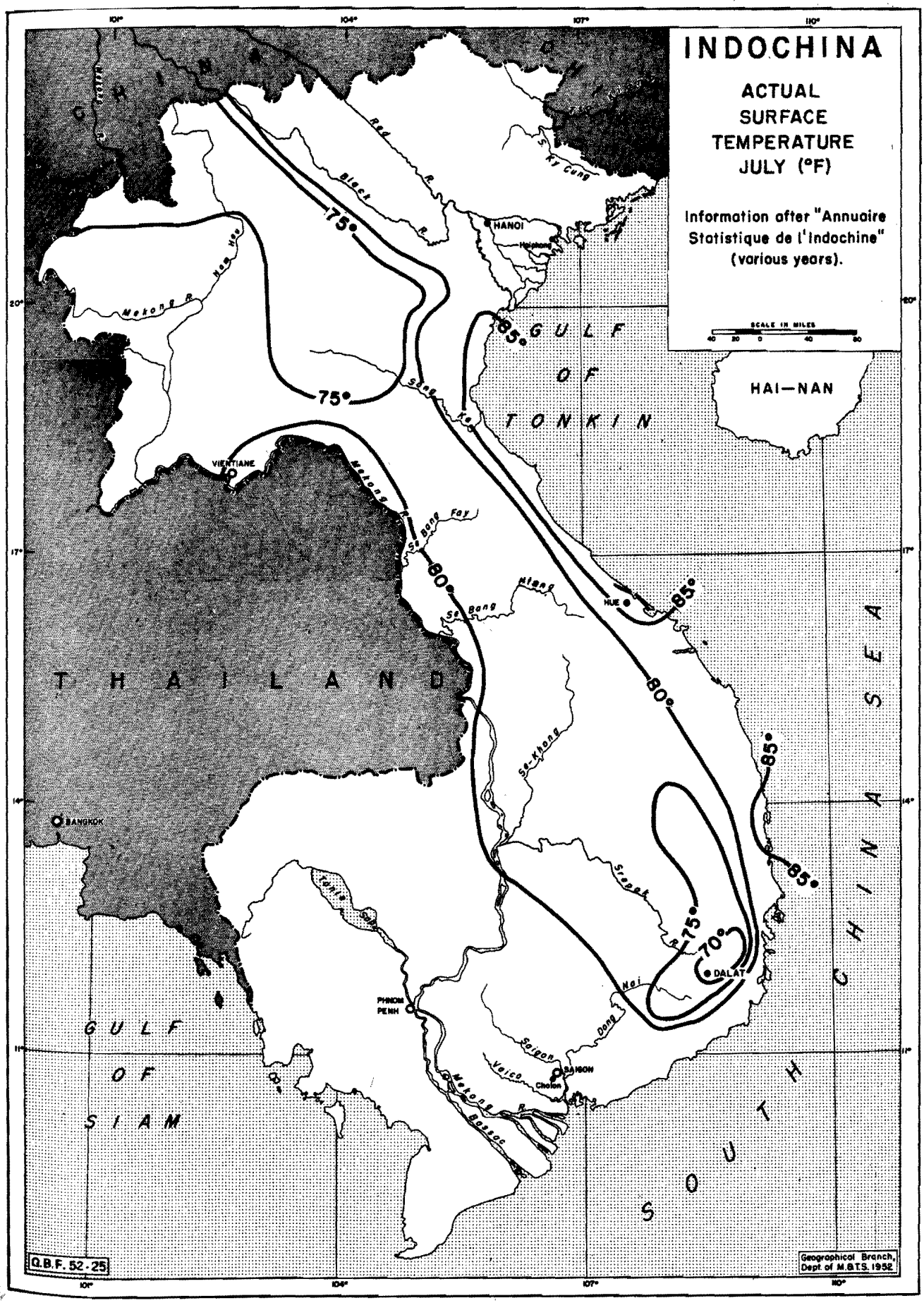
INDOCHINA
ACTUAL SURFACE TEMPERATURE JULY (°F)
Information after "Annuaire Statistique de l'Indochine" (various years).
SCALE IN MILES
40 20 0 40 80
101° 104° 107° 110°
20° 17° 14° 11°
CHINA
Red R.
Black R.
Ky Cung
HANOI
Haiphong
75°
Mekong R.
Nam Hou
85°
GULF OF TONKIN
HAI—NAN
Stung Kao
VIENTIANE
Mekong R.
Se Bang Fay
80°
Se Bang Hieng
HUE
85°
THAILAND
80°
Se-khong
85°
BANGKOK
Srepok R.
85°
75°
70°
DALAT
Tonle Sap
PHNOM PENH
Mekong R.
Saigon R.
Vaico R.
SAIGON
Cholon
Mekong R.
Bassac R.
GULF OF SIAM
SOUTH CHINA SEA
Q.B.F. 52-25
Geographical Branch, Dept. of M.B.T.S. 1952

FIG. 8

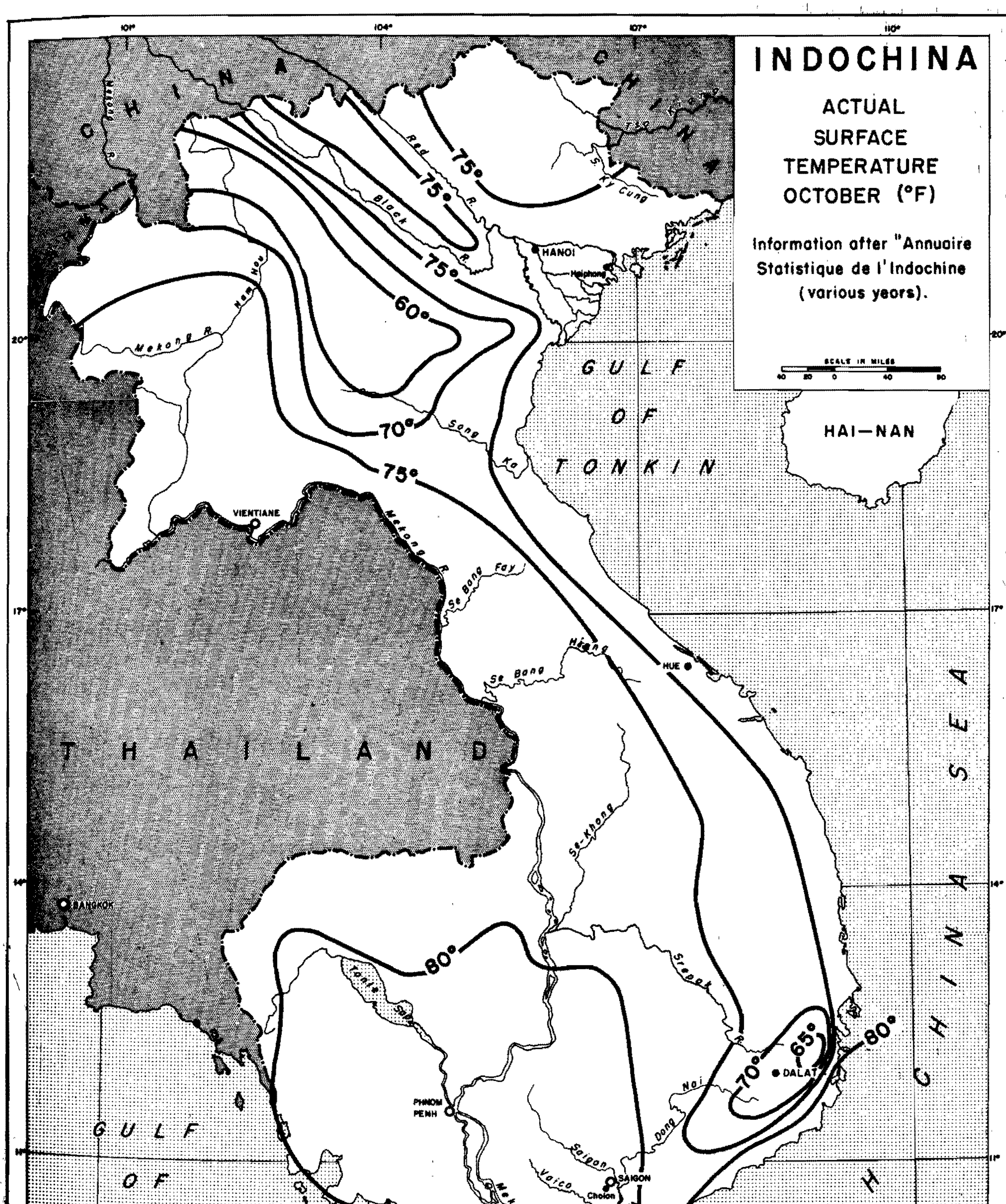
INDOCHINA
ACTUAL
SURFACE
TEMPERATURE
OCTOBER (°F)
Information after "Annuaire
Statistique de l'Indochine
(various years).
SCALE IN MILES
CHINA
GULF OF TONKIN
HAI-NAN
THAILAND
GULF OF SIAM
SOUTH CHINA SEA
HANOI
Haiphong
VIENTIANE
HUE
DALAT
PHNOM PENH
SAIGON
Cholon
BANGKOK
Red R.
Black R.
Mekong R.
Song Ka
Se Bang Fay
Se Bang
Se Khong
Srepok R.
Dong Nai
Saigon
Vaico
Bassac
Tonle Sap
75°
60°
70°
65°
80°
Geographical Branch,
Dept of M.&T.S. 1952

FIG. 9

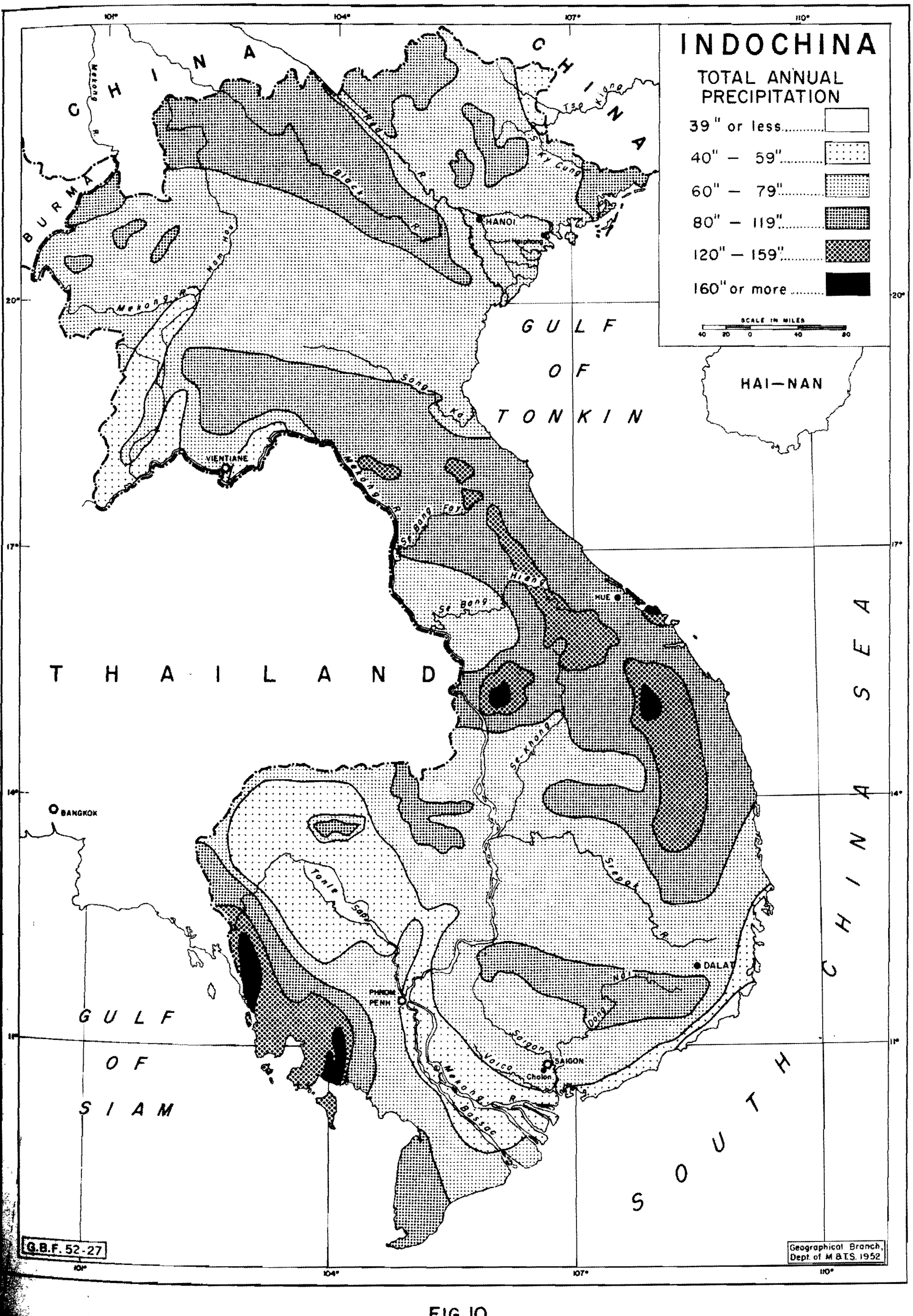
INDOCHINA
TOTAL ANNUAL PRECIPITATION
39" or less
40" — 59"
60" — 79"
80" — 119"
120" — 159"
160" or more
SCALE IN MILES
CHINA
BURMA
THAILAND
GULF OF TONKIN
HAI-NAN
GULF OF SIAM
SOUTH CHINA SEA
HANOI
Haiphong
VIENTIANE
HUE
BANGKOK
PHNOM PENH
SAIGON
Cholon
DALAT
Mekong R.
Black R.
Red R.
Song Ka
Se Bang Fai
Se Bang
Se Khong
Srepok R.
Tonle Sap
Dong Nai
Saigon
Vaico
Bassac
G.B.F. 52-27
Geographical Branch, Dept. of M & T.S. 1952
101°
104°
107°
110°
20°
17°
14°
11°

FIG. 10

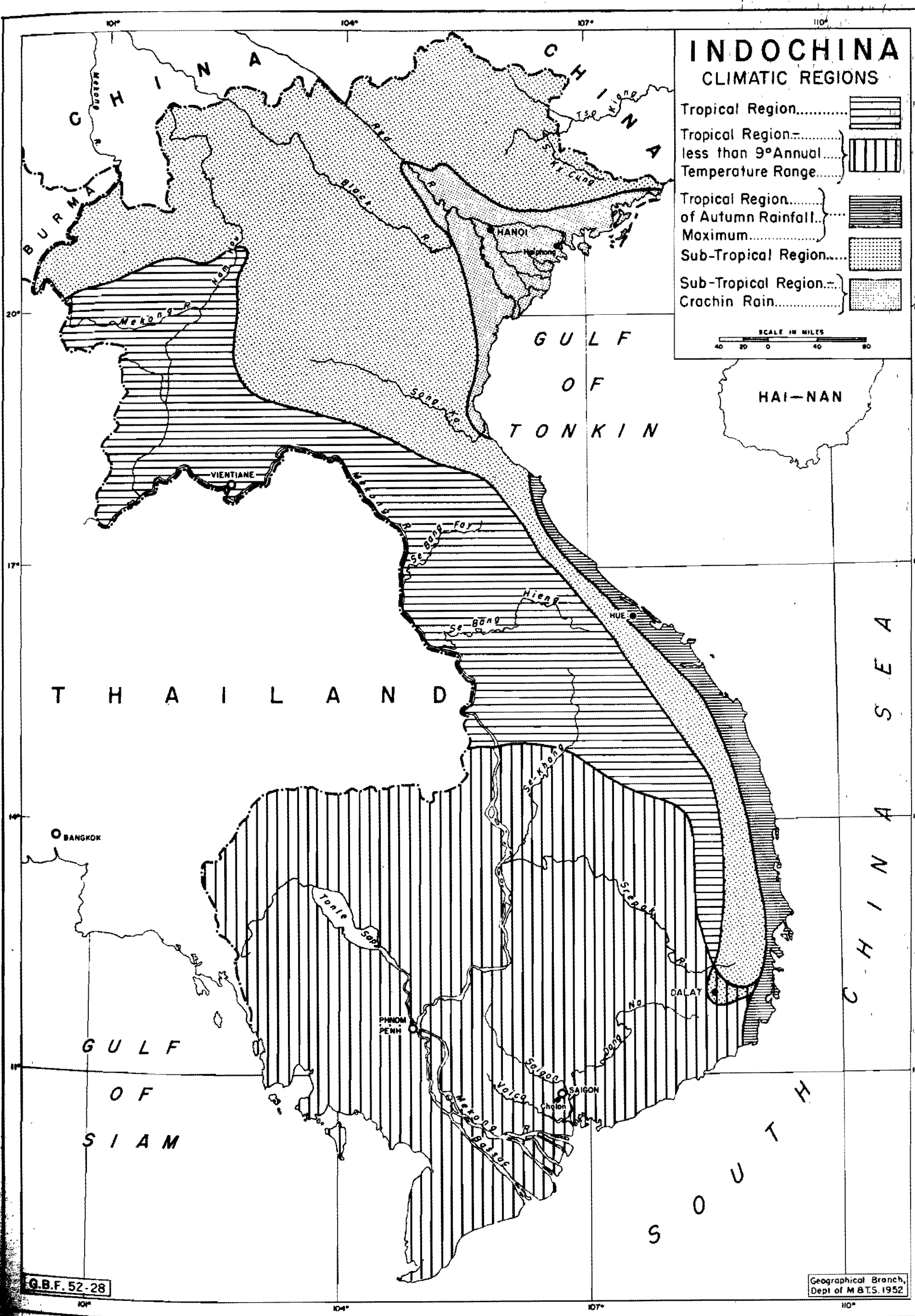
INDOCHINA
CLIMATIC REGIONS
Tropical Region
Tropical Region — less than 9° Annual Temperature Range
Tropical Region of Autumn Rainfall Maximum
Sub-Tropical Region
Sub-Tropical Region — Crachin Rain
SCALE IN MILES
CHINA
BURMA
GULF OF TONKIN
HAI—NAN
THAILAND
SOUTH CHINA SEA
GULF OF SIAM
HANOI
HUE
VIENTIANE
BANGKOK
PHNOM PENH
SAIGON
Cholon
DALAT
G.B.F. 52-28
Geographical Branch, Dept of M &T.S. 1952

FIG. 11

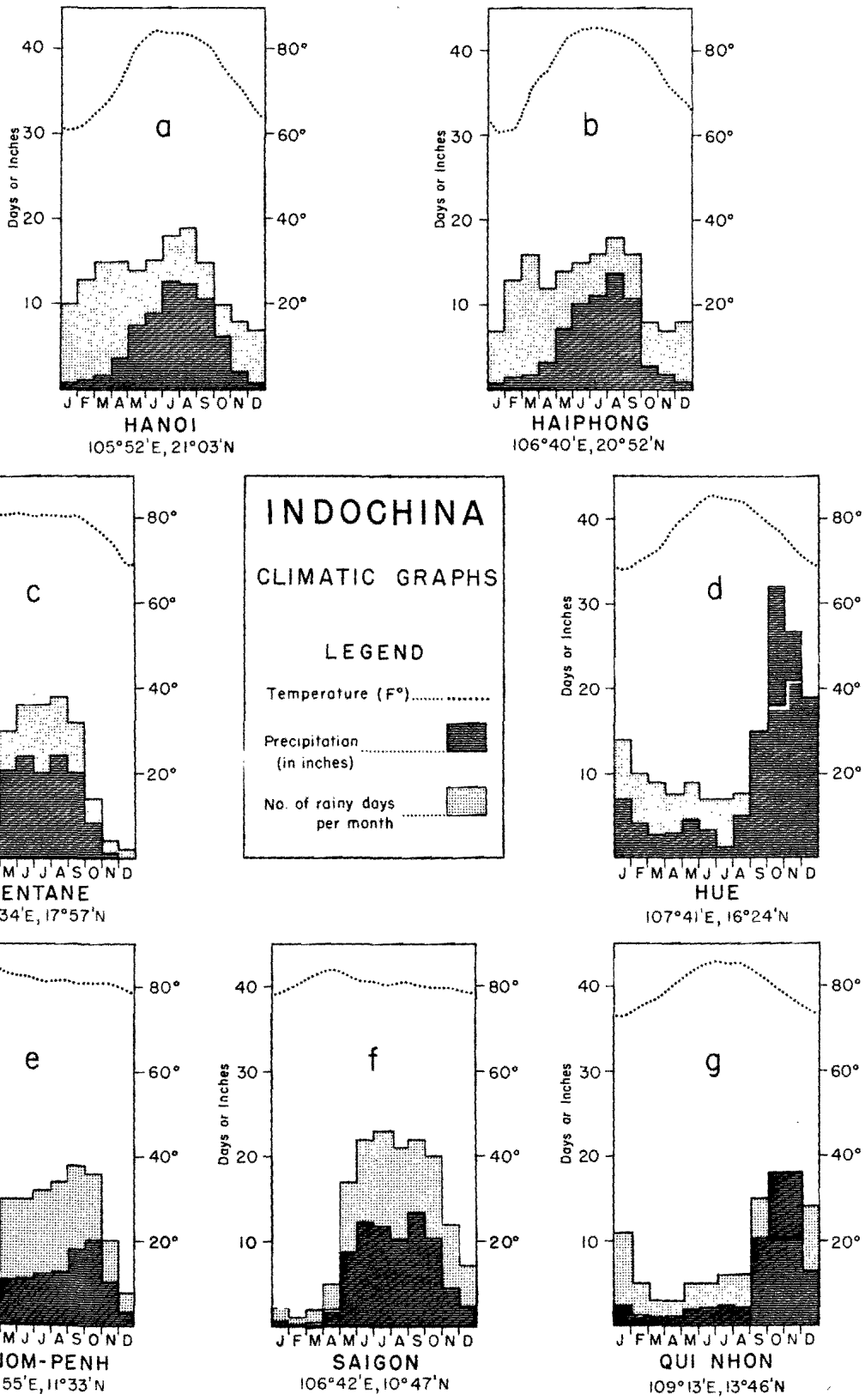
INDOCHINA
CLIMATIC GRAPHS
LEGEND
Temperature (F°)
Precipitation (in inches)
No. of rainy days per month
a
HANOI
105°52'E, 21°03'N
b
HAIPHONG
106°40'E, 20°52'N
c
VIENTANE
102°34'E, 17°57'N
d
HUE
107°41'E, 16°24'N
e
PHNOM-PENH
104°55'E, 11°33'N
f
SAIGON
106°42'E, 10°47'N
g
QUI NHON
109°13'E, 13°46'N
Days or Inches
J F M A M J J A S O N D
Geographical Branch, Dept. of M.&T.S. 1953.

FIG.12

NATURAL RESOURCES

As in many other parts of the world, Europeans have utilized the natural resources of Indo-China in a manner vastly different from that of the native inhabitants. The resources, of course, remain essentially similar, but the methods used in their recovery and the shifting emphasis in demand have made changes in their relative values. However, because of the overwhelming numbers of people engaged in rice culture, the soil remains the greatest single resource of Indo-China.

Soil

The most valuable type of soil in Indo-China is recently deposited alluvium (Fig. 13). If alluvial deposits are not renewed by fresh layers of sediment, the heavy rainfall, in conjunction with the prevailing high temperatures, tends to leach the soil. Humus is quickly destroyed and, in soil lacking humus, water action removes the silica, leaving aluminium and iron in the upper levels (horizons) of the soil. The iron and aluminium form a hard layer near the surface of the soil. This process, known as laterization, forms the brick-red soil which is seen in many parts of the tropics, and which is particularly common in areas where unequal rainfall throughout the year keeps the soil wet at one season and very dry at another.

Not all laterization is harmful. In the basalt plateaux of Indo-China, for example, partial laterization has produced the red soils ("terres rouges") which have proved valuable for plantation agriculture. There are large areas of this soil type in Indo-China (Fig. 13). The forest cover has prevented complete laterization, and the basalt has been decomposed only enough to make its components available to plants. However, when the forest cover is cleared the soil becomes exposed to erosion, the component minerals are leached or are removed by the crops, and the original value of the soil is lost. The dense natural vegetation of the red soil areas formerly limited exploitation to shifting cultivation as practised by mountain tribes, but French capital has been expended on clearing for plantation purposes.

In sandstone areas, or on ancient alluvial terrances, laterization has produced grey soils ("sols gris") which have been also used for plantations. Many of the grey soils are, however, older than the red and are infertile.[1]

Over most of Indo-China, the surface is mantled with a deep layer of decomposed rock.

Vegetation

About 120,000 square miles, or somewhat more than 40 per cent of the country is forested.[2] Little of the forest cover remains in its original condition, owing to exploitation by the natives. Industrial development in the deltas has hastened the cutting of accessible forests.[3]

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[1] McCune. Op. cit., p. 342.

[2] Gourou, P. L'Utilisation du Sol en Indochine française. Paris, 1940. p. 359.

[3] Robequain. Economic development. p. 272.

The ray, or shifting cultivation, of the mountain tribes is particularly destructive of the vegetation cover. Fields are cleared by burning in order to grow crops. In a few years, the soil is exhausted and a new patch is cleared. The original area is returned to cultivation when the vegetation is re-established, but the prolonged practice of ray leads to deterioration of the forest cover. About 16 per cent of the total forest area has been affected.[1]

About 33 per cent of the forests are inaccessible to the population at the present time. These forests are chiefly in Laos and in the Cardamome mountains of Cambodia. Over-cutting in the accessible areas has caused serious inroads in 17 per cent of the forests, and only about 34 per cent is both accessible and of quality suitable for exploitation.

Climatic and soil variations have produced several forest types in Indo-China, but nearly all are altered from their original condition.

The tropical rain forest is found in areas having an annual rainfall of approximately 80 inches or more, distributed fairly evenly throughout the year. Soil conditions greatly alter this distribution, however. A moist area with a light soil may not support a tropical rain forest, whereas a drier climate in an area where lateritic "pans" (impervious sub-surface layers) restrict drainage may support this type. The tropical rain forest is found on the plains and on slopes to an approximate altitude of 2,300 feet (Fig. 14). This forest typically contains a great variety of plant species, a high proportion of which are tree species. Among the species found are many belonging to the Dipterocarpaceae family; tall trees with winged fruits. Trees of the legume family also occur, as do some palms and climbing rotan.

The rain forest, in its natural state, exhibits three layers of vegetation. The first is of trees from 75 to 90 feet tall. Below them grow trees whose mature height is about 50 to 65 feet. The third layer is composed of young, immature trees. Bushes and other smaller plants are not found, because of the lack of light on the forest floor. Such untouched forest types are found only in the inaccessible areas.

If the tropical rain forest is cleared and then abandoned, a secondary rain forest type results. The trees are smaller and more closely spaced, the slower-growing hardwoods are scarcer, but lianas and other herbaceous climbers are more common. This type is widespread in Indo-China.

When the annual rainfall is 60 to 80 inches, with a pronounced dry season, the monsoon forest develops (Fig. 14). This type is distinguished by the shedding of leaves during the dry season. It is usually an open type of forest cover, with some clumps of dense growth. Dipterocarps are found in this type of forest also. Teak (Tectona grandis) a monsoon forest species, is rare in Indo-China (Fig. 14), although its resistance to fire gives it an advantage over other species. A typical monsoon forest species is a rank type of grass known as tranh (Imperata cylindrica) which can be

[1] Thompson, V. French Indo-China. New York, 1937. p. 112.

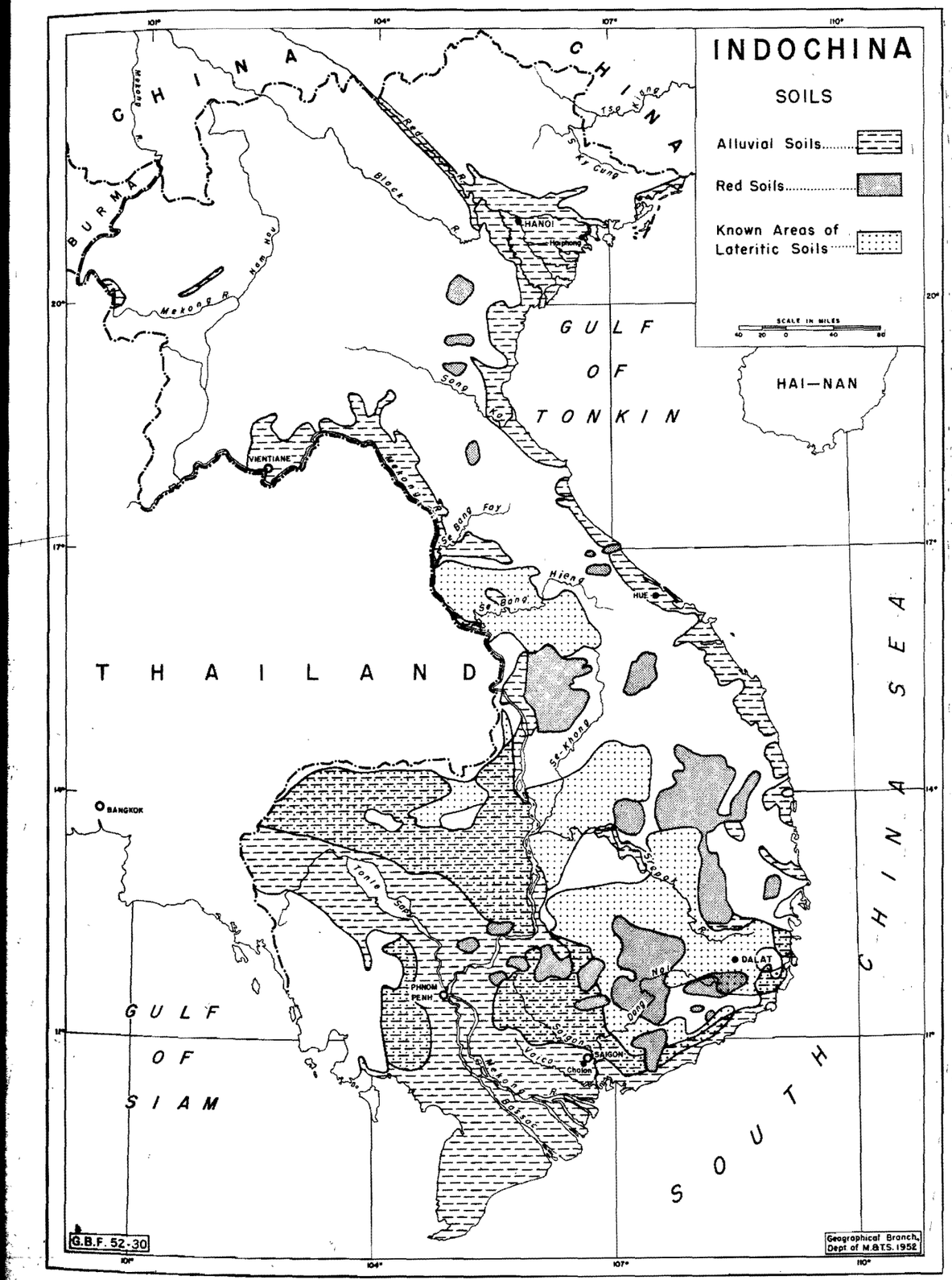

FIG.13

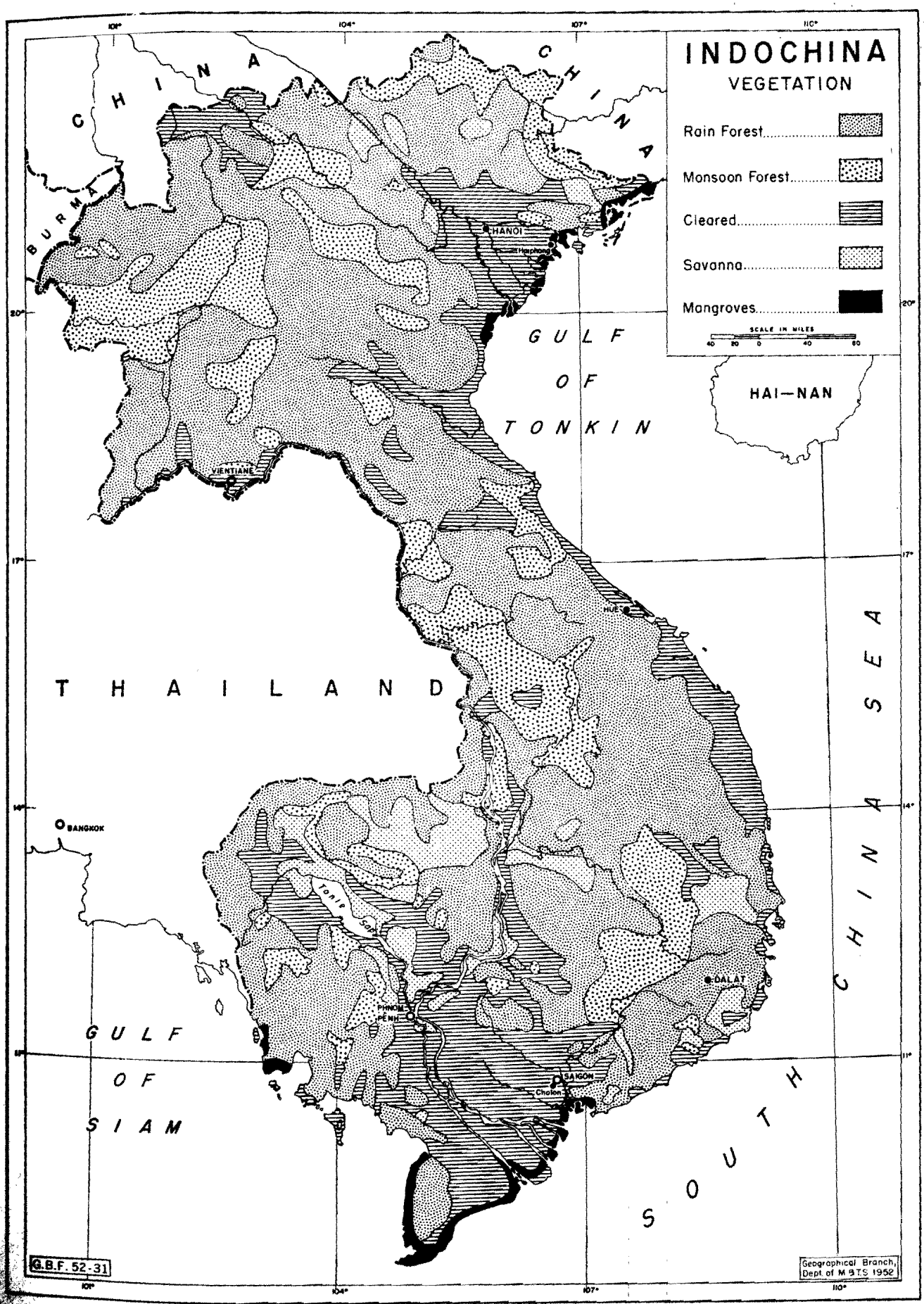
INDOCHINA
VEGETATION
Rain Forest
Monsoon Forest
Cleared
Savanna
Mangroves
SCALE IN MILES
40 20 0 40 60
CHINA
CHINA
BURMA
HANOI
Haiphong
GULF OF TONKIN
HAI—NAN
VIENTIANE
HUE
THAILAND
SOUTH CHINA SEA
BANGKOK
Tonle Sap
PHNOM PÉNH
DALAT
SAIGON
Cholon
GULF OF SIAM
G.B.F. 52-31
Geographical Branch, Dept. of M.P.T.S. 1952

FIG. 14

used for grazing when it is young, but is useless for that purpose when mature. Lianas are scarce.

The monsoon forest is so frequently burned that it is now nearly all a secondary forest type. The less resistant species die out, and few seedlings or saplings survive. If the monsoon forest is cleared and abandoned, herbaceous plants first establish themselves, followed by wild bananas and bamboo. The latter gives a protective cover for the establishment of the secondary forest.

At altitudes above 2,300 feet, or at lower levels near the coast, pine forests are found (Fig. 14). These forests contain few species but pine, although they may be mixed with borad-leaved trees in some mountain areas. The pine forests are also subject to fire, which destroys the young trees and the undergrowth forming a protective cover for the seedlings.

Along the muddy stretches of the coast, mangrove forests are found (Fig. 14). These forests are not named for a dominant species; "mangrove" is a general term for all types of trees and bushes which can exist in the mud of sea-shores and estuaries. Buttressed or stilt roots, and projecting knees from the roots are common features. Mangrove forests usually grow in a narrow impenetrable belt about high-tide level.

In many localities, the burned monsoon forest is not succeeded by a secondary forest but by a grassland or parkland vegetation known as "savanna". This is usually the case in areas where the soil is poor (Fig.14). Tranh is a common plant of the savannas; numerous bushes and, in the north, a tree of the alder family are also found.

Fisheries

The fisheries resources of Indo-China are of major importance to the country, exceeded only in their value to the general population by rice cultivation. Fish is the chief supplement to rice in the native diet and also forms an important item of export.

Part of the importance of the fisheries is due to their availability to the dense lowland population. Not only do the shallow seas, rivers, and lakes provide fish, but the canals, ditches, and flooded rice-fields teem with fish. The number of full-time fishermen among the population is relatively small, but nearly every peasant engages in fishing at some time of the year. It is only during the busy planting and harvesting seasons that fishing is not pursued as a subsidiary activity to rice cultivation. In Tonkin, the natural supply is increased by the feeding of captured fish.

The intensity of fish production in the Tonlé Sap is the highest in the world, the volume for a given surface area being ten times that of the North Atlantic or the North Sea. When the lake retreats during the drier season, vegetation covers the exposed areas, and when this land is again flooded, the vegetation provides an abundant food supply for fish. This favours the existence of vast quantities of fish within the lake, and the rapid growth of individual specimens. The fishing season is from December to June, towards the end of the dry season, when shrinkage of the lake area

concentrates the fish in the central part.[1] When the lake is eventually filled by sediments, this valuable resource will be lost, although it will be replaced by an immense new rice area. Over-fishing and destruction of the lake-shore forests have tended to reduce the catch in recent years.

Salt water fisheries are a less important resource, although the coastal fishing grounds contain good supplies. Both the Gulf of Siam and the Gulf of Tonkin, less than 600 feet in depth, are part of the Eurasian continental shelf. The sea-waters are warm, but contain a fairly good supply of tropical fish species. Off the mouth of the Mekong, food supplies promote the growth of large fish. In addition, the coasts of Tonkin, Annam, and Cambodia have many small harbours. Coastal fishing is carried on in Tonkin, northern Annam, and Cambodia. However, the prevalence of typhoons on the central Annam coast discourages the development of a large-scale industry along much of the coast. Thus, although salt-water fishing is locally important, it is of relatively small scale when compared to the fresh-water industry.

Minerals

The mining industry has increased its scope greatly during the period of French occupation. Although some mining was carried on by the Chinese and Annamites,[2] using primitive methods, it was not until the modern industrial market was created that mining became important. Minerals and coal comprise a large part of the country's exports.

Coal. Coal is the principal product of Indo-China's mines. The estimate prepared for the International Geological Congress held in Toronto in 1913 placed the reserves of Indo-China at about 20,000,000,000 tons.[3] This estimate is considered to be over-optimistic, but indicative of the considerable volume of coal reserves in Indo-China.[4] Most of this reserve is comprised of coal of anthracite type, deposited during the Triassic and Jurassic periods of the Mesozoic era.

The greatest coalfield in Indo-China is the Quang Yen field in Tonkin (Fig. 15), which runs in an arc concordant with the structure of the region. The measures extend from the off-coast Ké Bao Island westward for about one hundred miles, divided by a barren area in the middle into two basins: the Dong Trieu to the west and the Hon Gay to the east. The coal seams are irregular in depth, varying from about two feet to over 250 feet in thickness. The beds are interruped by faults and other irregularities in places, but are generally economical to work. Earlier mines were of the

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[1] Sion. Op. cit., p. 447.

[2] Miller, E.W. Industrial resources of Indochina. Far Eastern Quarterly, Vol. VI. No. 4: 396-408. p. 401.

[3] For comparison, Canada's coal reserves were estimated in 1946 as follows: probable mineable reserve 62,000,000,000 tons; probably recoverable reserve 31,000,000,000 tons. Canada, Report of the Royal Commission on Coal, 1946. Ottawa, 1947. p. 11.

[4] Miller. Op. cit., p. 403.

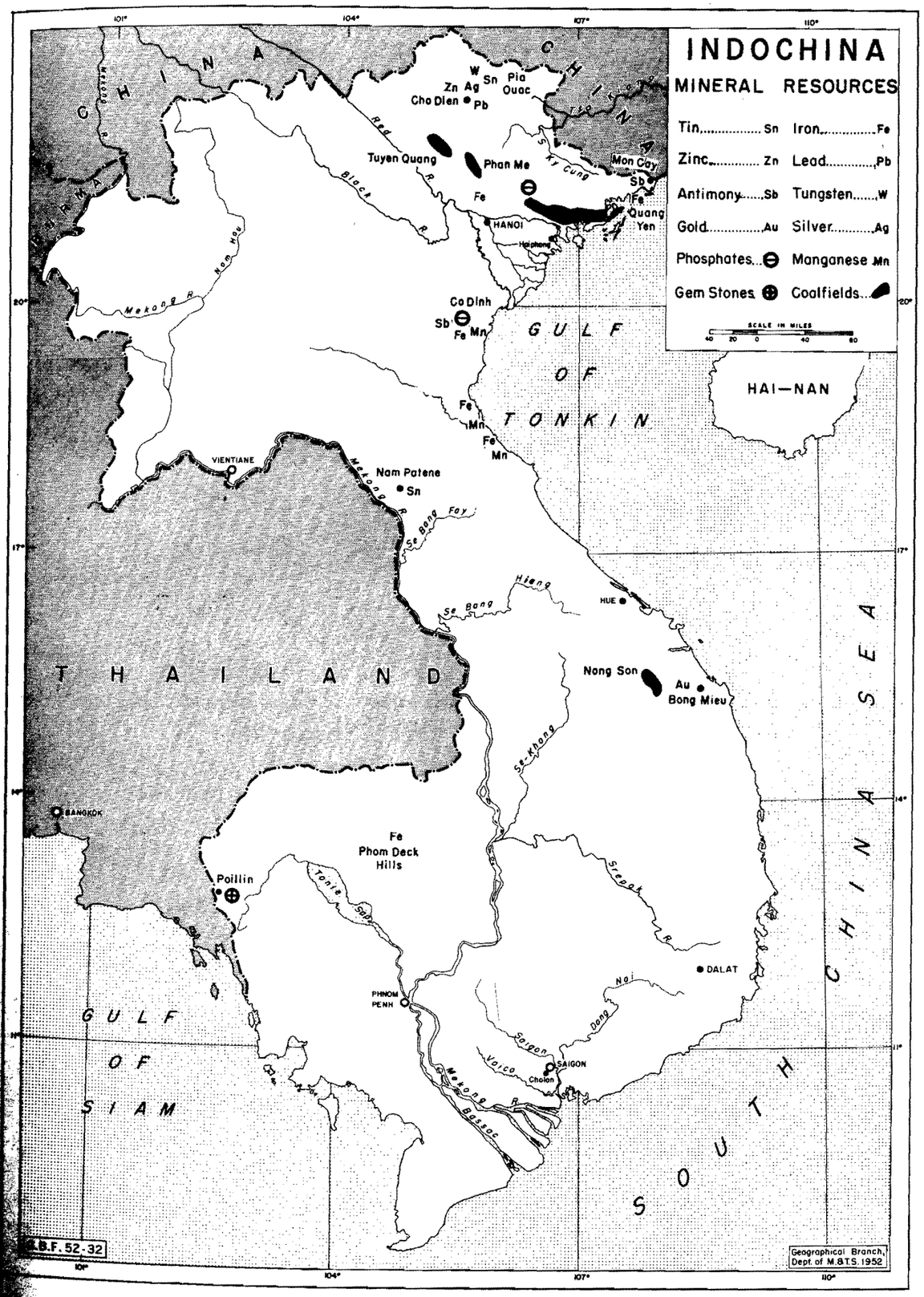

FIG. 15

open-pit type, but as these more accessible reserves became exhausted, new underground workings were developed, from which the major proportion of the coal has been extracted in recent years.

Two other Tonkin coalfields are situated at Tuyen Quang and Phan Me (Fig. 15). These basins are less accessible and their reserves are smaller. The Tuyen Quang deposits are of lignite.

The Nong Son field, in Annam, (Fig. 15) contains anthracite coal, but operations were discontined in 1920, when the surface seams were exhausted.

Zinc. Zinc ore occurs in a limestone massif in northern Tonkin, the principal mines being located at Cho Dien (Fig. 15). The chief ores used are calamines (zinc carbonates and silicates) which are found as outcrops in the limestone, or as surface deposits in hollows in the limestone. The mines are worked by open-pit methods.[1]

Tin. Although tin has become the principal mineral product of Indo-China in recent years, production is small when compared to that of neighbouring countries. The first deposits mined were those of the Pia Ouac granitic massif near the Chinese border in Tonkin (Fig. 15). The veins contain an ore known as cassiterite, in association with other metals. However, most of the workings are in beds on the surface, from which erosion has removed the lighter soil materials.[2] The leading tin-mining area of Indo-China is now in the Nam Patene district of Laos (Fig. 15). The surface deposits were worked by the Laotians and later by the French, but operations have now commenced in the underlying ore-bodies. The ore of Laos is low in metal content and is not associated with other minerals as are the ores of Tonkin.

Other mineral products. Wolfram, an ore of tungsten, is associated with cassiterite, the tin-producing ore of Pia Ouac (Fig. 15). The complex zinc ores of Tonkin (Cho Dien, etc.) produce a little silver and lead as well. Antimony is mined near Mon Cay, in northeast Tonkin, and at Co Dinh in northern Annam (Fig. 15). Alluvial gold deposits are found in many mountainous areas, but the chief source of gold is the hard-rock mine at Bong Mieu in Annam. Phosphates are mined in Tonkin and northern Annam, where they are found in fissures in limestone rocks. Gem stones, mainly sapphires, are mined near the Siam-Cambodia border at Paillin (Fig. 15).

Iron ore reserves of unknown quantity exist in Indo-China, but have been little developed. The magnetite and hematite ores of the Phnom Deck Hills in Cambodia (Fig. 15) are of lateritic origin, and are worked by the natives. The deposits near the Quang Yen coalfield are thought to be potentially valuable. Those of Ké Bao Island, mined by open-pit methods, have been used in the manufacture of certain kinds of cement.[3] The small deposits of north Annam (Co Dinh, etc.) (Fig. 15) are associated with manganese.

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[1] Robequain. Op. cit., p. 258.

[2] Ibid., p. 259.

[3] Ibid., p. 262.

The limestone and clay deposits of Tonkin are used for the manufacture of cement. Salt is prepared by brine evaporation on the coasts of Annam and Cochin-China.

The presence of coal, iron, limestone, and alloy metals in Indo-China would appear favourable for the development of an iron and steel industry. However, to the difficulties of terrain and climate must be added those of inadequate labour supplies in mineral areas and poor transportation facilities. Furthermore, the country lacks good coking coal.[1] The lack of capital and uncertainty of markets offer financial obstacles to such an industry.

In retrospect it can thus be seen that Indo-China is a land of limited physical endowment, the most important feature of which is its wet lowland areas available for rice cultivation. The following chapters consider the adaptation to the land of the Indo-Chinese people.

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1 Thompson. Op. cit., p. 119.

CHAPTER II

HUMAN GEOGRAPHY

Two groups of people comprise the greater part of the population of Indo-China; those whose appearance, language, and religious beliefs, demonstrate their Chinese origins, and those whose origins can be traced to India and Burma. The indigenous peoples form only a small part of the total population. In general, those of Chinese origin live in the northern parts of the country, those of Indian origin live in the south, and the Indonesians live in the central plateaux.

The contrast between peoples of the uplands and peoples of the lowlands is, however, perhaps greater than that between the great racial groups.

PEOPLES OF CHINESE ORIGIN

Annamites. The 17 million Annamites who inhabit the lowlands of the Red River and the coastal deltas of Annam (Fig. 16) form the largest single group in the country. They are thought to have originated in Tonkin from the mingling of Chinese, Mongols (Thai or Muong) and the local inhabitants.[1] Over several centuries, they have spread slowly as far south as the Mekong Valley.

The Annamites, comprising 75 per cent of the population, live on 8 per cent of the land surface of the country.[2] Fear of the upland regions, possibly based on the prevalence of malaria there, has kept them from moving to more sparsely settled areas.[3] Furthermore, the influence of Chinese civilization tends to keep the family in the village where the ancestral graves are located.

These people are small and typically Mongoloid in appearance. Their language, like Chinese, is tonal, and words pertaining to administration and religion are Chinese, although common words are derived from Khmer (the Cambodian language), and their modern script is Roman. The predominant religions are Confucianism, Taoism, and Mahayana Buddhism, all of which came from China, but local animistic beliefs and practices have been adopted as well.

Most of the Annamites are engaged in intensive rice cultivation combined with fishing; rice and fish forming the chief items of their diet. In their native Tonkin they are a hard-working people, but they appear to lose their capacity for heavy labour in the more enervating climate of the south.[4]

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1 Janse. Peoples of French Indochina. p. 11.
2 Micaud. French Indo-China. p. 217.
3 Robequain. Economic development. p. 61.
4 Janse. Op. cit., p. 12.

Laotians. The Thai people, to whom the Laotians are related, usually inhabit mountainous areas, but the Laotians live in the lowlands of the Mekong Valley from Yunnan to Cambodia (Fig. 16). The borders between the various Laotian kingdoms, and between Laos and Cambodia, were established where rapids impeded river navigation.[1]

The influence of China upon the Laotians has been modified by contacts with Indian influences. Thus, although they are small in stature, they are less Mongoloid in appearance than the Annamites. They speak one of the variations of Thai, but their religion, Hinayana Buddhism, has come from India.

The Laotians live in small villages. Their social organization is feudal, and some areas have developed into kingdoms.

There are, approximately, only 600,000 Laotians. Because they do not live in a densely populated area, they lead an easier life than do the Annamites.[2] They cultivate rice, hunt game, and collect wild fruit and nuts. Fishing, boat-building, and weaving, are secondary in importance to farming.

Mountain peoples of Chinese origin. For hundreds of years, there has been a slow movement of people from the mountains of China into Indo-China. The earliest migrants moved down the Mekong and its tributaries, settling on the valley floors. Later migrants, finding these areas occupied, settled on the slopes above. Different characteristics, associated with their history, are still to be distinguished among the mountain tribes.

The largest group, the Thai, lives in some of the adjoining countries as well. These people were the first to infiltrate the area, and now live on the valley floors. With them, are found the Muong. This group, which may represent the remnants of the original Annamites, lives on the margins of the Tonkin lowlands as well.[3] The Man, who began moving out of China in the 13th Century, now live on the lower slopes between 1,000 and 3,000 feet above sea-level. The Meo, who have come in during the last few centuries, live on the upper slopes at an altitude of about 3,000 to 4,500 feet (Fig. 16).

The Thai are fairly tall, and are not markedly Mongoloid in appearance. The Man are of medium height, but the Meo are small and of Mongoloid appearance. The Muong resemble the Annamites.

All these tribes, with the exception of the Muong, use Thai speech, which resembles Annamite but has some resemblances to the Cambodian language and uses Cambodian script. The Muong speak an archaic form of Annamite.[4]

Although the religions of these people have been obscured by local beliefs and practices, they are, basically, those of the periods when the

1 Sion. Asie des moussons. p. 443.
2 Janse. Op. cit., p. 17.
3 Masson. Histoire de l'Indochine. p. 16.
4 Janse. Op. cit., p. 12.

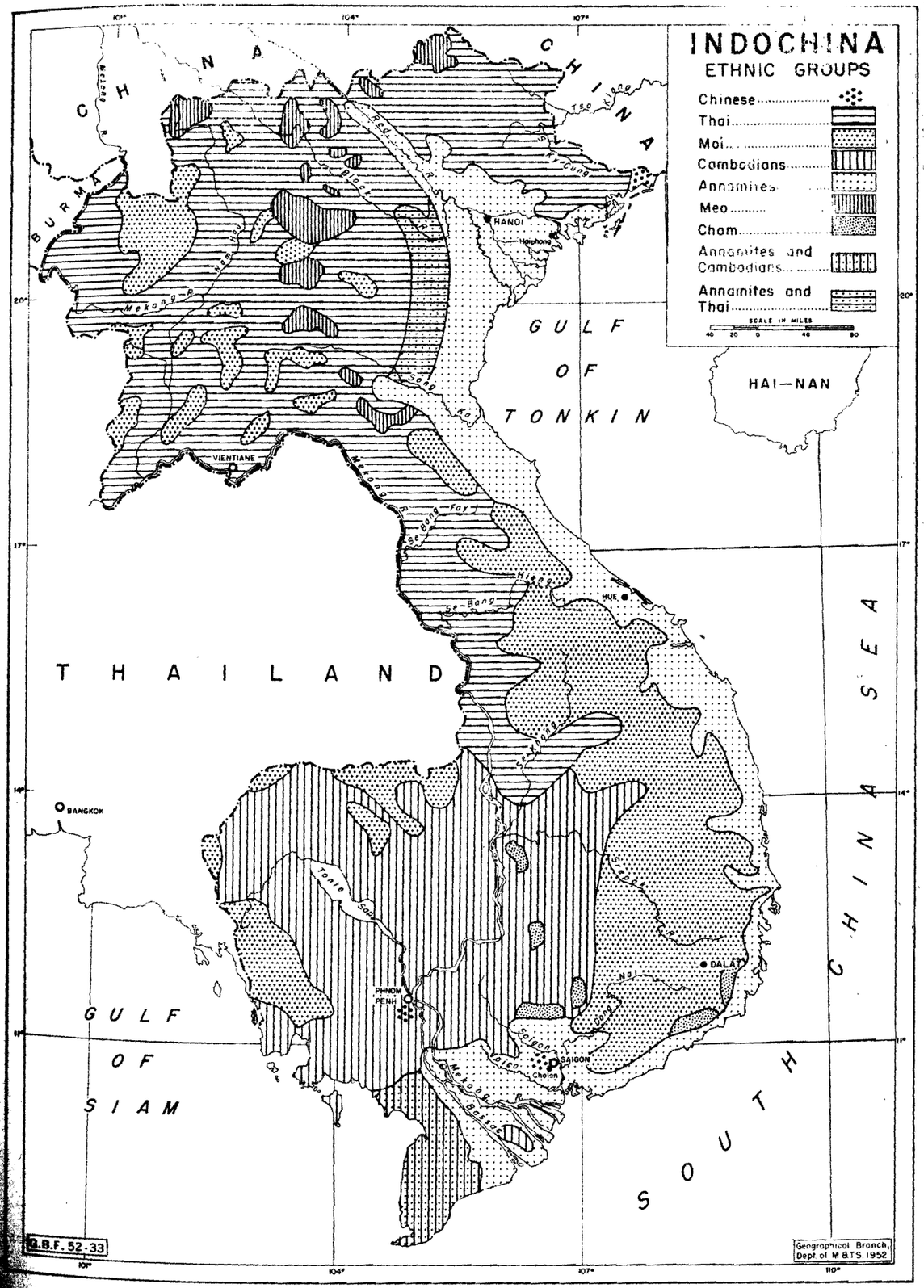

FIG. 16

people left China. Thus, the Thai practise a pre-Confucian form of religion, the Man are Confucians, and the Meo religion is based on Buddhism.

Social orgnaization also exhibits a vertical zonation. The lowland-dwelling Thai live in small villages and have an hereditary feudal organization. The Man, on the lower slopes, are semi-nomadic, but are adopting a sedentary life. The upland-dwelling Meo are still nomads who live in isolated cottages rather than in villages.

The Thai grow rice and other crops, but have few native industries. The Man are farmers, but collect forest products as well. The Meo practise shifting agriculture, and rear livestock. They also produce and trade in opium, which is produced from a poppy which flourishes at the altitudes they inhabit.[1]

PEOPLES INFLUENCED BY INDIA

Cambodians. The Cambodians, who form the second largest group, are thought to be the descendants of the Khmer people, mingled with Thai, Chinese, and perhaps Malays and Hindus as well.[2] They now inhabit western Cochin-China and Cambodia (Fig. 16). At one time they dominated the whole Mekong delta, but they have retreated as the Annamites have advanced.

The Cambodians are not Mongoloid. They have brown skins, and are taller and more robust than the Annamites, but are less active than the Annamites of the north. The Khmer, or Cambodian, language is related to the Mon language of Burma. The tones of the voice, as in English, are used to convey expression rather than the meanings of syllables. A Hindu alphabet is used. The principal religion among the Cambodians is Hinayana Buddhism, which has spread from India. Cambodian settlements are almost continuous along the banks of the rivers, and villages are clustered on the alluvial lowlands beyond. The temple is the centre of village life, but the people are less firmly rooted to the village sites than are the Annamites.

Farming and fishing are the main occupations, but land is less intensively cultivated than in the Annamite lowlands. In the vicinity of the Tonlé Sap, fishing plays a fairly important part in the economy.

Chams. The Cham group of today, the remnant of a once powerful people, has been pushed back to the lowland margins and small, non-alluvial uplands (Fig. 16).

In appearance, the Chams resemble the Cambodians. They speak a Malayo-Polynesian language which has been influenced by Mon-Khmer. There are two predominant religions among them, both of which originated in India. The Chams of Annam are Brahmins, but the Chams of Cambodia are Moslems whose religion has been subjected to Hindu influences. Their society is matriarchal and is dominated by religious ritual. The villages are clustered on river and lake margins, and some may be built on rafts. The Chams tend to remain a separate group because they prefer to marry within their own group.

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[1] Janse. Op. cit., p. 25.

[2] Ibid., p. 14.

The Chams raise a variety of products beside rice, and their diet, although restricted by religious beliefs, is further supplemented by game and fish.

The Moi. The Moi, or Indonesian, group is thought to be indigenous to Indo-China. They live in many of the upland areas (Fig. 16), but because they have been driven back by newcomers from China, they are more numerous in the south.

They are of medium height, with flat noses, straight or wavy hair, and are muscular in build. Some of the Moi speak the Khmer language, but those in contact with the Chams have adopted the Cham language, and matriarchal organization. They lead a nomadic life, but may settle long enough to build stilt houses sheltering several related families. The Moi have no organized religion. Religious practice is evolved by the individual or the family, but belief in magic and spirits is general.[1]

The Moi are hunters (some specialize in elephant hunting) and primitive farmers whose main crop is rice. They collect forest products and practise domestic industries.

RECENT IMMIGRANTS

Chinese. Only about half a million Chinese live in Indo-China, but they form a very influential group. Most of them live in the cities and are engaged in business. The trade of the country was already in their hands when the French arrived, and they have prospered under French administration.

All the Chinese are members of occupational guilds which maintain order among their members.

The Chinese control the processing and handling of rice, and play an important part in the fish trade, river navigation, and the retail grocery trade. Cho-lon is predominantly a Chinese city where craftsmen and artisans have their own small businesses. There are, also, many Chinese factories, chiefly employing female immigrants from China.[2] The Chinese also act as money-lenders in connection with the rice trade.

Chinese not engaged in commerce include the pepper-growers of Cambodia, the market gardeners near the large cities, and the Hakka peasants of northeast Tonkin. Chinese labourers and plantation workers are being supplanted by Annamites.

Other Asiatics. Malays, Indians, and a few Japanese, living in the lowland areas, make up the rest of the Asiatic population. The Malays, who are fishermen and small merchants, live in stilt houses on the river banks. Indians settle in the cities as small merchants, or as employees in the textile trade. Some, known as Chettyars, are money-lenders.[3]

1 Janse. Op. cit., p. 20.
2 Robequain. Op. cit., p. 37.
3 Janse. Op. cit. p. 19.

Europeans. The European population, chiefly French, is concentrated in the larger cities. Poor communications, lack of labour, and unhealthy conditions have discouraged European penetration of the remote areas.

The European residents are rarely permanent settlers. The majority are in the armed forces and the government, serving for temporary periods. Those in private employment are usually in managerial positions and in the liberal professions. Plantation owners, who are more likely to be permanent settlers, comprise only about three per cent of the employed Europeans.[1] Thus, in 1937, nearly 60 per cent of the European population had been in the colony for less than 10 years, and 40 per cent for less than five.[2]

CITIES AND TOWNS

Settlements

An overwhelming proportion of the Indo-Chinese population lives in rural communities. Even with the recent growth of cities, the total urban population is probably not much more than two million.[3] Village communities, not isolated homes, are typical of rural settlement in the country. Dispersed settlement is found only on newly emerged mud flats, either in southwest Cochin-China or on the seaward portions of the Tonkin deltas.

Houses in rural Indo-China are usually built of bamboo, and thatched with weeds or leaves. Leaders of Laotian communities may have brick houses, and some Meo houses have beaten earth walls. The lowland Annamites and Chams, and the upland Man, Meo, and some of the Thai build their houses directly on the ground. All other groups build houses on piles along waterways, and some of the Cambodians, Muong, and Cham build their houses on anchored rafts.

There are several types of village patterns in Indo-China, but all have been developed to meet the same two objectives: to keep the houses above the level of the flooded rice-fields, and to conserve for cultivation all available fertile ground.

In Tonkin and Annam, the levees and dykes built for flood control are used as village sites. Water is obtained from ponds and wells on the dykes, and the enclosed lowlands are used as rice-fields.

In parts of the Tonkin deltas, and elsewhere, abrupt peaks of limestone or other rock are surrounded by deltaic sediments. Villages circle the bases of these peaks, above the general level of the fields. Sometimes the slopes above the villages are terraced and cultivated.

The sand-dunes of the Tonkin and north Annam coasts are also used as village sites, the settlements forming linear patterns parallel to the coast-line. In the north, the villages completely cover the dunes, but

1 Robequain. Op. cit., p. 29.
2 Ibid., p. 27.
3 Reduction of the urban population of Canada to a similar proportion would eliminate all cities except Montreal.

to the south they are confined to the lower slopes of the larger dunes. Water is obtained from springs at the bases of the dunes.[1]

The more regular regime of the lower Mekong has permitted the development of almost continuous settlement on its banks. As new canals are opened, settlement spreads along their banks also. The new communities of Cochin-China are developing on a more angular pattern quite different than those following natural waterways.

There are two zones of settlement around the Tonlé Sap. The first is at the high-water level of the lake, where live people who combine rice cultivation and fishing. Urban communities are found only in this zone. Along the low-water level are found the homes of professional fishermen; houses built on piles or floating on rafts.

The characteristic appearance of certain villages is usually due to the customs and beliefs of the inhabitants. In the Annamite lands, the closely spaced villages are laid out on a plan. Each is surrounded by a hedge, a symbol of communal security, the removal of which is considered a disgrace, and an order to do so as a punishment upon the village. The communal house for the men and the Buddhist temple for the women form the social nuclei of the Annamite village. Cham villages, from which all vegetation is removed, are also surrounded by a palisade. The mountain villages are small, the largest of the Thai not exceeding 50 houses, and those of the Man and Meo less than ten.

The incidence and size of village settlements decreases in the uplands, but in all regions of the country the majority of the inhabitants lead the village life of peasant cultivators.

Urban settlements were never of great importance prior to the period of French administration. The earlier cities were governmental or commercial centres. Surviving Annamite cities are still surrounded by a moat and a wall. The cities developed by the French function as administrative and commercial centres, together with ports, industrial and mining centres, and military positions. With the exception of the Chinese city of Cho-lon, they were laid out on the style of French towns.

Saigon-Cho-lon (Pop., 1948: 1,669,600).[2] Although these two cities have been united as one administrative unit since 1931, they still preserve distinct functional and ethnic differences. Cho-lon was founded by Chinese merchants in 1778 and had become the industrial and commercial centre of the Mekong delta before the arrival of the French.[3] Cho-lon is still a predominantly Chinese city, both in population and appearance. It is the great river port for the water-borne internal rice traffic and one of the world's great rice-processing and rice-marketing centres. A variety of large and small industrial plants is concentrated in Cho-lon.

[1] Rain falling on the dune permeates the sand and collects above the more impervious underlying rock layer. Springs of similar origin are found elsewhere in the world.

[2] Annuaire Statistique de l'Indochine. 1947-1948.

[3] Robequain. Op. cit., p. 112.

Saigon was, apparently, a small native settlement at the time of the French arrival. In 1860 it was declared open to international trade, and drainage work was commenced in preparation for the city site. The city was developed on a plan reminiscent of French provincial towns. It is the chief European city of Indo-China and retains some administrative functions. Saigon, however, is most important as a sea-port and the chief centre for foreign trade in the country. It has a great variety of large and small industries operated by Europeans as well as by Chinese and Annamites.

Hanoi (Pop., 1951: 216,900).[1] It was the administrative centre for the whole of Indo-China, and is similar to Saigon in its French appearance. It is a centre for both rail and river communications, and has attracted numerous industries to its vicinity, but is not primarily an industrial centre.

Haiphong (Pop., 1951: 146,082).[1] Haiphong is the chief port of Tonkin, and the second port in Indo-China. It suffers from many disadvantages as a port, because of its river-mouth location. Proximity to the Hon Gay coalfield has made Haiphong an industrial centre. Coal, limestone, clay, and other minerals are used in the manufacture of cement, glass, and similar goods, and in the smelting of tin and other metals.

Phnom-Penh (Pop., 1948: 110,600).[2] This city, which eventually succeeded Angkor as the Khmer capital, is still the capital of Cambodia and the residence of the King of Cambodia. Its chief economic importance is as a river port. The town has been greatly built up by the French.

Hué (Pop., 1936: 43,000).[3] Hué was the capital of Annam and the seat of the Emperor. One section of the town is the old city with its traditional concentric walls. The other section is newer, and has been built by the French. It is primarily an administrative centre.

Can Tho (Pop., 1951: 58,728).[1] This city is of recent growth, its inhabitants being, in large part, Chinese immigrants. It is one of the many urban centres which have developed as markets and trading points with the increasing importance of the Cochin-China and Cambodia rice-growing regions (Fig. 2). Other such centres include Bac Lieu (40,000), Battambang (20,000 in 1936), My Tho (96,800), and Pursat (20,000 in 1936).

Vinh (Pop., 1936: 25,000). This city is one of the market towns for the agricultural regions of north Annam (Fig. 2). It is a provincial capital, and now includes the old Annamite town.

Nam Dinh (Pop., 1936: 25,000). This is the third largest city of Tonkin (Fig. 2). It has been built up quite recently, and is a centre for industries and handicrafts.

[1] Annuaire Statistique du Vietnam, 1949-1950.

[2] Annuaire Statistique de l'Indochine, 1947-1948.

[3] Didot-Bottin. Annuaire de commerce. Paris, 1938. All figures for 1936 are from this source.

Tourane (Pop., 1943: 50,915).[1] Tourane is the chief port of the Annam coast. Although it has a natural harbour, its scope as a port is limited by the small size of its hinterland. Other Annam coastal parts include Phan Thiet (15,500) and Phan Ri (10,900), both of which are centres for the fish trade.

Vientane (Pop., 1936: 15,000). This city once the capital of one of the Laotian kingdoms, is now the capital of all Laos.

Some of the mining towns include: Nam Patene, in Laos, Cho Dien and Tuyen Quang in Tonkin (Fig. 2). Hon Gay (2,000) is the principal coal-shipping point.

Garrison towns, such as Cao Bang (8,900) are found in the Military Districts which adjoin the Chinese frontier.

POPULATION

The population statistics of Indo-China are of limited usefulness. No census was taken before 1906, so that it is impossible to trace any population changes which might have occurred at the time of the French intervention. The first regular census, still not completely accurate, was taken in 1921. Since 1936, only estimates have been made, and, since 1943, there have been no estimates made in the two most populous states of Tonkin and Annam. Difficulties in obtaining accurate census returns are so great that Robequain considers an estimated error of 10 per cent to be optimistic.[2]

Population Growth

The population of Indo-China has shown a steady rate of growth during the 20th Century (Fig. 17). In 1906, it was about 16 million, and in 1943 about 26 million. The population total for 1946 comprised the estimated population of Cochin-China, Cambodia, and Laos in 1946, combined with the 1943 estimate of the inhabitants of Tonkin and Annam. If the rate of population increase has remained steady since 1943, the total population in 1950 was probably about 30 million.

The rate of population growth in Tonkin was steady from 1906 to 1943 (Fig. 17). In Annam, an increased rate developed with the revival of prosperity after the depression of the thirties. If the estimates are trustworthy, the rate of population increase in Cochin-China, which had been steady until 1943, remained nearly static after that date. Cambodia, however, which had a slow rate of increase prior to 1946, has shown a sharp rate of increase since then. Laos, the state having the smallest population, has had a slow rate of increase because of malaria and other factors.

Ethnic Composition

The mountain peoples of Indo-China comprise only about 10 per cent of the total population (Fig. 18a), fairly evenly divided between the tribes originating from China and the aboriginal Moi.

1 Annuaire statistique du Vietnam, 1949-1950.

2 Op. cit., p. 46.

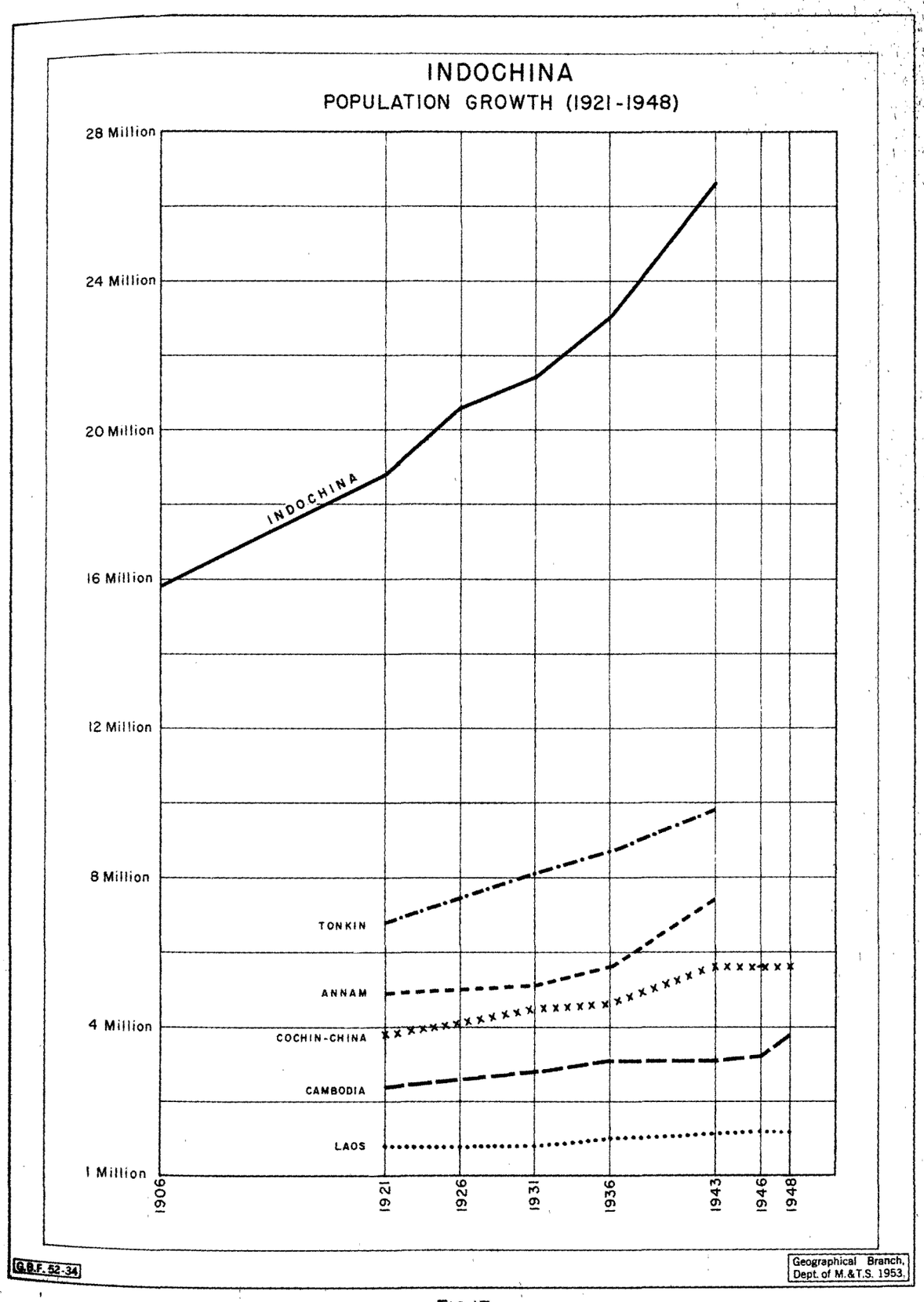

FIG.17

The remaining 90 per cent of the population is made up of the various lowland peoples. In 1936, the Annamite group formed about 72 per cent of the total population, or about 80 per cent of the lowland peoples. The Cambodians, forming about one-eighth of the total, were the second largest ethnic group in the country. The lowland-inhabiting Thai sub-group, the Laotians, and the Chinese and Minh-huong formed smaller groups than either the northern or southern mountain peoples. Other lowland peoples, including the Europeans, totalled only about .2 per cent (two per thousand people) of the whole population.

Nearly 90 per cent of the population of Tonkin was composed of Annamites (Fig. 18b). The population of the mountainous interior comprised about ten per cent of the total. The avoidance of Tonkin by the Chinese is very apparent. They, together with the miscellaneous group which included Europeans, formed a group totalling less than one per cent of the whole.

The Annamite population of Annam was the major ethnic group, although of a slightly lower proportion than in Tonkin. The Annam Cordillera supported about 14 per cent of the total population, most of whom were Moi.

Annamite penetration of Cochin-China has resulted in a proportion of these people within that state similar to that in Tonkin. The Cambodians, in 1936, comprised only seven per cent of the total, and were nearly equalled by the Chinese. The Chinese city of Cho-lon is in Cochin-China.

Cambodian dominance is still maintained in Cambodia itself. In 1936, only about six per cent of the population were Annamites, and over 80 per cent Cambodians. Here, also, the Chinese comprised a significant proportion, about four per cent of the total population. The group in which the Europeans are included formed a higher proportion of the total population, about three per cent, than in any other state.

The ratio of mountain to lowland people is more nearly balanced in Laos. In 1936, the mountain peoples formed about 40 per cent of the total. The Laotians were the largest single group in the state, about 56 per cent of the whole. Annamites formed less than three per cent of the total. The second largest group in the state was that of the mountain-dwelling Moi, who comprised nearly one-quarter of the total population, followed by the third largest group, the northern mountain people.

Population Density and Distribution

Statistics of population densities in Indo-China are available for the provinces within the five states. In the delta areas, where the provinces are small, density figures indicate population distribution fairly accurately. In the larger interior provinces, however, the average density of population in a province may include lowland areas where density is relatively high and upland areas sparsely inhabited. The pattern of population distribution in these areas is, therefore, obscured, and that for the whole country can be perceived only in a general fashion (Fig. 19).

This general pattern of population distribution shows the intense concentration of people in the deltas of the Mekong and the Red River. A

narrow belt of fairly densely populated lands fringes the east coast between the two river mouths. The uplands of the interior are all sparsely populated, although local concentrations of population occur. Factors affecting population distribution include the suitability of the land for irrigated rice cultivation, the distribution of the Annamite people, and the prevalence of malaria.

The most densely populated upland area of Indo-China is in northeast Tonkin (Fig. 19), where the rounded hills are much less rugged than in the interior. Even here, however, a detailed map of population distribution would show concentration of the inhabitants in the lowlands. In the interior of Tonkin, only the province of Lao Kay, where the Red River crosses the Chinese border, has a density of more than 15 persons per square mile (Fig. 19). The people live chiefly on the narrow alluvial lowland of the Red River (Fig. 13). Local population centres are formed in mining areas.

Only three provinces of Laos have an average density of more than 15 persons per square mile. These contain areas of fertile river valley alluvial soils (Fig. 13), or low passes through the Cordillera to Annam (Fig. 3).

The average population density in the Cambodian mountains is over 50 per square mile; the population is chiefly distributed on the landward slopes above the Mekong plain.

Population densities on the Mekong plain vary greatly, the higher concentrations being found in areas of alluvial soil that have not been laterized (cf. Figs. 13 and 19). On the Mekong delta, however, it is the presence of undrained, swampy areas which lowers the population density. Some of the delta provinces have densities of less than 50 persons per square mile (Fig. 19).

A further factor making for unequal population distribution within the delta is the presence of urban centres. The provincial population totals do not include those of the actual city inhabitants, so that the concentration in the vicinity of the cities is significant of the attractive force these centres exert upon the population.

Population densities have not yet become as high as in the Red River delta. The average densities of the provinces of Gia Dinh and Cho-lon, which abut on Saigon and the city of Cho-lon, are less than 1,000 per square mile, a figure which is exceeded in parts of the Tonkin delta.

The provinces of the Annam coast have densities which vary in accordance with the number and size of the deltas within their boundaries. The highest densities are thus in northern Annam and in the provinces south of Hué (Fig. 19), the lowest on the southeast coast, where the Annam Range is closer to the sea (Fig. 3), the soil is laterized (Fig. 13), and the rainfall light (Fig. 10).

The unequal population density in the Red River delta is due to variations in soil fertility and the presence of modern irrigation projects in some of the areas. In addition, some provinces can support higher densities because many of their people are engaged in handicrafts. Larger scale

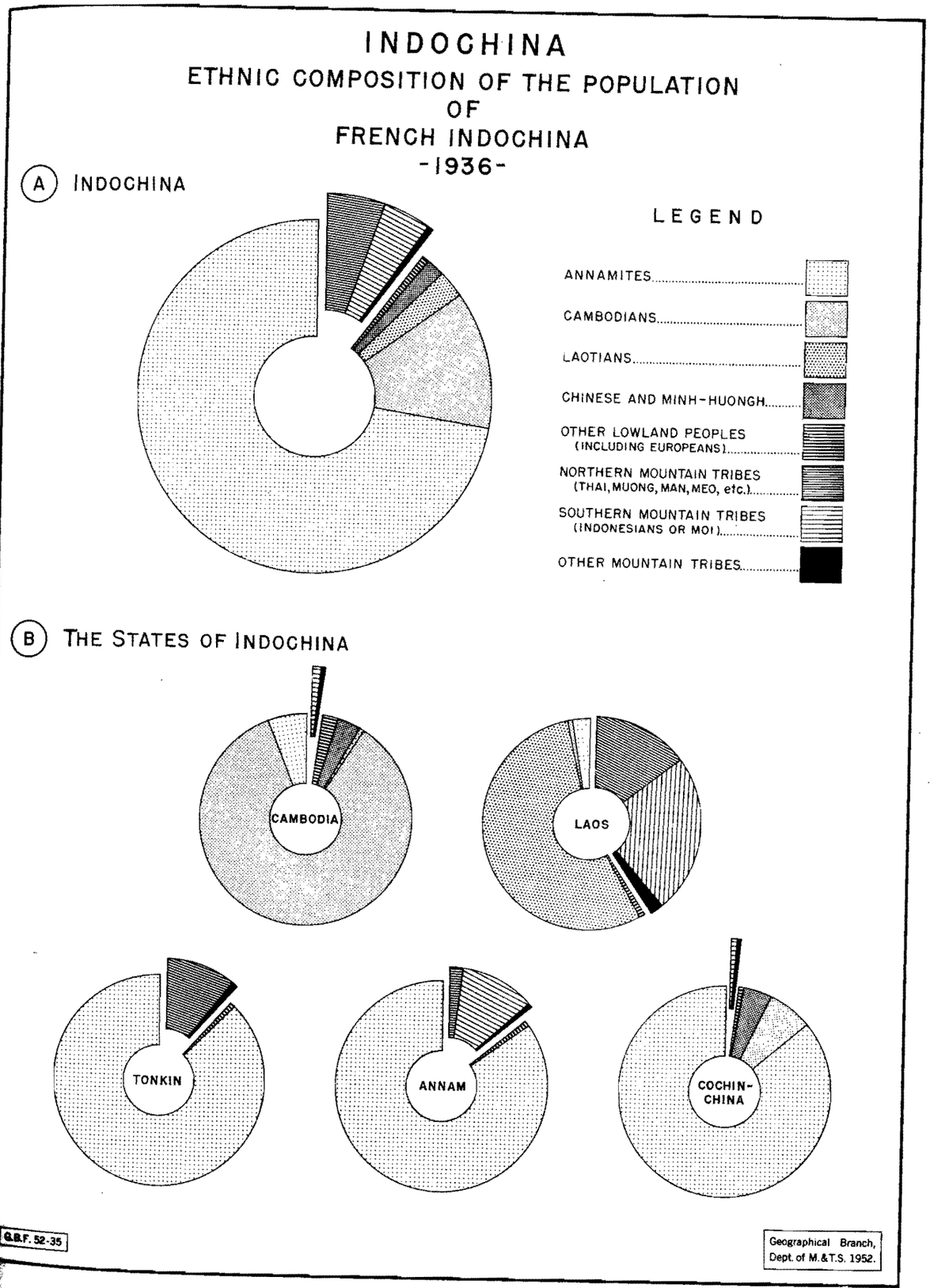

FIG.18

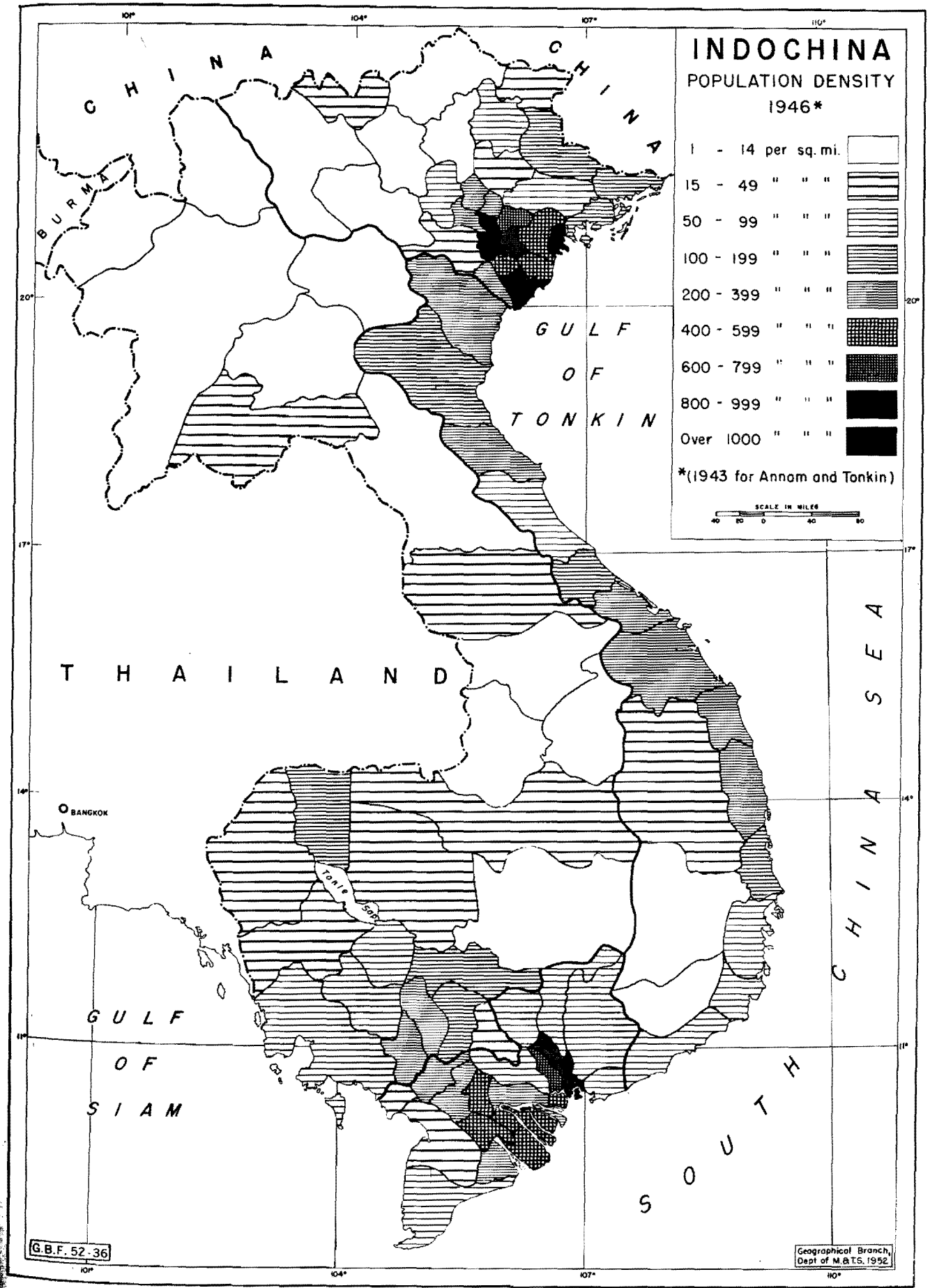
INDOCHINA
POPULATION DENSITY
1946*
1 - 14 per sq. mi.
15 - 49 " " "
50 - 99 " " "
100 - 199 " " "
200 - 399 " " "
400 - 599 " " "
600 - 799 " " "
800 - 999 " " "
Over 1000 " " "
*(1943 for Annam and Tonkin)
SCALE IN MILES
40 20 0 40 80
CHINA
CHINA
BURMA
GULF OF TONKIN
THAILAND
SEA
CHINA
SOUTH
BANGKOK
GULF OF SIAM
101°
104°
107°
110°
20°
17°
14°
11°
G.B.F. 52.36
Geographical Branch, Dept of M.B.T.S. 1952

FIG. 19

industry increases the density in the vicinity of Hanoi and Haiphong (Fig.19). The coastal province of Quang Yen, including the island of Ké Bao has a density of over 100 per square mile, owing in part to the mining industry of the Quang Yen field (Fig. 15).

Although some of the provinces having over 1,000 persons per square mile lie on the coast, there is actually a sparsely populated belt along the sea where sand-dunes are prevalent and the recently emerged alluvial soils have not yet been brought under intensive cultivation.

Population Movements

The disparity between the population densities of the lowland and upland areas of Indo-China has become greater in recent years. Asiatic immigrants, of whom the majority are Chinese, settle mainly in the lowlands, as do the French and other Europeans. However, the population increase of the lowland areas resulting from the immigration of Asiatics and Europeans is partially offset by emigration, and the annual net population increase from immigration is probably low. The population of the lowland areas is increasing in part, perhaps at the expense of the uplands. However, the volume of inter-regional and intra-regional migrations is small considering the total population; the most important factor in population growth is the high rate of natural increase in the lowlands.[1]

Trends in regional population growth may probably be judged from comparison of the provincial population densities for recent years (Fig. 20).[2] Population densities increased throughout Indo-China, with the exception of those provinces which include the Annam Cordillera and the plateaux to the west. The other upland regions have increased their population densities, but not to any great extent. The areas of greatest increase are those where the highest densities already existed. In the Mekong plain and delta, the provinces closest to the river experienced the sharpest increases in population density. The attraction of the Saigon-Cho-lon area is also apparent. On the southeast Annam coast the increase was low, but farther north greater increases were recorded. The rapidity of population increase on the Tonkin deltas is also obvious. From 1931 to 1943, the population on most of the Red River delta increased by 200 persons per square mile, and, in one province, by 500 persons per square mile. In many of these delta provinces, therefore, the 1943 population was nearly double that of 1931. (cf. Figs. 19 and 20). The problem of local over-population was not being solved but was rapidly becoming more serious.

The disturbances in Indo-China appear to have affected population distribution to a great degree. Population movements between 1946 and 1948 indicate the disruption of the Indo-Chinese economy (Fig. 21). In Cochin-

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[1] United Nations. Secretariat of the Economic Commission for Asia and the Far East. Economic survey of Asia and the Far East, 1948. Department of Economic Affairs, Lake Success, 1949. p. 29.

[2] The period examined is from 1931 to 1946, but in the case of Tonkin and Annam from 1931 until 1943.

China and Cambodia, considerable areas experienced little change in population numbers. However, many of the most populous delta provinces experienced heavy losses of population. These were compensated, to some extent, by movements into the peripheral lowland areas. Many of the people, however, moved into the Saigon-Cho-lon area, which from 1946 to 1948 increased its population from 492,000 to 1,179,000.

Figures from many of the Tonkin provinces are lacking (Fig. 21). Here also, there appear to have been movements from the delta lands to the peripheral areas, or into the cities.[1]

Recent movements, such as these, are not the commencement of new trends in internal migration, but result from disturbed conditions within the country. They are not likely to be of a permanent nature, and, to the extent that the people move from the deltas to less fertile lands, will serve to intensify the problem of providing adequate food supplies. Growth of urban populations probably reflects an increase in the size of the floating, landless population.

We can thus see that the majority of the Indo-Chinese people have through force of circumstance been tied to the lowland areas where the production of subsistence crops constitutes the main endeavour.

[1] The French authorities did not prepare population estimates for all provinces of Tonkin in 1948.

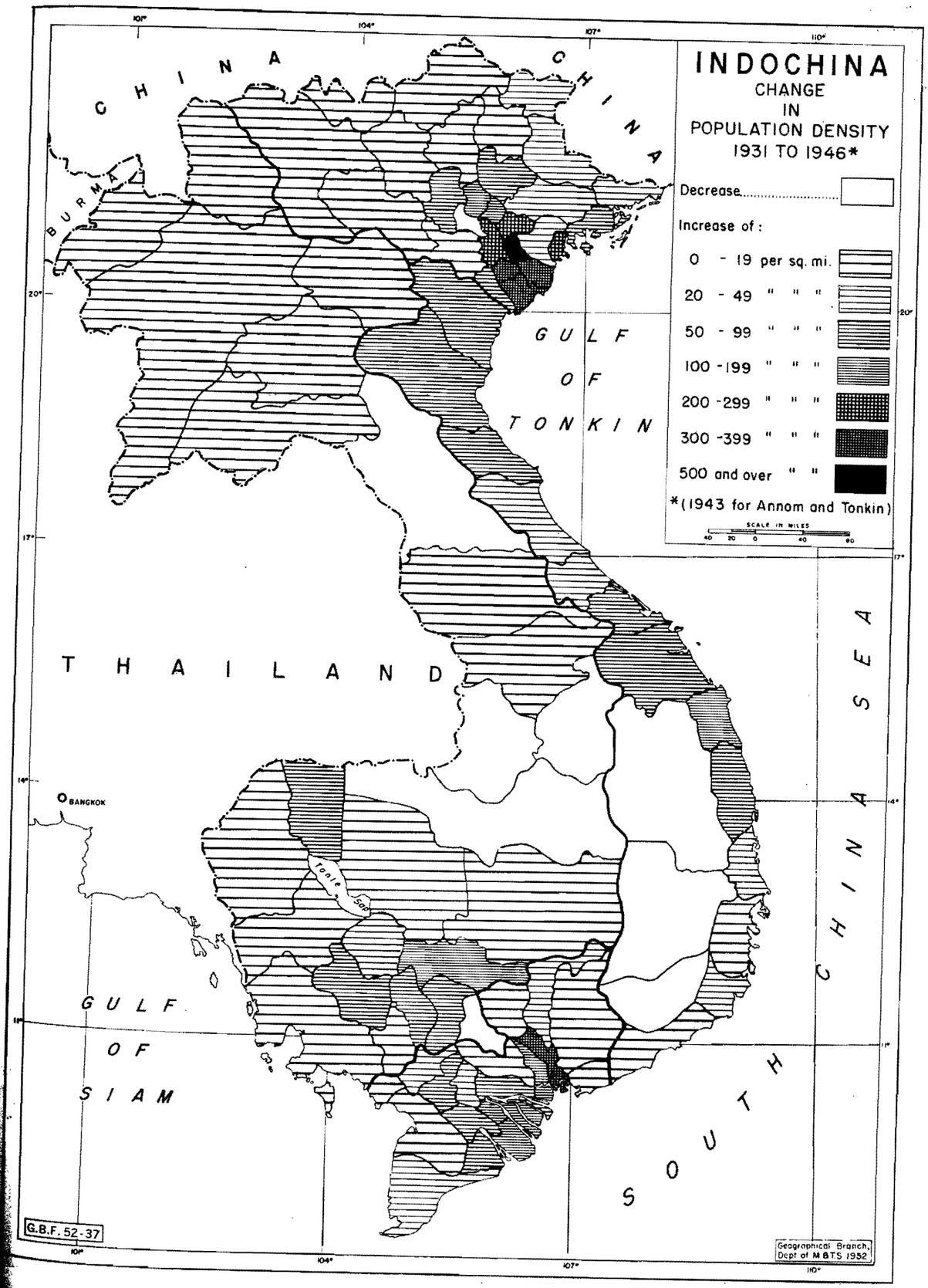

FIG. 20

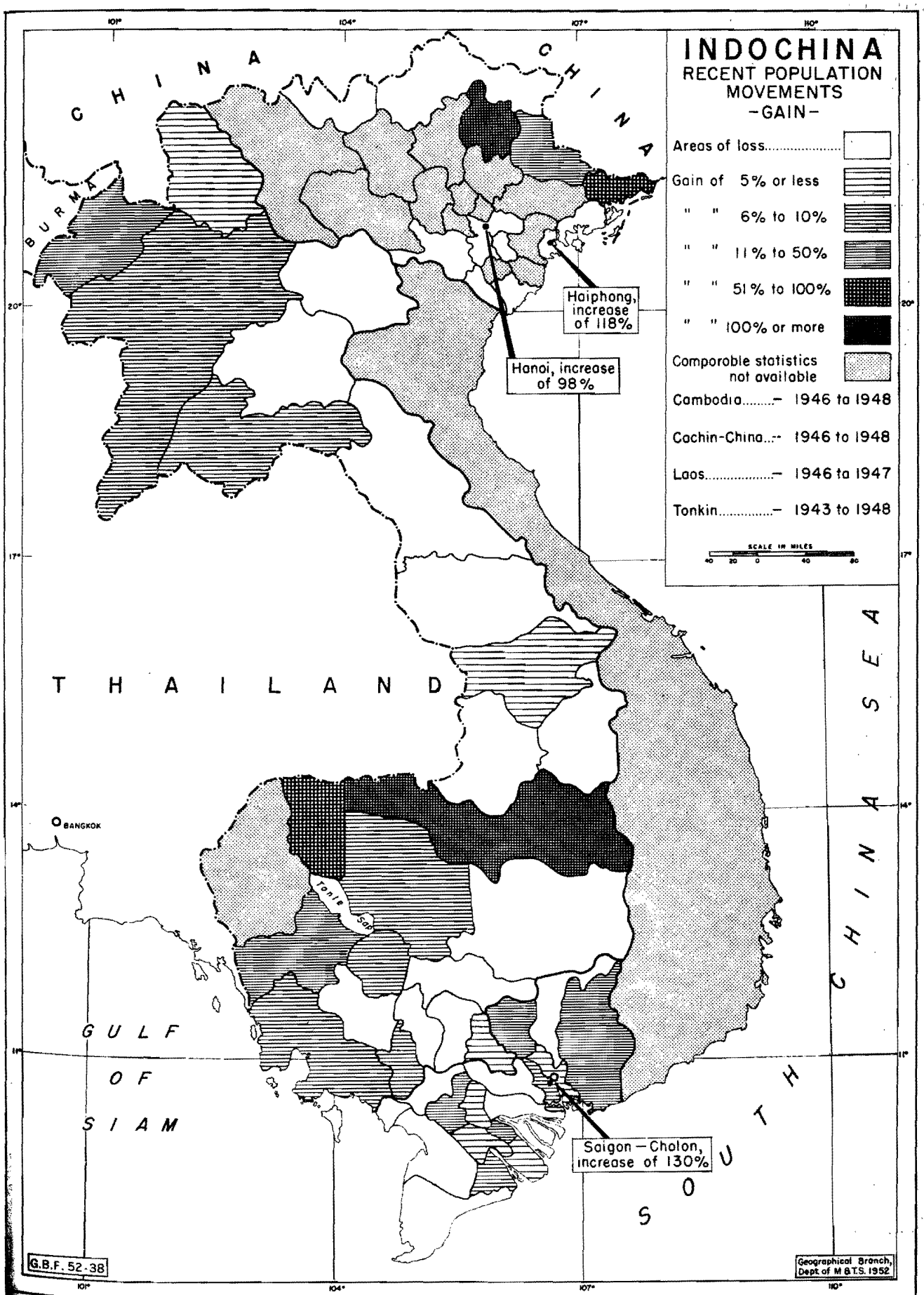
INDOCHINA
RECENT POPULATION MOVEMENTS
-GAIN-
Areas of loss
Gain of 5% or less
" " 6% to 10%
" " 11% to 50%
" " 51% to 100%
" " 100% or more
Comporable statistics not available
Cambodia.....– 1946 to 1948
Cochin-China...– 1946 to 1948
Laos.....– 1946 to 1947
Tonkin.....– 1943 to 1948
SCALE IN MILES
40 20 0 40 80
Haiphong, increase of 118%
Hanoi, increase of 98%
Saigon – Cholon, increase of 130%
CHINA
CHINA
BURMA
THAILAND
BANGKOK
Tonle Sap
GULF OF SIAM
SOUTH CHINA SEA
101°
104°
107°
110°
20°
17°
14°
11°
G.B.F. 52-38
Geographical Branch, Dept of M.&T.S. 1952

FIG. 21 (A)