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Viet Nam | transportation and its policies

Joseph P. Hien

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VIET NAM: TRANSPORTATION AND ITS POLICIES

by

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B. A., CARROLL COLLEGE, HELENA, 1953

Presented in partial fulfillment of the requirements for the degree of Master of Arts

MONTANA STATE UNIVERSITY

1954

Approved By:

[Signatures]
Chairman, Board of Examinors
Dean, Graduate School

Date: Aug 14 1954
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INTRODUCTION

GENERAL CONSIDERATIONS

A Reason. Viet Nam is taking another sharp turn in its turbulent history. After a century of letting other countries formulate policies for it, from now on it must make them itself. Starting on a new path, old policies must be reviewed and corrected and new ones formulated before any satisfactory reorganization can be attempted.

The Method. First an inventory of the present system of transportation must be made, and second, in the light of experience and comparison with other countries, an overall system must be prepared.

Limitations. Because Viet Nam has no sea or air transport this study is limited to inland transportation. Statistics on transportation are available for prewar years only. Assumptions as to the extent of damage to transportation facilities that has been done in the last thirteen years of war will be used to give some idea of the present situation.

-1-
Transportation and Economics. Great civilizations depend upon means of transportation. First man carried a bundle on his head, then he tamed the ox. Then he invented the wheel and the axle. Fulton in 1809 invented the steamship. In 1814 Stephenson built the first locomotive and relevant advances created great cities and shifted millions of men and women from one part of the world to the other.\(^1\)

In the chronological order of human progress, transportation came first, then production followed. Where lands were fertile and population scarce, men needed only to move around to gather food. Where lands were niggardly and population dense, men needed to move great distances in search of the means of subsistence. This is still true for any undeveloped country such as Viet Nam. As an economic system becomes complicated, transportation services must be synchronized. In a lowly organized society such as Viet Nam, movement is one step ahead of production. Transportation and its policies will be the bases on which Viet Nam has to build its future production.\(^2\)

Transportation and History. "The history of any nation is closely interwoven with the development of transportation. Even before the invention of the wheel and the axle, rulers recognized that a state or an empire could be welded together into political unity by possessing a system of roads."\(^3\)

---

2. M. L. Fair, *Economics of Transportation*, p. 34.
In Viet Nam political motives have dominated transportation policies, yet the history of Viet Nam is more than political affairs. It is a story of an economic migration. Immigrants came first to Northern Viet Nam two thousand years ago, and started cultivating the fertile delta of the Red River. They built roads and canals and improved the vast waterway system that nature had provided. This historical fact reveals the importance of waterways in Viet Nam.

"A people whose entire history has been a continuous struggle to control the flow of water, whose national life was bound with construction of dikes and canals would regard the waterway as an inseparable part of their existence." 2

Social Trends. Viet Nam's acute problem is overpopulation of the Northern Delta, where the density of 2000 inhabitants to the square mile is one of the highest in the world. Unemployment is general and income very low. 3 Domestic colonization of the back country would relieve those conditions, but strong family ties and fear of unexplored areas prevent settlement. A partial offset to these conditions would be improved transportation facilities.

"We know that where the group is small a certain standard of specialization can be attained without creating a problem of transportation. But if the pressure of the population exceeds the productive capacity of the land, then a transportation problem

---

1 Nguyen thi Huong, History of Viet Nam, p. 34.
2 M. R. Bonavia, Economics of Transportation, p. 12.
arises. Also the increased standard of living associated with external specialization is historically linked with great advance in transportation method."4

**Topography.** Viet Nam is divided into three political regions, North Viet Nam, Central Viet Nam and South Viet Nam. These three divisions correspond to three distinct geographical regions. (See map I, P. 5). The North is mostly mountainous with high peaks and deep valleys where roads and railroads are hard to build, but where waterways are excellent and mostly natural. The Center is a narrow strip of coastal plain with a long range of mountains running through its entire length. It is not suitable for any kind of transportation. The South is completely flat and traversed by numerous and large rivers. It is a place of excellent waterways.

---

MAP I

GEOGRAPHY OF VIET NAM

Source: Notions Elementaires de Geographie, L'Indochine Francaise, 1944.
CHAPTER I

WATERWAYS IN VIET NAM

The Red River. The most important geographical feature of Viet Nam is its immense river system. This system includes two separate groups: The Thaibinh and the Red River in the North; the Donnai and the Mekong in the South. Between them along the narrow coastal plain, short and precipitous rivers run from the Annamitic Chain to the sea.¹

The two most important rivers are the Red River and the Mekong. The Red River, locally called the Song Hong Ha, descends from Yunnam, southern province of China, to the gulf of Tonkin, a distance of 414 miles.

From the beginning of Viet Nam the Red River has been its biggest asset. Its delta provides food for the people and its water the most important means of travel. But its navigability for anything bigger than a native poling boat was long disputed.

In August of 1890 Dupuis, a French explorer, took the steamboat Yunnam (which drew 70 centimeters) up the river to

¹Annamic Chain is the name for Central Viet Nam's mountains.
Laokay on the Chinese border and then down back to Hanoi, thus proving the practicability of shallow draught vessels for navigation on the Red River.\(^1\)

But flood and irregularity of the Red River course make navigation difficult on this stream. The general slope of 75 centimeters to the kilometer in the upper region is too steep for good navigation. In the delta the slope is more favorable, with an average of 9 cm/km. The low water period is from December 15 to May 15, and the lowest gauge at Hanoi is two meters. The flow of 770 cubic meters per second at that period is not enough for deep boats. The high water period is from July to August with the highest gauge of 12 meters at Hanoi and a flow of 35,000 cm\(^3\)/sec, and a speed of three meters per second, which are very disturbing for the up-stream traffic.\(^2\) The silt charge of 0.5 kilogram per cubic meter in lowest water and of 3.5 kilogram in highest floods, has an average deposit of 130 million tons a year, so as to create shifting barriers dangerous for traffic.\(^3\)

"So the Red River was admitted to be unsatisfactory and the French Government decided that the railroads, not the river, are to be regarded as the only possible means of opening up communication with China.\(^4\)

We note carefully the words "communication with China" which show a definite policy of finding a traffic route to

---

\(^1\) Hughes C. Clifford, *Further India*, p. 329.

\(^2\) Technical Conferences on Flood Control in North Viet Nam by Dao Ngoc Kim and Tran Ngoc Han, 1952.

\(^3\) *Ibid.*

\(^4\) Clifford, *op. cit.*, p. 332.
South China and forgetting completely the back country of North Viet Nam. However, statistics show that the bigger part of the Red River and its tributaries is in the back country of the North and not in the delta. In the hinterland, the basin of the Red River comprises 50,000 square miles, the Black River 45,000 square miles and the Clear River 25,000 square miles; the total is 120,000 square miles. But in the delta the Red River basin including also its effluents is only 15,000 square miles.¹

This old policy dating from the first days of occupation, with the expectation of a prosperous trade with China, has never been dropped and the back country of North Viet Nam is still unsettled, leaving its immense pastures and rich raw materials go to waste.

The Mekong River. In contrast to the Red River, the Mekong interests us only by its delta. Most of its course lies outside Viet Nam. It flows from Tibet through Laos and Cambodia and South Viet Nam, with a total length of 2800 miles. Only 300 miles of the river lie in Viet Nam.² The famed Francis Garnier first dreamed of a trade route from Saigon up to the Chinese border via the Mekong, a distance of 1600 miles.

"But after surveying the river throughout its whole length Garnier arrived at the conclusion that the Mekong

¹ Pouganme, A. A., L'Hydraulique Agricole on Tonkin, p. 46.
² Clifford, op. cit., p. 332
was impracticable for navigation all the way through. In 1893, however, Captain Reveillere succeeded in forcing a launch up the flight of the formidable Sambor Rapids, and steam communication between Saigon and Khon was assured.

In 1893 two steamers, the Ham Duong and the Massief, reached Luangprabang from Khon.

In 1895 La Grandiere went further from Luangprabang to Keng Hoi. So from Saigon to the Chinese border, a waterway had been followed through. But the fact that should not be lost sight of is that it was a feat that cannot be repeated easily. Therefore, it may safely be averred that there is little probability of a trade route to China via the Mekong. 1

In conclusion the failure to make the Red and the Mekong Rivers big trading routes, still influences the policies of transportation. The French have never tried to explore new possibilities. The result is that a rich hinterland is left undeveloped. For Viet Nam it is more important to develop the hinterland than to trade with China. 2

Other Rivers and Canals. Map II (p. 10) shows that in North Viet Nam the Red River and the Thaibinh River, with their effluents, provide the whole region with a very well distributed drainage system. The greatest distance from any river is no more than 20 or 30 miles. The entire system converges at two points, Hanoi and Sept-Pagodes. The two concentration points are joined by the Bambous canal and the canal of the Rapids.

With 17 other canals and thousands of irrigation ditches the delta of the North is criss-crossed with water-

1Ibid., p. 334.
2This involves a lot of other arguments not in the scope of this thesis.
Map II
TRANSPORTATION IN NORTH VIET NAM

Legend:
- Railroad
- Roads
- Blue rivers
- Towns
- Scale
- 50 km

Source: Notions Elementaires de Geographie, L'Indochine Francaise, 1944.
ways, big and small, that make up a very comprehensive system of transportation. ¹

But as comprehensive as this system is, yet it still lacks organization and backing for its use and navigation. Only around the delta is there adequate navigation, whereas in the upper region none exists. The desire to maintain a remunerative trade with China is still the major force in determining transportation policies.

It appears that the logical solution for some of our economic problems lies in the full development of the resources of the hinterland. In the high elevations, people could enjoy excellent climate. To North Viet Nam with its overpopulation, the upper region affords a place for immigration and extension of industry. There are practically no towns beyond the delta except for some on the Chinese border, towns which began as military posts. Creation of a few towns by better penetration of the country by transportation would absorb some of the excess population of the delta. Minerals which are very abundant in the upper lands could be developed with more favorable transportation facilities.

Rivers furnish cheap transportation, but a definite program for their development is still needed. It is the writer's opinion that the policies for a program of development should include these points:

a) Abandon the idea of an exclusive trade route to China.

¹H. Russier, Notions Elémentaires de Géographie, p. 12.
b) Coordinate transportation policies with other developments in the area.

c) Subsidize transportation where necessary.

d) Abandon the primary policy of planning valleys on the basis of irrigation alone.

In Central Viet Nam the situation differs from that in North Viet Nam as Robequain points out:

"The waterways of Central Viet Nam, running through very narrow valleys and fed by irregular rains do not permit steam navigation except for very short distances. Between February and September, these are limited to a total length of about 3000 kilometers for the whole region."1

River traffic seems to have decreased in Central Viet Nam since the French occupation. The evidence is that, before the occupation, a series of arroyos2 and canals allowed junks to ply between Hue and Hanoi by a wholly inland waterway.3 (see Map III, p. 13) This route is much less important now that the coastal trade route is safer and cheaper. Moreover, the old canal route might compete with the Transindochinese Railroad and the Mandarin road.4 Therefore, the maintenance of the canal has been neglected and it has gradually filled with mud.

In my opinion, this canal should be reopened and improved for the following reasons:

---

1The Economic Development of French Indochina, p. 108.

2Name for very small canal, circulating within the limits of a locality.

3Roequain, op. cit., p. 112.

4This is the main road, running from North to South, so called because it follows the old administration road used by administrators or Mandarins.
MAP III
TRANSPORTATION IN CENTRAL VIET NAM

Legend
- Transin docks
- Railroad
- Roads
- Blue rivers
- Towns

Scale
- 50 km

Source: Notions Elémentaires de Géographie
a) There is no real competition with the railroads and the highways because of the dense population along the coast.

b) It reaches directly the most isolated village.

c) It is more suitable to the transport of rice and salt, chief products of the area, than railroads and trucks.

The experience of the last few years serves as a big argument in favor of this canal: It was reopened to traffic in 1945 and has been a busy thoroughfare ever since.

But as a whole, waterways of Central Viet Nam are not important because of the rough topography.

It is a completely different picture in South Viet Nam. The Mekong delta of South Viet Nam is very suitable for river navigation. The course of the Mekong is irregular; however, the floods, which are sometimes of considerable volume, rise less suddenly. Flood waters are first checked by overflow into irrigation canals and the Great Lake itself stores part of the floods. The difference between high and low water is eight to ten meters at Phnompenh. But down stream from that city, which is 350 kilometers from the sea, the water spreads out and falls rapidly into the vast hollows of the delta.

---

1 Some 50,000 cubic meters.

2 Situated in Cambodia, this lake has an area of 300 square miles.

3 Russier, op. cit., p. 35.
Here in fact the flowing waters have not been hampered by man as they have in the North. Most of the expenses were uncultivated when the French arrived; the population is still much less dense than in the North, and had not felt the need to enlarge the area of flood protected rice fields by the way of dikes. Rivers flow between the silt banks which they themselves built.¹

If navigation depended only on the run off from the continental mass, its usefulness would be greatly lessened. But the Mekong's several branches,—the Donnai, the Vaico, the Saigon Rivers,—are washed by strong ocean tides. As a matter of fact, the tide is stronger than in the North and reaches much further up the flat stretches of the South where the general elevation is only two meters.² At Saigon, daily tides raise the river level at least two to three meters, the maximum being 3.60 meters; the ocean currents reach as far as Trion on the Donnai, and almost to the sources of the Vaico and Saigon Rivers. On the Mekong itself the tides rise and fall as much as 50 centimeters at Phnom Penh, 350 kilometers from the sea.³

Thus throughout the year, the action of the floods and tides improves navigation on the waterway system of South Viet Nam. So navigation has played an important part in the colonization of the delta, especially since the network of natural streams has been improved and extended.

At the time of the French occupation a number of canals already joined the Mekong to the Saigon River, and also

¹Robequain, op. cit., p. 290.
²Russier, op. cit., p. 37.
³Russier, op. cit., p. 39.
MAP IV
TRANSPORTATION IN SOUTH VIET NAM

Source: Notions Elementaires de Geographie, L'Indochine Francaise, 1944.
connected the Hatien River and the Rachgia River (See Map IV, p. 16).

"The American, John White, who lived in Saigon in 1819 and 1820, mentioned the completion of a canal which had made communication possible with Cambodia: It is 12 feet deep throughout its entire course and about 80 feet wide. It was dug through the forests and across immense marshes, in the space of six weeks. Twenty-six thousand laborers toiled in gangs night and day on the amazing project, and of these 7000 died of exhaustion and diseases."1

But the task accomplished since that time has been enormous. French engineers did not find as they did in the North, a delta already improved by countless generations of human beings and to which only a few minor improvements were necessary. Here they were faced with a new country. Roads were difficult to build and maintain in these low and marshy lands. So only by improving existing waterways and creating new ones, was it possible to develop these uncultivated lands.

Started in 1866 by the French Admirals, canal building was carried on until 1895 largely by manual labor. The main job was to prevent the formation of the shelf-like ridges built up by opposing tidal currents. Sometimes this was remedied by building storage reservoirs such as on the Dupre and Saintard Canals.2 The geographical service of Indochina which now extends over the greater part of the delta and the growing knowledge of hydrological conditions have been extremely helpful to colonial engineers.

2Robequeain, op. cit., p. 110.
In 1993 public works projects planned for five or ten years were undertaken. This program was let out on contract to private companies, subject to the supervision of the "Service des Travaux Publics". Powerful, mechanized dredging equipment was used. In later years, huge suction and compression dredges decreased the cost and accelerated the digging of canals in mud. The amount of earth dredged in 1930 amounted to 10 million cubic meters whereas in 1993 it was only 140,000 cubic meters.¹

More than 1,300 kilometers of main canals were dug with an upper width of 22 meters and a depth of more than 2 meters below the level at the lowest dry season tide. The rectilinear course of these canals, cutting across the winding arroyos,² characterizes South Viet Nam.³

The table below shows that the mileage of navigable rivers and canals in South Viet Nam compares favorably with that of the Netherlands.

### TABLE I

<table>
<thead>
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<th>Countries</th>
<th>Areas</th>
<th>Waterways</th>
<th>Population</th>
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<td>Holland</td>
<td>40,892 sq. km.</td>
<td>6928 km.</td>
<td>10,326,343</td>
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<tr>
<td>South Viet Nam</td>
<td>26,476 sq. km.</td>
<td>5474 km.</td>
<td>5,737,000</td>
</tr>
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¹Ibid., p. 111.
²Small canals in Viet Nam.
³Robequin, op. cit., p. 112.
Secondary branches to the main canals make the network even more complete. In practice the building of secondary canals was neglected by the landowners in their haste to get land into production and in the feverish speculation which characterized the development of the eastern part of South Viet Nam.¹

It also happens that the layout of large canals, especially the older ones, was not adapted to the specific needs of rice growing. These difficulties became apparent during the depression of 1930-1936, and a special Division of the "Hydraulique Agricole" was charged with remedying the situation.

Below is a table presenting the lengths of waterways in the three regions of Viet Nam.

**TABLE II**

**LENGTH OF WATERWAYS IN VIET NAM**

(in kilometers)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Rivers</th>
<th>Canals</th>
<th>Total</th>
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<tr>
<td>North Viet Nam</td>
<td>643</td>
<td>5320</td>
<td>5963</td>
</tr>
<tr>
<td>Central Viet Nam</td>
<td>321</td>
<td>2674</td>
<td>2995</td>
</tr>
<tr>
<td>South Viet Nam</td>
<td>343</td>
<td>5126</td>
<td>5474</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,312</td>
<td>15,121</td>
<td>14,432</td>
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Source: Annuaire Statistique Abrege, 1947.

¹Big landowners in South Viet Nam are Frenchmen who received concessions from the Government.
CHAPTER II

RAILROAD AND ROAD CONSTRUCTION

Early Railroads. The great expansion of European colonization in the last century coincided with the rise of the railroads throughout the world. It was quite natural that rail transportation should be considered indispensable to the development of Viet Nam. Moreover, there was a wholly understandable ambition on the part of the colony to use rails to attract as much as possible of the South China trade.

Until the end of the 19th century, when the Union of Indochina was finally effected, only the fragments of a railway system had actually been built. South Viet Nam, occupied since 1886, began first a program of its own. Between 1881 and 1885 a line was built from Saigon to Mytho through the most populated area of the South Delta. This was the beginning of a line that would continue later toward Vinhlong and Sostrang.\(^1\)

A little later at the other end of the country, the conquest of North Viet Nam entailed the construction of a

---

\(^1\) Robequin, op. cit., p. 115.
60 centimeters gauge railway between Phulangthuong and Langson, where it connects with the water route to Haiphong. It was needed to supply the Langson and Caobang garrisons on the Chinese border and for the purpose of evacuating the sick and wounded. So it was for military purposes first that this early narrow-gauge railroad was built. Later the 60 centimeters gauge was changed to a one meter gauge, but this is still too narrow to connect with the Chinese railroads.

In the beginning it became clear that Viet Nam could not provide itself with adequate transport facilities without outside assistance. From 1889 on, the greater part of railway construction was carried out with borrowed funds, almost entirely underwritten in France. French capitalists thus had the double advantage of collecting dividends and making a profit out of furnishing supplies for construction.

The first of these big bond issues, which amounted to 80 million francs and was guaranteed by the French Government, was authorized by the Decree of February 10, 1896. It was oversubscribed twenty-eight times. Two years later, the law of December 25th, 1898, authorized a bond issue of 200 million francs, designated to develop what is popularly known as the Doumer Program.

1 One meter gauge is equivalent to 3' 5" gauge.
2 R obequain, op. cit., p. 116.
The Transindochinese Railroad. The Doumer Program's\(^1\) main item was the Transindochinese railroad line, which would link the two great deltas of the North and of the South, as well as connect the frontier of China with that of Thailand. The construction work along the coast, where mountains reach the sea, was very costly. In the delta, the areas usually provide a good road bed. Almost everywhere the rocky subsoil made good ballast. Crossing wide and numerous estuaries meant costly engineering works. Mountains of Central Vietnam had to be tunnelled through such as at Tan giap in the north and at Faderan hills in the south.

It was felt that this line would serve as an "imperial link" in strengthening the Indochinese Union, and that it would facilitate the exchange of products between the different regions where varying climate and degrees of skill yield a variety of commodities, and also that it would encourage the migration of the population from the north to the south.\(^2\)

The expansion of railway construction was most rapid between 1908 and 1913. Most of the roads were built by the Government which awarded the construction of the roadbed to contractors and dealt directly with the suppliers for the materials.\(^3\)

---

\(^1\)Named after the French governor who proposed it.

\(^2\)Robequain, *op. cit.* p. 118.

\(^3\)Ibid., p. 118.
The first job completed on the Transindochinese system was the change in gauge from 60 centimeters to one meter, between Langson and Phalangthuong, and its extension to Hanoi. This change was made possible by the construction of the famous Doumer Bridge\(^1\) across the Red River in 1902.

By 1905, the line had been completed as far south as Vinh (See Map III, p. 13). In 1906 a second section from Tourane to Hue was completed. The line from Saigon to Nhatrang was opened to traffic in 1913.\(^2\)

The big objection to the construction of the Transindochinese railroad arose as to whether the road should have been built along the coast, or along the interior. The Colony Government decided for the route along the coast, where population is denser. This was another short-run policy.

John F. Fuller, in his book, Pegasus, says that the railroad creates a prosperous zone of 40 miles on each side of its route. If we look at the map on page 13, we would see that Central Viet Nam, has only a width of 60 miles in average. Then putting the railroad right through the middle of it would have made the whole region a prosperous zone.

Many other arguments also favor this latter course:

a) The coastal railroad could not compare with cheap shipping.

---

\(^1\) with a length of 1.6 kilometer.

\(^2\) Robequain, op. cit., 118.
b) The monsoon typhoons flood the coastal areas several months a year.

c) An inside-the-country railroad would encourage the immigration to the rich but still deserted hills.

It is, however, obvious that to build this railroad along the coast is cheaper and would have immediate returns for the capital invested.

The Yunnam Line. The other main section of Viet Nam's railroads is the Haiphong-Yunnan line. It was built by the government of the colony and conceded to a private concern, the Company of the Indochinese and Yunnan Railroad. It was completed in 1906.1 Its construction required 5,000 meters of bridge, viaduct, aqueduct and 155 tunnels, totalling 18 kilometers. Owing to bad working conditions thousands of lives were lost during construction.2 Yet this costly line in money and lives added very little to the welfare of the people.

This line was the realization of the dream of early day colonization, that is, to trade with the rich and populous province of Yunnan of South China. It was planned and constructed hurriedly in order to be ahead of the British who were planning to build a railroad from Bangkok to Yunnan. The French won the race but at great expense.

1Robeiquain, op. cit., p. 119.
2Ibid., p. 120.
As shown in the next chapter the Haiphong-Yunnam line brought nice returns for the few investors, but the transit from China did not benefit Viet Nam as a whole. This was due to several reasons:

a) The road runs at the bottom of the deep and narrow Red River valley, so that it is very hard to connect feeder lines from either the roads or railroads to it. In fact, there is no railroad feeder line and only a few trails leading to the main artery that runs across North Viet Nam.

b) From the delta up to the Chinese border it does not run through any town.

c) In case of war it is vulnerable to enemy's attack.

d) Its costs of maintenance are high.

Other Sections. Besides the two main lines--the Transindochinese and Yunnam railroads--there are a few other sections. But because of their short length, they are not important. The Saigon-Mytho section is 44 miles, the Hanoi-Nacham, 111 miles and the Bendongxo-Looninh, 43 miles. These sections are feeder lines.

On the eve of the World War II, Viet Nam's railways have a total mileage of 2,093 miles. The following table will give a relative idea of its importance when compared with railroads of neighboring countries:
TABLE III

RAILROADS IN VIET NAM, BURMA AND THAILAND
(in kilometers)

<table>
<thead>
<tr>
<th>Year</th>
<th>Viet Nam</th>
<th>Burma</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>1938</td>
<td>2,908</td>
<td>3,315</td>
<td>3,100</td>
</tr>
<tr>
<td>1948</td>
<td>1,353</td>
<td>2,874</td>
<td>3,213</td>
</tr>
</tbody>
</table>


In the construction of railroads in Viet Nam political motives, not economic principals, dominated, and France's interests were given precedence over Viet Nam's.

Early Roads. Before the French occupation in Viet Nam, roads were not important. Trails appeared to meet the people's needs. But the struggle for flood control brought a by-product, the dikes, and dikes, it was discovered, made good roadbeds.

In his book, Les Paysans du Delta Tonkinois,1 Courou quotes a very ancient Chinese work, the Hecou-Han-Chou which, in a chapter on geography, referred to dikes in the region of Sontay, thus establishing the existence of dikes as early as the beginning of the Christian era.2 The first adminis-

1 Translated: The Peasants of North Viet Nam.
2 Courou, p. 82.
trative and technical body supervising dikes dates from this
time. It is thus that King Tran-Thai-Ton (of Viet Nam)
appointed a director general and an assistant director of
embankments. ¹

In short, through the accumulated effort of many
generations North Viet Nam toward the end of the last century,
when the French arrived, had a dike system, serving as roads,
as extensive as the one now existing.

Along the Red River alone, there are 1000 kilometers
of dikes. But, constructed piecemeal as they were needed,
without any overall plan, the dikes have a tortuous align-
ment with a too steep slope. So the French needed only to
consolidate this system of dikes by modern methods of
engineering and convert it into an efficient flood control
system and also into good roads. The width of most of the
dikes is six meters at the crown, while most ordinary roads
have a width of only five meters. The total length of 1300
kilometers is impressive. ² Most of the dike roads have
been metalled to facilitate traffic. ³

Colonial Period. In Viet Nam as in many other
colonies, it had long been thought that railroads ought to
take precedent over roads. This was at least the policy

¹Ibid., p. 85.

²Dao-Ngoc-Kim and Tran-Ngoc-Man, Conferences on
Flood Control in North Viet Nam, 1953.

³Metalled by a raw material from coal mines, which
contains iron ore, so to make the roads a little rough and
not slippery in rains, but which would not melt under tropi-
cal heat as asphalt would.
prior to World War I. While railways were expanding with the aid of government bond issues, road work was carried on without any comprehensive plan. Each province using its own resources, most obligatory labor, tried to comply with higher authorities' order. To most administrators nothing gives them greater pleasure than opening a new road little by little.  

In 1914 the Transindochinese Railroad was far from completion. Loans could not be renewed and the era of the automobile was slowly making itself felt everywhere. It became apparent that the unity of Indochina might be more quickly and easily accomplished by highways than by railroads. Furthermore it would cost less.

Following a comprehensive study by the Public Work Department, the Government of Indochina issued an order classifying roads into two categories: local roads which would remain the responsibility of the province, and "colonial" roads, which should be built and maintained out of the general budget of the Indochinese Union, and by the Public Work Department.

From then on there was rapid progress, and the road system became more and more logical and compact. Just before the last war it undoubtedly was one of the best in the Far East. In 1936 Viet Nam had 27,000 kilometers of banked roads, usually passable throughout the year of which 17,000

1Gourou, op. cit., p. 89.
3Pougeanne, op. cit., p. 242.
kilometers are metalled.  

The Mandarin Road. The colony's main highway parallels the Transindochinese railroad along the coast, where population is densest. This highway, also called the Mandarin Road, can be compared with the old road linking North Viet Nam to South Viet Nam, which was built by the emperors in the 13th century. But despite their efforts, when the French arrived it was no more than a trail, interrupted by frequent ferries and crossing mountains with stone steps. In 1913 only certain sections were passable for push carts or light carriages. At many points the road became lost in the sand dunes of the beaches. Wealthy travelers were carried in litters or sedan chairs, and their luggage on men's backs. The coolies walked fast, sometimes at a jog trot. They worked in relays from stops at inns called "Trams". The "Coolie-Tram service" was used mostly by officials.  

Each year since 1913 large sums have been appropriated in the General Budget for the Mandarin Road, also classified as Colonial Highway Number One. It has been improved constantly. The foundation has been widened to six meters

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1Ibid., p. 245. For meaning of the word "metalled", see footnote on page 27.
2See footnote on page 12.
3Pougaime, op. cit., p. 245.
and it is metalled\(^1\) to a width of five meters.\(^2\) The number of ferries has been reduced from about fifty to five on the stretch from Hanoi to Saigon. Though automobile traffic between the two cities is interrupted when violent typhoons accompanied by flooding rains hit the coast, it can be quickly restored to service by means of temporary detours.\(^3\)

From Colonial Highway Number One, side roads branch out over the country. Naturally, the system is most extensive in the delta. Penetration of the hinterland was aided by the progress of cartography. It is impossible to emphasize too strongly how the work of the "Service Geographique de l'Indochine" has assisted in developing a knowledge of the terrain and the use of the country's resources. This Service has taken many uncertainties out of the work of engineers and excavators. Road building no longer follows ancient native paths around sharp curves and over steep ascents. The general direction of the route from one end to the other can be laid out in advance.\(^4\)

**Other Roads.** A detailed study of the road net-work in North Viet Nam shows that besides the 1,800 kilometers of dikes, there are 2,750 kilometers of other roads with 6,000

\(^1\)See footnote on page 27 for the word "metalled".

\(^2\)Pouguanee, \textit{op. cit.}, p. 246. Six meters equal 19 ft. and five meters equal 101/2 ft.

\(^3\)Robequain, \textit{op. cit.}, p. 211.

\(^4\)Pouguanee, \textit{op. cit.}, p. 247.
kilometers of metalled roads. (See Map II, p. 10). Four principal roads numbered from 2 to 5 diverge from Hanoi to the Chinese border, with another one connecting them, running along that border. These roads follow natural valleys.

In the upper part of North Viet Nam there are no transversal roads. This was due to the policy of not developing that part of the country. Ideas have not changed since the time when a road-building governor was accused of working for the interests of piracy in preparing for the invasion of Chinese troops.¹

In the delta of the North, roads are good and sufficient. Because of the shortage of bridges, a few ferries still exist. Another inconvenience is that existing bridges are so narrow that railroads and roads are crossing them on one single lane, so that road traffic may wait for as long as one hour at some crossings.

In Central Viet Nam the main road is the Colonial Highway Number One, which runs through it from north to south. Only since 1928, has the back country of Central Viet Nam received attention. The development of the summer resort of Dalat involved the construction of roads which scale the Annamitic ridge.² Beginning with 1925, the red land's potentiality for colonization started a sudden rush

¹Delanessan, Le Colonisation Francaise en Indochine, p. 326.
²Mountain in Central Viet Nam.
toward the basaltic plateaus of Darlac and Kontum. (See Map III, p. 13). Connection between Kontum and Quinhon on one hand, and Banmetuot, Ninhhoa, and Nhatrang on the other was regularly assured. Bus and truck companies carry passengers and freight between the coast and the plateaus.1

A strategic road across the plateaus paralleling Colonial Road Number One, from Saigon to Tourane, was built and found particularly useful during autumn months when typhoons strike the coast. A steel bridge over the Donnai now makes it possible to reach Dalat from Saigon in the dry season in five hours.2

The main highways in Central Viet Nam are linked by roads built at much lower cost and provided with only light bridges of wood or bambou, but still passable during heavy rains.

The road network in Central Viet Nam totals 10,382 kilometers of which 5,400 are metalled.3

In South Viet Nam, the highways are the most beautiful in Indo-China. They are wide, up to eight meters instead of the usual width of five meters, straight and shaded with trees on both sides. The total length is 8,000 kilometers of which 6,000 are surfaced. The chief disadvantages are the same as in the North. But here the

1Delanessan, op. cit., p. 335.
2Gourou, op. cit., p. 35.
3Russier, op. cit., p. 45.
branches of the Mekong river are too large\(^1\) to build bridges across them. Therefore, ferries are used to cross the streams, which slow down the traffic on the good roads of South Viet Nam. Because the country's agricultural people do not need big and expensive bridges to transport their products, little consideration is being given to improving transportation facilities.

**Summary of Roads.** In the main, roads in Viet Nam are good. They average 13 feet in width and they are in few cases 18 feet. These widths compare favorably with the regular 18 feet in the United States. They are metalled and well maintained. There are in Viet Nam a kilometer of road for every ten square kilometers of area and three kilometers of roads for every 2,000 people in comparison with a mile of road to a square mile of area and a mile for every 50 persons in the United States.\(^2\) Statistics show that there is 0.08 kilometer of road to a square kilometer in North Viet Nam; 0.09 kilometer of roads for a square kilometer in Central Viet Nam; and 0.13 kilometer of roads for a square kilometer in South Viet Nam.

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\(^1\) Two or three miles across.

\(^2\) Charles A. Taff, *Commercial Motor Transport*, p. 3.
Below is a table that gives pre-war and post-war statistics on roads in the different regions of Viet Nam.

**TABLE IV**

**VIET NAM ROADS ACCORDING TO REGIONS AND SURFACING**

*(in kilometers)*

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total</th>
<th>Metalled</th>
<th>Stoned</th>
<th>Pistes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1948</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local roads:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>3422</td>
<td>438</td>
<td>1220</td>
<td>1764</td>
</tr>
<tr>
<td>North</td>
<td>372</td>
<td>117</td>
<td>255</td>
<td>-</td>
</tr>
<tr>
<td>South</td>
<td>6200</td>
<td>1235</td>
<td>4333</td>
<td>632</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9994</td>
<td>1790</td>
<td>5808</td>
<td>2396</td>
</tr>
<tr>
<td>Federal roads:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>2048</td>
<td>425</td>
<td>1047</td>
<td>750</td>
</tr>
<tr>
<td>North</td>
<td>263</td>
<td>85</td>
<td>178</td>
<td>-</td>
</tr>
<tr>
<td>South</td>
<td>781</td>
<td>320</td>
<td>461</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3092</td>
<td>830</td>
<td>1696</td>
<td>750</td>
</tr>
<tr>
<td>Grand Total</td>
<td>12086</td>
<td>2620</td>
<td>7494</td>
<td>3146</td>
</tr>
<tr>
<td><strong>1946 Total</strong></td>
<td>16692</td>
<td>3022</td>
<td>8204</td>
<td>-</td>
</tr>
<tr>
<td><strong>1938 Total</strong></td>
<td>27441</td>
<td>5418</td>
<td>13566</td>
<td>8456</td>
</tr>
</tbody>
</table>

Source: *Annuaire Statistique de l'Indochine, 1939-1949.*
CHAPTER III

OPERATION OF TRANSPORT

Waterways Operation. In Chapter I, the system of waterways in Viet Nam was described. In this chapter an attempt is made to show the importance of waterways and how they operate.

"Transportation by water plays indeed a large part in undeveloped countries, in which rivers continue to be almost the sole available means of transportation. In highly developed countries waterways play only a small part in transportation of passengers, in most cases for tourism purpose, as on the Rhine, the Rhone, the Seine."1

Waterways in Viet Nam are important for carrying both freight and passengers. The country's main freight is rice, corn and salt all of which have a bulky volume and do not require speed. The next important freight is raw material whose demand for service is elastic, i.e. the cheaper the traffic, the larger the volume of freight.

Another factor that makes waterways important in Viet Nam is that they reach everywhere in the country. From big rivers that run through principal towns, one can go into

1 Jean Aubert, Le Transport, p. 46.
transversal canals and then on into irrigation ditches, right to the most remote villages.

Passenger traffic is important because people are not in a hurry; they are used to travel on water; besides, under tropical heat, it is cooler on water than on roads.

"The traveler is astonished to see outlined against the plain's horizon the numerous sails of sampans and junks which seem to glide over the fields of rice."

Sampans and junks carry mostly rice directly from the field to the markets or to ports of export. They are privately owned by the landowners. There is no farmer nor tenant so poor that he cannot possess at least one sampan to go around with his family, either to the market or to festivals. Besides the farmers there are fishermen who live on the water with their family.

Big junks are owned by merchants, mostly Chinese, and they are for hire to transport rice, corn, salt, raw material, construction materials, pottery, etc. They use sails, tides or animal power for locomotion.

There are regular schedules of launches driven by propellers or paddle wheels, similar to river boats of the early days in the United States. They are very popular, and have a big passenger traffic. They carry also pottery, rice, pickles, and alcohol. Annually there are 300,000 people who embark and land at Hanoi alone.  

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1 Robequain, op. cit., p. 119.
2 Ibid., p. 120.
Water transportation takes care of most of the transport demands of the country. Twenty years ago some 500,000 people of the cities traveled in railroads or motor transports. Eighteen million inhabitants of villages depended on waterways for their transport and the transport of their products.

But to the colony's point of view, only trade is important, and since the dream of making the Red and the Mekong Rivers trading routes to South China failed, waterways in Vietnam were neglected by the government. The general policy is now that irrigation purposes come before transportation.

There is no water transportation organization in Vietnam worthy of the name; only a few, small private concerns trying to operate with very poor equipment. Figures reveal there are 2,660 junks of 16 tons burden, 21 motor barges of 50 to 350 tons each and 191 steam launches of 30 tons each. River boats with flat bottoms are still used. In recent years some old landing ships were brought into service by the military.

In actual operation, waterways in Vietnam are not impressive; they show little if any progress over a hundred years ago.

**Railroads Capital.** Like most of France's colonial

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1 See above, p. 9.

2 Robesquain, op. cit., p. 119.
railroads those of Viet Nam are one meter gauge (3.3/3 feet). They have been adopted also in India but not in China where the gauge is 1.44 meters (or 4' 3"'). The minimum radius of curvature is 100 meters and the grade is 1.5 per cent.\(^1\)

The wood burning-box is still in use on locomotives. Commercial operation speed is little more than 30 to 40 kilometers an hour for ordinary passenger trains and 20 kilometers an hour for freight trains.\(^2\) But there are some fast schedules on certain runs. For example, daily trains cover the 1,728 kilometers between Hanoi and Saigon both ways in about 40 hours, with an average speed of 42 kilometer/hour. Sleeping cars and diners make the trip a comfortable one. A fast weekly service unites Hanoi and Yunnam (China), the average speed of trains being 34 kilometer/hour. This speed is made possible by the use of gasoline-powered Michelin engines. These Michelin engines, also called Autorails, operate at a maximum speed of 50 km/hour over the government-owned lines, such as between Saigon and Mytho, Bienhoa and Mytho, Hanoi and Phulangthuong, Hanoi and Naminth.\(^3\)

The stations, except the one at Saigon which is such a small building that it resembles a small-town station

\(^{1}\)Robequain, \textit{op. cit.}, p. 123.

\(^{2}\)30 km/hour are about 18 miles/hour.

\(^{3}\)50 km/hour are about 30 miles/hour which are a low speed compared with speeds in the U. S.
rather than that of the capital city, are large, modern buildings. Transshipment facilities, however, still depend more on human power than on modern motorized equipment.

Table V on this page presents the rolling stocks of prewar and postwar dates for Viet Nam and two of its neighbors.

**TABLE V**

**ROLLING STOCKS FOR THREE COUNTRIES IN THE FAR EAST**

<table>
<thead>
<tr>
<th>Countries</th>
<th>Year</th>
<th>Locomotives</th>
<th>Pass. Cars</th>
<th>Wagons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viet Nam</td>
<td>1937</td>
<td>277</td>
<td>658</td>
<td>3826</td>
</tr>
<tr>
<td></td>
<td>1947</td>
<td>122</td>
<td>205</td>
<td>2296</td>
</tr>
<tr>
<td>Thailand</td>
<td>1937</td>
<td>192</td>
<td>322</td>
<td>3485</td>
</tr>
<tr>
<td></td>
<td>1947</td>
<td>339</td>
<td>453</td>
<td>5346</td>
</tr>
<tr>
<td>Burma</td>
<td>1937</td>
<td>379</td>
<td>1183</td>
<td>9704</td>
</tr>
<tr>
<td></td>
<td>1947</td>
<td>274</td>
<td>479</td>
<td>6912</td>
</tr>
</tbody>
</table>

Source: Annuaire Statistique, 1952.

This table shows that Burma, an English colony slightly larger than Viet Nam, had in 1937 a larger number of rolling stocks than Viet Nam. Independent Thailand did not make as well as the two colonies.¹

**Railroad Traffic.** A factor that distinguishes Viet Nam railroad traffic is the relative importance of the passenger traffic, a characteristic of railroads in a new

¹Some of the figures will be used in later analysis.
country. The trains provide four classes of passenger service, the first three usually combined in one coach. The fourth class coach has benches along the sides, with a central passage for baggage. Fourth class cars are very popular with peasants chattering noisily or sleeping amid pigs and chickens.\(^1\)

The distribution of traffic has changed since the inauguration of the railroads. Up to 1920 the number of passengers increased steadily. In 1920 passengers accounted for 71 per cent of all revenues on the government lines and 50 per cent for the Haiphong-yunnan line. After 1920, competition from automobiles, became important so that by 1937, notwithstanding an upswing in the number of passengers, passenger revenues fell to 49 per cent and later in the depression to 24 per cent.\(^2\)

The volume of travel is in direct relation to the density of the population. But the people in Viet Nam rarely take long trips. As a rule they take the train only to reach the market place, or a neighboring city to visit their parents or to make a pilgrimage. The average distance traveled is short, yet it has lengthened slightly from 39 kilometers in 1913 to 46 kilometers in 1936. In the latter year the revenue per trip was 0.27 piaster.\(^3\) There is no doubt that

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\(^1\)Robe quain, op. cit., p. 132.

\(^2\)Robe quain, op. cit., p. 132.

\(^3\)One piaster is equivalent to 10 francs.
to a certain extent the railroad encouraged migration. A mass migration which could put an end to the congestion in the North Delta can not be handled by railroads alone. The comparison often drawn between South Viet Nam and the western part of the United States is not a realistic one.¹

The railroads of Viet Nam cannot profit from heavy volume of freight. In fact, the great export commodities,--rice, corn, and coal,--are usually shipped by rivers or loaded directly on ocean going vessels. Inter-regional trade is restricted because the coastal plains which are linked by rails produce almost the same things and here again the location of the railroads and other means of transportation, being parallel to one another, compete with and duplicate their services which results in wanton waste or resources.²

The railroads must compete by adjusting rates, increasing the number of schedules and speed of trains, and pooling commodities as they do in France. The principal freight items are rice and other foodstuffs, cattle on hoof, and lumber. In 1913, 454,000 tons of merchandise were carried by the railroads. In 1929, 1,118,000 tons and in 1937, 1,171,000 tons.³

The average haul per ton was only 172 kilometers. The freight revenue is better on the Haiphong-Yunnam, for here

¹Robequin, op. cit., p. 134.
²Robequin, op. cit., p. 134.
³Annuaire Statistique de l'Union Francaise, 1939-1949.
the railroad does not compete with other means of transportation. But traffic on this line is only to a very slight degree indicative of the real economic activities of the North, because China's trade and transit figure so heavily.¹

On the rail system within Viet Nam, rice shipments are mainly responsible for seasonal variations in traffic. On the Northern line, the grain is transported in December and January and again in June and July. On the southern line the grain is transported only in June and July.²

When revenue is compared to operation cost, only the Haiphong-Yunnam line shows a steady favorable balance with a reasonable return on the capital invested. As for the rest of the railway system, operations are hardly profitable. There were deficits from 1932 to 1935, inclusive.

For more recent years, railroad traffic is given in the following table.

TABLE VI

RAILROAD TRAFFIC IN VIET NAM FROM 1944 TO 1948

<table>
<thead>
<tr>
<th>Years</th>
<th>Length in Kilometers</th>
<th>Passengers (000's)</th>
<th>Merchandise (000's tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943</td>
<td>2,945</td>
<td>21,538</td>
<td>1,535</td>
</tr>
<tr>
<td>1944</td>
<td>2,579</td>
<td>19,765</td>
<td>936</td>
</tr>
<tr>
<td>1945</td>
<td>267</td>
<td>452</td>
<td>155</td>
</tr>
<tr>
<td>1947</td>
<td>1,217</td>
<td>1,654</td>
<td>400</td>
</tr>
<tr>
<td>1948</td>
<td>1,310</td>
<td>1,221</td>
<td>686</td>
</tr>
</tbody>
</table>

Source: Annuaire Statistique de l'Union Francaise, 1952.

¹ SOUROU, op. cit., p. 232.
²robequain, op. cit., p. 348.
The decrease in traffic from 1943 to 1948 was caused by the war. Passenger traffic declined from 21,583,000 in 1943 to 1,221,000 in 1948. The lowest point was in 1945 at the end of World War II and the beginning of the Indochinese War.

During the war the railroads suffered not only losses of capital equipment but also from operating deficits.

TABLE VII

REVENUES AND EXPENSES OF RAILROADS

IN VIET NAM FROM 1946 TO 1948

(000' of piasters)

<table>
<thead>
<tr>
<th>Years</th>
<th>Revenues</th>
<th>Expenses</th>
<th>Profit</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>80,707</td>
<td>31,760</td>
<td>49,007</td>
<td></td>
</tr>
<tr>
<td>1947</td>
<td>40,214</td>
<td>104,359</td>
<td></td>
<td>90,245</td>
</tr>
<tr>
<td>1948</td>
<td>14,125</td>
<td>195,729</td>
<td></td>
<td>179,605</td>
</tr>
</tbody>
</table>

Source: Annuaire Statistique de l'Indochine, 1948.

The year 1946 produced a profit of almost 50 million piasters, but the railroads in 1947 and 1948 suffered heavy losses. The figures of 1948 show that the expenses are about thirteen times the revenues. These expenses include the cost of reconstructing roadbeds, replacing equipment lost in war.
Railroad Organization. Railroads in Viet Nam were built by the government, or with its help as in the case of the Haiphong-Yunnam line. In 1937 the government still owned three-fourths of the railroads. The Haiphong-Yunnam line now belongs to a private company, the Yunnam Railroad Company, and a line of 62 kilometers in the south belongs to the "COMPAGNIE DES TRAMWAYS".\(^1\)

Actually the few sections which are still in operation are administered by an official agency of the government called "La Regie des Chemins de Fer", established on January 1, 1948. This return to the control of the government was necessitated by the war.\(^2\)

Before the war the government line was managed by a chief engineer under the direction of the General Inspector of Public Works of Indo-China.

Until 1921, owing to the lack of coordination between the government lines and the private lines, there was fear that an enemy power might seize one section of the system and thus divide the peninsula. In 1921, therefore, the government began the unification of the railroads under its own supervision.\(^3\)

This changing back and forth from government ownership to partial private ownership of the railroads was to

\(^1\)Robequin, op. cit., p. 99.

\(^2\)Annuaire Statistique, 1949, p. 63H.

\(^3\)Ibid., p. 63H.
favor the French investors. In peace time the railroad is left to private concerns (or at least certain sections of the railroads) so they could derive more profit. In case of war, or of trouble, the government takes it over. This has the advantage of better organization, and in some cases might save the French investors from big losses.

Whether owned by the government or by private companies, the railroads in Viet Nam enjoyed until 1925 complete monopoly of important traffic. The waterways were left unorganized,¹ the motor transport was slowly coming; only railroads were to take care of most of the country's traffic.

Because of the unorganized state of affairs in transportation and the corruption in colonial government, the railroads were in no hurry to modernize their equipment nor to run them efficiently.

"The railroads in Indochina", according to Virginia Thompson, "were at best slow, expensive and lazily negligent in their assured monopoly."²

Press campaigns had tried in vain to arouse railroad companies of their lethargy. Not until motor bus competition became serious did they speed up their schedules of trains, lower the rates and import new locomotives.³

In conclusion, government control of the railroads in

¹See above, p. 36.
Viet Nam has been both their strength and their weakness. The government built the railroads when no private companies would run the risk of loss, but inefficiency and graft have been stumbling blocks in their effort to provide suitable service to the peoples of Viet Nam.

Road Operations. Military purposes were the first motives of road construction in Viet Nam. Supplying food to famine areas and making mines accessible were other reasons. Viet Nam had good roads even before the advent of the automobile. Before World War I, Governor Albert Sarraut and some of his colleagues envisioned the importance of motor travel at the time when the railroads were still regarded as the best means of transportation. In 1913 the country had 15,000 kilometers of roads, and only 350 cars, most of them tourism cars for evening drives. But the number of cars caught up quickly with the roads. In 1927, there were already 17,200 cars for some 20,000 kilometers of roads.2

Although the elephant is still used in certain hilly sections in the South, particularly in the Cardamone Mountains, yet there are probably not as many as 2,000 domesticated elephants in the whole country. The use of oxen as carriers, which is extensive in Thailand and Burma, is small in Viet

1See above, p. 26.

2Ibid., p. 215.
Nam. In the mountains of the North, small native horses and mules are used frequently.\(^1\)

Improved roads have resulted in the use of more animal-drawn vehicles. But the use of human beings for transportation has by no means disappeared. A large part of the traffic over the mountain roads is handled by this most economical and adaptable means. Carriers using baskets, or a flexible pole balancing two equal weights, are common sights. Men used also to push wheelbarrows and pull carts or rickshaws. In recent years only did the cycle-cart and the taxi cab make their appearance.

But as a rule motor vehicles are infrequently seen in the country. The long lines of men and women carriers, trotting along at the side of the roads among passing automobiles is a familiar sight in Viet Nam.\(^2\)

Improvements in the road system have been accompanied by increased numbers of automobiles. In 1913 there were 350 cars. In 1923 there were 5,663 cars. In 1935 the number jumped up to 17,800 cars.\(^3\)

The people as a whole profit from the growth of motor transportation. A favorite undertaking is to purchase a second-hand car, already well worn out, keep it repaired as far as possible and, in defiance of police regulations, "cramp" it with passengers to the bursting point. There are no big organizations, operating on a national scale; only

\(^1\)Ibid., p. 215.
\(^2\)Thompson, op. cit., p. 215.
\(^3\)Annuaire Statistique de l'Indochine, 1937.
small concerns organized on a proprietorship or partnership basis. These carriers make runs between towns not more than 60 miles apart. They enter into the keenest rivalry on each new road as soon as it is open. In the year of 1933 they carried a total of 50 million passengers.\(^1\)

Besides carriers, as described above, there are a number of two-axle trucks for hire. These make mostly short hauls of perishable foods or light-weight merchandise to towns. There are no regulations for automobile transportation, except to pay a license fee, and be in "good terms" with the controller who has charge of inspecting cars. There are no fixed rates. They vary according to what the traffic will bear. A circulating tax was put on motor buses in 1933, aimed to relieve competitive pressure on the railroad.\(^2\)

Roads bring no revenues at all to the government apart from the sale of gasoline which is monopolized by the state. The upkeep of roads is a terrific burden on the budget of the colony, which amount to an annual cost of six million piasters. Thus burden is translated into taxes.\(^3\)

But roads in Viet Nam have contributed much to the economic development of the country. Canals in use for centuries, and the "magic" of the railroad did not bring to

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\(^1\) Thompson, \textit{op. cit.}, p. 217.
\(^2\) Thompson, \textit{op. cit.}, p. 216.
\(^3\) Relatively heavier on peasants.
the country adequate transportation. Roads, in a few years, destroyed traditions of inertia and isolation of the village. Today with increasing number, people are moving from place to place in less time and with greater ease than ever before.¹

Coordination of Transportation. The problem of coordinating waterways, railways and roads is at the present time a minor one. Demand for transportation is still very small. But within a few years, when production is greater than at present, the problem of coordinating transportation into an efficient system will be an urgent one. The construction of most of the main roads and railways parallel to rivers was bound to bring about serious consequences. The first attempt toward coordination came in 1935. Before that date the government was confident that the railroads would beat off competition from road transportation. But when railroads began to lose ground, a circulating tax was imposed upon motor carriers. This did not stop the growing use of motor carriers and railroads continued to suffer. In 1935 the government made an agreement with motor transports, whereby railroads and motor carriers redistributed their services on a cooperative geographic basis.²

To conclude, it is clear that if transportation in Viet Nam is to raise its level of service, it must adopt modern methods of management, coordination, and organization.

¹Thompson, op. cit., p. 240.
²Thompson, op. cit., p. 215.
A later chapter will study the future needs of transportation in Viet Nam.
CHAPTER IV

EFFECTS OF TRANSPORTATION

Dissolution of the Village as an Economic Unit. The development of a modern system of transportation coincided with the imposition of French rule in Viet Nam. The effects of the French colonialism system, which were the real inspirational motives for the creation of transportation in Viet Nam are mentioned in previous chapters. They are the pacification and unification of the colony.

In this chapter, attention is focused on the economic effects of the past development of the means of transportation upon the life of the country. The first outstanding effect is the beginning of the dissolution of the village as an economic unit. The evidence that a much wider market is gradually supplanting the old market is clear. In the first place many villages have shops with a large assortment of merchandise. An increasing amount and variety of goods kept by the village shop-keeper have been imported from cities or even from abroad. Such articles as mirrors, cutlery, matches, lamps, sewing thread and general hardware are standard items in a growing number of shops. The factor that

-51-
makes possible their import into the isolated village, even when lacking good transportation facilities, is that the commodities are light in weight. Furthermore, the people of the villages have been demanding more transportation service as revealed by the increased passenger traffic. From 1923 to 1933 this traffic jumped from three million to seven million for the railroads and from almost nothing to fifty million for bus traffic.\(^1\)

This increase in passenger traffic is due to a partial break-up of rural population. For instance, it is estimated that four million people shifted from villages to towns between 1936 and 1949.\(^2\)

Through better transportation, foreign trade is affecting both the production and consumption of the village people. Imports jumped from 78 million piasters in 1903 to 106 million in 1913, and to 154 million in 1933. Export went up in those same years successively from 62 million to 105 million and to 154 million piasters.\(^3\)

Transportation also brings an increasing degree of local specialization in particular crops, especially those grown for export. Cotton is now no longer planted in small patches in almost every village, but is concentrated in areas which are especially adapted to its various types. The dry

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\(^1\) *Annuaire Statistique de l'Indochine*, 1952, p. 64H.  
\(^2\) Robequain, *op. cit.*, 307.  
plains of western North Viet Nam are suited to the short-staple kind, while the canal-fed zones of the deltas are producing the longer-staple types. Production of corn is being expanded for foreign markets.\(^1\) New products, including rubber, are being introduced exclusively for export.\(^2\)

It is evident, therefore, that the development of the means of transportation has rendered the Viet Namese village less independent as an economic unit:

"The development of the means of transportation is perhaps the most important economic event of the nineteenth century, and the multiplication of roads and railways is alone sufficient to explain the break-up of the old industrial organization, in which the village was self-sufficing."\(^3\)

**Price Equalization.** The second outstanding effect of the expansion of the means of transportation follows naturally from the breaking-up of the economic self-sufficiency of the village. That is, prices tend to move toward equality with reference to both time and place. Under ideal conditions, the difference in prices of a commodity in two places should not be more than the cost of getting the commodity from one place to the other.\(^4\) Regarded from the social point of view, equalization of prices benefits both the producer and the consumer.

To illustrate the effects of the introduction of rail-

\(^1\)Robequain, *op. cit.*, p. 310.
\(^2\)Ibid., p. 310.
\(^4\)Charles E. Landon, *Transportation*, p. 46.
roads upon prices in different places at the same time, the following table has been prepared from some Burma statistics. (Similar statistics for Viet Nam are not available).

| TABLE VIII |

WHEAT PRICES IN RUPEE PER POUND

IN RANGOON AND PONNAM, BURMA

<table>
<thead>
<tr>
<th>Year</th>
<th>Rangoon</th>
<th>Ponnam</th>
<th>Difference</th>
<th>Per Cent Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1871</td>
<td>12.02</td>
<td>6.34</td>
<td>5.68</td>
<td>89.5</td>
</tr>
<tr>
<td>1872</td>
<td>12.08</td>
<td>6.05</td>
<td>6.03</td>
<td>99.6</td>
</tr>
<tr>
<td>1873</td>
<td>11.07</td>
<td>6.45</td>
<td>4.66</td>
<td>72.1</td>
</tr>
<tr>
<td>1874</td>
<td>12.02</td>
<td>6.24</td>
<td>5.78</td>
<td>93.2</td>
</tr>
<tr>
<td>1875</td>
<td>17.76</td>
<td>34.54</td>
<td>16.78</td>
<td>93.5</td>
</tr>
<tr>
<td>1876</td>
<td>26.34</td>
<td>27.16</td>
<td>.82</td>
<td>3.1</td>
</tr>
<tr>
<td>1877</td>
<td>The year the two places were connected by R.R.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1878</td>
<td>9.01</td>
<td>7.62</td>
<td>1.39</td>
<td>18.2</td>
</tr>
<tr>
<td>1879</td>
<td>8.39</td>
<td>7.09</td>
<td>1.30</td>
<td>18.5</td>
</tr>
<tr>
<td>1880</td>
<td>9.83</td>
<td>7.12</td>
<td>2.71</td>
<td>28.0</td>
</tr>
<tr>
<td>1881</td>
<td>13.98</td>
<td>11.13</td>
<td>2.85</td>
<td>24.1</td>
</tr>
<tr>
<td>1882</td>
<td>14.12</td>
<td>14.13</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>1883</td>
<td>15.35</td>
<td>11.07</td>
<td>4.28</td>
<td>28.4</td>
</tr>
</tbody>
</table>

Source: Prices and Wages in India (Calcutta, 1893) p. 10.

The average percentage of difference until the introduction of the railway was 129.2 and this same average after railways were built was only 16.5. It is clear that the railroads did bring equality of prices.

The effect of transportation upon prices is seen clearly in times of famine. If there is a strong tendency toward equalization of prices, then there is reasonable proof that supplies have been able to flow from places of
greatest abundance to localities of greatest need. Such a flow cannot occur where the means of transportation are inadequate.

The Viet Nam system of transportation is not intended primarily to eliminate famines. But the facts remain that those localities which for natural or artificial causes have escaped famines, have been able to ship their surplus into the areas where shortage existed, and so have reduced distress and mortality.\(^1\)

**Beginning of Large-Scale Production.** The third consequence of improved transport is the beginning of large-scale production. Factors other than transportation have contributed to the rise and growth of mass production, but better methods of transportation are strategically important. Associated with large-scale production has been the widening of the markets, which is the sine qua non of the division of labor and mass production.

The first step in the direction of industrialization is the extraction of raw material. This is possible only when there is transportation to link sources of raw materials to industrial centers. In Viet Nam, most of the railroads of the North, except the Haiphong-Yunnam, had been built to connect mines to shipping ports. The main port is Redon, the terminus of a twenty-kilometer line which stretches northward

\(^1\)North Viet Nam had a mortality of two millions during the 1946 famines, while in the South rice surplus was burnt because it could not be shipped.
as far as the mines of Maokhe. Boats drawing eight meters
can reach Redon where they are loaded from barges. Coal from
Hongay and Campha can be reached directly by ships drawing
nine meters. These ports are provided with wharves and
cranes. The Wharf of Campha has four electrically operated
booms which can load two ships at a time at 500 tons an
hour.\(^1\)

The second step toward mass production is processing
the raw material in the country instead of exporting it in
its bulk form. This demands transportation for labor and
products. Statistics show that there is an increase of the
number of workers by an average of 2,500 every year since
1890. The freight traffic also increased from 450,000 tons
in 1913 to 1,171,000 tons in 1937.\(^2\)

Viet Nam, among all the French colonies is the most
suitable for industrialization.\(^3\) The actual system of
transportation is sufficient for a good start. Only the
imperialistic policy of deliberately keeping industriali-
zation down destroys in part the logical effect of large-
scale production that would result from good transportation
facilities.

The results of the last fifty years of transportation

\(^1\)Robeauain, \textit{op. cit.}, p. 278.

\(^2\)\textit{Annuaire Statistique de l'Indochine}, 1937.

\(^3\)Robeauain, \textit{op. cit.}, p. 340.: "Of all the French
colonies Viet Nam seems particularly suitable for industrial
development. In the first place there is an abundant labor
supply, relatively skilled and in the second place there is
abundant raw materials and apparently an inexhaustible fuel
supply."
developments in Viet Nam, when compared with its previous quasi-primitive state, seem to be entirely dependent on colonialism. But a careful look would reveal that the development of transportation during the first half of the 20th century is a particularly familiar trend all over the world. In Viet Nam this development has been coincident with French rule rather than the result of it. Furthermore, policies that have been examined in this study seem to give the impression that they are holding back the development of Viet Nam in general and transportation in particular.  

**Effect of War on Transportation.** In an independent country there is less friction between interests and, therefore, less contradictory policies than in a country which is dependent upon another. Viet Namese certainly will have their interests and the development of the country uppermost in their minds in any policy making for their country. So the first good effect of the war in Viet Nam is the shift of power to make policies from the colonial government to the native government.

The second effect of the war is the extensive destruction in Viet Nam, particularly the systematic destruction of the means of communication. There is no record of the extent of destruction in the communist controlled areas.  

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1. See above Chapter II, pp. 20-30.

2. Communists control three-fourths of entire area, (before the truce treaty of Geneva, 1954)
safe to say, however, that destruction is nearly complete. All bridges have been destroyed, including even some just a few yards long. All railroad tracks have been demolished. All roadbeds have been leveled so there is no trace of their former location. All equipment has been dumped into strategic waterways to make river blocks. The French tried after the reconquest of the South and part of the North in 1946 to repair roads and some sections of the railroads for military purposes. But civilian population would not take the risk of traveling in those troubled times. From a total of 3,906 kilometers of railroads of prewar date, only 968 kilometers are in operation and these with high costs and big risks. The equipment actually used is less than one-half of the total equipment before the war.\(^1\) Roads now in use by motors are narrowed down to a few six or seven regular schedules between big towns.

**TABLE IX**

MOTOR VEHICLES IN VIET NAM, 1946-1949

<table>
<thead>
<tr>
<th>Year</th>
<th>Tourist cars</th>
<th>Common Carriers</th>
<th>Trucks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>11,350</td>
<td>9,214</td>
<td>2,250</td>
<td>22,710</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>13,280</td>
<td>2,140</td>
<td>5,470</td>
</tr>
<tr>
<td></td>
<td>Central</td>
<td>310</td>
<td>100</td>
<td>410</td>
</tr>
<tr>
<td></td>
<td>North</td>
<td>830</td>
<td>50</td>
<td>880</td>
</tr>
<tr>
<td></td>
<td>South</td>
<td>11,000</td>
<td>1,650</td>
<td>3,000</td>
</tr>
<tr>
<td>1949</td>
<td>15,860</td>
<td>3,600</td>
<td>11,250</td>
<td>30,710</td>
</tr>
</tbody>
</table>

Source: *Annuaire Statistique de l'Union Francaise, 1949.*

\(^1\)See Table V, p. 39.
Reference to Table IX shows that the demand for motor vehicles since the war has been for touring cars. This is probably due to the greater traffic in towns and cities and also to the fact that the war made some men rich. In 1946 the increase was 221 cars, in 1947 it was 354 cars, and 1948 it jumped to 2,208 new cars. In the same years the increase of common carriers are respectively only 30 cars, 126 cars and 764 cars. The number of trucks also increased, mostly by war surplus purchases. Among the three regions, figures show that the South is the less affected by war.

The waterways are not much affected by the war. That is the only means of transportation left to most people. The most common sight nowadays is a number of junks on which an unused motor from trucks has been fastened to a home-made propeller and fueled with charcoal gas instead of gasoline.

Population Shift. In recent time, after the Geneva agreement, there is a plan to move about one million people from the north to the south. But a lot of these people came from the south itself eight years ago when they fled the French occupation force. Over these years of war an estimated six million people were displaced from their former homes. Many of them will want to go back to their native villages.

1Annuaire Statistique de l'Union Francaise, 1949.
2Ibid.
3June, 1954.
after the war, others will have to move to a better home. This will be a big problem of transportation for Viet Nam to face in the future.
CHAPTER V

FUTURE NEEDS OF TRANSPORTATION

IN VIET NAM

Economic Factors. The need for more and better facilities in transportation for Viet Nam will be studied from the economic rather than from the technical point of view. Methods of construction, maintenance, organization, rate-making will not be emphasized.

In dealing with economic factors in the life of Viet Nam, the needs of the people will be kept in mind. The question is not whether some companies will make a profit, but whether Viet Nam can afford to be without improvements in transportation. The welfare of the people rather than dividends must be our chief concern. Profits, however, are not to be overlooked, for if the investors judge that a proposed railroad can never make returns on their investment, they will refuse to supply the necessary capital. The government might persuade reluctant investors to supply necessary funds by guaranteeing a certain rate of interest on their capital as it has done in the past.  

\[1\] See above, p. 21.
hand the government might also build the road and either
operate it or lease it to a private company.

**Income and Transportation.** The first factor to affect
transportation is the income of the people. The average
income of a Viet Namese is only 50 piasters per year.\(^1\)
With such low income there is actually little demand for
transportation. Therefore, transportation cannot become
adequate and remain so unless the people's income is in-
creased either by increasing productivity or by some social
reforms.

Uneconomical distribution of the population has con-
tributed to the low level of income. In the North, there
are 2,000 to 3,000 inhabitants to the square mile, with
practically all of them in the delta. Even with extensive
use of the land it is clear that the delta could not ade-
quately support so dense a population. On the other hand,
the upper land is almost deserted, and the South still needs
laborers. So an increase in production by shifting the
population to new settlements might raise the standard of
living.

**Village as an Economic Unit.** At the bottom of these
population and production problems is the economic self-
sufficiency of the village. It is necessary to have trans-
portation facilities to render the village less independent

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\(^1\)The average income of a Frenchman in Viet Nam is
5,000 piasters.
as an economic unit:

"The widening of the market with the concomitant changes in consumption and production, might be considered the natural beginning of an industrial revolution."¹

**Elasticity of Demand.** With a low standard of living the demand for necessities even in normal times has a degree of elasticity. This is the case in Viet Nam. Any improvement of transportation that lowers the price of food grain will bring about a large increase in the quantity of goods consumed.

A study of the poverty of Viet Nam cannot be limited to consumption. Marketing is another important problem.

"Before the building of the railroads, grains could not be moved, so that prices depended upon local scarcity or abundance with the result that the peasants were no worse off in bad years than in good. In good years, especially in consecutive, the markets were glutted and the peasants who were compelled to sell in order to meet the Government and other demands were ruined by their own superabundance."²

**The Character of Viet Nam Produce.** The character of the goods which compose the bulk of the nation's produce tends of make the need for transportation more urgent. Viet Nam's output, chiefly agricultural and raw materials, has much bulk or weight in proportion to its value. Until manufactured goods comprise a larger proportion of the total national dividend, the costs of transporting goods from the

place of origin to the place of consumption will continue to be an important item in determining and supply price. Therefore, under competitive conditions any improvement in the means of transportation will affect more favorably both producers and consumers, than could be the case if transportation played a less important part in determining values.\(^1\) This characteristic of much bulk to small value has an intensified influence in Viet Nam.

**Conditions of Transportation Demand.** It has been pointed out that the demand for transportation is influenced by four factors: the density and distribution of population, the intensity and variety of wants, the extent to which territorial division of labor is practiced, and the extent to which the production system demands that capital and labor will flow to places which yield the greatest return.\(^2\)

With respect to the density of the population and its distribution, the country averages 200 inhabitants to a square mile. In the plains of the North the population is over 1,000 to the square mile, and in the delta of the South, over 500, while for the rest or 90 per cent of the country the density ranges from five to 80 inhabitants to the square mile.\(^3\)

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\(^1\) Charles E. Landon, *Transportation*, p. 23.
\(^3\) E. H. Dobby, *South East Asia*, p. 308.
This distribution of population affects the distribution of income. The difference of income between the North and the South is almost in direct proportion to the density of the population. The annual income in the North is 30 to 40 piasters, and that of the South is 75 to 100.\(^1\) Certainly other factors affect income, but the population distribution is the most important factor in the case of Viet Nam. A better distribution of the population depends in large measure upon future transportation policies.

Besides being very unequally distributed, the population is quite immobile in Viet Nam. The average distance traveled in 1936 was only 46 kilometers.\(^2\) Even in famine times there has not been the movement of people one would expect. According to the General Labor Survey all migrations are temporary. This results from the family tie that keeps people home or brings them back after they have been gone a few months. The breaking-up of the village as an independent unit has been slowed down by certain colonial policies such as forced labor on rubber plantations, or moral division between North and South.\(^3\)

The absence of variety of wants is another factor which helps to explain why the actual demand for transportation in Viet Nam is small. Here people are content if they

\(^{1}\)Ibid., p. 324.

\(^{2}\)See above, p. 39.

\(^{3}\)South people are brought up to consider themselves superior to North people.
get some rice and fish to eat twice a day.

Lardner's Law of Squares. What should be the ultimate minimum of transportation with which Viet Nam can be satisfied? It has been shown that the demand for transportation increases with industrial development, and that massive production cannot occur without effective means of transport. The ultimate goal for a nation in estimating the future development of its transportation system should be to make the nation one market for commodities of universal demand.

Marshall discusses the course of the market extension as follows:

"Improvements in the mechanism or organization of transport which increase the distance over which trade in certain goods can be carried at a given expense, are likely to increase in the square of that ratio, the area over which the trade can be conducted profitably."\(^1\)

To achieve the operation of the Law of Squares in transportation and trade, main lines should be supplied with sufficient feeders to draw the isolated village into the same market as those towns and cities which lie on the main lines. This question will be studied in more detail in the next chapter.

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\(^1\) *Industry and Trade*, p. 27.
CHAPTER VI

METHODS OF MEETING VIET NAM'S NEED FOR TRANSPORTATION

Caution. It is one thing to say that Viet Nam must go forward with its plan for extending the transportation system, but it is another thing to specify what form the extension should take. Meeting the nation's demand for transportation facilities is a complex problem requiring the combined skill of the engineer, and the wisdom of the statesman and the economist. Proposals in this thesis are broad in character so as to fit any particular situation in the future, and are limited as far as possible to the economic aspect of the problem.

Provincial Department of Transportation. In developing transportation in Viet Nam the impact of colonial administration manifested itself everywhere. All plannings had been from the top level, while little or no planning was made on the lower level of the provinces. This explains why policies were short-run exploitation in nature and benefited only a few, and also ignored the needs of the
majority. Future plans must be based on the needs of each province first.

It is the writer's belief that there should be created in each province a special department for the study of its transportation problems. What form it should take and what status it would have in relation to other departments are questions for the students of Viet Nam politics to answer.

Since the results of providing means of transportation are not limited to the boundaries of any province, the different provincial departments should be centralized in one high official.

The general duty of each provincial department would be to further the development of material resources of the country through the use of better means and methods of transportation. The need of such an organization, the chief duty of which is to know the conditions of the village and to assist the small producer in buying and selling to the best advantage, is intensified because of the villager's ignorance of outside conditions.

The transportation department should be responsible for the following: (1) An examination of the standard of living with special reference to the supplies of the village itself or in the immediate vicinity. (2) A study of the surplus of production within the village and the ability of the people to find satisfactory markets. The general movement of goods should be noted, and an effort be made to discover the reasons why these movements take the direction
they do. (3) An estimate should be made of the existing supply of transportation facilities in each locality and their adequacy in the light of actual potential growth in production. (4) A study should be made of community losses due to unnecessary duplication of transport. (5) Information on the mobility of labor in the different districts should be analyzed.

After such an examination of the village conditions has been made, certain constructive programs for the economic advancement of the provinces and of the country can be undertaken. All these programs might not be carried out by the transportation department, for some other department might be more intimately concerned.

Each local department should formulate its needs for transportation and make definite plans for meeting its own requirements. These plans would be subject to the approval of the provincial department. Where trunk lines are concerned involving more than one province, the ultimate approval would rest with the government of Viet Nam. But the point to be emphasized is that in so far as possible, future expansion of the means of transportation must be based on economic facts.

Also, such a department with an efficient staff of men who are familiar with village conditions could render great service in moving goods. Cooperative marketing is still in its infancy in Viet Nam. There is little regular collection of goods at the place of sale, such as is carried
on in the United States. What cooperative effort exists in Viet Nam is unorganized and more or less accidental in character.¹

The result is a wasteful duplication of men and shipments of goods. Shipping in less-than-carload lots means higher rates. By organizing and systematizing the village demand for regular transportation and, by the best use of the existing transportation facilities, the community losses due to duplication could be reduced to a minimum. The organization would plan for full loads in so far as possible in carrying goods to markets and in bringing back supplies to the village.²

A department of transportation in each province would be a strong right arm for the department of industry. In all plans for Viet Nam’s economic welfare, in so far as they reach the village, this organization of transportation would be the necessary link.

In conclusion any plan for the future must include the Viet Namese village or it is not reaching Viet Nam.

Motor Transportation for Viet Nam. As a means of strengthening and increasing the country’s transportation resources encouragement should be given to the development of more efficient motorized transportation. Motor transport

¹Robequain, op. cit., p. 402.
²Landon, op. cit., p. 56.
would be a valuable adjunct to the railways, particularly in areas which are productive agriculturally, but which cannot make progress on account of the lack of facilities for transportation to markets.

The growth of motor transport in Europe and in America has been phenomenal. In America the service rendered to the rural areas by motor trucks has greatly stimulated and assisted production. In the western states alone, the trucks have moved great quantities of commodities which could not otherwise have been marketed, and which would have gone to waste.¹

In England and the United States, Rural Express is being organized on a national scale for the purpose of making markets more accessible to agricultural communities, of bringing the consumer into closer touch with the producer, and with the view of relieving the producer of the burden of marketing his own product, thus permitting him to remain on the land where his labor is the highest.²

By Rural Express is meant the use of the motor truck in regular daily service over a fixed route, with a definite schedule of stops and charges, gathering farm products such as milk, eggs, livestock, and vegetables, and delivering them to the city dealer. On the return trip, Rural Express

¹Highways Transport Committee (Washington, May, 1918, #2, p. 2.
²Landon, op. cit., p. 65.
would carry merchandise, machinery and supplies to the farmers and others along the route.¹

Rice and other agricultural products of Viet Nam still depend heavily on water traffic. But there is a specific case where products demand a faster transportation, namely the marketing of perishable foods. Population has shifted to towns at the rate of four million in the last twenty years. Saigon had a population of 300,000 inhabitants in 1937 but now has more than two million. Hanoi has grown from 100,000 inhabitants to 300,000 in the same period.²

As industry is developed the concentration of population will be greater. These cities will demand a big supply of perishable foodstuffs every day. These perishable foods should not be transported by water because any delay in transit will permit them to spoil under the tropical heat. They could not be transported by the railroads because the production areas are relatively too near for railroads to profit from low-cost long haul. Therefore, trucks are ideal for the situation. At the present time, perishable produce from areas only a few miles from the cities is brought to them by junks or on man's back. With the expansion of speedier transport the areas surrounding cities will increase in value according to the Lardner's Law of Squares.³

¹*Highways Transport Bulletin, op. cit., p. 3.
²*Annuaire Statistique de l'Indochine, 1952.
³See above, p. 66
Another feature of motor truck transport which makes it peculiarly suited to Viet Nam's needs is its adaptability to varying conditions, especially with reference to routes, schedules and tonnage. Motor truck service could be moved from point to point to suit the seasonal demand of transportation. The routes could be varied so as to make different villages on different days of the week. The schedules could also be timed to suit the majority of the patrons. Emergency trucks could be put into operation at times when there was a special demand for freight or passenger traffic. To have such a service would greatly reduce suffering and mortality during times of famine.

Before undertaking the establishment of a motor route there should be a thorough canvas of the field of operation. A careful business survey must be made in advance to determine the necessity or desirability of starting the route at all, and to aid in formulating plans relative to the investment of funds and the selection of equipment. This can be greatly helped by the organization of a local department of transport.

The success or failure of any rural road will be determined ultimately by four important factors: (1) The volume of farm products along the contemplated route; (2) The volume of miscellaneous hauling which can be secured to supplement regular loads; (3) Competition from other

1Address by Robert C. Wright (Assistant Director, Division of Traffic) before the regional Highways Transport Committee, September 17, 1918.

2See above, p. 68.
carriers which would be encountered; (4) The character of
the highways over which the truck must run.¹

A question of vital importance in determining the
feasibility of establishing a motor-truck route is the cost
of operating a truck. It is essential that some idea of
prospective operating costs be secured for, on the basis of
this estimated cost, rates will be established, the route
planned and the truck purchased. Costs would include tires,
gas, oil, and labor. Besides these, there are depreciation,
maintenance, insurance and other miscellaneous expenses.
Accounting, and especially cost accounting, is the thing
most needed in Viet Nam private business.²

The advantages which follow from the use of motor
transport are so great that it is a mistake not to strive
for them. Besides, Viet Nam has already a good system of
roads. So just a little encouragement in the form of sub-
sidiary or liberal regulations, would bring motor-truck
benefits to Viet Nam. The railroads will indirectly benefit
from it, too. There would be a regular flow of goods from
localities now isolated to the railways, where transshipment
would occur for the long haul. The amount of freight which
the railways would be called upon to carry would be increased.

One of the most interesting features of the rapid

¹J. H. Collins, Motor Transportation for Rural

²Conclusion inspired from Landon Text Book on Trans-
portation, p. 45.
development of the motor transport service during the war both in England and in the United States was the establishment of the return loads.\(^1\) To make it possible, organization is necessary. The Department of Transportation might help set up some model organizations for other private concerns to follow. If trucks start on their daily run from a city, the city shops and factories would thus be able to extend their markets to the villages. The isolated consumer would be able to order what he wishes on one day through the driver of the truck and receive his commodity the following day.

In introducing motor truck routes into Viet Nam, the old question would again face the government, whether the enterprise should be carried on by the state or left to private concerns. It is suggested that certain selected routes be chosen in different provinces, the survey made, and the organization perfected by provincial departments. These routes could be operated by the state as a demonstration of what can be done. Private enterprises would undoubtedly follow. It would be a mistake for private enterprises to start motor transport service without the necessary study and survey.

There is one thing that should be of great assistance in introducing the motor transport service throughout Viet Nam, namely, the existence of Cooperative Credit Societies. The societies should help in interesting the village

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\(^1\)Highways Transport Committee, Bulletin 40, p. 45.
communities in the possibilities of the motor truck service. There is reason to expect that the cooperative societies themselves might become shareholders in motor transport companies, when it has been definitely proved that motor trucks can operate with profit and advantages to the communities.

Future Railroads in Viet Nam. The situation is quite different for the railroads. No drastic reorganization will be necessary. But some improvements can and must be done. First, all sections of the railroads destroyed by war should be repaired as soon as possible, but not before a complete survey is made to determine if it is necessary to change location of the railroad.

Objections have been voiced against the routes of the two main railroad lines in Viet Nam. The Haiphong-Yunnam runs through the deep and narrow valley of the Red River, which prevents feeder lines from being connected with it.\(^1\) Besides, there are too many expensive works on that line. (These are now destroyed). A survey to see if it is more advantageous to abandon that route to follow another with easier access for feeder lines and with less costly works is necessary. The new route should also pass as near as possible to locations that possess industrial possibilities.

\(^1\)See above, p. 25.
A second line should be added to the single track line of the Transindochinese railroad. The new line should be more inside the country so as to promote its development. The reasons have been given in the second chapter on page 22. Feeder lines can be constructed to connect the two lines.

In addition to this second Transindochinese railroad, a few other main lines can be constructed. The country has more length than width. (See Map I, p. 5) All through its length, the country will be served by the two lines of the Transindochinese Railroad; but the width of the country varies from 30 miles to 700 miles. The largest width is situated in the north, so only there is it possible to construct a few more sections of railroads. The other reason is that the North alone has the potentiality to become industrialized.

The railroads must also be changed to a larger gauge for the reason of speed, which will be important in the face of motor-truck competition. Another reason for this change is that it will be easier to buy equipment of universal standard. The third reason is to make the Viet Nam-China railroad connection. The gauge proposed is 4'8", the gauge already in use in China.

Bridges, when rebuilt after the war have to be larger with at least separate lanes for cars and for trains.

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1 See above, p. 22.

2 See above, p. 23.
Better equipment for railroads should be introduced to improve speed and comfort. Electrification would be very advantageous. Thus far, only one per cent of the hydro-electric power in Viet Nam is developed. Multiple-purpose dams can be constructed to benefit irrigation and navigation and furnish power for electrification of the railroads.¹

For two reasons the reconstruction should be undertaken by the state. (1) Because of political instability, private capitalists, mostly foreign, will be very slow in investing in Viet Nam for many years to come. (2) The need will be urgent so that only the government can rebuild the railroad system fast enough to cope with the big shift in population caused by war.²

Better coordination with roads and waterways transport should be promoted so as to make the whole system of transportation efficient.

Laws should be liberalized so as to attract foreign capital and encourage native capitalists to invest in railroads.

The most important need is a change in policies. The old conception of catering for China trade must be subordinated to a new policy of catering to the country's development. Other reforms, social as well as industrial, should go hand in hand within a comprehensive plan for all branches

¹Robequain, op. cit., p. 432.
²See above, p. 59.
of activity in the country.

**Future Waterways in Viet Nam.** Waterways have been important in Viet Nam, and they will remain so for many years. However, too much dependence upon them has tended to slow down improvements in other branches of transportation. Furthermore, waterways among all means of transportation are the slowest to modernize.

The method for improving motor trucks transport, elaborated in the preceding pages can serve as a framework for water transport improvements. There should be a survey on provincial levels of the needs of water transportation in each province. There should be better organization and management. There should be introduction of better equipment.

The big question is whether a large program including flood control, irrigation, creation of power and navigation should be undertaken. The writer's answer is in the affirmative. There is uncertainty only as to the proper time and amount of necessary capital.

Flood control is the most important factor in any water conservation program in Viet Nam. The improvement of dikes by the French was a logical and easy way to solve the flood problem. It did not cost much and public opinion favored it. Other methods more modern and comprehensive were proposed but the government did not think they would bring quick returns. People of some regions also opposed
them because they did not wish to be moved to another place and let their land be flooded to serve as reservoirs.\(^1\)

The dike method of controlling floods has another drawback, that is, it hinders water transportation by its many artificial barriers. A better method of controlling floods is making use of dams and reservoirs. Through this scheme, electricity can be produced, water levels controlled, and navigation made more efficient.\(^2\)

**Seaports.** A study of transportation in Viet Nam is not complete without reference to seaports. They are in close relation to all means of transportation. In Viet Nam, practically all transportation leads to a port, because exports and imports are more important in Viet Nam's economy than the interior trade.\(^3\)

Most cities in Viet Nam are situated in locations close to navigation routes, either at the junction of two waterways or at transshipment points.

Viet Nam has only two large ports, Saigon and Haiphong. One is located in the South and one in the North.

Haiphong has grown up about twenty kilometers from the open sea, on the right bank of the Cua Cam, one of the outlets of the Thaibinh river. The Thaibinh river is

\(^1\) Dec Ngoc Kim and Tran Ngoc Han, Conferences on Flood Control in North Viet Nam, 1953.


\(^3\) Robesquin, *op. cit.*, p. 117.
interlinked with the Red River by the Song Tambooc and the
Canal des Banbous. The latter is the most frequented route
from the sea to Hanoi.

The most serious defect of Haiphong is the rapid
silting of the channel. The tide's action forms a double
mud bank at the entrance of the Cua Cam. A new entrance,
the Cua Nam Trieu northeast of the Cua Cam is now used. It
is 55 meters wide at the bottom. But still only boats drawing
five meters or less can cross it at all times. Regular
dredging operations are necessary. At high tide, boats
drawing seven meters can go up the river, but there is only
one tide a day in the Gulf of Tonkin. Steamers and freighters
too heavily loaded have to wait for several hours for the
high tide.¹

The progress of Viet Nam can be seen in the increased
amount of trade. The average tonnage of the steamboats
entering the port has increased constantly. The two large
French shipping companies,--the Messageries Maritimes and
the Chargeurs Reunis--each maintain a monthly liner to
Saigon, France, Hongkong and Japan. In 1937 incoming and
outgoing shipments had an overall weight of 3,315,000 tons.²
This included both foreign and coast-wise shipping, the
latter still including a large number of native and Chinese
sailing boats.³ The principal export commodities are rice,

¹Conferences on Flood Control, op. cit.
²Annuaire Statistique, 1947.
³Robequain, op. cit., p. 121.
cement and coal from Dongtrieu. It is through Haiphong that the distribution of coal as well as foreign imported commodities is carried on in North Viet Nam. Haiphong in fact has the advantage of being the outlet for the waterways which serve the Northern Delta and part of the Hinterland. It likewise owes much to the railroad which links it with Central Viet Nam, and in particular makes Yunnan (Southern China) its only port.

The defects of Haiphong suggest that another location would be a better port for North Viet Nam. The most radical solution proposed is the construction of shipping facilities in Along Bay, behind the natural shelter of the numerous islands. The secondary port Courbet, 30 miles from Haiphong, is also a favorable site. But these plans are objected to on the grounds that navigation between the islands in foggy weather would be difficult.

A mission of experts sent from France in 1930 decided to maintain Haiphong and to undertake the improvement of the port. ¹

Saigon is 80 kilometers from the sea, on the right bank of the river which bears its name. Saigon enjoys more natural advantages than Haiphong. It is well away from the Mekong River, whose silts are dumped near Camau Point by ocean currents. The canals which connect the Vaico River and the Donnai River to the mouth of the Mekong do not bring

¹A. Rouville, L'Amélioration des Ports en Indochine, Paris, 1931.
much silt. The play of the tides clears the waterways leading to Saigon, and keep them deep enough without much costly dredging. The tide itself is more regular than it is at Haiphong, and flows up the river twice a day. Fog is very rare here and landfalls are made easy by two unmistakable landmarks: Poulo Condore Island and Cap Saint Jacques.¹

Thus, any day of the year, ships drawing as much as nine meters can go up the river to Saigon by a twisting channel which nevertheless can be easily traversed in four or five hours. It is hoped to make the port accessible to ships drawing ten meters by cutting some of the banks that force ships to turn too sharply, by increasing the channel's breadth and by improving the buoys and lighting so indispensable for night traffic.

Saigon should be able to handle the development of regional trade. The port has grown with the increase in trade, particularly the rice trade. The port extends along the river for about six kilometers. Back of the embankments are storehouses with 30,000 square meters of covered storage space. Buoys and stakes are set in the river to make additional moorings and are used mostly for loading grain, since they permit the work to be done from both sides of the ship at once. The port of Saigon can thus harbor about

¹Russier, op. cit., p. 32.
forty large and medium-size ships at one time.\footnote{Robequin, \textit{op. cit.}, p. 122.}

More than Haiphong, the prosperity of the port of Saigon depends on the river navigation facilities. The river port stretches for more than 25 kilometers through Saigon and Cholon along the Chinese Arroyo on the one hand and along the Doublement and Derivation Canals, which are joined by three crosswise canals. It is over these waterways rather than the railway, that supplies are brought into Saigon, and it is by the same route that the produce of South Viet Nam and Cambodia—particularly rice and corn—is transported by junks right up to the ships in the harbor.

Unfortunately, the canals are shallow, vessels are often beached in front of Cholon factories and can get away only at high tide. Ferrying by junks between the factories and the ocean-going ships is not as rapid as it could be.

In the plans for improving the Saigon harbor, the clearing and deepening of channels, the construction of wharfs are the most urgent projects. The extension of the seaport downstream would entail dredging new canals, which would assure communication with Cholon.

Far ahead of corn, rice leads among Saigon's exports, which totalled 2,140,000 tons in 1937 compared to 1,370,000 tons in 1914. Although Saigon's total trade is considerably larger than Haiphong's, the discrepancy between imports and exports is even more striking. In 1937 incoming and outgoing
vessels totalled 8,274,000 tons. This figure also includes coastwise trade.

Saigon is Viet Nam's largest passenger port. In addition to the two shipping companies—the Messageries Maritimes and the Chargeurs Reunis—there are weekly sailings to Singapore and monthly sailings to Batavia. During the pleasant season of the year, foreign liners often debark tourists at Saigon.

Secondary Ports. There is no port of any great size in Central Viet Nam. This is due to violent typhoons in these areas. Nevertheless there are protected harbors such as Toumane, Cape Padaran, Vinh, Cam Ranh. But there is little coastal trade. There is only a narrow strip of coastal plains. Railroads and roads competition are in part responsible for the inactivity of ports in Central Viet Nam.

Toumane is the only port of Central Viet Nam where ships make regular stops. It could be eventually connected with the Mekong River. Toumane trade hardly exceeded 180,000 tons in 1936. Rice, unrefined sugar, tea and cinnamon are the principal items.1

Among the small ports of Central Viet Nam two have claimed special attention. First is Benthuy, which is located on the Song Ca River. It is a thriving city, starting point of the highways to Thakhet and Luangbrabang,

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1Robequain, op. cit., p. 124.
and where the uncompleted Laos railway and the Transindochinese meet. The second is Quinhon, which now is serving the newly developed areas of southern Central Viet Nam.

The geographic position of Indochina, facing the ocean which lies between Malaya, Indonesia and China, on the busy Pacific, has often drawn attention of world commerce. But, because of the outline of Asia's coast, with the Malaca Peninsula stretching all the way to the equator, Viet Nam is off the important shipping routes, particularly the heavily traveled ones between Singapore and Hongkong. The trip up the river to Saigon means several additional hours, so there has been a good deal of agitation for building a port of call on the Central Coast, where stops could be made with little lost time. Foremost under consideration in this connection is Camranh Bay. Consideration of defense and of strategy alone could justify large scale construction on this bay. Works begun during the last war now serve as a naval base. Economic development of Central Viet Nam will benefit greatly from that port in the future.

A National Policy. Viet Nam's three transportation agencies—railroads, roads and waterways—have been developed independently and most of the time piecemeal. As each originated and grew, there was little or no thought of the general national situation. Private interests were largely involved. The rivers were assumed to be gifts of nature and

\[1\text{Robequain, op. cit., p. 124.}\]
almost no attention was paid to their improvement. The highways were of primary importance for political reasons and military purposes. The railroads were exclusively for the benefits of a few.

Clearly those transportation agencies, developing at different times, under varying conditions, need to be reorganized on a national basis.

In the future, there should be a unified government policy toward all agencies of transportation. This policy should be outlined by a competent body of engineers, government officials and business and industrial leaders. Implementation of this policy should be so devised that the results attained would meet the true measure of a useful transportation system, that is, in the fullness or completeness with which it can serve the total need of a nation.
A. BOOKS


Fuller, J. P., Pegasus or Problems of Transportation, New York: E. P. Dutton and Company, 1926.


Janse, Robert, The People of Indochina, Description and Travel, Washington, D. C.: The Smithsonian Institute, 1944.


B. GOVERNMENT DOCUMENTS

Department des Colonies, Annuaire Economique de l'Indochine, Paris, 1925.

Department des Colonies, Annuaire General de l'Indochine, Hanoi, 1887.


United Nations, Conferences on Flood Control by Tran Ngoc Kim and Tran Ngoc Han, United Nations Publication, Washington, 1953.


C. PAMPHLETS

Revue Indochinoise, Hanoi, 1953.
Nguyen-xuan Giao, Regime Economique de la Cochinchine, Paris, 1924.