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**Transport Problems in Relation
to Economic Development
in
West Africa**

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TRANSPORT PROBLEMS
IN RELATION
TO ECONOMIC DEVELOPMENT
IN WEST AFRICA



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FOREWORD

The programme of work and priorities adopted by the Economic Commission for Africa at its second session included among research topics "selected problems of transport in Africa, with emphasis on transport deficiencies as obstacles to economic development and the ways of removing these deficiencies" (E/3320).

As it was thought advisable to reduce the scope of this subject by approaching it from the regional point of view, it was decided to confine the study to "West Africa", i.e. the region somewhat loosely

so named, the guiding principle being the availability of pertinent facts and figures rather than any strict geographical concept. Thus some countries came to be treated at greater length than others, in particular Ghana, the Ivory Coast, Nigeria and Togo.

The present study does not pretend to deal fully with all the transport systems in West Africa, even with those of the four countries above-mentioned, or with all the problems confronting them. It aims merely at a discussion of some important questions that are more or less common to the whole region.

TRANSPORT PROBLEMS IN RELATION TO ECONOMIC DEVELOPMENT IN WEST AFRICA

Introduction

Even if the famous dictum that "the material development of Africa may be summed up in one word — transport" is not taken in its absolute literal sense, improved transport is certainly a prerequisite for any type of development. It is likewise obvious that the general inadequacy of the transport system has been one of the principal obstacles to such development in practically the whole African region. In what follows this statement will be borne out, mainly by facts and figures from West Africa. This geographical limitation leaves aside certain obstacles to the development of a modern market-economy in general and of an integrated transport system in particular which are rather conspicuous in some parts of the African continent, e.g. East Africa, among them institutional arrangements like restrictions on access to resources applied to members of particular racial groups¹. In addition since this study concerns only transport in relation to *economic* development, the political, strategic and sociological aspects of transport problems are largely omitted. This point is of definite significance in the West African region, where the existing transport systems often originated in military, political or administrative rather than economic motives. On the other hand, "economic development" as understood here means more than, for instance, "industrialization"; indeed, one of the most important aims of this study will be to assess the role of transport in developing internal markets. Thus the emphasis is on the role of transport in general economic development plans rather than in specific industrialization projects. This does not however, preclude raising the question of bottlenecks caused by inadequate or non-existing transport facilities. A wider approach to transport and economic development problems must also take in the movement of persons and all kinds of "mixed" transport.

A bird's-eye view of transport in Africa in general and in West Africa in particular, reveals some obvious gaps.

As one expert aptly puts it²: "Almost nowhere in tropical Africa is there a fully integrated transport complex permitting a rational selection of either road, rail or air transport." This state of affairs is most remarked in regard to domestic markets: where economic aspects predominated the various modes of transport were developed with the primary aim of promoting foreign trade. Hence, the movement of goods, except between ports and their economic hinterlands, remained singularly restricted until fairly recent times — a fact which was reflected in transport costs. To mention only one example, the cost of transport between the port of Abidjan on the Ivory Coast and almost any point in Upper Volta would until quite recently not have been less than that for a shipment from Marseille to Abidjan!³ Not a single African country, with the possible exception of the Union of South Africa, has in fact adequate transport facilities in its own territory; nor is the situation any more satisfactory between different regions. In West Africa the transport picture is marred by missing "international" links and devious transport routes.

A study of transport in Africa will be largely concerned with "bottlenecks" due to the lack of adequate goods and passenger transport services, possibly caused by defective infrastructures, shortage of suitable equipment, faulty routing etc. This situation partly arose out of war or post-war conditions, and is thus more or less temporary, but its causes may be to some extent inherent in such basic constraints on West African trade and production as seasonal variations.

Transport operations in Africa are complicated by, *inter alia*, handling and packing problems, a basic difficulty being the heterogeneous character of most imported goods coupled with the relative homogeneity of exported goods, necessitating different types of handling equipment. In regard to packaging, improved transport may make it possible to use lighter materials, e.g. when the establishment of a continuous transport chain eliminates repeated loading and unloading operations; again, improved transport conditions may open up a new domestic market for packaging.

¹ East Africa Royal Commission 1953-55, *passim*.

² William A. Hance, "African Economic Development", N.Y. 1958, p. 87.

³ Marcel Capet, "Traité d'Economie Tropicale, Les Economies D'A.O.F.", Paris 1958, p. 103.

One of the main factors affecting transport, especially road transport, efficiency and costs is the state of repair and maintenance services. The lack of skill, equipment and organization in this field which is still very common in the region under consideration seriously hampers and raises the cost of transport operations.

A study of transport in West Africa designed to assess its present and future value as a tool of economic development will naturally be very different from one devoted to transport in an economically developed area. This fact is of special importance when we come to study the true costs and profit-earning capacity of transport undertakings. While the main need in many an economically developed area is to share the transport market among the various modes of transport, the problem in an under-developed area may be rather one of selective investment in the transport industry.

When transport in West Africa is approached from the angle of studies in the field, one serious obstacle met with is the lack of relevant statistics. The only mode of transport fairly well, although by no means comprehensively, covered in this respect is the railways; but even here many accepted ideas about railway operations have to be modified to take account of special features of West African travel and transport. For instance, the conspicuous fact that passenger transport in West Africa means something rather different from the transport of passengers and luggage, say, in Europe or in the United States is not brought out in current railway statistics. Indeed, passenger transport in West Africa (whether by rail or road) is a mixed operation and the goods an African traveller is likely to take with him or her on

a journey are, in quantity and volume, freight rather than just luggage. A retail dealer may take her entire stock along with her!

Considerable quantities of goods are moved by primitive means of transport. Human portage is still frequent, cattle move on the hoof, canoes and pack animals are still widely used. Much use is also made of bicycles; but all this traffic cannot be accurately estimated.

In regard to road traffic in particular, it can be said that no, even approximate, estimate of the actual volume of traffic is yet available in any part of West Africa.

Such scrappy transport statistics as exist naturally concern only "licit" traffic, whereas there is a substantial illicit traffic in various goods between many territories, e.g. Togo and Ghana or Nigeria and Dahomey, on the one hand, and Nigeria and the Niger and Chad territories, on the other. This considerable contraband traffic, especially in cattle, also raises a transport problem, but there is little hope of accurately estimating its scope.

Another point on which useful information is still rather scarce is traffic accidents. Here the relevant statistics should include data on damage to goods, pilfering etc.

A worthwhile, though by no means easy, task would be to try to obtain some idea of the main traffic flows. Attempts have been made for some countries⁴, but much still remains to be done.

⁴ E.g. certain studies by the Geographical Institute of the University of Strasbourg on Togo, the Ivory Coast, Senegal and the Ubangi-Shari railway project, and others undertaken by the World Bank.

Chapter 1

BASIC FACTORS DETERMINING TRANSPORT DEVELOPMENT

A. *Natural conditions*

Natural conditions in West Africa often constitute obstacles to rational transport development; as they are so well known, they will be referred to only briefly here.

Africa has been aptly described as a "plateau continent", and this explains some of the difficulties affecting transport. Behind a narrow coastal plain, averaging for the continent only 20 miles in depth, there rise steep slopes, which make the building of railways and highways difficult and costly. While West Africa is in this respect somewhat more fortunate than East Africa, since the plateau is lower, routes are nevertheless often very difficult, e.g. in Sierra Leone and Guinea. Another consequence of the topography is that streams are likely to descend over falls and rapids from the plateau in the interior.

The construction and the use of railways and roads are hampered by the relative scarcity of suitable ballast and the general absence of local fuel and, in some areas of water-difficulties which have been only partly overcome or reduced in recent times by technological developments like the introduction of diesel traction or the application of new road-building methods.

The West African coasts are generally inhospitable, and good natural harbours like Freetown or Dakar are the exception. One major problem is the shifting sandbars that block harbour entrances and river mouths. River traffic is hampered by rapids in the upper reaches and sandbars in the lower reaches or off-shore.

While the topography of the region is thus generally inimical to the establishment of transport services, climatic conditions cause even more serious difficulties.

West Africa can be roughly divided into six vegetation zones¹ ranging from the coastal grasslands and rain forests in the south to the Sahara desert in the north. Many of the main transport

routes run south-north and pass through all or most of the regions.

The tropical forest is in a sense the most formidable obstruction to overland communications, whether by rail or road. In pre-colonial times there was but little intercourse, except in the form of raids, between the peoples of the savannah and those of the forest zones until this isolation was finally broken by railway-building. In the forest zone, torrential rains and the density of the vegetation make surveying and the building and maintenance of railways and roads extremely difficult and expensive. In the rain forests, laterite roads do not stand up to heavy traffic and asphaltting is the only answer to the demand for all-weather roads. In the savannah zone, rains are a seasonal problem; but during the wet season they are often torrential and make many routes impassable. High humidity creates oxidation and speed deterioration of plant and equipment. In the semi-arid zone, however, the very lack of water has been a serious obstacle, especially to railway operation.

The construction and use of railways and roads may be greatly affected by climatic conditions; but river traffic is even more so, mainly because of the extreme variations in water levels between the rainy and dry season; hence the minor importance of most rivers in West Africa as main transport routes, although they all carry traffic. A further complication arises from the fact that the rise and fall of the main river do not necessarily coincide with the fluctuations of its principal tributaries, thus obstructing the creation of a "system". A good example is the Niger-Benue "system". Here, the upper Benue is navigable only for two months of the year (August and September); the rain-water which feeds the sources of the Niger takes more than a year to reach Nigeria, and the rise and fall in the Niger and the Benue do not coincide. In consequence, the traffic on these rivers has to follow an annual rhythm to avoid serious difficulties. If river craft for any reason tarry on the Benue just one day too long, they may be stranded on sandbanks for the next ten months; if, on the other hand, river craft load and leave the Benue sector too soon, substantial quantities of goods may not reach wharfs and landing-stages until after the craft have sailed and thus either be left

¹ E.J. Pedler, "Economic Geography of West Africa" pp. 12-13, London 1956; according to this author the zones are: grassland, rain forest, middle belt woodland, savannah, thornland and Sahara desert.

behind or have to be moved by more expensive means. Such conditions necessitate a chain of complicated operations. Craft of various sizes, from large self-propelled craft down to small canoes, take over from each other on the Benue, as river depth decreases. Such difficulties explain why, for example, the Lagos-Kano railway instead of the river Niger has become the main traffic artery of western Nigeria.

The extraction of timber from the forest and its transport to the mill may be greatly facilitated where floating is possible. This is, however, not always the case in West Africa; floating is widely used in Nigeria, but in Ghana, for instance, timber is moved by rail or road.

While topography and climate in West Africa normally affect agriculture more than industry, the transport industry is likely to bear their full brunt. Agricultural production is still the backbone of the economy of West Africa, and agricultural goods still constitute the bulk of the goods carried. Hence the determining factor in traffic peaks is the crop season. The rainy season greatly affects road transport and only less so rail transport, where it disrupts connections and raises transport costs in general. Fortunately, in normal times the movement of export crops has usually been completed when the rains start so that the traffic volume is reduced to its lowest yearly level. At the same time the demand for import goods is restricted because the farmers, having long since received payment for their crops, are without funds, while the nomadic herdsmen have almost everywhere moved far to the north taking any demand of theirs for import goods with them. Hence, the volume of goods traffic is always much reduced during the rainy season, regardless of whether the roads are passable or not.

The influence of such factors as relief and climate can be partly overcome by technological developments, and this has undoubtedly happened in West Africa, with certain effects on the choice made between the various modes of transport.

An important requirement for the development of an efficient transport industry is an adequate supply of power; indeed, as one expert puts it, such a supply "...holds much the same place in transportation... as do raw materials in production. Costs of transport in a district are affected by its transfer relations with sources of power supply, and the transportability of the various sorts of power. A district which is close to a cheap coal supply and has good communications with it, for example, may have fairly good transport relations in general even though the topographical conditions are unfavourable to transportation."² A case in point is Nigeria, whose Eunugu mines contain the only important coal deposit in West Africa, although the quality is rather poor. Imported diesel oil usually proves

to be the most economical fuel for African transport and is itself cheaper to transport (and import) than African coal, even if better grades were obtainable. Few important oil wells are as yet exploited in West Africa, although some deposits are known. But Nigeria has been exporting petroleum since 1958 and a refinery is planned which would make the country self-sufficient in paraffin oil, petrol, diesel and fuel oil.

As to electric energy, an important hydro-electric project in West Africa is the Volta barrage in Ghana, though neither this nor any other similar project will be a direct source of power for transport. Such projects will mainly supply industries whose products — like aluminium or bauxite, or pulpwood and paper — will have to be moved by one or other mode of transport. But the prospect of large-scale electrification of railways, which would demand very heavy traffic to justify its cost, seems still rather remote.

The demographic pattern of a region is of course one of the basic natural factors governing transport development. Here it may be pointed out that, while West Africa has the highest average population density in tropical Africa, the population is scattered³, owing partly, of course, to climate and relief, but also — interestingly enough, especially from the transport angle — to other factors, whose effect has sometimes been even more decisive. Population distribution, in West Africa be it noted, is strongly influenced by traditional factors. Attachment to the soil may be strong, even where the soil is poor and adjacent to more fertile land, which remains unfilled because it is disliked. Thus, as one authority points out⁴, "the Ibo of south-eastern Nigeria are densely concentrated in a mediocre environment, but to the east are richer thinly populated lands. The same is true of fairly heavy concentration in Upper Volta, of the Kabrai in the Atacora Mountains of northern Togoland... and many more". Slave-raiding and intertribal wars formerly resulted in depopulated areas and isolation, as for instance between the savannah and the forest zones.

Lack of adequate transport facilities has reduced agriculture in many regions to subsistence crops and also caused migration, seasonal or otherwise, of workers in search of employment. Hence, as was recently pointed out in an ILO survey⁵, there are in Africa regions of labour shortage and regions of labour surplus, incomes being relatively lower in the latter. Labour migrates from the lower-income regions for varying periods, sometimes for years to the higher-income regions which are usually in the south. The migrants usually travel by road, the better-off using buses, bicycles or lorries; the poorer walking the

³ Church, R.J. Harrison, "West Africa", pp. 164-173.

⁴ Church, R.J. Harrison, "West Africa", p. 167.

⁵ International Labour Organisation, "African Labour Survey", Geneva, 1958 p. 712.

² Bertil Ohlin: *Inter-regional and International trade*, London 1933, p. 196 etc.

whole way and often covering as much as 20 miles or more a day.⁶

Communications have been largely responsible for the location of towns in the past and for the urbanization of the coastal regions in more recent years. Thus many towns grew up on trade routes, especially where easily defensible halts could be established. Special requirements, particularly in areas using primitive means of transport, have sometimes determined the location of a town, e.g. that of Kano in Nigeria, which was a caravan halt of special importance as goods were transloaded there from camels to donkeys, horses or human porters. In recent years, the development of the export-import trade made possible by the construction of railways and roads, has naturally been one of the principal factors in population shifts, especially in the coastal regions, typical examples being the great urban concentrations in Yorubaland in western Nigeria. On the other hand, the bearing of communications on population shifts has been less evident in the so-called "Middle Belt" on the outer fringes of the forest region. This poorly populated area, which stretches from the Upper Niger westwards to the Guinea Coast, has few natural resources and little prospect of an export trade; it has hitherto not been opened up to any extent although some communications exist.

B. *Political divisions*

Transport routes and transport development in West Africa, with some exceptions like the old caravan routes, largely reflected political divisions, especially during the period from the Berlin Conference (1885) to the Peace Treaty of Versailles in 1919. The salient factor here is that natural geographical frontiers generally do not coincide with political ones in West Africa; hence the latter do not, or only partly, delimit natural or economic regions. The Berlin Conference established the principle that effective occupation of a territory by a particular Power determined its allocation to that Power as a colony. The most effective means of proving occupation was to construct a railway; the farthestmost point reached by the railway marked the political boundary, so that the railways often reflect nothing more than the limit of military penetration. An instance of this is the northern boundary of Ghana; another, more complex, is the north-western frontier of Nigeria, which represented a compromise between Great Britain and France. Other national frontiers emerged likewise as compromises between the Powers in-

volved; such was the case for instance with the transfer of the *Iles de Los* off Conakry on the coast of French Guinea in exchange for a rectification of the north-western boundary of Sierra Leone.

International boundaries in West Africa are apt, on the whole, either to follow "natural" dividers, like watersheds, or to be just straight geometric lines. Ethnic considerations have carried much less weight, and international frontiers have disrupted the unity of many African peoples and cut their natural markets in two. This happened with the Kru people, who found themselves on both sides of the border between Liberia and the Ivory Coast, and with the Ewe, when former German Togoland was divided into a French and British mandate in 1919.

Such a state of affairs is bound to affect the economic development of the countries concerned and to have direct bearing on the planning of communications. The disruption of economic units, the division of natural markets and the bisection of ancient trade routes have led to longer and more circuitous routes, as is the case with the border between the former French Niger Territory and Nigeria, and even more so with the Dahomey-Nigeria boundary, which cuts the lagoon waterway, the natural route for traffic between Porto-Novo and Lagos.

Gambia provides another example of "political" frontiers; these are highly artificial and cut off the Gambia river from its natural hinterland in Senegal.

The frontiers of Togo, situated between Ghana and Dahomey, demonstrate how boundaries were drawn with no regard for ethnic and economic needs. Here the artificiality of the frontiers separating ethnically identical or similar tribes has led to considerable contraband traffic, particularly between Ghana and Togo. Similar conditions reign between the Republic of Chad and the Niger Republic on the one hand and Nigeria on the other, where cattle are smuggled on a large scale⁷.

The policy of restricting communications to the national territory, in order to create a national instead of an international transport system, has led to the establishment of transport routes with no economic justification, except perhaps a monetary one.

Although it would not be correct to blame the illegal traffic, for instance between Chad or the Niger Republic on one hand and Nigeria on the other, entirely on artificial boundaries, it cannot be denied that the latter cut across old trade routes. Examples of the creation of longer and more circuitous transport routes are frequent throughout

⁶ In addition to the above-mentioned ILO survey: Davison, R.B., "Migrant Labour in the Gold Coast", Achimota, Ghana, 1954; Richards, A.I. (ED.), "Economic Development and Tribal Change"; ILO, "Inter-territorial Migrations of Africans South of the Sahara", "Labour Review", Vol. LXXVI, No. 3, September 1957.

⁷ According to some estimates ("Le Chemin de Fer Bangui-Tschad" by G. Sautter, Brazzaville 1959, pp. 80-83), at least 25,000 head of cattle cross the border to Nigeria illegally, as compared with 40,000 head cleared by the customs; but, according to other estimates, the real figure is much higher. Another commodity transported illegally in great quantities is dried fish. In 1955, 13,000 tons were shipped from the Chad to Nigeria but only less than a 1,000 tons cleared by the customs.

West Africa. For instance, the lower Niger river, the natural outlet for the former French territories of Sudan, Niger and the northern Cameroons, was not used as such; instead an effort was made to direct all traffic towards Dakar. Similarly, until about 1950 Chad traffic was systematically routed the round about way through French Congo and Pointe Noire, instead of through Nigeria. This caused a steep rise in the price of imported commodities; for instance, a ton of cement for Chad, cost (1950) about 28,000 francs if routed via Pointe Noire, as compared with 15,000 francs when shipped through Nigeria⁸.

The general tendency in recent years has certainly been to try to conclude agreements on the use of international communications; the only trouble being that existing routes are ill-adapted for the purpose, especially in the case of the railways, which, having been built primarily to promote effective military control and efficient administration rather than economic development, reflect politico-geographical rather than ethnic or economic needs.

Some transit traffic problems arise directly from the politically motivated "shape" of the country. Thus the Togo national territory (with its coastline of only 50 km.) is so narrow that trucks running between Ghana and Dahomey or Nigeria can cross Togo without having to replenish their tanks; nor does this transit-traffic otherwise contribute to the maintenance of the Togolese highway it uses.

The artificial shapes of countries like Togo, Dahomey or Gambia raise all kinds of problems for rational transport development. For example, demand for transport services on a "national route", which must *ipso facto* keep within the national borders, may be very uneven, while demand in the north could best be satisfied by an international route. The fact, however, that so many West African communications, and especially railway routes, have to traverse unproductive or sparsely populated areas where there is little demand for transport services, is due less to political frontiers than to the location of productive resources, which are often situated far from the coast to which products must be moved for export. Such is the case, for instance, in Nigeria, where the railway receives practically no freight between Oshogho (180 miles from Lagos) and Zaria (618 miles from the same city). On the eastern Nigerian line there is almost no traffic between Enugu (151 miles from Port Harcourt) and Kafanchan Junction (459 miles from that port)⁹.

Recent political developments in West Africa are likely to change some of the conditions resulting from former political divisions, including the traffic link situation. International transport services may then grow in importance through the filling of gaps. The readier the new governments are to engage in regional co-operation, the swifter will be the change.

C. Economic structure

The preceding paragraphs stress the fact that few of the political divisions in West Africa conform to ethnic or economic regions, both of which frequently go far beyond political boundaries. The economic structures of the various West African countries are very similar as regards productive activities. The general setting is that of a primitive subsistence economy centred on the native village, production being mainly designed for home consumption and located close to consuming centres. Hence the value of locally produced and consumed food-stuffs far exceeds that of crops grown for export. For instance in 1950-51 the total value of production for economic consumption in Nigeria was 336.6 million pounds, whereas the export crops did not exceed 69 million pounds in value. While 283,000 tons of groundnuts brought 7.9 million pounds, 7.7 million tons of cassava produced for the domestic market realized 93.2 million pounds and 6.8 million tons of yams 70.6 million pounds¹⁰.

Movements of goods, except over very short distances, mainly concern export crops and mining products for the carriage of which the transport system of the various countries were primarily designed. Exchanges of goods between production zones for the purpose of diversifying standards of living are still unusual, although exceptions exist, such as the exchange of salt, dried fish, meat, and cattle from regions in the north for timber and kola nuts from the forest provinces. In this connexion, it may be pointed out that not all of those goods travel by mechanized transport; cattle, for example, still usually move on the hoof. The demand of West African industry for transport services is still slight, except as regards building materials, owing both to the low level of industrialization and to the location of industries. Most plants, especially oil-producing factories, are to be found in ports, as their products are largely exported. In the timber industry, sawmills are usually sited close to production centres, logs being relatively more expensive to move especially over bad roads than dressed products.

Transport in West Africa is still largely characterized by the movements of heavy, low-grade commodities in bulk¹¹. The modes of transport best suited to this type of traffic are the railways and, to some extent, inland water transport.

Some of the most important crops of West Africa, like cocoa, palm kernels and coffee, are almost entirely exported; but considerable quantities of others, such as groundnuts, cotton, palm oil, hides and skins, and timber are consumed in the region and are among the goods carried in domestic

⁸ Philippe Fromont, "Les Transports dans les Economies sous-développées", Paris 1952.

⁹ Church, "West Africa", p. 155.

¹⁰ F.J. Pedler, "Economic Geography of West Africa", p. 41.

¹¹ Pedler *op. cit. passim*; Church *op. cit. passim*.

traffic. Of 340,000 tons of palm oil produced in Nigeria in 1955, about 150,000 tons were taken up by the home market. Countries formerly part of French West Africa ship groundnut oil and cattle-cake to North Africa. There is likewise very brisk, mostly south-north, domestic trade in kola nuts.

Since the Second World War, there have been some important changes, both qualitative and quantitative, especially in the adaptation of transport to general economic development needs. As pointed out in a recent study¹², one striking feature has been the extraordinary increase in transport activities, especially at ports, coupled with systematic modernization of the railways in many, and considerable expansion of road traffic in all countries. Of particular interest in regard to goods traffic is the fact that imports have increased in volume faster than exports. The composition of export traffic has under-

gone some important changes that have necessitated new transport arrangements. One example is the enormous growth of the timber industry in Ghana where only half-a-dozen species were known to the trade before the war as against seventy now, thirty of which are utilized commercially.

Imports, too, are becoming steadily more diversified. In 1956, while the value of goods like machinery and transport equipment still amounted to more than 39% of the total, various manufactured goods (other than metals) accounted for 13.3%, textiles for 14% and foodstuffs for 11.4%¹³. The general tendency has been to import more miscellaneous consumer goods, whereas hitherto producer goods preponderated. This may be taken as a sign of a growing diversification of the general economy, which is advancing from the subsistence level towards the lower stages of an exchange economy.

¹² Transport and Communications in Non-Self-Governing Countries, A/4134, UN publications.

¹³ Economic Developments in Africa, 1956-57, Supplement to UN World Economic Survey, 1957, p. 56.

Chapter II

THE TRANSPORT INDUSTRIES IN WEST AFRICA

A. THE DEMAND FOR TRANSPORT SERVICES

Transport may rightly be regarded as a form of production; its principal function is to extend the market for the goods concerned. In fact, the volume of demand is to some extent determined by the availability of transport facilities, deriving in its simplest form from the demand for certain goods or, in passenger traffic, from the desire of certain persons to reach a given destination. Furthermore, transport may on occasion be, not a means of production, but an article of consumption — as is the case with some types of tourist traffic in which the travel is an end in itself. For our purposes here it should be noted that the demand for transport services is definitely heterogeneous: the products sought and supplied may be passenger/miles and ton/miles, but it would be quite misleading to present them as homogeneous. To the producer they may seem more or less similar, but to the buyer they are not. Transport services have to observe, not only certain general standards with regard to safety, reliability, and speed of execution, but special requirements applicable to specific ancillary services (e.g. storage, including storage in wagons, warehousing, breaking of bulk, palletization, provision of container, erecting and dismantling etc.), which may determine the user's choice of mode of transport.

The transport market is in general, characterized by "monopolistic competition", which is the kind of competition that exists when the demand for a certain product or service is such as to enable the seller to exert limited monopolistic powers. The assumption then is that the products or services concerned are non-homogeneous. (Transport services are moreover non-transferable and non-storable.)

Other similar market "imperfections" which split up demand arise from, for instance, variations in the characteristics of the product or service, often in the form of trade-marks, or special packaging or advertizing devices. In the special case of services, conditions of delivery, individual treatment of customers, location etc. are all so many market "imperfections" influencing demand. Hence, while quality-of-service will almost invariably predominate when two similar transport agencies are competing, the monopolistic nature of competition comes out more

clearly where the competition is between dissimilar services, like rail and road transport.

The foregoing remarks, are not merely of theoretical interest, but of practical importance, especially in under-developed regions like West Africa, where, owing to the general economic setting, the demand is for two distinct types of transport service: one for the export trade, the other for the import trade and the domestic markets. In the latter case, the two components are not, strictly speaking, identical; but they overlap to some extent as regards consumer goods.

The general theory of demand for transport services must, however, be to some extent modified when applied to West Africa. First, the traditional distinction between passenger and freight transport is not so clear-cut in West Africa as in most economically developed countries. Secondly, some transport operations connected with export goods, like groundnuts in some parts of the region are necessarily simple cases of demand for homogeneous ton miles. Thirdly, there exists a demand for certain primitive types of transport which may be due, not to lack of more modern facilities, but to the fact that under present circumstances the primitive mode of transport preferred, though technically inefficient, is not economically so.

The railways were the first modern mode of transport to be introduced into West Africa. The main economic reason for their introduction (although there were many more other reasons) were the needs of the export trade. Generally speaking, transport development in the region was for long — even until after the Second World War — pursued on behalf of the export and less so of the import, trade. In this sphere, particularly where the demand is for bulk transport of agricultural or mining products for export, what may be called the "money-charge" element takes precedence over the "quality-of-service" element in other words, the market concerned is not characterized by monopolistic or imperfect competition. The opposite is the case for domestic markets; and this is highly important for actual transport planning in West Africa, where the domestic market is obviously ill served. As a matter of

fact, the "imperfections" of the domestic market may well be regarded as typical of this region. African consumers are generally noted for their strong preferences for and conservative adherence to certain commodities¹. For instance, the Nigerian consumer insists on stock-fish from Norway or Iceland, although dried fish is also imported (usually smuggled) from Chad; in Sierra Leone the local bonga is preferred to salt herring, which may be only half the price; and the Ghana consumer buys only corbinas imported from the Canary Islands. Certain types of salt enjoy the same sort or restricted monopoly, as also certain cotton fabrics printed in Holland. In all these cases, variations in quality aside, the commodities concerned are basically very similar. This also holds for bicycles, certain makes being preferred to all others. Among other commodities whose brand names also constitute restricted "monopolies" are perfumes, soap and cigarettes.

Scarcity of capital and the inadequacy of transport facilities affect the West African market situation in various ways. The middlemen (sometimes women) have usually very little capital and so can handle but small quantities of goods. The final transaction may cover a single drop of perfume, half a cigarette or a bundle of ten matches! Hence, the breaking of bulk assumes great importance and any mode of transport serving this sort of market has to meet a demand for the movement of heterogeneous freight in small quantities. Communications being usually poor or non-existing (and telephones still rather a luxury), the retail trader must seek out his prospective customer. He must also take his goods to them. Hence the same user's demand for a sort of combination of passenger/miles and freight/miles². This holds good for both rail and road, as also for much river and lagoon transport. As stated in the introduction, this is not clearly brought out in current railway statistics for West Africa, and there are practically no road statistics at all.

The dealer takes all or most of his stock with him (or her) and though the individual unit is small the total bulk may be considerable in volume and value. For instance, Nigerian railway receipts from "luggage", comprising parcels, mail and livestock, carried on passenger trains amounted to 359,000, 348,000 and 383,000 pounds respectively in the years 1956-58, while receipts from passenger fares amounted to 1,337,000, 1,517,000 and 1,561,000 pounds respectively — a signal proof of the importance of this type of traffic³. To take another example at

least two-thirds of the passengers on the Togo railways are petty retailers, practically all women, who carry baskets of various goods, sometimes weighing around 60 kg. with them. These "mixed transport" operations, though covering only short distances, (on average 37 km.), are very frequent, the total number of journeys per year amounting to some 2 million for a population of 1.2 million. The importance of this kind of traffic is also shown by the fact that the revenue exceeds that from freight traffic (around 149 million, as against just over 52 million, francs in 1957).

While of considerable importance for the railways, this "mixed" traffic is mostly carried by road. A recent study on road transport in Nigeria shows that most vehicles by far in the west — and a high proportion of all used in the country — carry passengers only (which here means passengers and luggage). Next come vehicles carrying passengers and freight, then, far behind (nowhere more than 10%), vehicles carrying freight only⁴. There seem in the main to be two principal reasons for this combination between the mere movement of passengers and goods and other commercial activities: (1) traders incline to produce a kind of "ancillary" service by buying or selling goods at the same time as they are transporting other commodities, and (2) some firms may find it convenient to engage in transport on own account.

In Senegal, most of the traders concerned are Lebanese, who own over 40% of the commercial vehicles used for this kind of traffic and, though usually only in a small way of business, to a large extent control the trade conducted through the so-called "boutiques de la brousse". They buy the crops from the farmers, to whom they also sell the goods they need, which they themselves have generally bought from large concerns, these in turn sometimes purchasing part of the agricultural crop. As to the transport pattern, the Levantine merchant (or his counterpart in other areas) uses his truck for transporting groundnuts to various destinations — above all to Dakar — and tries, whenever possible, to get general goods in return. Often he transports groundnuts for a third party, on the basis of an oral agreement. His truck thus serves a variety of purposes and his rates for the transport of groundnuts are based on competitive conditions, which vary greatly with season and region, rather than on true transport cost. It seems safe to say that these Levantine merchants and, perhaps even more so, their African counterparts, hardly ever do any strict cost accounting on the transport side of their business.

Transport on own account may have its attractions for firms with a wide distribution system to serve, as a fleet of vehicles in the best means of stocking the various "boutiques" of the system and

¹ F.J. Pedler, *op. cit. passim*; P.T. Bauer, "West African Trade", *passim*.

² Some technical difficulties also arise. Wagons must have space enough for female dealers to keep their bundles and loads with them, as they generally refuse to let them travel in the vans. The substitution on the roads of buses for the very unsafe "mammy" wagons has this drawback that live animals like goats cannot travel on the roofs!

³ Economic Survey of Nigeria in 1959.

⁴ "Road Transport in Nigeria", E.K. Hawkins, Oxford, 1958.

of providing sufficient transport capacity at peak periods, which raise thorny problems in West Africa owing to the rainy season. The commonest drawback to transport on own account is the difficulty of finding return loads, which may sometimes cause the company to engage in branches of trading outside its main line. Some firms may even buy a certain commodity merely in order to reduce their overall transport cost by securing return loads. One company engaged in transporting cotton for export purchased as return freight a considerable quantity of cement, which it sold at cut prices through its contacts on the domestic market.

The main reason for the return-load problem in West Africa is the preponderance of exports over imports, although the balance is being steadily redressed. The most extreme case is probably Senegal, because of the vast quantities of groundnuts it exports. Nigeria, the second largest groundnut exporter in West Africa, is a less extreme case; but there are nevertheless marked fluctuations in the transport demand, during the export season, the capacity of the Nigerian railways is almost entirely taken up by export crops, with adverse effects on both the Nigerian domestic market and the considerable transit traffic from Chad.

The problem of lack of capacity during seasonal peaks (and over-capacity in the slack season), which mostly affects the railways, is aggravated by fluctuations in crop yields. This phenomenon is, of course, a common-place in agriculture everywhere; but the transport problems it creates are far from being the same in countries with an integrated transport system operating on an adequate infrastructure as in an under-developed area like West Africa, with its very limited capacity in both fixed installations and rolling stock. One of the main transport problems in West Africa would therefore appear to be how to intensify the utilization of existing installations.

One feature of passenger transport peculiar to West Africa (and other parts of the continent) is the demand for transport for migrants.

As stated in the ILO study referred to earlier, migratory movements have been from early times a normal aspect of life for the African peoples, doubtless for a wide variety of reasons, the first and foremost of which is under-employment due to lack of capital, and transport. The Africans mostly live in remote villages at a subsistence level, engaged mainly in primitive agriculture which keeps them occupied only during the growing season, so that for about half the year they are either partially or completely idle. While some women particularly may find alternative work in small-scale distribution, where labour plays the role that capital plays in developed countries, most unskilled labour has to seek outlets elsewhere; hence various forms of migration, the most important from the transport angle being recurrent movements of a seasonal character, which play a considerable role in West Africa. Some of

these movements occur within the boundaries of a particular country; others are sub-regional.

In the countries formerly constituting French West Africa, there are several strong seasonal flows. One of the most marked is that of the so-called "navetanes", workers who move every year during the rainy season from the Sudan and north Guinea to Senegal to take employment with African farmers for the groundnut harvest, during which they are housed and fed by their employers. Their number has been estimated at 50,000 yearly. A similar number of Mossi from the Upper Volta region, Sudanese and Guineans travel every year to the Ivory Coast to work for European concerns; they normally stay six months, then, like the "navetanes", go home to their families, whom they have usually left behind.

The numerically most important migrant labour force from the former French territories moves to Ghana from September (after the harvest) until May-June (when the rainy season starts).

There is a similar migration to Ghana from the, for West Africa, densely populated areas of northern Togo and the southern province of Aného, mostly comprising young male labourers seeking work in the coffee and cocoa plantations during the agricultural off-season at home. According to some sources, out of some 550,000 persons engaged in such work in Ghana, about 250,000 are seasonal workers.

In addition to this entirely seasonal movement, there exists a semi-permanent type of migration. Many of Kabrais go from Togo to Ghana for longer than just the Togo off-season; they often acquire land in Ghana but return at regular intervals usually every second or third year, to their home villages.

There are migratory movements, about the extent of which little is known, throughout former British West Africa. In Nigeria labour migration is a marked feature, and a survey made during the dry season (October-March) in 1951-52 showed that 250,000 migrants, including some from the French Niger territory passed through the province of Sokoto in the north on their way to the Jos mines, the cocoa plantations in the west, and even to Ghana.

Despite scanty or non-existent statistics on the subject, these migrations undoubtedly assume substantial proportions. They also create a far from negligible demand for transport. Some, albeit incomplete, information as to how these movements proceed has been collected in recent years. Many of the seasonal or other migrants obviously set out on foot, mainly for want of money; but the later stages of long journeys are usually completed by road transport, whose flexibility makes it especially convenient. In some areas, e.g. between Togo and Ghana, the popular means of transport is the bicycle. Road transport is comparatively expensive when operated by private carriers, as is usually the case, and costs the migrant labourer a substantial part (often about

25%) of his earnings. Consequently, many use bicycles even for very long distances, e.g. 400-500 km. on the north-south route in Togo; but of all migrants by road from Togo to Ghana only about 10% reach Ghana on foot.

In some cases, e.g. labour moving from the Upper Volta region to the southern part of the Ivory Coast, special travel arrangements are made by the employers through their own transport organization, which moves about 50,000 workers a year. The "navetanes" are provided with free transport by the government.

Brief mention should also be made here of another kind of demand for passenger transport, which is not without its importance, especially in the northern and eastern parts of the region, namely, pilgrimages to Mecca and Medina. Although these journeys are usually made on the initiative of the individual and comprehensive figures from the region are still

lacking, the total number of pilgrims seems to be fairly constant from year to year. The potential demand for journeys to Mecca must be considerable among the Muslim population of the region; but the cost of travel and, at least formerly, the dangers involved greatly reduced the numbers of pilgrims, so long as their sole choice was between the overland journey and a very roundabout voyage by sea. The situation has been greatly improved by the introduction of relatively inexpensive "air busses" for charter by better-off groups of Muslims. Many pilgrims nevertheless still make the journey by land, e.g. from Nigeria via Chad and Sudan, generally in busses, that take up to 80 passengers, which is far above their official capacity. This west-east traffic amounts to about 20,000 persons a year; the number travelling in the opposite direction is less, as there usually are some pilgrims who break their journey to settle in Sudan.

B. TRANSPORT SERVICES

1. Primitive transport

The structure of transport in West Africa is strongly affected by various kinds of primitive transport, which may not divert traffic normally carried by more modern means. In certain conditions, where no alternative is available, human portage may even be "economical"⁵, though commonly regarded as perhaps the most uneconomical and wasteful form of transport still widely used. To be sure, the very cost of human portage may seem prohibitive when directly compared with rail, road or inland water transport costs. According to some estimates, rail transport of the type most common in West Africa, i.e. by light, narrow-gauge railways of moderate capacity, costs 5-10 times less than human porters, and the capacity of an ordinary train equals the loads of 15,000-20,000 porters, while in road transport a 5-ton truck will easily replace 500 porters. Cost, however, is not the principal argument against human portage, which is seldom in practice a commercial alternative to modern modes of transport. The main purely economic objective (leaving aside social aspects) is that wide spread use of portage removes great numbers of men and women from agricultural production for varying periods⁶.

However, transport "on own account" is another matter. The first link in the distribution chain for a

commodity is often its transport as headload from the small producer to the nearest market, whence transport by truck may constitute the second link in the chain. Indeed, large quantities even of commercial crops like cocoa and groundnuts, start their journey to the markets by human portage (in non-tsetse areas various kind of pack animals are also used). In Togo, for instance, almost the only links between the productive areas of the south-west and the main road arteries (Lomé-Palimé and Palimé-Atakpamé) are bush-paths. In one typical case, cocoa has to be carried in headloads of 50 kg. to the Palimé-Atakpamé road a five-hour journey costing the producers around 500 Frs. CFA per ton/kilometre, or about twenty times the corresponding road transport charge (at 1957 rates).

In such cases there is as yet really no alternative means of transport.

The main use of portage lies perhaps in retail trade. The petty retailers (predominantly women and men of the Hausa tribe) the so-called "mammies", who sell goods in minute quantities, often walk distances of 15-30 km. with headloads, mostly in baskets, weighing up to 40-60 kg. Of course, road or even rail transport could be used instead, as it indeed often is, where the retailer can afford it. But, if he travels on foot, the retailer can keep all his rather modest profits for himself; and there may be other considerations, as, for example, in connection with the considerable traffic between Togo and Ghana where the fact that headloads are not inspected by customs is an incentive to the traders concerned. The goods carried in this way and subsequently sold are foodstuffs (mainly sugar), textiles, palm-oil and, sometimes, cocoa and coffee; another line, in which children are also active, are used containers like cans or bottles.

⁵ Some caution seems on the whole advisable when judging methods of production, trading or transport in regions like West Africa by experience gained in more developed countries, particularly when the question is whether to replace manual labour by mechanical equipment.

⁶ J. Harrison Church, "Modern Colonization"; W. A. Hance, "African Economic Development."

To anyone confusing the technical and economic aspects of the question, such marketing arrangements based on certain primitive types of transport may seem wasteful and inefficient. But this is not so, since in countries where capital is scarce but labour plentiful (the latter therefore sometimes replacing the former) marketing methods are quite different from those used in countries otherwise placed. As one expert referring to retail trade in West Africa puts it: "So far from the system being wasteful it is highly economic in substituting superabundant for scarce resources; within the limits of available technical skill nothing is wasted in Africa"⁷.

While some kinds of "primitive" transport may well appear "economical", in certain circumstances others still widely used in West Africa are definitely not. Among the latter is moving cattle on the hoof, which is very widespread in and between many West African territories. As already mentioned large numbers of cattle, are moved on the hoof to Nigeria from the Niger Republic, Ubangi-Shari and the Mali Republic, from the latter to the Ivory Coast, from the northern to the southern provinces of Nigeria (Kano being the principal cattle-market), and from northern Togo to the coastal districts. Sometimes only part of the journey is made on the hoof; goats and sheep are mostly carried by rail or road. The nomads of the north naturally drive their cattle to market, in much the same way as when seeking new pastures. Such journeys or mere movements across a frontier do not as a rule adversely affect the condition of the cattle; but long drives from north to south are another matter. In Togo, for example, cattle are driven in herds of 30-40 head either to Blitta, the rail terminus in the north, whence they travel on by rail, or all the way by road down to Lomé, a distance of up to 700 km. Even if rail transport is used, conditions are hardly ideal, and some beasts usually have to be slaughtered before arrival. And there are often bad bottlenecks; e.g. a few years ago 2,000 head of cattle were held up awaiting railway cars at Ferkessedougou on the Abidjan-Niger line in the Ivory Coast.

Where the cattle walk all the way, considerable losses occur, especially if they have to be driven through the tsetse-infested forest belts. More serious still is the fact that they inevitably lose up to, on average, 30% of their weight. Experience shows that in Nigeria, as in former French meat-consuming areas, there exists an unsatisfied demand for transport of cattle by rail or road (often bad road conditions may be an obstacle) which cannot easily be met by flying frozen meat from cattle-producing centres in the north to consumption centres in the south.

Some other means of transport, like small canoes and rafts, which are widely used on all West African waters, may well be regarded as primitive modes. In this connexion, one expert (Gilbert Walk-

er) writes: "A journey to market by water even at ten miles distance becomes a long day in a canoe pulled at two or three knots;... Produce may have to be sold at nearer markets though buyers may be fewer, prices lower consequently, and the goods displayed for purchase less varied and more expensive simply because the means of reaching the better markets are just not there. The incentive to increase output is correspondingly diminished and the stimulus to migration of the more energetic and enterprising among the inhabitants increased". All this naturally holds good for most kinds of primitive transport. However, the canoe might in certain circumstances prove to be either the most efficient or the only means of moving goods by water; for conditions during the dry season, including very marked variations in the depth of water, make it impossible for all but very shallow-draft boats to sail far up the rivers.

Although it may also be regarded as a technically primitive medium for the transport of goods, the bicycle may sometimes prove to be the most economic medium. For instance, some of the kapok or karité reaching Ghana from northern Togo is carried in big sacks on bicycles.

Small local markets in all West African countries are naturally served by more or less primitive means of transport. For example, women potters often make several trips a day carrying their wares from home to market. If each potter sells no more than four large articles and about twenty small ones a day, no mechanized transport can economically be used; and, in any case, carrying obviates most of the losses by breakage which are such a common feature of transport over West Africa's primitive roads.

To summarize, primitive transport in West Africa may be said still to satisfy certain types of demand more economically than could more elaborate modes of transport, while other types of demand would best be met by substituting the latter. This point should be noted when planning transport development, and even more attention should be paid to latent than to existing demand. This would occasionally involve something more than merely introducing a new mode of transport for a certain commodity; for instance, the decision whether to transport livestock or meat depend on the location of the processing industry.

II *Railways and railway transport*

The railways were the first modern mode of transport to penetrate West Africa, coming indeed as the first alternative to human portage, or pack animals. As previously stated, the first railways were constructed for political rather than commercial reasons in the context of the "scramble for Africa", the "rules" for which were finally laid down in the Berlin Treaty of 1885 and subsequent amendments thereto.

⁷ Bauer, *op. cit.*

With the introduction of this new mode of transport in Africa it became possible to consider transporting large quantities of bulky commodities over great distances at practically any season of the year — an important factor for cash crops and mining products. In view of the low purchasing power of the African population, export of surplus crops was an economic necessity, so that the first active demand for rail transport (as an economic feature) was created by the export trade, though this gave rise in turn to increased demand from the import trade. It need hardly be repeated here that the main value of the railways as a mode of transport is their ability to carry goods in bulk over moderate or long distances more cheaply than any other means of transport and, at all events, faster than inland water transport, which, in terms of mere rates, often proves the cheapest mode of bulk transport. Of particular importance in West Africa is also the fact that the railways operate more or less without interruption all the year round.

As previously mentioned, most commodities exported from West Africa make typical railway freight — i.e. bulky goods of low unit value (groundnuts, cotton, rice, manganese ore, bauxite, phosphates, iron ore etc.) Other products (cocoa, coffee, palm-oil and its derivatives etc.) may use railway transport in particular circumstances, otherwise road transport. In terms of ton/kilometres there is little doubt even in the absence of complete road traffic statistics that more goods are moved by rail in West Africa than by any other means. The preponderance of the railways is, of course, especially noticeable in export-import traffic; a few years ago it was estimated that in what was then French West Africa 75% of this trade was carried by rail and that three-quarter of all rail traffic concerned foreign trade and only one-quarter domestic trade. In the former British territories the railways are still the backbone of the transport system.

The most striking feature of a transport map of West Africa is, however, the rarity of railways and the almost total absence in every country of a comprehensive railway network. It may therefore, well be asked whether existing rail transport facilities really meet the demand of export-import trade, not to mention the more or less latent demands of domestic markets. The answer to this question must, in the light of technological progress, take account of the prospects of replacing rail transport by other modes.

Before going into this problem, a rapid review of railway development and conditions in West Africa may be helpful, though there is no intention of giving the subject exhaustive treatment here — it is adequately covered in numerous books and articles — but only of pointing to certain facts and figures relevant to our main theme.

The railways in West Africa today comprise some 5,500 miles track, about 46% of it in former French West Africa (see table below).

LENGTH OF TRACK (in miles)		
		%
Ghana	591	10.7
Nigeria	1,781	32.4
Sierra Leone	311	5.7
Togo	274	5.0
ex-French West Africa	2,542	46.2
Comprising:		
(Dakar-Niger)	1,043	
(Conakry-Niger)	411	
(Abidjan-Niger)	729	
(Benin-Niger)	359	
Total length of track:	5,499 miles	100%

Source: "Overseas Railways", 1959.

Basic operating conditions have been largely identical in French and British territories: roughly the same natural setting and similar vegetation zones stretching far into the same kind of hinterland. Despite difference in, say, population density and mineral resources, those territories on the whole produce similar commodities and import the same categories of goods; hence the transport pattern shows many common features. Yet, similarities notwithstanding, the railways in former French West Africa and those in the four former British territories have developed along different lines. The transport pattern was, generally speaking, more homogeneous in French than in British West Africa, because the former was far more of a continuous territory than the latter.

As seen earlier when modern transport methods were first introduced into former French West Africa, the guiding principles were military, political and administrative rather than economic. In the last quarter of the 19th century, however, the growing demand for vegetable oils and certain minerals gave a new fillip to trade between West Africa and Europe, which exported cheap manufactured goods in return. Thus signs of general economic integration slowly began to appear in West Africa, sooner and perhaps more readily in French Africa because the latter was less split up. Whatever the motives of governments, the means to the various ends was rail transport. The basic aim was to link the navigable stretches of the rivers Senegal and Niger by railways in order to provide communications between the hinterlands and the Atlantic coast and Gulf of Guinea. But the main railway lines had certain secondary lines added as "feeders" and aids to local development; hence the pattern of four "reseaux" in French West Africa: Dakar-Niger, Conakry-Niger, Abidjan-Niger and Benin-Niger (the latter two not actually reaching the river). The fact that these railway systems constituted "lignes de pénétration" rather than real systems based on a solid economic and technical foundation was very obvious until the

extensive modernization carried out under "FIDES" after the Second World War.

Although when the railways were built, in French West Africa, the latent opportunities for "opening up the country" economically were realized, they occupied rather a minor place in planning, the possibilities of creating remunerative traffic being somewhat remote coupled with the obvious need to build fast to cope with the urgencies of the general international political situation. What was required was light-track railways following routes selected for politico-geographical, rather than topographical or economic reasons. In addition, the work was done by army engineers, without modern equipment or adequate funds, relying mainly on manual labour that was not always entirely voluntary. As one expert has written, "hurried construction of railways through little known country difficult to survey, together with vital need to keep down costs, meant that gradients were severe, curvature acute, the tracks devious and often economically ill-placed". These railways have a 1-m. gauge; at the end of the Second World War, both infrastructure and superstructure were still of low quality and much the worse for wear. Ballast was insufficient or non-existent, tracks light (usually 20-25 kg.) and all lines single-track. The rolling stock (mostly taken over from secondary railways in France) was inadequate and of poor quality. The locomotives were all steam-driven and fired with coal or wood, the average age of the three principal types being 10, 20 and 40 years respectively. The cars were all wooden and of small capacity.

War brought a substantial increase in traffic (14% for freight and 30% for passengers), with which the initial installations, even after much expenditure on permanent installation and equipment, could not cope. It was obvious that the capital cost of modernization and development could not be met out of current railway revenue.

No attempt will be made here to describe the various post-war changes in railway organization designed to unify the various "systems" (operated by private companies) administratively, technically and commercially, on the broad lines of the 1937 railway reorganization in France. But it should be noted that under the new system the railways became autonomous public bodies, i.e. the State now owns the majority of the shares in the incorporated company, but the latter enjoys considerable administrative and financial autonomy, and the railway budget remains separate from the general budget.

This reorganization enabled the French West African railways to operate on more efficient commercial line — an important factor, considering growing competition, especially from road transport, and the increased demand for diversified transport services.

The main purposes for which further capital expenditure on the railways was felt necessary after the war were the extensions of existing networks, renewal of installations and equipment, and improv-

ed operation. Although renewals proved to have by far the greatest claim, one important extension (on the Abidjan-Niger line), was decided upon and carried out.

Some work was begun on the Bobo-Dioulasso-Ouagadougou line in 1939, but was interrupted by the war late in 1941. Owing to delays caused by scarcity of cement (the new line used concrete instead of steel sleepers) and of rails the last section of this 349 km. line did not come into operation until 1953 (December).

The fact that rail transport can in certain cases be replaced by other modes, and in particular road transport, and that railway capacity can be substantially increased by improving equipment and rationalizing operation, seem to explain the adoption in former French West Africa of the principle that no extensions of the system would be accepted unless the volume of new freight over the whole line could be expected to reach 150,000 - 200,000 tons yearly. For similar reasons, double-tracking was used only on the Dakar-Thiès line. The principal applied to domestic traffic was that road transport should be developed; whether or not that principle was stretched too far will be discussed later.

Perhaps the most important step taken to improve and cheapen railway services has been the dieselization of traction, another important step in the same direction being the introduction of heavy, welded rails.

The success of dieselization has been remarkable. The French railways in West Africa previously used coal and wood as fuel. As there are no local coal deposits, coal has to be imported - a costly and sometimes complicated matter in a region where only a few ports have the necessary handling equipment. As a locomotive fuel wood is technically wasteful and difficult to store or stockpile. Furthermore, to save transport, the wood needed was often cut indiscriminately alongside the track, frequently causing soil-erosion.

Diesel traction has many advantages over steam traction, particularly in a region like West Africa, where coal and water are scarce. It is, nevertheless, on the whole doubtful whether the margin of superiority of diesel traction over other types has yet been accurately determined. The saving in operating costs is generally estimated at about 40%⁸.

Replacement of light rails by heavy rails (up to 36 kg. rails on certain parts of the Dakar-Niger line, less heavy elsewhere) became necessary in order to increase railway capacity by introducing heavier trains to take heavier traffic; the change was in any case imperative in view of the worn-out state of rails and sleepers on most lines, whose track sometimes dated back to 1904. Welded rails make for greatly improved rolling; the going is smoother and there is less risk of breakage — not an un-

⁸ International Bank "Economic Survey of Nigeria".

important factor in the competition with road transport using mostly rather bumpy African roads. Both the laying of welded rails and the welding of rails already laid are, however, expensive processes, only justified economically where traffic is rather heavy.

An important item in the railway reorganization plan is the introduction of improved maintenance and repair workshops, the most important of which are at Thies, Conakry, Abidjan and Lomé (Togo).

As to operation, many measures have been adopted to give more efficient and at the same time cheaper service, but much still remains to be done in this field.

Traffic statistics for the railways of former French West Africa appear in the tables 1 & 2 of the appendix. The fact that the volume of traffic has scarcely changed while the average transport distances have on average increased may well be due to the growing impact of road competition. In Togo, the situation has been further aggravated by the cessation of the transport of cocoa by rail from Ghana to the port of Lomé.

As to passenger transport, the considerable increase in total passenger/kilometres since the Second World War is the more remarkable in that it coincided with the development of motorized road transport in the region. But a reverse trend arose in 1955, for various reasons. Firstly, passenger/kilometre figures show only the work performed, i.e. the number of passengers carried multiplied by the distance; but the average distance tends to increase because road competition is keenest over short distances, while the number of passengers tends to drop as motorized transport expands. Secondly, as table 3 of the appendix shows, there is a marked preponderance of commercial road vehicles in all parts of the region except the Dakar area. Although these vehicles are also widely used for mixed transport, the fact remains that private motor vehicles are comparatively scarce and the railways need fear no serious competition from them. The steep rise in passenger traffic after the war was largely due to the fact that the previously rather sedentary African had begun to travel.

Other changes in utilization of the railways which are mainly due to rate-fixing measures, especially in the former British territories, are discussed in the chapter on transport policies. That chapter also deals with the financial aspects of railway operation. In this connexion, it will be noted that, while the heavy demand for transport created by the war, coupled with postponed maintenance and renewal of installations and equipment, did give rise to special difficulties after the cessation of hostilities, the basic reasons for the railways' past and present financial and other troubles largely lie in the inadequate volume of traffic, for which the region's basic economic structure is to blame. Hence, expenditure on infrastructure will show very modest returns unless productive resources are simultaneously developed.

Railway development has proceeded on somewhat similar lines in the former British and former French territories, the common denominator being the desire, first, to secure political control over the territories and, secondly, to keep as much trade as possible within their territorial bounds. However, while railways in the former French territories were originally planned to supplement the Niger and Senegal river networks and gradually merged into the general economic integration plan, those in the British territories were planned separately for each colony, the purpose of the "systems" being to tap the main agricultural and mining areas and channel their products to the ports⁹.

The lengths of railway lines in the former British territories are as follows:

Ghana	591 miles
Nigeria	1781 "
Sierra Leone	311 "

Nigeria possesses the greatest length of railway line of all countries in West Africa (just under 1,800 miles of 3'6"-gauge track). But even the Nigerian railways are actually only a skeleton system: there is no east-west communication in the south. The journey by rail from Lagos to Port Harcourt is something like 1,300 miles, while it is only 315 miles by sea and 576 miles by road. (The latter distance will be further reduced with the completion of the new Lagos-Benin road.)

Like practically all West African railways except those of Sierra Leone, the Nigerian railways were built ahead of demand. A start was made in 1898 in the Lagos area; but the present system was not completed until 1930, and the Bornu extension is still building. The system mainly consists of two single-track lines.

The western line runs from Lagos through the cocoa-growing areas, across the Niger at Jebba, to Kaduna, the northern capital, and on through Zaria to Kano the only city in the country that was already one before the railway age, as it was the traditional terminal for the desert camel caravan traffic between western Sudan and North Africa. It was the new outlet to the sea in the south that fostered the growth of the groundnut industry in the area. A branch-line from Zaria to Kaura is used to ship out cotton and groundnuts, and an extension via Kano to Nguru serves the same purpose for groundnuts, meat, hides and skins, and various other products.

The eastern line starts from Port Harcourt; it was built mainly to facilitate exploitation of tin deposits in the north and of coal seams in the east. Initially, Jos, the tin centre, was connected with Zaria on the western line by a light 2'6"-gauge railway (which is now closed). Later, a 3'6"-gauge track was laid from Port Harcourt to Eunugu, th-

⁹ E.B. Stapleton, "The Wealth of Nigeria", pp. 73-74.

coal-mining centre. This line is, as a railway built to pay its way, a rarity in West Africa. Eunugu coal is poor in calorific value and quality, but it can be used as fuel for steam locomotives. The Eunugu line was later extended to Kaduna, which involved such major investments, as the heavy cost of constructing the long bridge over the Benue at Makurdi. The original plan was to meet the tin-mining industry's power needs by shipping coal to the Jos area, but by the time the line was completed the problem had been solved by hydro-electric power.

The Nigerian railway was to some extent faced with the same problem as its counterparts in former French West Africa, i.e. insufficient demand. Capacity stood at roughly $1\frac{1}{2}$ million tons per annum; little was invested in infrastructure, superstructure or rolling stock, and renewals lagged far behind needs.

The war produced more traffic than the Nigerian Railway could carry; after hostilities ceased, it steadily carried more than its $1\frac{1}{2}$ million tons, yet had to refuse a considerable amount of traffic. This state of affairs produced such phenomena as the well-known groundnut bottleneck at Kano, which occurred although groundnuts enjoyed priority over cocoa, palm-oil and palm kernels. According to the International Bank 1953 mission to Nigeria, the main causes were shortage of motive power, insufficient rolling stock and poor maintenance¹⁰. However, from 1953 on the situation steadily improved; not only was the Railway able to obtain more locomotives (some of them diesels) and rolling stock, but the re-laying of 488 miles with heavier track and improved signalling and telecommunications achieved a substantial increase in capacity. Mention should also be made here of the steps taken to commercialize operations; from being a government department, the Railway in 1956 became a public corporation (Nigerian Railway Corporation).

All these measures met with considerable success. For instance revenue-earning freight carried by the railway increased¹⁰ in the ten years between 1947-48 and 1957-58 by 50% to 2 million tons¹¹, while the number of passengers carried rose from 6.6 to almost 7.9 million.

In Ghana, railway construction started in 1896, two years earlier than in Nigeria; it was undertaken in conjunction with the exploitation of the mines at Tarkwa (gold, and later manganese ore). Increased traffic has recently justified a double track to Takoradi. The line from Sekondi to Kumasi was completed in 1902, but it took twenty more years to complete the Accra-Kumasi line. Branch lines serve the cocoa-growing areas of the Central Provinces and the forest

region of Orestea in the south-west, which produces considerable quantities of timber and logs. The Central Provinces line was extended in 1953-54 to link up with the eastern line north of Accra, and a line has been built eastwards from Accra to reach the new deep-water harbour at Tema. In 1955, the Achiassi-Kotoku section was opened, shortening the Accra-Takoradi run by 165 miles.

The total length of Ghana's railway lines is at present 591 miles. In 1957-58, revenue-earning freight, at a total of 1.8 million tons, almost equalled the Nigerian figure, while passenger journeys amounted to 5.2 millions.

In regard to goods traffic, the Ghana Railways carry most of the cocoa, much of the timber and all of the manganese ore from the production centres to the ports of Takoradi and Accra¹²; other important products carried include bauxite, crude oil, and building materials.

The Ghana Railways were once described as a "... compact, well-managed and prosperous" system¹³, but financial results in recent years have for various reasons, which will be discussed below, not been entirely satisfactory.

In Sierra Leone, the situation in regard to railways is rather unusual. The Sierra Leone Railway which was completed in 1899, is a narrow-gauge line (2'6") extending 227 $\frac{1}{2}$ miles eastwards from Freetown to Pendembu, with a branch line, 83 miles long, from Bauya to Makeni in the Northern Province. But this "system" is not the principal rail freight carrier; for, against its total of 127,000 tons, in 1957 the private railway of the Sierra Leone Development Company Ltd. carried 1,445,000 tons of iron ore¹⁴. However, the Sierra Leone Railway was also responsible for 1,438,000 passenger journeys.

A significant trend has been noticeable on that Railway in recent years. While in 1948 the freight carried was mainly export goods, it now mostly comprises import goods. The Railway has always operated at a loss, and is now the victim of growing competition from road transport. Its main freight items are chrome and agricultural products, and it is in the latter category that its entire traffic loss has been sustained.

Taking the railway industry in West Africa as a whole, the question arises whether the supply of railway and ancillary services can be considered sufficient to meet demand, both actual and latent — the latter type being a determining factor in assessing the value of the railways as a medium for economic development.

¹⁰ Economic Survey of Nigeria, 1959; Nigerian Railway Corporation, Reports and Accounts for the year ended 31 March, 1959.

¹¹ The figure for gross freight, including railway stores and coal used by the railway would be 2 $\frac{1}{4}$ million tons, as against 2.1 million tons for the Ghana Railways.

¹² In Ghana railways and harbours are operated together under the Ghana Railways and Harbours Administration, the ports being Takoradi and the surf-ports Accra, Winneba and Cape Coast. The port of Tema is nearing completion.

¹³ M.R. Bonavia, "Report on Transport in the Gold Coast" 1951.

¹⁴ D.T. Jack, "Economic Survey of Sierra Leone".

If, in that connexion, the view be taken that the railways must increase their capacity still further, it has to be decided whether this should be done by increasing investments in infrastructure, particularly where extension of the present network is contemplated, or whether it will suffice to improve equipment and operating methods, or whether these two approaches to the problem might be combined.

On the question whether railway development in West Africa has now more or less reached saturation point, there is a school of thought, well represented f.i. in Public Works Departments, whose thesis is that the "railway age" is over and that further expansion of infrastructure should be confined to the roads¹⁵. A closer scrutiny of the situation in West Africa from the "transport and economic development" angle does not seem fully to bear out this thesis.

The first question that arises is whether the railways of the West African countries now have capacity enough to meet actual demand. Generally speaking, the restoration works necessitated by damage, neglected maintenance and postponed renewals may safely be described as now more or less finished, particularly as regards motive power and rolling stock. Practically all West African railways are now carrying more freight and more passengers than before the war. Bottlenecks due to shortage of locomotives or rolling stock are few and far between, although they do occur at traffic peaks. However, freight cars are sometimes overloaded (frequently, it would appear f.i. on the Dakar-Niger system); such a policy, if systematic, certainly indicates shortage of rolling stock.

Unlike other railways in West Africa, the Sierra Leone Railway is short of the capacity required to meet actual demand. This shortage was still very marked during the period 1953-55. Although the situation has improved since then, it is stated in a recent study¹⁶ that with its increased capacity the Railway can still meet only 60% of actual demand.

As to the question whether there is a latent demand for transport and, if so, what policy should be adopted to meet it, statistical evidence is hard, if not impossible, to come by (and could only be gathered by extensive field studies).

There is, however, good reason to believe that railway expansion in West Africa is still far from completion: witness the fact that in Nigeria, after much preliminary surveying and planning, the rail extension to Bornu is now under construction, with the aim of linking the agriculturally rich north-eastern part of the country with markets open only to goods shipped in bulk by cheap long-distance transport.

¹⁵ Two aspects of infrastructure, varying mainly in the scope of the problems they involve, demand consideration: construction of new lines and relaying of existing lines with heavier rails etc.

¹⁶ D.T. Jack "Economic Survey of Sierra Leone", 1958.

An International Bank Mission studied the case in 1953, and subsequently a loan of 10 million pounds was granted, the total cost, including locomotives and rolling stock, being estimated at 19½ million pounds. This project comprises an extension of the present line via Kuru, south of Jos, through the Bauchi and Bornu provinces to Maiduguri in the north-east corner of Nigeria¹⁷. The work on the first stretch has begun and is due for completion in 1963.

The Bornu extension is designed to cope with the potential production of the area it traverses and, to some extent also, to provide for additional international transit traffic. The Bauchi and Bornu provinces have a population of 3½ million, to which should be added the 1,350,000 inhabitants of the Adamawa province, which the new line will also serve. These three provinces produce cotton, groundnuts and surplus supplies of millet and guinea corn¹⁸. Both Bauchi and Bornu are important cattle countries and produce a surplus of cow-peas, and Bornu also a surplus of dried meat and fish. The new railway connexion is expected to stimulate production by increasing producers' return; it will also facilitate the import of more diversified goods, thus creating new demand that can only be satisfied by increasing production for export to pay for imports. The Bank expects the new long-distance traffic to reach some 200,000 tons in about 20 years. The first effects of the new service will probably be felt by the cotton growers in east Bauchi and the groundnut producers in east Bornu; but they should gradually spread to raise exports of livestock, hides and skins and foodstuffs. The already considerable transit traffic from the Republic of Chad should also expand. The Nigerian Railways are already linked with foreign territories by roads which are in the nature of "feeders"¹⁹. The logical result of the Bornu extension should at least as a temporary measure, be the upgrading of the Maiduguri-Fort Lamy highway to A-class, the only difficulty being that there is a choice between a southern and northern route, the former preferred by Nigeria, the latter by Chad²⁰.

While the Bornu extension is already a reality, there are similar extensions proposed in other countries that merit serious study.

¹⁷ Economic Survey of Nigeria, 1959; Nigerian Railway Corporation, Reports and Accounts for the year ended 31 March 1959.

¹⁸ *Op. cit.*

¹⁹ Thus Kaura-Namoda is connected with Maradi in the Niger Republic, Kano with Zinder and Jos with Fort Lamy. There is substantial smuggling across these borders.

²⁰ The trouble here is that the southern route, while topographically, rather easy in Nigeria is difficult in Chad, while the northern route is exactly the opposite. The problem of sharing construction costs might be solved by an international loan.

In Ghana, for instance, it was felt that transport costs were still too high for the producers in the Northern Provinces to have enough financial incentive to export their products to Ashanti and to the south. The railway management's view was that with adequate capacity guaranteed, considerable quantities of groundnuts, shea kernels, cotton, cattle, hides and skins could be produced for export and shipped by rail. But the development of motorized road transport has forced a revision of expansion plans which at one stage covered an estimated total of not less than 600 - 700 miles of new lines, as compared with existing 591 miles. Further extensions of the present network, although they will be rather moderate in scope remain a practical proposition.

This is particularly true in the case of Dahomey, where, under the agreed programme, the railway will be extended via Parakou to Kanti, and branch-lines may be built to link the Dahomeyan railways with Niamey in the north and the Togolese railways in the west.

In Togo the south-north line of the railways stops at Blitta, a small village of no importance as a production centre²¹. The exploitation of the agricultural and stock-breeding potential of the northern part of the country may at this stage depend on productive methods rather than on transport services, which would come in only as a secondary factor. At any rate, existing transport demand is fairly well served by the south-north trunk road, which is asphalted between Blitta and Sokodé, the trading centre of the north. An extension of the railway via Blitta to Bassari might, however, enable the only known deposits of iron ore in the country (at Bangéli in the north-west, north of Bassari) to be exploited and at the same time tap some agricultural production centres in the west, like the valley of Fazao, which has absolutely no transport connexions with the rest of the country.

As noted earlier, the Ivory Coast shares with Nigeria the distinction of having witnessed most railway expansion. Nor do all possibilities seem even yet to be exhausted. The project closest to implementation is the Anoumaba-Daloa line in the west.

Conditions are generally favourable for increasing agricultural production in the Ivory Coast, especially in the south. There is sufficient density of population, the soil is fertile and the climate propitious. So the establishment of a transport system should yield rapid and interesting results. Typical is the Man province in the south-west, which according to some estimates has perhaps the greatest timber resources in the country. It has a population of 230,000, representing a density of 7.5 per square

kilometre. The function of a new transport system in this area would be to link the province with the port of Abidjan²². The first step would be to build a western branch-line of the Abidjan-Niger railway from Anoumaba to Daloa, a distance of 247 km., this would reduce the total distance of Abidjan from 476 to 377 km. The new line would also establish a provisional road-rail connexion between Man and Abidjan via Daloa—a distance of 573 km., compared with 673 km. at present. The Man district today exports around 6,000 tons of coffee, palm products and rice, while the Daloa district, with a population of 150,000 (density 7.8), produces coffee, cocoa, kola, nuts, palm products and foodstuffs. There is good reason to believe that a new line would considerably raise production in Man and Daloa as well as in neighbouring districts, and that it would also pay its way. A further extension to Man would ensure full exploitation of the forest resources of the district and would probably prove a good economic proposition.

While the Anoumaba-Daloa project is the one nearest realization, it by no means exhausts the possibilities of further railway construction in the Ivory Coast. The most important of these is a connexion between Bobo-Dioulasso on the main line and Mopti, the largest transport centre in the Sudan²³; this would provide a link with the port of Abidjan 500 km. shorter than that which could be established by extending the Dakar-Niger railway to the east via Bamako the port used being then Dakar.

The linking of the Dakar-Niger and the Abidjan-Niger systems at Bamako was often discussed while French West Africa was still a political entity; but it is now more than ever before part and parcel of the broader problem of trade routes and competition between the ports of Dakar and Abidjan, under which heading comes also the possible extension of the Dakar-Niger line to the east via Bamako.

The Conakry-Niger "system" has not yet taken final shape either. The main line now stops short at Kankan; but two other lines — Conakry-Fria and Conakry-Boke, both approximately 150 km. long, are projected, the former to carry aluminium, the latter aluminium and bauxite.*

²² The first plan to open up the Man and Daloa districts goes back to 1913. But at that time the idea was to link them to the port of Sassandra by a line passing through the districts of Sassandra and Tabou. As, however, the latter are but sparsely populated, the Sassandra project lost all attraction after the advent of Abidjan as a modern port.

²³ Particularly for kola nuts, smoked and dried fish, and cattle.

* Since the preparation of the main text the information has been received that it has been decided to connect Bamako in Mali with Conakry in Guinea by means of a railway by Kouroussa. This new line which will comprise about 370 km (of which 150 on Mali territory) will be prospected by engineers from USSR; this work is supposed to last about one year. Industries & Travaux d'Outremer, November 1961.

²¹ Blitta is an interesting proof of the fact that the introduction of transport facilities may make little contribution to economic development, if the other requirements (productive resources and existing trade relations) are not met. In this case the real domestic trading centre, Sokodé, is located 82 km. to the north, though there are old centres like Bassari and Kabou, near Bangéli.

Increasing railway capacity to stimulate latent demand may be achieved by extending present installations, including permanent way and structures. But there are other means that may be used; for example, improved operating methods applied within the framework of existing installations, together with limited investment in rolling stock and infrastructure, might achieve the same result with no actual extension of lines. The favourable effect on a railway's net income derivable from increased traffic may also be obtained by cutting expenditure.

The most striking improvement of recent years in the operation of West African railways has of course come from the introduction of diesel traction, the special advantages of which in the region have been summarized as follows²⁴: "They (i.e. diesel locomotives) can haul bigger and heavier loads, and also require less maintenance and servicing with the result that they can be used more continuously than steam engines.. The fact that they do not need to pick up water saves running time and, more important still, avoids the disruption of running schedules during seasonal water shortages in the north from which steam locomotives suffer through having to stop at alternative watering places. Finally, diesel locomotives are cheaper to run²⁴ than steam engines (although more expensive to buy) because of the saving in fuel costs, in the need to provide water and in operating and maintenance staff." The water angle and the simplified, although specialized, maintenance are of special importance in West Africa, where both water and mechanical skills are scarce. In most West African countries, the choice of fuel is not difficult: both coal and diesel-oil have to be imported, and coal is more cumbersome and relatively more expensive to carry than oil. Nigeria, with its coal deposits at Eunugu, is in a slightly different position, and there the comparative costs of the two types of traction must be more carefully calculated than elsewhere. The indications seem, however, in favour of diesel traction²⁵.

²⁴ According to the Nigerian Railways Administration, with which this problem was thoroughly studied by the International Bank Mission, the fixed charges per engine/mile are 6.7d. more for diesel engines than for steam engines; however, variable costs are much less and cost per engine/mile comes to 12.00—13.66d. for diesel and 30.00-60.91d. for steam engines. The following table shows some comparative figures for diesel and steam traction:

	Steam	Diesel
Gross haul in million ton/miles	162.707	136.380
Number of engines in use	103	31
Gross haul in ton/miles per engine	1,578	4,410
Cost of fuel per train/mile (at Zaria)	47.8d	13.66d

²⁵ The transport of coal to supply the Nigerian Railways needs for fuel is a major transport item. The farthest distance it has to travel (to Jebba) makes a journey, of about 770 miles by rail - sea - rail. In 1957-58, the transport of the Railways coal supply represented 124½ net ton/miles, or over 10% of total freight ton/miles for the year. Economic Survey of Nigeria.

In order to maximize utilization and lessen costs, smaller units than ordinary trains have with good success been introduced on some railways notably in Europe. Such smaller units, like rail-cars, have however only limited application in West Africa, although they may prove useful in certain circumstances. The time element often plays a different role in West Africa, as compared for instance with Europe; fast transport is not a desideratum with petty retailers, and small transport units like rail-cars may not provide enough space for their goods.

Transport capacity can also be raised by re-laying the track with heavier rails or with welded rails, which allow heavier axle loads and higher speeds, and improved signalling and telecommunication systems will speed rail movements. Such measures have been applied and are regularly under review by all the more important railway system in West Africa, which are also regrading and realigning tracks to reduce gradients and curves.

Many of the measures taken to re-organize operation will affect staff, i.e. enable numbers to be reduced, thus cutting expenditure, of which wages and salaries are a major item. However, although economically justified, such measures have also their social and political aspects; and they may meet with strong opposition from the railway unions, which are both strong and active in West Africa. This may be another argument for extending existing railways so as to create wider networks and increase the volume of long-distance traffic. As pointed out above, the linking up of various national railway systems in West Africa would undoubtedly create more employment, both permanent and temporary (the latter when the lines are building) and also make possible saving in the purchase of equipment, the pooling of rolling stock etc.

III. Ports and harbours

The main economic function of the railways in West Africa was originally thought to be to link the ports with their hinterlands in the interest of foreign trade. Before the advent of the railways, that trade used the trans-Saharan route, and the motorization of road traffic since the war may yet re-create something of its former importance.

The most important port in former French West Africa, Dakar, seems to have been first conceived as primarily a port of call, but developed later into the most important interpost of the region, a contributory factor being undoubtedly the location of the seed-crushing industry there. The general trend was for long a marked concentration of traffic movements on Dakar, which not only affected railway policies but caused traffic at less well-equipped ports to decline. This trend was however, severely checked after the opening of the Vridi Canal and the completion of the works at Abidjan and, to some extent, of those at Conakry. There are as a

matter of fact, signs of at least a temporary stagnation or slackening in activity at Dakar.

The policy adopted in regard to ports and harbours in French West Africa after the war was to equip the larger ports with modern handling equipment in order to remove bottlenecks and improve turn-round times. This policy was extended to secondary ports under the "FIDES" plans. With the exception of Dakar, the ports concerned do not have good natural harbours, hence their capacity is largely dependent on installations of various kinds: piers, warehouses, handling equipment etc., which were few and far between in almost all West African ports until the end of the Second World War. Open wharfs, the lack of warehouse facilities and loading and unloading by lighter or surf-boat involved various problems, including that of packaging. For instance, the handling of cement in paper bags was difficult in such conditions, and serious losses through water damage were quite frequent, because exporting firms in Europe and elsewhere did not appreciate the need for packaging suited to African conditions.

The effort to improve port conditions gave Dakar a wharf to take tankers of 30,000 tons and over, refrigerated warehouses, and modern docks and handling equipment. At Conakry, a modernization programme launched in 1951 is now more or less complete. It comprised the construction of a north dyke²⁶, a 300-metre long dock, a pier for loading minerals, a 140-metre pier for loading bananas and a 140-metre berth for coastal vessels. The port is now equipped for mechanical loading of iron ore and bananas. Other improvements concerned railway connexions, warehouses etc.

But the most striking development took place at Abidjan, with the cutting of a canal through the lagoon-bar at Vridi. The work started under great difficulties in 1938 and was completed in 1950, and the canal was opened for traffic in 1951, since which time work on the final installations has steadily proceeded.

By making a deep-sea port of Abidjan, these works have radically changed its importance and also had far-reaching effects on export-import traffic flows. The total tonnage handled, which amounted to 418,000 tons in 1949) and (in round figures) 700,000 tons in 1951 rose to 1,400,000 tons in 1959²⁷, the increase between 1958 and 1959 being 14%. From 1951 to 1959 imports rose from 380,000 to 690,000 tons and exports from 320,000 to 710,000 tons. The increase in imports was very marked in the case of cement, petroleum products, rice and flour, while that in exports was largely accounted for by a very steep rise in exports of timber and other forest products, coffee and bananas. One result of the new handling capacity of Abidjan is that all petroleum products now enter through that port instead of taking the roundabout way via Dakar.

²⁶ *Op. cit.* (A/4134).

²⁷ Port d'Abidjan. "Rapport Annuel 1959".

All three big ports, Dakar, Conakry and Abidjan, have developed rapidly since the war. Goods handled at Dakar rose from some 1.3 million tons in 1946 to about 4 million tons ten years later, the corresponding figures for Conakry being 100,000 and 1.6 million tons, and for Abidjan 600,000 and 1 million tons respectively. Their increasing capacity is not of mere "local" interest; it affects the whole West African region in various ways. For instance, the handling equipment available at Dakar, and in particular the powerful cranes with their lift of 125 tons (as compared with the usual maximum of 5 tons) may to some extent result in directing difficult handling operations to this port²⁸.

As in former French West Africa, foreign trade greatly expanded in the former British West African territories after the Second World War. In the ten years from 1948 to 1958, the tonnage of exports from Nigeria doubled, and significantly enough, its imports trebled, as will be seen from the following table²⁹.

	1948	1958
Cargo loaded (tons)	1,265,000	2,612,000
Cargo unloaded (tons)	756,000	2,338,000
Number of ocean-going vessels entering Nigerian ports from abroad	762	2,159

Ghana's foreign trade expanded by 60%, and Sierra Leone's by 70%. Apart from Freetown in Sierra Leone, there are no good natural harbours; but as a result of extensive works good artificial harbours have been or are being constructed. Among the former are Bathurst in Gambia, Monrovia in Liberia (where great improvement works are under way), Takoradi in Ghana, and Lagos and Port Harcourt in Nigeria; among the latter, Tema in Ghana. Furthermore, an elaborate plan has been conceived to keep the Niger delta harbours open to ocean-going traffic³⁰. It is expected that by the end of 1964, these harbours — Burutu, Warri, Sapele and Koko — will take over a much larger share of the country's foreign trade and that Burutu and Warri will join Lagos and Port Harcourt as national ports.

The main improvements of harbour facilities to enable more traffic to be handled are described below.

²⁸ For example, heavy barges destined for Nigeria have sometimes been unloaded at Dakar and then taken in tow to Lagos.

²⁹ Economic Survey of Nigeria in 1959. The figures for cargo relate only to cargo carried in the same ship between Nigeria and a foreign country. They include, however, also transit traffic to or from former French territories. In addition to this cargo, ocean-going ships in 1958 moved over ½ million tons between Nigerian ports.

³⁰ See notes on page 22.

Bathurst got a deep-water dock in 1952. The Elisabeth II dock at Freetown was inaugurated in 1954. Takoradi harbour (which comes under the Ghana Railways and Harbour Administration) has seven quay berths inside two breakwaters enclosing a water area of 220 acres. Five of the berths are used for handling general cargo and one for loading manganese ore while one is reserved for colliers and coasting vessels. At three of the berths oil fuel can be supplied to vessels requiring bunkers. The handling equipment includes a conveyor for loading bauxite, and there is an oil berth, in sheltered water, for the discharge of oil from tankers and bunkering of other vessels.

Takoradi is the principal port for timber exports, and also handles the bulk of the cocoa export. These products are loaded by means of lighters, for which there is a wharf 1,400 feet long at the inner end of the harbour. For vessels loading or discharging by lighter there are eight sets of moorings at depths varying between 20 and 30 feet³¹.

The greatest improvements in harbour facilities since the war have taken place at Lagos, and in particular at Port Harcourt, in Nigeria.

Lagos handles 44% of the country's exports and 68% of its imports, Port Harcourt 24%, and 20% respectively. The great post-war expansion of Nigerian foreign trade is largely due to improvements in handling equipment at these two ports³².

³⁰ Economic Survey of Nigeria in 1959. Before the coming of the railway, Forcados in the Niger delta was the trading outlet for the northern region. But it slowly silted up, so that the permissible draught of vessels had to be reduced from 20 to 12 feet. Hence the Escravos estuary replaced Forcados, though it had only 13½-14 feet high-water; efforts to deepen the channel by dredging proved unsuccessful. As a result, much of the produce shipped down the Niger and the Benue for export cannot be loaded direct into ocean-going ships but has to be shipped coastwise to Lagos to be loaded there, causing a surcharge of 12s 6d a ton. When the projected dredging of the Escravos channel behind a protective mole is completed, ships with a draught of 20 feet will be able to load up to 5,000 tons instead of 1,200-1,400 tons as now.

³¹ The surf harbours at Accra, Winneba and Cape Coast are also controlled by the Ghana Railways and Harbour Administration. At Accra there is also a small jetty equipped with 2-3 ton cranes for handling heavy lifts from surf-boats. The harbour has also ample shed accommodation. At all these harbours, all transfers of export or import cargoes, between vessels lying in the roadstead and the beaches are made by surf-boat (Administration Report by the Ghana Railways and Harbour Administration, 1957-58). Since 1954-55 the import trade of Takoradi has shown no increase; but export trade has steadily increased since 1953-54, except for a slight reduction in 1957-58, mainly due to a steep increase in the export of timber and bauxite.

³² Including five 6-ton mobile cranes, 13 fork-lift trucks and 2 David Brown shunting tractors, together with a great number of pallets for palletization of general cargo.

The Nigerian Ports Authority was set up under the Ports Ordinance of 1954, which separated the ports administration from the railway administration (both, as has been seen, being still under one authority in Ghana). This measure has undoubtedly made for much more efficient administration and much smoother operation.

Installations have been greatly improved. At Lagos, four additional berths with transit sheds were put into service in 1956. Various types of mechanical handling equipment have been installed and new working methods introduced in order to speed up loading and unloading operations and to enable more vessels and vessels of greater draught to use the port. At Port Harcourt, three new deep-water berths now building are expected to be ready for use in 1961. Meanwhile, steps have been taken to increase the capacity of existing berths: among these are the installation of an electrically operated belt-conveyor running from produce sheds to loading quays and the introduction of other types of mechanical handling equipment. In addition, separate tanker moorings, a berth for lighters and small coasters, and a palm-oil tanker berth have been provided in order to free main berths for other vessels. The great difficulty is that there is a serious backlog of maintenance on the old wharf aprons to be cleared before the new berths can be fully utilized. The work is in progress, but involves putting the berths out of service one at a time³³.

The problems of West African ports are complex. Often it was a combination of factors which caused the congestion that characterized these ports after the war. A basic feature was certainly the general inadequacy of the transport system, and especially of rail links serving ports, both as such and for quality of service. It should also be noted that the tremendous increase in foreign trade after the war was unforeseen and existing facilities were inadequate to the new demand.

As many West African exports and imports consist of bulky and heavy goods, a wide variety of equipment is needed to ensure efficient handling: ropeways, cranes, tippers, hoppers, conveyors, trucks, elevators and the like. Warehouse lay-outs and warehouse operations have been greatly affected, especially by the introduction of fork-trucks and pallets. Petroleum and petroleum products, imports of which have risen steeply since the war, demand special installations like submarine pipelines from tanker to tank-farms ashore. Complex equipment is also needed for storing and loading palm-oil.

The main cause of traffic bottlenecks in West Africa since the war has undoubtedly been congested ports and port operations. As late as 1956, ships of the West Africa Conference Line were delayed a total of 741 days in five West African ports, among them Lagos, with the result that surcharges

³³ Nigerian Ports Authority, Fourth Annual Report, for the year ended 31 March 1959.

for traffic in that region were introduced by the insurance companies. It might therefore be of interest to assess the extent to which inadequate port capacity in West Africa is hampering and swelling the cost of economic development.

A general survey of existing port facilities seems to indicate that port capacity is adequate, or nearly so, to existing trade. In the near future, the completion of the port of Tema in Ghana, the fitting out of Port Harcourt, the dredging of the Escravos channel and the building of a deep-sea port at Cotonou will further increase capacity. Among the more important ports, Dakar has according to some estimates, 50% unused capacity, and the situation seems stagnant. The port of Abidjan is estimated to be over-congested on 150 days a year, with traffic normal on 75 days and only minor delays on 140 days; but the installation of two new berths should reduce days of heavy congestion to 95 and produce 150 "free" days and 120 "manageable days".

Takoradi harbour is used roughly to capacity; but an appreciable improvement has been achieved in average turn-round times — a proof of greater operating efficiency.

Lagos has been more or less relieved of the congestion for which it was notorious among West African ports in the immediate post-war years, though conditions will not be entirely satisfactory until the backlog of maintenance work is cleared. Any heavy increase in foreign trade would necessitate further installations; but the additional traffic might be absorbed by Port Harcourt and the delta ports. The former will have adequate capacity, and to spare, for its present volume of traffic when the three new berths are operating. This situation will change, however, when the railway's Bornu extension opens, as exports via Port Harcourt (and transit traffic from Chad) will then increase.

Some of the smaller ports still constitute bottlenecks because of inadequate facilities. Among them is Accra with its breakwater steadily deteriorating; but the advent of Tema will solve this problem. In Togo, phosphates for export are loaded at a special wharf east of Porto Seguro; the wharf at Lomé is a bottleneck at peak periods, but could with improved facilities and more efficient operation probably cope with existing traffic³⁴. According to latest information negotiations for the financing of a deep-water port right east of Lomé are well advanced.

Port capacity in West Africa seems on the whole to be rapidly expanding. But under the cir-

cumstances and in view of a certain "spottiness" in the general picture, e.g. as regards Dakar, it might be advisable to make a special study of port capacity in relation to development of trade in the region, although the necessary data for such a study may not yet be available.

IV. *Inland waterways and inland water transport*

Inland waterways have always been important for West African transport, although they have been somewhat overshadowed in modern times by other modes of transport, like rail and road. There is, however, reason to believe that West African waterways, be they rivers, navigable creeks or lagoons, will resume much of their former importance; for they have the attraction of cheapness and, as has been seen previously, most West African traffic consists of low-grade commodities carried in bulk. The development of river and lagoon transport is intrinsically international or sub-regional, which is as yet true only in a limited sense of rail or road transport in the region.

The demand for water transport in West Africa will nevertheless remain largely latent unless considerable sums are spent on improving waterways and port installations. One of the principal goals should be to secure continuous traffic throughout most of the year, whereas the dry season now halts many river operations. To ensure an undisturbed flow of river traffic, it will in many cases be necessary to improve river-beds and to eliminate or moderate falls and rapids. To maintain an adequate depth of water, dams may have to be constructed and locks provided. (This is treaty obligation on international rivers.) In addition, suitable river craft must be available with or without engines, but with a shallow enough draught to permit navigation during the dry season, and river harbours must have the necessary handling and storage facilities. As to lagoon traffic which is for all practical purposes a kind of coastwise shipping, the most important measure would be to pierce channels at strategic points.

While only the Niger (with its tributary the Benue), the Senegal, the Volta and the Gambia rivers can be regarded as main transport routes (although as yet far from being fully utilized as such), considerable quantities of goods and large numbers of persons travel by canoe in West Africa. This traffic continues all the year round, and the rivers have aptly been called "the highways for common folk". Tidal creeks are also used by canoes, the largest taking loads of 10-15 tons, the average capacity being about 2-3 tons. These craft carry food-stuffs between the villages and the local markets, and serve to extend the services of the river companies to "bush" stations³⁵.

³⁴ This wharf was lengthened in 1954 and equipped with three new cranes, in addition to the former six, to enable it to handle three vessels at a time. This proved there were too few lighters (4 of 20 tons and 20 of 10 tons). Thus, although electrification of the cranes is in progress, the capacity of the wharf is still too low, for want of adequate floating equipment. In May 1960, the ship "Belfort" waited 12 days, at a cost of six million CFA before it could discharge its cargo of 866 tons — and the case is not unique.

³⁵ International Bank, "The Economic Development of Nigeria", p. 539.

The extraction of timber from the forest is a complicated and costly business, as is also its conveyance to the coast for export or to the sawmills for processing. The cheapest way to move logs is to float them down rivers or propel them in rafts across lakes or along lagoons. In West Africa, the marked seasonal variations in water level greatly complicate timber transport, especially at the extraction stage, as small creeks dry up completely during the dry season. In other cases shoals and, more so, rapids make timber floating difficult or impossible. Again, some of the African hardwoods most in demand, like the "ekki", are so hard and heavy that they do not float.

In many timber-producing countries, like Ghana, where the inland waterways are unsuitable, the timber is mainly moved by rail or road, and the sawmills are then sited near the production centres in order to save transport costs (unprocessed timber naturally contains a high percentage of waste material). Nevertheless, considerable quantities of timber are floated every year in certain parts of the region, particularly in Nigeria, where rivers and creeks form ready-made routes for floating timber down to the coast, the delta port of Sapele being a centre for this traffic.

In former French West Africa, inland water transport comprises two main types of traffic, river and lagoon traffic.

Steamers and barges ply on the following rivers: the Senegal, between Saint Louis and Kayès (555 miles) from July to October, and up to Podor all the year round; the Niger, from Kouroussa to Bamako (240 miles), Koulikouro to Asongo (915 miles), and Niamey to Gaya (125 miles). There is also some traffic on the Kilo and the Bani, two tributaries of the Niger. On all these rivers a substantial amount of traffic is also carried by canoes of varying sizes. Again timber floating is important, especially in the Ivory Coast, where the port of Sassandra is one of the main centres for this traffic.

Traffic on coastal lagoons is of particular importance in the Ivory Coast, where the coastal lagoon system, which is 300 km. long and 800-1000 m. wide, comprises:

- (1) in the east, the combined Aby and Tenda lagoons into the latter of which flows the river Tanoe, marking the frontier with Ghana, while the former receives the river Bia, which is navigable up to Aboisso and meets the ocean at Assinie;
- (2) in the centre, the Ebrie lagoon, which is connected with the Potou and Aguin lagoons and which receives the Comoe, Me and Agneby rivers; and
- (3) in the west, the Grand-Lahou, Nouzoumou and Fresco lagoon, which receives the rivers Bandama, Bolo and Niouniourou.

Three canals — Assinie, Asagny and Groguida — were cut to link up all these lagoons. To complete this waterway another must be cut at Fresco; this work is at present under study.

The rivers which flow into these lagoons are navigable up to the following points:

Aboisso on the Bia	(20 km.)
Alepe on the Comoe	(45 km.)
Bago on the Agneby	(25 km.)
Bacanda on the Bandama	(70 km.)
Zegne on the Bolo	(12 km.)

Despite the vast effort already expended on the creation of this lagoon transport system, to which the Assinie canal is the key, a few collection points (*points de desserte*) for local products have still to be established; for some villages have as yet no road connexions, and wharfs must be constructed to link them with Abidjan by water.

Under the lagoon utilization programme a harbour is also to be constructed at Aboisso on the Bia. Apart from linking up the various lagoons, the project will provide for the transport of manganese ore via Mokta el Hadid from Kikegou on the Tadio lagoon to the one depot now under construction at the mouth of the Vridi Canal³⁶.

The lake network in Dahomey is now under study, and some dredging work has been done in order to improve inland water channels. It is now possible by way of a network of navigable creeks to travel from Dahomey almost to the border of the Southern Cameroons.

To summarize, the investments made in former French West Africa to develop river and lagoon transport, whether financed out of "FIDES" or by the Treasury, have had three main purposes:

- (a) to improve navigation;
- (b) to equip river harbours; and
- (c) to modernize river craft.

The measures taken aim principally at lowering transport costs, reducing storage time and in general, eliminating bottlenecks in river harbours. In other words, the ultimate goal is to secure a continuous flow of traffic throughout the year.

The most important waterways in West Africa for transport are the Niger and the Benue. While considerable quantities of agricultural produce (mostly groundnuts, rice paddy and cotton) travel over the 1,500 km of navigable stretches of the Niger in former French West Africa, the river plays its full role as a transport route only within Nigeria, through which it flows about 800 miles to the sea, being joined at Lokoja, 360 miles from the coast, by the Benue, the total length of which in Nigeria is some 900 miles.

There is very heavy traffic (mainly passengers and foodstuffs) on both rivers, operated by Africans

³⁶ Port d'Abidjan, "Rapport Annuel", 1959.

using canoes of varying sizes, barges and all kinds of small river craft³⁷. There are also three private companies operating river fleets which are solely engaged in overseas trade³⁸. These fleets use the delta ports of Burutu and Warri, and have combined tonnage of some 30,000 tons. A recent report³⁹ contains the following comments on river traffic: "In the middle 1950's river transport on the Niger and the Benue reached a total of 250,000 tons, producing 115 million ton/miles. At present (1958) 125-130 million ton/miles are transported along the Niger and Benue system, while the yearly increase over the last decade has been 6-7%. A faster development of river transport is for a large part dependent on the interest taken in this transport route, i.e., in the employment of capital to improve the transport route.....". The same report estimated the total tonnage lifted by the fleets at 275,000 tons in 1958. According to another source, the yearly average during the period 1957-59 was 179,000 tons on the Niger and 78,000 on the Benue; of these tonnages roughly one-third was carried up and two-thirds down the rivers. About half the total consisted of transit traffic to or from Garoua in the Cameroon Republic, situated 610 miles from Lokoja.

Although the river traffic is therefore considerable, it represents only a part of the waterways' potential and is conducted at a high cost. One of the main obstacles to better utilization of the Niger and Benue system is the fact that the depth of both rivers varies greatly during the year, navigation being possible all the year round only below Onitsha (232 miles from the coast). Although the Niger is navigable up to Jebba (566 miles from the coast) from August to March, the river fleets seldom go farther than Baro (434 miles from the coast), which has a connexion with the Lagos-Kano railway line. During the period when both rivers are navigable above Lokoja, traffic is concentrated on the Benue where unbroken hauls are longer. Only after the Benue has ceased to be navigable (December-March) is traffic resumed between Lokoja and Baro.

There are obstacles other than changing depths to river navigation. On certain stretches vessels have to reduce speed, and thus lose travel time, which is the more serious in that night sailing is extremely difficult and generally avoided.

³⁷ Some of these craft were built in Nigerian boatyards, thus creating work opportunities on the domestic market (Economic Survey of Nigeria in 1959).

³⁸ These three companies are N.R.T., a subsidiary of U.A.C., John Holt and a French Company, the "Compagnie de Transport et de Commerce". Of these, N.R.T., which is by far the best equipped, takes 88% of the total traffic. (*"Le Chemin de Fer Bangui-Tschad dans son contexte économique régionale"* Gilles Sautter.)

³⁹ Final Report by the Netherlands Engineering Consultants (NEDECO), submitted to the Federal Government of Nigeria.

A further hindrance to river navigation is obstructed access to the sea. The silting up of the delta, as stated earlier with reference to Forcados, makes it impossible for ocean-going ships to use delta ports like Burutu, Warri, Sapele and Koko, thus preventing any substantial increase in tonnages handled. Hence the first requirement for improved river traffic is to clear the delta approaches. As previously stated, a start has been made with the scheme for piercing a channel at Escravos at a cost of approximately 8 million pounds.

One effect of the present situation is that the river fleets, being unable to operate during the hours of darkness, are in service for only about 30% of the total hours in any one year. Freight charges are therefore unusually high the present average rate for river transport being 2s. 5d per ton/mile, as compared with 2s. 9d for rail transport. This is a very unusual ratio between river and rail freight rates, the figure being normally at least 1:2, and sometimes even 1:4. The special advantage of inland water transport, namely, its cheapness, is not particularly noticeable on the Niger-Benue system, which shows that the latter is not being exploited economically⁴⁰.

The Federal Government is now taking steps to make up the leeway it has noted in the exploitation of the river system. The first step should probably be to establish a scientific river administration, which should increase the capacity of the river fleets by 10-15%, and the second to introduce night navigation, which would lead to a further increase of 60%. Thus freight rates could be reduced by administrative measures alone, i.e. without recourse to engineering measures⁴¹.

But, while the above-mentioned measures should greatly increase the volume of traffic, and therefore reduce operating costs, further progress will only be achieved by engineering works.

The dredging problem is comparatively simple. The Benue cannot be dredged until a dam is built to regulate discharge; it may be possible to dredge the Niger, although experience is lacking on the subject. At all events, there seems reason to believe that successful dredging may increase the capacity of river fleets plying between the delta and Baro by 30%.

It will, however, be impossible to utilize the full potential of the Niger without major dam build-

⁴⁰ Federation of Nigeria, "Proposals for Dams on the Niger and Kaduna Rivers", 1959.

⁴¹ The previously mentioned NEDECO report states that: "An analysis of the daylight working of 39 ships over a period of more than a year showed that only 35-40% of the time is spent in steaming, a further 20% in loading and discharging, 5-7½% in maintenance and repairs while the remainder is lost for (other) reasons....."

ing. According to a recent estimate⁴², the construction of a regulating dam above Jebba with a storage capacity of 8-12 million acre feet (some 15-20% of the annual run-off) would increase depth by one foot during the Niger "black flood" period and open up the river above Jebba for nine months in the year, making it possible in fact to pass the rapids above Jebba and enabling the river fleets to serve the southern part of Sokoto and the former French Niger territory as far as Niamey. This would mean the opening of an international river route, on which shipping rights would be regulated by the "Niger Treaties", to which the Federal Government acceded in 1957.

The construction of a dam at Jebba (others could be built both on the former French side and at Baro), would have important economic repercussions. From the transport point of view, not only would the capacity of existing river fleets automatically increase, but improved operation would encourage the introduction of larger vessels. At present, with a draught of five feet, the largest tow on the Niger or on the Benue is about 3,600 tons, the equivalent of nine freight trains on the Nigerian Railways⁴³, but experience on the Mississippi shows that with a draught of nine feet push-tows of 20,000 tons, or the equivalent of 50 Nigerian groundnut trains, are possible.

Improvement in Niger navigation would therefore affect competition between rail and river transport, in the latter's favour. Since, however, river transport mainly serves areas with no other modern means of communication, it is more likely to complement than to compete with rail transport⁴⁴.

As to Benue, the construction of one dam in the former French Cameroons and of one or two in Nigeria would have similar good effects on the groundnut traffic; but the cost would not at this stage be economically justified by the mere increase

⁴² Report of the NEDECO. Dredging was unsuccessfully tried on the Niger in 1914, and the effort was never renewed. In regard to night navigation, it is doubtful whether its introduction would justify the extra cost involved in employing extra crews (except for training purposes) before the Escravos channel is in operation, i.e. in 1964.

⁴³ A groundnut train on the Nigerian Railways now takes a load of about 380-400 tons, but the average load is likely to increase in the near future, with the introduction of diesel traction, bigger wagons etc.

⁴⁴ In the case of groundnuts, however, the river route up to Baro competes with the Kano-Lagos railway route. The alternatives in this case are Kano-Lagos rail (about 700 miles) and Kano-Baro by rail and Baro-Burutu or Warri by river (750 miles in all). The rail freight charges from Kano to Baro might here prove decisive, but only on the assumption that rail capacity is enough to move the whole groundnut crop, which has not always been the case since the war.

in traffic. This would also hold true for the Niger, but for the effect a dam would have outside the narrow field of transport.

As a matter of fact, the dam project (or projects)⁴⁵ is multi-purpose. It would bring about an immediate, considerable improvement in the navigability of the Niger. Moreover, substantial benefits would accrue to agriculture through irrigation and flood control in the extensive Niger flood plain, and the reservoir created by the dam could support an important fishing industry⁴⁶. The final, and perhaps main, point is that the project is a power project which would supply Kano and Lagos and the whole area between with electricity. Revenue from the sale of electricity would pay the capital charges on the 55 million pound project, and it would still be possible to reduce the price of electricity and introduce a standard rate for sales throughout the area. While the economic viability of the project would not depend on the development of any particular industrialization scheme, but rather on the general growth of demand for electricity, industrial undertakings might well be attracted by abundant supplies of cheap electricity as well as reduced transport charges, which would in turn strengthen the economy of the project.

Although the Niger-Benue system holds the most promise for improved transport facilities and general economic development, the potentialities of other West-African waterways have by no means been exhausted, or even to any considerable degree exploited, e.g. the Volta in Ghana, which is used by power craft as far up as Akuse, but the future of transport is intimately bound up with the Volta scheme, and in particular with the construction of a dam at Ajena (some 40 miles from the coast) and with the building of the port of Tema.

Sierra Leone has some 680 miles of navigable rivers; but there is little information as to the volume of traffic they carry, except that it is far from negligible⁴⁷. The distance between centres of population is often shorter by water than by road.

One obstacle to wider use of waterways by large craft is shifting sands which demand repeated, difficult and expensive charting operations. Since, despite such obstacles⁴⁸, the waterways carry heavy traffic and present facilities, such as jetties and land-

⁴⁵ A dam is projected at Kurwasa, some 60 miles above Jebba, which might be followed by another at Shiroro on the Kaduna river, to come into operation when the Kurwasa dam is fully exploited. However, the full benefits of either dam could be obtained independently of the other.

⁴⁶ See footnote 40.

⁴⁷ D.T. Jack, "Economic Survey of Sierra Leone".

⁴⁸ *Ibid.* One obstacle to increasing traffic is that insurance companies will not cover cargoes of craft using uncharted waters.

ing-stages are apparently inadequate, a thorough study of Sierra Leone's waterways might well be made as a basis for future development programmes.

In Gambia, the river is of the same cardinal importance for transport as groundnut cultivation is for the country's general economy, and at one stage 90% of the groundnut crop was carried by waterway, although fair quantities travel part of the way by truck. Ocean shipping also uses the river as far as Kaour, Kuntaur and Basse, some two hundred miles upstream.

V Roads and road transport

One of the outstanding features of West African transport since the war has been the growth of motor traffic on the highways, which was naturally reflected in road-building and improvement works, which mainly resulted in the conversion of a goodly part of the previous road network from mere bush-track, cleared and kept open by manual labours, to modern roads demanding consummate skill to plan and heavy mechanical equipment to construct and maintain. However, although in recent years road-building and the motorization of road transport have probably together been the greatest single factor in West Africa's economic development, no passably accurate quantitative estimate of their scope can be arrived at. In fact, very little is known about road traffic-volume, density, rates and fares charged etc. Existing figures show the numbers of motor vehicles registered, but do not indicate how many are really in use, which is of particular importance in a region where most roads are bad and vehicle maintenance unknown or inefficient. Nor do available figures clearly show the extent to which production and trade (both foreign and domestic) have benefited from improved road transport. The growth of urbanization and increased domestic migration clearly owe much to improved transport services, but cannot be readily expressed in figures. While the growth of road transport has sometimes resulted in competition with older modes of transport, it has more often than not met a hitherto latent demand (which could not be met before because of the entire lack of transport facilities) without diverting traffic from the older modes. There exist as yet only very rough estimates of the extent of road competition. On the whole, there is an obvious need for more quantitative data on road traffic and for new and more efficient traffic counts.

The two basic elements of road transport services are the road or "permanent way" (whose "permanence" is sometimes relative, e.g. in desert zones) and the number and types of vehicles. The length of roads, number of vehicles and their distribution among various groups of users are given in tables 3 & 4 of the appendix.

Although users are often attracted by road transport because rates are lower than those charged by competitors and above all by the railways — their choice is just as often influenced by the quality of service offered, determined by the fact that there is no suitable alternative. In fact, perhaps the greatest contribution to economic development by road transport has been the provision of facilities and services where none previously existed.

Road transport is characterized by its mobility and flexibility, the use of small transport units, its adaptability to individual users' needs, the measurement of speed in terms of total time consumed, the frequency of services and scope for publicity. In view of the relative scarcity of rail transport in West Africa and the limited nature of inland navigation, road transport has logically developed as one of the principal media of economic integration and domestic trade expansion throughout the region. The creation of domestic markets has been largely the achievement of road transport, though its contribution is not yet measurable statistically. Road transport also performs an important function as "feeder" to the railways and as a link between different railway systems or between rail and river routes.

The emphasis in inland transport in West Africa since the Second World War has been on the development of national highways with a view to expanding and improving road transport services. In some exceptional cases it was even the railways that took the initiative. The demand for road transport, and in particular that generated by trade and industry, is growing so rapidly that supply may fall short of it in countries like Nigeria, Ghana or the Ivory Coast, where general economic development is making great strides. There is undoubtedly a latent demand for local road services in other countries although it is rather difficult to gauge in the absence of statistical data.

In economically developed countries, road traffic is predominantly motor traffic. In under-developed countries, the highways carry large quantities of goods and large numbers of travellers that do not use motor transport. Much of this traffic — people carrying headloads or just walking, cattle moving on the hoof etc. — uses roads or paths on which there is little or no motor traffic. It should be noted here that the great demand for bicycles is not just due to the desire to get easily from place to place; bicycles are used to transport large quantities of goods, e.g. tins of palm-oil or bags of kapok. This helps to congest the roads and also creates a road safety problem. Where roads are narrow and traffic heavy, as e.g. in Lagos and the centre of Accra and Abidjan, the situation is already acute, and may have to be remedied by the construction of cycle tracks along busy roads.

The demand for road transport is also greatly stimulated by certain non-economic incentives.

The outstanding example is to be found in private road transport. The individual's reason for entering the road haulage business, i.e. for purchasing a vehicle for the conveyance of goods and passengers, may very well not be mainly economic, although the occupation as such is definitely so. Ownership of a car in West Africa is very much a matter of social prestige. As one expert puts it, "the transport business also carries high prestige value... both as a sign of success and as a symbol of wealth." "Prestige" alone explains the fact that few motor owners drive their own vehicles, although it would obviously be the rational thing to do for purely economic reasons.

The haulage business in West Africa is mainly conducted by small firms, partly because demand for road services is so scattered and there is as yet little economic advantage for bigger firms in large-scale operation. Where most of the owners are Africans, as e.g. in Ghana and Nigeria (but less so in former French West Africa, where road haulage is largely in the hands of Lebanese), the capital needed mostly comes from what has been called, the "unorganized and imperfect market for capital represented by the extended family and kinship group". Thus it often happens that the ownership is collective rather than individual, although it seldom takes the form of a corporation.

The road transport situation naturally differs somewhat according to the area and, in particular, to population density; but the general features are more often than not the same. The typical pattern when a certain stage of development is reached, as e.g. in a fairly densely populated country like Nigeria, is described by one expert⁴⁹ in the following terms: "a vigorous and well utilized industry engaged in serving a market for passengers and freight, largely on a local basis. This market, although probably of considerable size, is as yet not developed enough to become split into specialized sections. The great majority of the vehicles in use are engaged in transporting a wide variety of goods in conjunction with passengers. The passenger business forms a very important part of the total business of the industry and on some routes may be the most important part".

Before the Second World War, there was no consistent highway development policy in French West Africa. Road-building was a local, or at best a purely territorial, matter; and no effort was made to link up different territorial or even local networks. Nor did the advent of the motor car make any radical change in this policy at first. Though some improvements were carried out on a few important main arteries, permanent works and structures remained the exception, ferries for example, still plying where bridges should have been. Local roads

were at best only improved enough to enable motor vehicles to pass. Most roads were merely dry-weather roads. All difficult technical works were executed originally by army engineers, later by engineers of the Department of Public Works. There was to begin with no, and later very little, road-building machinery to replace manual work. Until "FIDES" was inaugurated funds were altogether insufficient.

The general policy pursued after the war was to improve existing roads and permanent structures rather than to construct new roads. Some important works were undertaken, particularly bridge-building; but the road network remained substantially the same as in 1945. This situation was inconsistent with the initial programme under "FIDES", which had actually included far more ambitious plans for, inter alia, the establishment of new road links as well as the widening of roads and extensive improvements to road surfaces. The first two plans provided for the construction of not less than 4,322 km of asphalted roads, 1,970 km of metalled roads and 11,693 km of improved dirt roads. But this programme was soon found to be unrealistic, with due regard to the expenses involved and to the state of demand for road transport services. It was then considerably watered down; the building of many inter-territorial links was indefinitely postponed, and vast plans for improving roads paralleling the railways were drastically curtailed. This development was a general consequence of a shift in economic development policy away from expenditure on infrastructure to directly productive investments.

Improvement works were carried out before 1957 on 300 km. of city streets, 1,700 km. of busy highways and 3,900 km. of dirt roads, or a total of some 6,000 km., representing about 8% of the road network but also sections carrying more than 50% of all traffic⁵⁰. The most important measures taken have been summarized in a recent paper as "... the improvement of the road network starting from Dakar and of a certain number of inter-territorial roads: the Kaolack-Ziguichor road, which crosses Gambia; the main Beyla-N'zérékoré-Liberia road; the Dahomey coastal road connecting Togoland with Nigeria. Many temporary bridges have been replaced by permanent structures; several of these built to ensure that the rivers can be crossed at all seasons are very long, e.g. the Malanville bridge over the Niger (455m). Modern ferries have been installed at Rosso, on the Senegal-Mauretania-Morocco road."

Of special interest are recent developments in the highway system of the Ivory Coast, which shares with Senegal the densest road network and the heaviest motor traffic in the whole of former French

⁴⁹ E.K. Hawkins, "Road Transport in Nigeria", 1958.

⁵⁰ Transport and Communications in Non-Self-Governing Territories (A/4134)

West Africa. Developments over the past decade emerge clearly from a comparison of figures for 1948 and 1959. The difference observed lies not so much in the mere length of the network, to which few entirely new "links" have been added, as in the improved quality of the roads. In 1948 even the 1,400 km of trunk roads were nothing but dry-weather dirt roads — particularly inadequate in Basse Côte, the rich southern part of the country, which is the centre of cocoa, coffee and banana cultivation, where the heavy annual rainfall makes all-weather roads an absolute necessity. Yet only 50 km of roads (and a few streets in Abidjan) were asphalted.

By the end of 1959, 530 km of the 1,575 km of Federal roads were asphalted, while 9,000 km of busy territorial roads were maintained by the Public Works Department, and the network comprised 17,000 km of secondary roads more or less fit for motor traffic during the dry season⁵¹.

The principal effort was devoted to the removal of so-called "queer spots" ("*points singuliers*") from main and secondary roads, and also as far as possible from tracks usable by motor vehicles, and to the construction of permanent works, such as road bridges, in place of existing wooden structures. Again, large-scale permanent works, e.g. bridges to replace ferries, were initiated and completed, together with the correction of road profiles, straightening of curves etc.

This policy has produced a steady increase in motor traffic to cope with the country's expanding trade and fast-developing industrialization⁵².

Total imports, which amounted in 1948 to 107,400 tons, with petrol in first place (17,150 tons) and cement in second (13,360 tons), had risen in 1959 to 688,500 tons, with cement first (131,000 tons) and petrol second (108,000 tons). Exports also showed a considerable, though less marked, expansion. The total for 1948 of 223,600 tons, with timber in first place (79,000 tons), coffee second (55,000 tons) and cocoa third (41,000 tons) — the two latter groups naturally for exceeded the first in value — had risen in 1959 to 709,000 tons with timber accounting for 419,000 tons, coffee 107,000 tons and cocoa 64,000 tons. Banana exports had also gained a new importance, the increase from 13,500 to 52,000 tons creating a new demand for either fast or refrigerated transport.

⁵¹ The above facts and figures are taken from a document issued by the Public Works Department, Abidjan, in March 1960. See also, "*Evolution du réseau routier en Côte d'Ivoire au cours de la dernière décennie*" by C. Cans, in "Travaux", August 1959.

⁵² The Ivory Coast has an area of 315,000 km² and a population of 3 million, including 20,000 Europeans. The most fertile part of the country is a coastal belt some 350 km deep, except at Abidjan, where it is only 150 km. This is the coffee, cocoa and banana region.

Industrial development bringing new breweries, textile factories, canneries etc., has also given rise to new needs. Existing transport facilities were quite inadequate to the new or to latent demand. As late as 1951 it took a good half-day to cover the 50 km. between Abidjan and Dabou by the route over the dike. During the rainy season the 110 km stretch from Abidjan to Adzope could hardly be covered in one day! Conditions were especially bad in the forest area around Abidjan, with its hilly terrain, loose soils and heavy traffic.

Motorization of road transport has likewise proceeded very rapidly. The park of motor vehicles actually in use, which amounted in 1948 to some 4,000 (and included no truck of over 4 tons), had by 1959 risen to an estimated total of 29,000 vehicles, comprising 19,000 passenger vehicles or vans and 10,000 trucks. Heavy trucks are still rare, and most long-distance traffic is carried in trucks of no more than 5-ton capacity, whereas 12-ton diesel trucks would obviously be more economic; but an effort has been made to open up a substantial mileage of country roads (*pistes*) to 5-ton trucks. One noteworthy trend is the growing proportion of passenger vehicles and vans in the total number of vehicles registered (65% in 1957, 70% in 1959). This shows that "mixed transport" vehicles are gradually being replaced by vehicles specializing in one kind of transport: passenger or goods.

Traffic density in the Ivory Coast is high by West African standards. In 1959 (apart from urban traffic) 250 km of highways had a density of more than 1,000 vehicles per day; 800 km had 300-500 vehicles per day, 750 km had 200-300 vehicles and 3,000 km had 50-200 vehicles per day.

As regards seasonal variations in traffic density, particularly between the "*traite*" in January and the slack period in October, the trend has been towards a levelling out of traffic peaks. This is due to ever-increasing diversification of the economy, one manifestation of which is a relative increase in imports as compared with exports.

The road network in Togo can be deemed fairly adequate so far as concerns main arteries, although their maintenance leaves something to be desired; but secondary roads usable by motor traffic are rather poor. The network comprises about 1,300 km of all-weather roads including 124 km asphalted⁵³, and about 3,000 km dry-weather country roads which can be used by motor vehicles.

The motor vehicle park has shown a steady increase since the war, particularly in the number of trucks, which rose from 621 in 1952 to 2,931 in 1960, when the total number of vehicles was about 4,500. In the same period the number of passenger vehic-

⁵³ The coastal road from Aflao on the Ghana border to the Dahomey border is asphalted throughout its whole length of 50 km. The road from the railhead at Blitta to Sokodé 82 km., is asphalted for some 60 km., and the work is continuing.

les rose from 215 to 1,212. The high percentage of State-owned vehicles in the breakdown is rather typical for West Africa; in 1959, out of a total of 1,610 trucks and vans, professional hauliers owned 556, trading firms 345 and the State 293⁵⁴.

The main trunk road in Dahomey is the coastal road which forms an international link between Nigeria and Togo. It is a very busy road, is asphalted but badly aligned in places, and has two very narrow bridges near the Togo border. Other roads connect the productive hinterland with Cotonou; one of them goes to Dassa-Zoumé, where it forks north-west to the frontier at Porga and Pama and north-east via the railhead at Parakou and Kandi to Malanville-Goya, where there is a bridge over the river Niger. These two main roads are connected by the lateral Birni-Kouande-Guèssou link. The road from Parakou to Niamey in the Niger Republic is asphalted.

In Nigeria, as in most other West African countries, the railway system was built early in the present century before any need for a comprehensive road system was felt, so that there later emerged three categories of roads. Trunk A roads are designed to act as "feeders" to the major railway terminals; they provide links between the Federal and regional capitals, and between them and other important towns and the ports; they also link important centres in Nigeria with others in neighbouring countries.

Trunk B roads connect provincial and local administrative centres and other large towns with the trunk A system, with one another and with ports or points on the railway.

The third category ("Other roads") mainly carry local traffic and act as "feeders" to the trunk road system.

According to recent statistics⁵⁵, the Nigerian road system, which has increased in length by 50% since the war, comprises 37,000 miles of roads, of which some 4,000 miles are asphalted. Of the total 5,799 miles are trunk A roads, 6,745 miles trunk B roads and 24,433 miles secondary or "feeder" roads⁵⁶.

The number of motor vehicles has risen steeply since 1950⁵⁷ as can be seen from the table below.

⁵⁴ *Bulletin Statistique Mensuel du Togo*, July 1959.

⁵⁵ "Economic Survey of Nigeria in 1959"; see also "Nigeris", by Vincent W. Hogg in "Road International", Special African Roads Number, 1959-60.

⁵⁶ These figures are as of 31 March 1958; but much doubt surrounds the total figure, and an expert like V.W. Hogg has encountered estimates varying between 36,000 and 160,000 miles! This is due to the fact that many miles of dirt road were built by village communities without subsidy and consequently do not appear in the official statistics as maintained by any public authority.

⁵⁷ Comparable figures are not available for the period prior to 1950. Private vehicles include taxis and land-rovers owned by private persons or missions. Commercial vehicles include trucks and lorries, buses and land-rovers.

It is at present estimated at 50,000 units in round figures, or, for a population of roughly 33 million, one vehicle per 660 inhabitants — a sign of under-development, at least as compared with USA or Europe⁵⁸.

Number of vehicles licensed in the 1st quarter of each year⁵⁹

	<i>Private</i>	<i>Commercial</i>
1950	6,900	7,300
1953	12,300	10,700
1956	16,800	16,900
1957	22,060	18,070
1958	24,150	17,900

The demand for road transport services in Nigeria is determined by the country's economic structure. This fact, while true for West Africa in general, is perhaps more obvious in Nigeria's case owing to its size.

Nigeria is primarily an exporter of agricultural products, such as palm-oil and palm-kernels, ground-nuts and cocoa. As farms are small and widely scattered, the cost of collection is important in fixing final prices to compete with the export prices of other countries producing the same primary commodities.

Transport costs must therefore be kept to a minimum, in view not only of the actual and potential competition to be faced but also of the need for improved transport facilities to cope with the expansion in domestic industry and trade. Only road transport can meet this sort of dispersed demand.

Imports are much wider in range than exports⁶⁰; but the goods are distributed in small amounts to a widely scattered population hence road transport is the logical mode.

In the large rural areas which produce surplus crops and market them in neighbouring towns, short-distance traffic is carried by road. There is also heavy long-distance road traffic in foodstuffs from the north for the towns and villages in the south, and in kola nuts, yams palm-oil and casava from south to north⁶¹.

The three main indices to traffic growth — vehicle licences, motor fuel consumption and traffic counts

⁵⁸ Economic Survey of Nigeria in 1959.

⁵⁹ Economic Survey of Nigeria in 1959.

⁶⁰ In terms of value, cotton and rayon piece goods and footwear hold first place (30.6 million pounds). Next come products like sugar, salt, flour, milk, fish and beer (19.2 million pounds). Cars, bicycles, commercial vehicles and petroleum account for 18.8 million pounds, and corrugated sheets and cement for 6.6 million pounds. These figures are for the year 1958.

⁶¹ There is but little doubt that much of this long-distance traffic has been diverted from the railways, particularly kola nuts and piece goods.

- all bear witness to a steep increase in use of roads in recent years. The number of motor vehicles licensed has increased on average by 12% per annum since 1953, the rate of increase has, in fact, been even higher for certain categories (passenger vehicles and heavy trucks).

Petrol imports rose from 14 million (imperial) gallons in 1948 to 33 million gallons in 1953 and 50 million gallons in 1958.

Traffic counts reveal that most road traffic uses the trunk A roads⁶² linking the major collection and distribution centres with the ports. A sample count conducted at 123 points all over the Federation showed that the number of vehicles passing these points had doubled between 1954 and 1958. Analysis of the figures also revealed that two-thirds of the vehicles using A roads outside the cities were trucks, hackney carriages and coaches. If the whole federal network is taken into consideration, this traffic is very unevenly distributed. For instance, on road A 1 Lagos traffic density is something like 7,000 vehicles per day, three-quarters of which are private cars, taxis, and light commercial vehicles, whereas on road A13, near Yashikera in the west on the Dahomey border, traffic density is about ten vehicles a day, all of which are probably "mammy" wagons.

Increased road traffic has obviously followed road improvements such as asphaltting, strengthening of bridges etc. The first impetus has often come from private cars and light commercial vehicles carrying mainly passengers. Heavy commercial transport usually develops with growing activity at terminal points⁶³.

At the turn of the century, practically all traffic in Ghana was carried by porters, canoe or hammock in the forest areas and by pack animal in the savannah of the north. Goods were taken as far inland as possible by steam launch or canoe, then headloaded by porters or placed in large drums for rolling along the ground. (Even in the 1920's this drum rolling was still very common.)

The first step towards a modern transport system in Ghana, as in many other West African territories, was the construction of a railway, which "made" Accra and led to the gradual construction of roads as "feeders" to the railway, which was later extended northwards along the age-old caravan trade routes.

By 1913, 218 miles of roads had been constructed and some 100 motor vehicles were in use. In

⁶² These roads are by no means uniform. They vary in length from 5 to 840 miles and in width from 12 to 22 ft. Surfaces may be either soil, gravel, sprayed asphalt or pre-mix carpet. They pass through areas of widely varying population density, ranging from 2 to 1,000 inhabitants per square mile. (V.W. Hogg, *op. cit.*)

⁶³ Sometimes heavy trucks have been prohibited from certain roads because of light bridges, but permitted once these are strengthened. (V.W. Hogg, *op. cit.*)

1921, the great North Road from Kumasi to Tamale was opened to light seasonal transport. Transport costs were high, amounting to something like 5/- per ton/mile.

After the First World War, motorized traffic steadily increased, and costs fell 3/- per ton/mile in 1942 and 1/- in 1930, the number of motor vehicles rising in the latter year to 10,000. Since 1925, a determined effort has been made to apply proper engineering standards to road construction; 358 miles of road had been completed and 763 miles surveyed by 1932.

The Great Depression more or less halted road works in the early 30's, although a major bridge was constructed over the Pra river at Bopogo and the asphalt road between Accra and Takoradi completed in 1935. The so-called "road-gap policy", under which no roads could be built paralleling railway tracks was abandoned in 1938 and existing gaps filled. In the same year, a bridge was built over the Pra at Prasu and the north road extended to Bolgatanga. Between 1935 and the outbreak of the Second World War, 367 miles of road were constructed and 506 miles surveyed. During the war road construction was suspended, except for a few projects designed to facilitate the extraction of bauxite for the war effort.

At the end of the war Ghana had about 6,000 miles of trunk roads, 300 miles of which were asphalted and about 6,000 miles of secondary roads and tracks; but the network was in bad condition. Road traffic had shrunk considerably, the number of vehicles had fallen to 6,900, and transport costs had risen to 8-10 pence a ton/mile. In the words of one expert "The life of a vehicle was short, maintenance difficult, and transport operators were reluctant to operate long-distance schedules. The hazards, delays, discomfort and expense of passenger travel precluded all except the most imperative journeys". The rapidly increasing motor traffic on these inadequate roads speeded their deterioration; and this led to the adoption in 1950 of a road programme under which 7 million pounds were to be invested in road improvements over a period of 10 years. This sum was later increased to 21 million pounds and the period reduced to 5 years. Road projects to the value of 18 million pounds were carried out during the 5-year period ending 1957. This was followed by a consolidated development programme, under which all outstanding projects scheduled within the 5-year period were completed. Under a second development plan, covering the period 1959-64, a sum of 12½ million pounds is allocated for completing the main trunk road system.

According to recent statistics, the total trunk road mileage is 18,663, of which 1,900 miles are asphalted. Motor traffic has expanded greatly the annual increase in the number of vehicles being 11-12%. The total, which amounted to 36,696,

in 1958, is now about 39,000, and transport costs have fallen to 4-6 pence per ton/mile.

Twenty years ago, Liberia had only one road, the 27-mile stretch linking Monrovia with Careysburg. During the Second World War, this road was extended to Salala and continued by American troops a further 86 miles to Ganta. By the end of the fiscal year 1959, the total length of the Liberian highway system was 1,892 miles, comprising 740 miles (or 39%) actually in use, 383 miles (or 20%) still under construction and 769 miles (or 41%) to be constructed under the approved long-term programme.

The principal aim of the Liberian highway development programme is to open up the country and, in particular, to serve the domestic markets, or in other words to provide farm-to-market roads. As a result, marketing operations have already increased, particularly in coffee. The next step will be to link the Liberian network with those of neighbouring Sierra Leone, Guinea and the Ivory Coast. This point is dealt with below in connexion with international road policies.

The length of roads in Sierra Leone, which had been 1,739 miles in 1948, had increased to 2,842 miles by 1957. This development was accompanied by an even more marked increase in motor traffic, as shown by the growth in the number of motor vehicles and in motor fuel imports⁶⁴.

	Commercial vehicles	Private vehicles	Total	Motor fuel imports (in million gallons)
1951	426	1,044	1,470	1.6
1952	960	1,258	2,218	1.9
1953	965	1,709	2,674	2.1
1954	1,421	1,928	3,349	2.1
1955	2,126	2,005	4,131	3.1
1956	2,497	3,958	6,455	4.4

The road system of Sierra Leone was primarily designed, to link the ports of Freetown and Port Loko with Kabala to the north, Bo and Pojehun to the south and Kailahun on the Liberian border to the east. The major current road project is the reconstruction and re-alignment of the Freetown-Bo road, which entails the laying of a 20-ft asphalt carpet as far as Taiama, and later on the Bo. In consequence, all small bridges with a span of 100 ft are to be reconstructed to provide a carriageway of 20 ft.

Another asphaltting project is planned for the road to Marampa, where the Sierra Leone Development Company works high-grade iron ore deposits, which yield about 1 million tons a year, the ore being transported by the Company's own 3'6"-gauge railway to Pepel on the coast. It will also

be necessary to construct a "feeder" road to Bunde-gu in the Tonkolili district, where new iron ore deposits are about to be opened up. In that connexion, the Company proposes to extend its railway into Tonkolili, but will meanwhile use both the Sierra Leone Railway and road transport for moving material and equipment to the site of operations.

In the northern district another network is planned to open up the stock-breeding country; one branch to the south-east (Mamansu-Sumbaria-Baoma) would shorten the distance by road between Freetown and the Kono diamond field.

In Gambia, the river itself has always been regarded as the country's principal line of communication, flowing as it does between the narrow strips of land that constitute the Protectorate (Bathurst being a Crown Colony). Indeed, ocean-going vessels drawing up to 19 ft. can sail upriver to Kuntaur, and those drawing 12 ft. the whole 176 miles to Georgetown, while 5-ton launches can pass the Bara-Kunda Falls in Senegal.

The economy of Gambia is entirely dependent on a single crop — groundnuts. Hitherto this crop has been taken by truck to the river wharfs and shipped thence by water to Bathurst. But the present main road is in very poor condition, and there is a project to construct an arterial road using the existing road base where suitable; this road would run along the south bank of the Gambia from Bathurst to Mansoh Konko, where the trans-Gambia highway from Bignona to Dakar crosses the river.

The development of road transport in West Africa is one of the most striking features of the post-war period. Despite the great progress made, it cannot be pretended that any West African country as yet possesses a highway system adequate to its need. One indication of defective standards is the short average life of, in particular, commercial vehicles. In Nigeria, for example after the post-war shortage of new vehicles had been overcome, replacement requirements still remained high: being 56% of all new commercial vehicle registrations in 1956, and never less than 50% at any time since. Such a state of affairs seem to indicate that the entire park is replaced about every four years.

Of all motor vehicles in Nigeria in 1955, 86% were under 5 years old, and of these 29% were under 1 year, 25%, under 2 years and 17% under 3 years old, only 1% being between 7 and 8 years old⁶⁵.

A comparison of the rate of increase in the number of motor vehicles for certain countries in West Africa with that for Great Britain shows an average rise of 8½% for the latter, against about 12% for Nigeria and Ghana. As to vehicle/miles travelled, the increase is about 6.3% for Great Britain, and around 15% for Nigeria.

⁶⁴ "Economic Survey of Sierra Leone", D.T. Jack, 1958.

⁶⁵ "Road Transport in Nigeria", E.K. Hawkins.

Despite the obvious need for a system of secondary roads in West Africa, to serve the domestic markets, the markedly short average life of motor vehicles indicates that more improvements on trunk roads are desirable, even if allowance is made for the bad effects of poor vehicle maintenance. The probability is that, with the steady increase in traffic volume, trunk roads in the most "motorized" West African countries like Ghana, the Ivory Coast and parts of Nigeria and Senegal will have to be reconstructed to higher standards. As the roads improve traffic density tends to rise and heavier vehicles appear, making road improvement a continuous process. Road-building techniques made great strides since the war (e.g. in regard to soil testing and stabilization, setting of standards, and use of road-building equipment); but costs have likewise gone up, owing to mechanized handling processes and a general rise in wages. Hence the planning of expenditure on infrastructure in general and on roads in particular raises awkward questions of precedence, as between not only the various modes of transport but also the various road-building standards.

VI. *Commercial air transport*

No substantial developments took place in air transport in West Africa until after the Second World War. Yet some of the characteristic features of air transport, such as speed, should be of particular interest to such a vast region, as regards not only its links with the rest of the world but also its domestic transport services. Apart from the great distance, to be covered, there may be little or no chance of using other modes of transport, owing to the normally primitive state of road networks and the widespread lack of railways. Often the very slowness on other modes of transport in present conditions may make air transport the only solution. Air transport has the great technical advantage that it is unaffected by changing climatic conditions. Whereas in many areas of West Africa road transport in particular is totally or partially interrupted and rail transport greatly impeded by rains or floods during the wet season, and inland water transport is immobilized during the dry season, air transport can still continue to serve areas that would otherwise be cut off from the rest of the country.

Although latent demand for air transport services may therefore be regarded as substantial, actual demand has been greatly restricted by cost. Air traffic in West Africa was initially confined to passenger transport and the movement of goods of high unit value or of those demanding speedy transport (e.g. spare parts, certain chemicals etc.). The most marked trend in the development of air transport since has been towards widening the range of

demand to be satisfied. Especially noteworthy has been the growing importance of air freight, including a considerable volume of perishable goods like frozen meat⁶⁶. This type of transport has been tried out particularly in former French West Africa; supplies come from the cattle areas in the Mali Republic and Niger, the most important centres being Niamey and the Chad territory in former French Equatorial Africa, while demand lies in the coastal areas of the Ivory Coast, Ghana, Togo, Dahomey and Nigeria. It is still too early to judge the future of this air traffic which started in 1948 and now amounts to some 3,000 tons of meat a year carried by refrigerated planes. Customers are as yet few in number, and most of the meat for the population centres in Ghana and Nigeria is still imported by sea.

Airports in West Africa are classified according to the facilities they offer. The highest class (A or I) mainly cater for international long-distance traffic. The next class takes care of medium-distance traffic but can be converted to international standards, and are often used for coastwise traffic where other means of transport are difficult or not available, e.g. in the lagoon area of the Ivory Coast. Class C airports (in former French West Africa) mostly deal with intra-regional traffic, while class D, the famous "aviation de la brousse" handle only local, short-distance traffic in "bush" country.

Special services like ambulance work, forest fire prevention or surveys, e.g. in agriculture, are of great and increasing importance; here more and more use is being made of helicopters, although for administrative rather than commercial purposes.

Perhaps the most striking aspect of air transport in West Africa has been that it now serves domestic demand at rates within the economic reach of the African population. Reduced air transport rates have made it possible to by-pass certain stages in transport development, e.g. in some cases rail or road transport, the step being direct from primitive transport like portage, or from no transport at all, to air transport, in much the same way as from dog-sleigh to aircraft in Canada.

Nigeria might well be regarded as typical for air transport development in West Africa. The number of aircraft landing in the country from abroad increased from an annual average of 1,883 in 1947-1949 to 4,118 in the period 1956-58. The number

⁶⁶ Meat was one of the first products to use air transport and was soon followed by other commodities, after a general reduction in transport rates. For instance there appeared an actual demand for air transport for imports of citrus fruits and mixed goods and for exports of cotton, groundnuts, rice, fish and medicinal plants. (See "Co-operation économique franco-africain", René Hofherr, Paris, 1958.)

of passengers arriving and departing more than doubled in five years, from just under 26,000 in 1953 to over 56,000 in 1958. The freight carried on international air routes is still relatively small (335 tons both inwards and outwards in 1958⁶⁷).

Domestic air services in Nigeria were operated by the West African Airways Corp. Limited until 1958, when they were taken over by Nigerian Airways Limited, a private company in which the Federal Government holds 51% of the shares. The number of passengers and volume of freight carried increased rapidly between 1948 and 1957-58:

	1948/49	1952/53	1957/58
Number of passengers ...	13,813	57,189	73,473
Thousand passenger/miles	3,948	15,973	21,797
Tons of mail	156	352	553
Tons of commercial freight	81	720	835

The figures for Ghana are somewhat less comprehensive, but the trend is unmistakable. The number of aircraft arriving rose from 78 in 1947 to 1,953 in 1958. Cargo unloaded reached a monthly average of 5 metric tons in 1947 and 32 metric tons in 1958 (39 in January 1959). Monthly averages for cargo loaded were 4 and 13 metric tons respectively.

⁶⁷ Economic Survey of Nigeria in 1959.

Chapter III

THE COST OF TRANSPORT

A. *General problem of costs in transport*

The function of transport has been described as "to bridge the time and space gap separating producer and customer, either by the movement of the goods made by the producer (goods transport) or by the movement of the producer or consumer himself (passenger transport)". The more efficient the transport services are the greater will be the volume of demand within reach of the producers, the wider the market and the greater the scope for specialization among productive resources¹.

The most fruitful reductions in the producer-consumer gap are to be achieved in space and time. In West Africa, space reductions were originally preponderant, modern modes of transport being primarily introduced in order to narrow the gap between the overseas producers and their sources of raw materials in West Africa, as most traffic was in export goods². Passenger transport was a gradual development. However, the situation changed after the Second World War, with the growth of motor transport on the highways and domestic air transport. Hence the time element of transport started to assume more importance in both goods and passenger services — a fact which must be carefully noted in assessing the special role of transport in economic development plans. Faster goods transport services enable industry and trade to economize in inventories and achieve a faster turnover of stocks. This is of special importance in West Africa where one of the most serious bottlenecks in the flow of

goods has been, and to some extent still is inadequate warehouse space and storage facilities. In other words, with faster services, trade and industry can finance their activities on a given level at lower capital cost.

The conventional division of costs into those which vary with output and those which do not, needs some qualification when applied to the transport industry, where the real problem is the high ratio of fixed to variable costs, particularly in the case of the railways. Even if the goods or services are produced by initially scarce production factors, the latter's scarcity is merely relative, being but an aspect of the degree of utilization of the industry's capacity. If the actual volume of production falls short of its optimum, leaving idle capacity, some of the production factors may not be scarce at all until the capacity limit is reached; until then these factors are in the nature more of "free goods" in general economic theory than of "economic goods" in the customary sense.

The important element for a transport industry in operation is therefore the intermediate technical optimum, which is attained when the technical equipment and installations are fully employed, in other words, when the industry is working to capacity. Until this optimum is reached, the industry will show excess capacity and what is usually called "increasing return with increasing output". This situation must, however, be distinguished from that marked by an intermittent excess capacity, which is a common feature in transport, particularly rail transport, in which the technical optimum is reached only at peak-traffic times. The effect of additional traffic on production costs therefore varies according to when it occurs. If it supervenes during off-peak periods, it will mostly boost returns while giving rise only to "special" transport costs, i.e. costs which do not arise if the transport operation concerned does not take place. The acceptance of additional traffic at peak periods may necessitate new equipment or even new installations (double tracks etc.), in other words, further capital outlay. Total transport costs then "bound" upwards to a new capacity level the technical optimum of the industry then naturally changing to meet the increased capacity.

¹ A. M. Milne, "The Economics of Inland Transport", pp. 22-23. "Producer-consumer gap" should be understood to mean, not just a physical distance measured in miles or minutes, but an economic distance measured in terms of cost. Transport improvement is more than a mere technical change like replacing portage or canoes by rail transport or motorized river craft. The aim is not to make physical changes or to increase transport facilities, but to reduce transport costs.

² Import traffic also embraced large quantities of raw materials and producer goods for whose transport the space element was relatively more important than the time element.

The peak-traffic aspect is of particular importance in such conditions as prevail in West Africa, where seasonal variations in traffic volume are commonly aggravated by the predominance of agricultural produce and the problem of providing sufficient transport capacity (a legal obligation on the railways) is further complicated by the existing imbalance between exports and imports which has, however, been less noticeable in recent years. Such factors force the railways to keep enough rolling stock available to handle peak requirements, although it may be partly idle during the slack season. Surplus capacity in road transport takes the form of difficulties in finding return loads. The adoption of any feasible policy of spreading transport operations over longer periods to solve this problem will raise difficulties of storage.

Generally speaking, it may prove convenient to use terms like "fixed" and "variable" transport costs, so long as it is remembered that they are abstract expressions of a somewhat complicated reality. Certain costs vary with changes in output and are proportional or regressive depending on whether the relative progressive changes in cost is the same as, or greater or less than the corresponding change in output. Other cost changes occur in "leaps" or "bounds" (as mentioned above) at certain points of change in the volume of production. The technical terms "joint production" and "joint costs" are much used in the transport industry to denote that certain production factors or their cost cannot be specifically allocated to one transport item (because, for example, many services and installations are used by both passenger and goods traffic, by both fast and slow trains etc.) The cost concerned may be either fixed or variable.

Costs can also be divided into en-route costs and terminal costs. Cost analysis of any transport operation often shows a high percentage of total costs to be incurred in loading and other types of handling (terminal operations), and the trend is undoubtedly towards an increase in such "ancillary services" (i.e. services other than actual conveyance of goods). This problem is of great importance in West Africa, where natural conditions frequently complicate handling operations yet great caution has to be exercised in substituting expensive handling equipment for relatively cheap manual labour.

B. Pricing of transport: rates and fares

To say that the aforementioned "producer-consumer gap" must be taken as a quantity to be measured in terms of transport costs and that the economic function of transport is to minimize this gap really means that a given transport industry should be so organized that persons and goods are conveyed at the lowest possible cost. What the transport undertakings, private or public, are concerned with is the cost of providing the services demanded,

which is of far less interest to the customer or user than the price charged for the services. This brings up the "quality-of-service" aspect. Where the choice lies between two services demanding different uses of scant resources, the user may find the more costly actually cheaper if by choosing it he can in some ways so reduce his production costs, as to bring them below the total he would have faced by choosing the alternative. For instance, where rail transport costs from station to station are less than equivalent road transport costs but in the latter case door-to-door service may mean savings in time, breakages etc., the higher rate may still be the better for the user. As previously stated, demand for a particular transport service is very often more than an unqualified demand for passenger/miles or ton/miles. The most-costly-to-provide-service is not necessarily identical with the most-costly-to-use!

The application of the "quality-of-service" criterion depends on the general elasticity of demand. The salient point in transport is whether a choice of services exists. If various modes of transport operate in a certain area, demand for the services of one will be affected by the existence of the others, provided substitution is technically possible. Thus a rise in railway rates may divert traffic to road or inland water transport. In industrially developed countries there is always a variety of passenger and goods transport services available, and demand for them is correspondingly varied — and frequently rather elastic, since one may so readily replace another. This leads to competition between the various modes of transport — but more often competition in quality of service than in rates.

The situation is different in under-developed countries, where the choice between modes of transport is often extremely restricted, or even non-existent. Before the advent of road transport, potential demand from domestic markets could be but scantily served by the existing mode of transport, viz., railway — at least given the rates charged and the quality of service offered. Road transport has therefore been largely complementary to rail transport in West Africa, although there is strong competition on certain routes for certain commodities at certain periods, due to seasonal variations.

Perhaps the main difficulty in rate-fixing lies in the role to be assigned to prime costs (*prix de revient*). Should transport charges be based on "special" transport costs, i.e. those that would be avoidable if the particular transport operation was not performed, and if so, in how far could such a policy be applied? Theoretical aspects aside, costs have tended to assume more importance in rate-fixing in recent years, owing both to more refined methods of allocating costs and to changing conditions on the transport market; but no attempt has yet been made to allocate part of the fixed costs to every single transport rate. During the "railway age", the time when modern transport was first introduced into West

Africa, the railways held a virtual monopoly of fast inland traffic in bulk; but their market position has since been steadily declining and is now characterized by monopolistic competition rather than by pure monopoly. So long as competition from other modes of transport was negligible, the railways' rate fixing system dominated the transport market. It was a system closely reflecting the railways' cost structure, which is characterized by a high percentage of fixed costs. Under this system there emerged the so-called "ad valorem" rates, which were until fairly recently the main element in railway rate-fixing and still, though in somewhat "diluted" form, have their influence in combination with cost elements.

Under the "ad valorem" system, rates are based on the user's willingness and ability to pay rather than on the cost of the service rendered, which usually means in practice that goods of high unit value are placed in higher tariff classes than those of low unit value.

The primary aim of the "ad valorem" system is of course to meet total costs out of total revenue and if possible to produce a profit on the whole transaction. But, if this result is achieved while certain rates are not adjusted to "special" costs and some services are therefore charged at less than cost, then other services must necessarily have been charged at more than cost; in other words, something that might be called "internal subsidization" is taking place. Motives for this may vary. The decisive arguments have often been strategic or political; but where economic considerations have prevailed the intention may have been to promote the creation of industries in certain areas.

Such "internal subsidization", both of groups of commodities and of particular transport routes, by the railways has been very frequent in West Africa. The situation in former French West Africa has been summarized as follows³ "... The transportation of costly products for short and middle distances made up for the lower rates charged for cheap products transported for long distances". "Internal subsidization" has also been a common feature in the former or present British territories, although apparently more frequent in West than in East Africa⁴. What for all practical purposes happened throughout West Africa was that bulk transport of agricultural produce for export was subsidized by railway rates that fell short of "special" costs. Hence goods of higher unit value, which were more common in the import trade, had to pay more than their share of total costs, so that exports were in fact partly subsidized by imports!

This type of "internal subsidization" is possible only if the carrier has something like the comparative monopoly enjoyed by the railways in bulk transport. While its adequacy as a policy has been contested,

the salient fact is not the subsidy as such but its "internal" nature, i.e. the fact that it has to be paid for by all or part of the other traffic. "External" subsidies coming, not from railway revenues, but from the State, may be more acceptable and sometimes, when "opening up" a region, necessary. One example is the so-called "hirondelle" operation in former French Equatorial Africa, by which the groundnut crop from the Niger territory was routed through Dahomey via the port of Cotonou instead of taking the shorter and cheaper Nigerian route. This was done to save foreign exchange, and the rebates granted were paid out of a compensation fund financed by a subsidy from the general budget.

The main disadvantages of an "internal subsidization" policy are that real transport costs may be forgotten and that it may cause waste of economic resources. The fact that some traffic pays more than costs really means an artificial broadening of the producer-consumer gap, which it is the function of transport to narrow! The effect of over-reliance on the "ad valorem" system, for the purpose of recovering not merely "special" but total costs, became apparent with the breaking of the railways transport monopoly on the advent of motorized road transport after the First World War. Various modes of transport, above all road and rail, now offer their different solutions to the demand for transport services. So the user may prefer, for example, a road to a rail service, even where the former is supplied at a higher social cost, and road competition may hit the railways in their most lucrative goods traffic, leaving them mainly with traffic carried at less than "special" costs, while subsidized traffic is diverted to the roads.

The subject of rate-fixing having been treated in rather general terms above, it may be well at this point to refer to certain aspects of special relevance to West Africa.

The previously mentioned post-war tendency of the railways in the region to base their rates on a modified "ad valorem" system was a new departure designed to take more account of "special" costs and regarded as a necessary adjustment to cope with the breach in the railways' monopoly made by the grow-

³ It may be recalled that railways in West Africa were almost invariably built ahead of demand and, at least to start with, were forced to maintain a rate-level which only precariously, if at all, allowed them to meet total costs out of total receipts. One difficulty for some railway systems was, that they were overburdened with capital charges. A case in point was the Nigerian Railways, which were in 1936 released by the Government from their obligation to meet them on a part of the eastern line, that had never paid its way. Another important change, concerning the Railways' administrative status was made in 1956, when they ceased to be a government department and became a public corporation ("Road Transport in Nigeria" by E. K. Hawkins, Oxford, 1958, pp. 9-10).

³ A/4139.

⁴ East Africa Royal Commission Report, 1953-55.

ing road transport business. The impact of growing road competition was, however, somewhat softened by the fact that the post-war period in which it was more and more strongly felt, also gave birth to new techniques in railway building and operation (welded rails, diesel traction), which improved services and strengthened the railway's competitive position⁵. In addition, traffic increased considerably, so that operating results were better than before the war, although this improvement was partly due to the fact that normal replacements were postponed.

However, arrears of maintenance and development were caught up with and when, for example, the Nigerian Railways became a public corporation in 1956 they already had several prosperous years behind them⁶. Freight rates on these Railways changed little during the war, and in 1946 net earnings were only 15% above the 1938 figure although traffic had considerably increased. But average receipts per ton/mile for all freight traffic increased from 2.02d in 1948-49 to 2.85d in 1952-53, or by 41% (the rate for groundnuts, which represented 34% of all traffic, had doubled). This resulted in earnings which by 1954-55 had risen to 400% above the 1946 level and 500% above the pre-war level⁷. The rate system comprises seven goods classes with a sharply tapering scale. The ton/mile haul rate for class 1 items, including local foodstuff, is 2.2d. for a 150-mile haul, but only 1.24d. for a 700-mile haul and 1.1d for a 1,000-mile haul. In class 7, the highest of the scale, which includes such items as bicycles and kola nuts, the corresponding ton/mile rates are: 7.33d., and 4.02d. respectively. In addition to regular freight rates by class, there are special rates, usually set by zones, for the main import and export goods as well as for certain local commodities. The general principle seems to have been to subsidize cement and fertilizer travelling long distances and local food products at the expense of export goods⁸.

The former French territories repeated some of the experiences of Nigeria and other British territories, although their railway capacity was apparently somewhat more able to cope with war-time traffic, at least to start with, probably because there was less total demand for transport services. But there are some indications that at the end of hostilities total demand (actual and latent) was not met, and there is no doubt that installations and equipment, particularly rolling stock, badly needed maintenance and modernization — so much so in fact that the expenditure entailed could obviously not be met out of current receipts, especially when these were beginning to be affected by road competition.

⁵ See note on page 37.

⁶ E.K. Hawkins, "Road Transport in Nigeria". Oxford, p. 10.

⁷ International Bank, Economic Survey of Nigeria, p. 468; Hawkins, p. 11.

⁸ International Bank, Economic Survey of Nigeria, p. 468.

This situation soon suggested the need for a more or less complete revision of the existing tariff system, i.e. the "ad valorem" system, which in practice meant an adjustment of rates on the basis of "special" transport costs. The application of the new policy in the French territories led to a general reduction of rates for short and middle distances, where road competition was most acute. This resulted in a sort of dissociation of the commercial prices of goods from the rates charged for their transport, and eventually in the placing of the more valuable goods in lower tariff classes than before. The principle of tapering rates per ton/kilometre progressively with increasing distance remained, but took a modified form in practice⁹.

The modified rate policy presumably contributed to the good financial results obtained after its introduction in former French West Africa, although the main contributory factor was the reduced expenditure achieved by improved equipment and modernized operation. With the exception of the Conakry-Niger and the Benin-Niger systems, the railways in former French West Africa have reached the so-called "*petit équilibre*", i.e. they have covered or more than covered their costs, other than capital costs. Although the rate-fixing system in the former French territories has generally tended to be more closely based than before on prime costs, this trend has not appeared uniformly in all of the territories, being for instance more clearly marked in West than in Equatorial Africa.

Railway rates — always a factor of primary importance for the general price level in a country — have remained very low, in the former French territories compared with changing price levels in the territories themselves, but not compared with those obtaining in, say, Nigeria and Ghana (1956):

(Rates in French Frs. (CFA) per passenger/km. or ton/km.)

Rate	AOF	Nigeria	Ghana (Gold Coast)
1st cl. passenger	4	5.32	4.32
2nd cl. passenger	2	0.75	0.93
Petrol	5.29	—	3.07
Cocoa	10.44	4.16	—
Groundnuts	5.11	3.7	— ¹⁰

Whereas all railways in West Africa have served, through their rate-fixing policies, as efficient instruments of economic development (and served other purposes — military, political and social — as well), and have been subjected to various charges for reasons that were often far from "commercial"

⁹ "Rail et Route au Sénégal", by B. Kaysen and J. Tricart, in "Annales de Géographie", July-August 1957.

¹⁰ "Les Economies d'AOF", by R. Hofherr, Paris, 1958.

in the strict sense of the term, road traffic has been differently placed. As is well known, the cost problem is not the same for road transport as for the railways, especially as regards the permanent way. Again, the road transport industry has no obligation to accept freight offered and need not therefore adapt its installations and operations to meet peak traffic requirements if to do so would be unremunerative. Whatever its contributions to highway construction and maintenance,¹¹ they will never be a major factor in the fixing of road haulage rates.

The road transport industry in West Africa is largely composed of one-man or small firms; moreover, the transport business is often operated in conjunction with other activities, like produce-buying or general trade. The smallness of firms reduces overheads, and vehicles can normally be used to capacity (or beyond!) even though the problem of finding return loads may cause some difficulties. Where road transport rates are based on costs, the industry may be considerably affected by competitive conditions, and this is very much the case in West Africa.

One major obstacle to an economic assessment of road transport in the region is the lack of reliable figures for road haulage costs and receipts. Indeed very little is known about the rates charged for traffic on African roads. This may be partly due to a certain reluctance on the part of the hauliers to divulge this kind of information, lest the tax authorities (as they suspect) be the sole beneficiaries. Other factors complicating the assessment for road transport costs are the mixed character of the operations performed (passenger and goods transport by the same vehicle etc.) and non-economic motives, such as the social prestige connected with the ownership of a motor vehicle. However, experts on transport in West Africa seem generally agreed that rates in the motor transport industry in the region are only to a limited extent based on true transport costs. One crucial point here is the question of depreciation: the difficulty in knowing how this all-important detail is treated is attributed by one expert (Hawkins) to the fact that "the habit of keeping accounting records, apart from those of the more rudimentary kind, has not yet developed amongst the lorry-owning community".

Nigeria is, from the economic point of view, one of the most important countries in West Africa, hence not entirely representative, particularly of the more sparsely populated areas.

However, as road transport rates have been investigated there more recently, and perhaps more thoroughly, than in most other territories, data for Nigeria probably reflect a situation not too different,

¹¹ The mainstay of these contributions will be the tax on motor fuel, although some of the revenue from this source may be diverted to other uses than road construction and maintenance.

qualitatively, from that found in, for example, the former French territories or Ghana.

From the point of view of rates, there is the usual distinction between passenger and goods traffic, the latter being sub-divided into: (1), the carriage of local products, which is to some extent linked with passenger traffic, and (2) the carriage of imports and exports.

The rate structure in Nigeria follows a more steady pattern than elsewhere. While some of this stability may be due to the influence of the carriers' associations, experience from parts of the country where these are comparatively weak and rates are nevertheless just about as steady suggests that the associations' approach in fact merely reflects the underlying pattern of supply and demand. It also seems likely that rates are conditioned by the factors behind demand for this kind of transport rather than by supply. This market is beyond doubt highly competitive, hence rate levels are very low, differing slightly for the three main areas of the country — being lowest in the west, highest in the east and intermediate in the north, where they are affected by sub-regional traffic with the Chad territory. Passenger rates would prove to be lower than freight rates if both could be reduced to a common denominator.¹²

There is a difference between freight rates for export-import traffic and those for local traffic: basically, only the former have a set pattern in Nigeria; the local freight market is hardly organized at all. Rates for export products mostly follow the Marketing Board's production price schedules, although it should be observed that not all export goods come under the Marketing Board system, notable exceptions being tin (mostly moved by rail), timber, rubber, hides and skins. But the transport of export goods is not a simple procedure; it takes place in two main stages, under different conditions affecting the rate levels. The first stage is the collection of the produce and its transport from the place of production to the point where the buyer licensed by the Board takes it over. At this stage rates are strongly affected by competition; the licensed buyers are usually able to offer the growers or middlemen higher prices than the published ones by manipulating the Board's transport allowances to reduce the real transport charge. This happens especially in years when the crop does not come up to expectations and the buyers compete for their share of the smaller supply¹³. At the second stage, which is the carriage of the produce to the port of export, the freight market is highly organized, so that the transport firms can plan regular services and obtain full loads: hence it is the most profitable kind of road transport in Nigeria, and most of the operators specialize in freight. At peak traffic seasons their number is

¹² Hawkins, *op. cit.* p. 70-71.

¹³ Hawkins, *op. cit.* p. 73.

augmented by smaller lorry operators as demand may require¹⁴. Price levels are based on the Marketing Board's allowances and are generally somewhat lower than the rates charged by the small, general-purpose transport firms, which are mostly owned by Africans engaged in the first stage of the transport operation and have to cope with comparatively short hauls and the difficulty of making up mixed loads (passengers and freight).

Competition from other modes of transport, especially the railways but sometimes even river transport, affects the rates, particularly in Nigeria for the groundnut crop, the bulk of which is carried by rail on the second stage of the journey to the export ports.

Traffic in local products in Nigeria is definitely small-scale and shows no clear pattern; bargaining on prices is the rule rather than the exception, as in freight traffic. Generally speaking, the ton/mile rates are much akin to passenger rates, owing mainly to the possibility of interchanging passenger and freight space in the types of vehicle commonly used in local traffic. According to one author, "this produces a type of discrimination between different kinds of freight, for goods that are heavy for their bulk tend to be charged at rates comparable to their passenger weight equivalent; goods which are bulky rather than heavy will have to pay a proportionately greater charge per ton/mile, because they are carried at the rate that will compensate for the passenger space given up"¹⁵. Another very important factor in transport charges, because of the incidence in cost to the transport firm or vehicle owner, is difference in road conditions particularly between asphalted and earth or gravel roads. These differences are already reflected in the Marketing Board's rates.

High on the list of factors affecting both the supply of and the demand for transport services in West Africa, as distinct from many other areas are seasonal variations. For instance, the number of transport routes is greatly reduced during the rainy season through damage to or destruction of road surfaces, bridges etc. Though mitigated by the introduction of more permanent structures, the effects of climate still have to be reckoned with throughout the region.

Everything considered, it seems a reasonable assumption that the pattern, in road transport rates in Nigeria has produced an active and well-utilized transport industry, mainly catering for a local market and carrying a wide variety of goods in addition to passengers.

The general picture emerging from certain studies on the road transport industry in former French territories like Senegal, the Ivory Coast, Chad and the Ubangi-Shari region, and Togo, although by no means complete, offers both similarities and dissimilarities with Nigeria.

Most of the French investigators seem to agree that there is no very firm pattern in the rates charged by the road transport industry.¹⁶ As one expert,¹⁷ referring only to French Equatorial Africa puts it, "there exists, with one recent exception, nothing even resembling a tariff". In his opinion, the very concept of road transport as a "public service" is totally absent from the minds of those operating it in the Chad and Central African Republic. Another expert describes the situation as such that it is more or less a practical impossibility for the individual shipper to obtain exact information as to the rate he will be charged, as every single transport operation is assessed separately. Although the conclusion of the study on the Ivory Coast¹⁸ seems to have been that road transport rates result from competitive conditions rather than considerations based on cost of the suppliers of transport services different tendencies may be observed, particularly in territories where competition is less acute. (The Ivory Coast is the most "motorized" of the former French territories). Among these may be mentioned the general tendency of unit prices to taper off with distance travelled and the fact that, as in Nigeria and elsewhere, rates are affected by costs arising out of road conditions, including road surfaces, bridges, ferries etc. For example, rates are always lower in the Chad than in the Central African Republic, because topographical conditions and the consequent absence of bridges, ferries etc. makes it possible to reduce transport costs by using heavier and larger units.

Where transport rates may be regarded as mainly conditioned by the relationship between supply and demand, they generally tend, *ceteris paribus*, to be higher in the dry than in the rainy season, when carriers are competing for a drastically reduced volume of traffic; the dry-season receipts more than offset higher transport costs caused by unfavourable conditions in the rainy season.¹⁹

In the former French territories, as well as elsewhere, road transport rates are so heavily dependent on return loads that rates for outward traffic are invariably determined by the availability of inward traffic. This often puts shippers of "secondary" goods for the return journey in a better bargaining position than shippers of the "principal" produce. It also explains the transport over great distances by road of heavy goods of low unit value, which

¹⁴ Hawkins, *op. cit.* p. 72.

¹⁵ Hawkins, *op. cit.* p. 75.

¹⁶ The studies here used are mainly those made by research teams of the Geographical Institute of the University of Strasbourg in Senegal, the Ivory Coast and French Equatorial Africa; the second of these has not yet come off the press.

¹⁷ Sautter, "Le Chemin-de-fer Bangui-Tschad", p. 202.

¹⁸ *Aspects de la Géographie de la Circulation en Côte d'Ivoire*; the most recent study is "Le Problème de la Concurrence Rail-Route en Côte d'Ivoire", Alfred Schwartz, 1960, Strasbourg.

¹⁹ Sautter, *op. cit.*, p. 203.

would in "normal" circumstances constitute standard railway freight. A typical return-load difficulty appears in the transport of motor fuel; the tank-cars used can take no return load, so have to travel empty in one direction. Several remedies have been tried, among them trailer-tanks coupled to trucks that can be loaded for the return journey and removable containers; but neither of these methods can be regarded as an entirely adequate solution to the problem.

While most traffic moves on the lines described above, there are certain exceptions, among them cotton, e.g. in the Central African Republic, where 70% of the traffic is carried by a single company, "Uniroute" rates are fixed on monopolistic lines, and there is very little possibility of return traffic. Another sector where free competition is restricted is on the Maiduguri (Nigeria)-Fort Lamy line, where, under an agreement between the agents handling the transit trade, French vehicles carry part of the traffic from Maiduguri onwards at rates considerably higher (the traffic is handled by a syndicate) than these of the Nigerian operators (on average 15d. a ton/mile, as compared with 10d. and only

3.2 - 3.9d. a ton/mile between Jos and Maiduguri)²⁰, owing to higher operating costs on the French sides, mainly caused by the preponderance of north-bound over south-bound traffic, which reduces rates for return loads to Jos to as low as 1.5d.-2.0d. a ton/mile.

The volume of freight carried by the road transport industry in the former French territories is of course strongly affected by the fact, mentioned previously, that transport of goods and passengers is largely operated in conjunction with other activities like trade, so that rates that do not cover true costs may nevertheless be found acceptable. Another point to be noted is that quite substantial traffic is apparently carried more or less "illegally", i.e. at variance with the rules and regulations governing passenger transport; for instance, vehicles not allowed to take passengers nevertheless do so, making up full loads by accepting passengers as "*fret complementaire*" and setting them down mostly at night before arrival at checking points.²¹

²⁰ Hawkins, *op. cit.*, p. 76-77; Sautter, *op. cit.*, p. 204.

²¹ Sautter, *op. cit.*, p. 199.

Chapter IV

TRANSPORT POLICIES

A. Investment policies and development plans

The Second World War brought a radical change in governments' attitudes towards transport and transport development. Wear-and-tear and inadequate maintenance during the war left communications like railways and roads in a run-down state, while at the same time traffic greatly increased in volume. The ratio of exports to imports, formerly heavily in favour of the former, tended to shift as a slowly rising standard of living swelled the flow of goods from overseas, with corresponding changes in traffic flows.

As noted above, the growing demand for transport services led to a marked development of road transport after the war, accompanied to some extent by a corresponding expansion of air transport, particularly in local traffic. But some post-war transport policies were aimed, first, at rehabilitating and improving existing installations and, secondly, at extending available facilities. The basic emphasis was on railways and ports, where the worst bottlenecks occurred and, somewhat later, on the planning of trunk roads.

Nearly all the earlier projects were part and parcel of general economic development plans. It was realized that the expenditure entailed in carrying them out would be well beyond the resources of some of the territories. In the case of the railways in particular, the considerable outlay on infrastructure contemplated, could not be entirely, or even mainly, met out of railway budgetary funds.

The general opinion may perhaps be ventured on these projects that they were somewhat unrealistic, as regards not only the actual scope of the extensions planned but also the standards contemplated. Needs were rather exaggerated in both cases, and both existing and potential traffic demand miscalculated, so that considerable revision of projects adopted soon proved unavoidable and no development plan was ever applied without substantial departures from the original setting.

In the territories under French administration, new instruments to meet investment needs were created in the "*Fonds d'investissement pour le développement économique et social des territoires d'Outre-mer (FIDES)*" and the "*Caisse Centrale de la France d'Outre-mer*".

About half of the commitments undertaken by these institutions during the period 1946-54 were for transport and communications. Before the first "FIDES" plan entered into operation, the rehabilitation of the transport system of French West Africa had already started and was being financed out of special funds.

Under that first "FIDES" plan, which covered the period 1947-54, expenditure on infrastructure amounted to 55½% of the total in French West Africa (and to 53.7% in French Equatorial Africa). As was stated in the 1954 report of the "*Commission du Plan des Territoires*" introducing a revised transport policy (although one still within the framework of "FIDES"), the economies of the various territories had greatly benefited from improvements in the transport sector financed through "FIDES". This was especially true of port improvements, e.g. at Abidjan, Dakar and Conakry, and of railway development, the outstanding example of which was the completion in 1954 of the single-track Mossi line between Bobo-Dioulasso and Ouagadougou in Upper Volta¹. As regards roads, the main stress was initially laid on the improvement of the trunk-road system.

"FIDES" was principally maintained out of grants from the French Metropolitan Government, but also out of contributions from the various territories, though most of the latter were also indirectly provided by the French Treasury in the form of long-term loans at a rather nominal rate of interest. Nevertheless, some of the expenditure incurred under the transport development plans laid rather a heavy burden on the territories concerned, in particular the outlay on certain very costly large-scale road projects which proved over-ambitious and whose economic impact was certainly not commensurate with their cost.

The revised approach was not without its consequences for the railways also. Most of the plans for extending the existing railway systems were shelved, including that for connecting the Dakar-Nigeria and the Abidjan-Niger systems. Instead

¹ This 225-km line was constructed at a cost of some 16.6 million dollars.

the stress was laid on dieselization and modernization of installations and equipment, especially track and rolling stock, although, as was seen earlier, this did not preclude the planning of further railway extensions in the newly independent countries.

Noteworthy changes in road policy were also introduced under the second "FIDES" plan (1954-58).

Experience having seemed to indicate that heavy construction and maintenance costs (including the cost of introducing, not to mention also maintaining, heavy road machinery) were not offset by corresponding general economic development in the areas affected, the second "FIDES" plan sharply reduced expenditure on infrastructure, the proportion falling to 42.1% for French West Africa (45.2% for French Equatorial Africa). The new principle was that projects involving expenditure on infrastructure should be approved only if results would show in increased production or in reduced production costs. Road maintenance was accorded high priority, and a clearer picture obtained of road transport costs, and, in particular, of the effect of better roads on them. After 1956 much importance was attached to establishing new communications in productive areas by constructing "feeder" roads (*routes de desserte*) to main arteries, railways or trunk roads.

While the "FIDES" system, which was later adapted to meet the needs of the newly created "French Community", was in a way the backbone

of the transport policy adopted in the territories then under French administration, other sources of financing were nevertheless also brought into play.

For example, about 1½ million Frs. CFA yearly came from the "*Fonds d'investissements routiers*", which was established in 1953 by levying a special tax of 6 Fr. CFA per litre on petrol and 5.50 Frs. CFA per litre on gas-oil.

Another source, used in the Ivory Coast until 1956, was the "*Fonds du café et du cacao*", which was created by levying an export duty on coffee and cocoa in order to provide planters with financial backing for various purposes. Considerable sums were channelled from this fund to road construction and improvement, though this was not one of its primary purposes. An annual total of some 250 million francs CFA from this source was spent on improving secondary and "feeder" roads in the plantation area.

Transport development has also been financed from international sources. For example, the International Bank for Reconstruction and Development lent 7,500 million francs for the dieselization of railway traffic in French West Africa, while 2,500 million francs came from other banks. The railways themselves have also invested some 1,000 million francs annually on the improvement of way and structures, and of rolling stock.

Total "FIDES" investments are shown in the following table:

*Investments financed by "FIDES" on local sections
("Railways")*

Source: "Outre-mer", 1958		Unit: millions of French metropolitan francs			
Item and financial year(s)	French West Africa	Togo	Cameroun	French Equatorial Africa	Madagascar
<i>First Plan (1948-55):</i>					
Payment made	14.365	1.032	5.806	3.073	4.423
<i>Second Plan:</i>					
<i>Appropriations:</i>					
Financial year 1953-54	1.044	24	96	100	350
" " 1954-55	1.594	24	120	68	438
" " 1955-56	1.264	99	154	58	420
" " 1956-57	526	23	160	60	372
" " 1957-58	516	304	390	96	458
<i>Totals:</i>					
Second Plan at 30.6.58	4.944	474	920	382	2.038
Both Plans at 30.6.58	19.309	1.506	6.726	3.455	6.461

Nigeria had its first development plan in 1946; this plan was subsequently revised to cover the period 1951-56². The plan examined for the purposes of this study, however, will be the current plan, which

was first laid down for the period 1955-60 but later extended to 1962 inclusive. It is to a large extent based on the comprehensive report on Nigeria made in 1954 by the International Bank, entitled "The Economic Development of Nigeria".

One of the most striking features of this latest development plan for Nigeria is the place given to transport. The sums allocated to transport development are as follows:

² For these plans, see "A Ten-year Plan of Development and Welfare for Nigeria", Lagos, 1946, and "Nigeria: Revised Plan for Development and Welfare, 1951-56".

	Million pounds
Roads	53.7
Railway system	44.7
Waterways and harbours ...	19.7
Civil aviation	2.4
	120.4

This total represents 36% of all appropriations for Nigeria, which (excluding the Cameroons) amount to 330.2 million pounds.

Although development planning in Ghana began as early as 1946, the so-called First Ten-Years Plan was not adopted until 1950. That Plan was transformed in 1959 into a Five-Year Plan, which will run until 1964 inclusive. In it transport and communications account for about 21% of the total earmarked. Perhaps the most interesting feature of the current Plan for the purposes of this study is the change in emphasis it represents. In earlier planning, as indicated in Chapter II, the railways took first place, the idea apparently being that they should be expanded as the country's basic mode of transport. But under the new Plan the roads, with 48% of the funds allocated to them, take precedence of the railways.

B. Co-ordination of transport

Although much used both in transport economics and in discussions on transport policies, the term "transport co-ordination" is apt frequently to be misinterpreted. In this study it will be assumed that transport co-ordination should be based on "economic cost", as previously defined, so that the aim of a co-ordination policy might be described as the provision of transport services of the best obtainable quality at the lowest possible "economic cost".

The kind of "co-ordination" here meant primarily applies to different modes of transport, such as rail and road. It signifies either the substitution of services supplied by one mode for services supplied by another, which is often known as "integration", or, where feasible, a division of the transport market between two competing modes, which is sometimes called "division of functions". In principle, both "integration" and "division of functions" can be achieved by voluntary agreements (more frequent in the former case) or by intervention on the part of the public authorities (more frequent in the latter case).

Some confusion has at times crept into discussions on transport co-ordination because its historical background was somewhat special; for they were confined to economically developed countries during the specific period of the world economic crisis (the early 1930's), and many of the arguments concerning relations between the various modes of transport, and especially road and rail, make sense only in that particular setting.

In Sierra Leone a considerable percentage of total expenditure under development plans has been allocated to transport or — as it is called — "communications". Thus, out of total appropriations of 22,438,000 pounds in 1957, a sum of 10,208,000 pounds, or 45%, was earmarked for transport. The largest share of this sum — slightly over 4 million pounds — was allocated to roads and bridges, while railway and harbour development took almost 4 million pounds.

Transport stands high in practically all development plans in West Africa. As stated in the "Economic Survey of Nigeria, 1959", all governments concerned "recognize the fundamental part played by the transport system in sustaining economic development" and the sums devoted to transport in their development plans "reflect their determination to secure the maximum expansion of the transport system without neglecting the social aspects of development such as education".

The relative parts played by the various modes of transport in development plans have to be considered as contributions to general economic development rather than to particular industrial projects. In other words, one of the aims is the promotion of an integrated system of transport by means such as what is commonly called "co-ordination of transport".

There are many important changes in the general picture when the question discussed is transport co-ordination in an under-developed country; for then the very sense of the term broadens. One salient feature is that there is no over-supply of transport services in general, and little or none even in regard to specific modes of transport, like rail or road. Yet this does not mean that no competition for traffic exists in under-developed areas. On the contrary, competition is, or has often been, very acute in West Africa, even though paralleled by an overall deficiency of transport facilities and services for which there is a potential demand.

In view of that fact, it is necessary not only to consider the best use of existing facilities — the pattern for which might down the years have become rather rigid in economically developed countries — but also to plan for an expanding transport system. Here, while overhead charges in general and track costs in particular, lose none of their importance, investment policy comes to the fore and special attention must be devoted to (1) alternative forms of investment and (2) standards. Not a few of the mistakes made in the past were connected with the latter factor. For instance, the adoption of too high standards for way and structures or of an over-costly employment policy (e.g. in regard to pensions — a method often used in former colonial territories to appease personnel from the mother country), makes for over-capitalization of the industry. Examples of

this can be found in earlier West African development plans. The first post-war plans for railway development in Ghana were out of all proportion to the country's economic resources, and the same can be said of the highway programmes under the first two "FIDES" plans, which seem to have been justified neither by the demands of existing traffic nor by any reasonably foreseeable growth.

Although transport co-ordination in our present context is principally of interest as applied to two or more different modes of transport, it also has a certain application within the framework of a single mode. For example, a kind of international co-ordination between neighbouring countries can be envisaged in regard to railway gauges, coupling and braking systems, rolling stock etc.³ As to road transport, the international adoption of the same or similar standards for road building and maintenance may also be considered a form of "co-ordination of transport".

I. Transport co-ordination in West Africa

As in most under-developed regions, the emphasis in transport co-ordination policies in West Africa is on the investment sector. Hence, the transport system must be regarded as a whole and the investment needs of the various modes of transport or the various transport industries must be judged in this general context; i.e. not only must maintenance and improvement requirements be compared for all existing modes but the prospects for expanding the transport system through each must be assessed, the general aim being to reduce transport cost and to improve quality of service.

Among the most important long-term problems in the West African region are the establishment of priorities for investments designed to expand and diversify the existing transport systems and, above all, general relations between road and rail transport. But past investments in the transport industries also raise problems regarding the co-ordination of services with a view to promoting economic development.

The first question to be considered in that context is competition. When co-ordination policies were originally adopted in Europe in the 1930's, the principal aim was to find ways and means of defending the railways, financially shaken as they were by the world economic crisis, against competition from road transport, the general impression being that there was an over-supply of transport services. Though there has never been any over-supply in West Africa, there was a certain tendency at government level (logically supported by railway administrations), when road transport first assumed an economic role, to

regard roads merely as "feeders" to the railways. This attitude also led to the adoption of similar measures for defending the volume and value of railway traffic to those adopted in Europe. Among these measures was the policy adopted in Ghana (and abandoned only in 1938), of preventing road competition with the railways by deliberately leaving "gaps" at strategic points in the main road system. In the former French territories and in Togo there are cases of roads linking places already provided with railway connexions being left in a technically inadequate state of maintenance.

Control of road transport exercised to serve the interests of the railways is certainly not unknown in West Africa. It has been practised, for instance, in Sierra Leone, the Ivory Coast and Ghana. In the last-named of these, it would appear that a consistent effort made to preserve the cocoa traffic for the railways led to the closing of the port of Takoradi to trucks. Very recently (1 July 1960) in the same country, too, the transport of timber by truck was prohibited wherever rail transport was available, although this was done for road safety reasons as well as out of the desire to protect the railways from what was deemed uneconomic competition. In Nigeria, the Motor Traffic Licensing Ordinance of 1947 established a Motor Traffic Licensing Board with power to limit the entry of commercial motor vehicles, though owing to a new attitude to competition on the part of the public authorities, this power has not so far been exercised.⁴

II. Competition between road and rail

There is little doubt that road and rail compete in the West African transport market, and that competition from road transport has affected the volume of and receipts from railway passenger and freight traffic. But to assess accurately the magnitude of this competition is no easy matter. In the first place, few statistical data are as yet available on the growth of road traffic, so that calculations have to be based on estimates. Secondly, the substantial rise in the number of persons and in the amount of freight carried by road, hence in passenger/miles and ton/miles performed, obviously does not all represent a net deduction from railway traffic but may represent new traffic or even "feeder" traffic to the railways! Nor does all competition occur between road and rail; there is some between rail and river traffic (and between a rail-river combination on one side and rail traffic on the other), for instance in Sierra Leone and Nigeria, and it is often very keen between road carriers, as for example in Senegal.

The impact of road competition can best be assessed in Nigeria, as more comprehensive figures are available for that country than for others in the region.

³ Under this type of co-ordination would come, for instance, the agreements sponsored by the International Union of Railways, and the decision taken by the African railways at the Central and South African Transport Conference (Johannesburg, 1950) to adopt the 1.067 metre gauge.

⁴ Gilbert Walker, "Report on Transport in Nigeria".

According to a description⁵ of the respective roles of road and rail transport in Nigeria before the upsurge of road transport and competition, the railways handled most of the inter-regional traffic, forming the main economic link between the regions, while road transport provided the bulk of the transport services within each of the three principal regions, north, east and west. This was especially true in the east and west, where the road transport industry operated more or less independently of the railways, whereas in the north road services primarily acted as "feeders" to the railways, one of their main functions being in fact to move the groundnut crop to the railheads, thus serving the export trade, and another to distribute import goods from the railheads, whither they came by rail from the ports. Produce from the farms and villages is collected by road transport (where primitive transport is not used); but here there is no element of competition.

In the two southern provinces, however, where on average distances are much shorter, road/rail competition tended to be keen at a comparatively early stage. The principal goods involved were cocoa and palm products, considerable quantities of which were deflected from the railways in the early 1950's, since when road competition has grown steadily with increasing "motorization".

One sign of the effect of this competition is naturally the decline in the railways' share of total traffic — a decline that is more noticeable when the volume of traffic is expanding. The following figures for Nigeria indicate the drop in the railways' share of import-export traffic passing through Apapa and Port Harcourt ("Economic Survey of Nigeria in 1959"):

Percentage of traffic handled by Railway (balance handled by road vehicles)				
	1948-49	1952-53	1957-58	1958-59
Apapa (Lagos)				
Imports	92	75	64	51½
Exports	94	86	69½	67½
Port Harcourt				
Imports	91	73	51½	40½
Exports	98	97	72	69½

In absolute figures, the railways carried only 233,000 tons of import goods from Apapa in 1958-59, as compared with 267,000 tons in 1957-58. The total quantity of goods entering through Apapa was 453,000 tons in 1958-59, as compared with 417,000 tons in 1957-58. So the railways' role as the export-import trade carrier diminished in both relative and absolute terms. However, during the period 1947-48 to 1957-58 revenue-earning freight increased, by over 50%, to about 2 million tons and the number of passengers carried rose from 6,600,000 to nearly

7,900,000, indicating the growing importance of domestic traffic for the Nigerian Railways.⁶

Road competition in Nigeria can however be more closely evaluated than from the above-mentioned global figures.

The following changes in the volume of and revenue from some "strategic" groups of commodities important in rail traffic took place in the period 1956-59:

Commodities	1956/57	1957/58	1958/59
	Tonnage		
Kola nuts	50,091	60,892	36,734
Motor Vehicles and spares ...	7,400	4,873	4,996
Piece-goods	23,710	29,251	22,468
Cement	129,185	127,108	110,057
Hardware	63,768	79,680	64,956
Palm-oil, kernels, etc.	28,000	21,712	15,587
	Revenue		
Kola nuts	589,341	715,356	432,118
Motor Vehicles and spares ...	128,088	106,760	97,686
Piece-goods	274,235	342,707	265,524
Cement	511,235	495,370	431,932
Hardware	472,864	561,454	496,924
Palm-oil, kernels, etc.	23,882	25,836	19,738

The above figures show a marked decrease in tonnage for all commodities from 1957-58 to 1958-59, with a corresponding shrinkage of railway income. Of special note here is the diversion of kola-nut and piece-goods traffic from the railways.

The diversion of the former started late in 1958. It is a lucrative kind of traffic; but hardly to be depended upon to stick to a particular mode of transport. Kola nuts are harvested in the western region, where distances to railheads are great, and the consumption centres are in the north. So, when railway rates were raised for a wide range of commodities from 1 July 1958, the effect on the kola-nut traffic was instantaneous. The change was particularly distasteful to the railways, as the long-distance (up to 800 miles) kola-nut traffic was highly remunerative. Hence railway rates were lowered by 37% from 1 January 1959 and the railways' kola-nut traffic partly recovered, whereupon road carriers shifted to the transport of piece-goods and motor vehicles, which suited them admirably, as they could get groundnuts as return loads from the north.

⁶ "Economic Survey of Nigeria in 1959". See also the reference in the "Fourth Annual Report" of the Nigerian Ports Authority (year ended 31 March 1959) to the large number of road vehicles bearing northern registration plates. The lorries on being off-loaded moved across to the import transit sheds for return loads to the north. This meant, of course, long-distance traffic competing with the railways!

⁵ A.R. Prest & I.G. Stewart. "The National Income of Nigeria, 1950-51", H.M.S.O., 1953.

The railways recouped some of their losses in the transport of motor vehicles by reducing their rates from 19 January 1959; but they were faced with a problem not only of cost but of quality of service, since the road carriers offered door-to-door delivery and were, in addition, heavily backed by the car importers.

Trends in the development of the piece-goods traffic, in terms of tonnage and revenue, were as follows:

	Tonnage	Revenue
1.4.58-30.6.58	4,244	47,478
1.6.58-30.9.58	5,858	69,620
1.9.58-31.12.58 (Christmas season)	7,529	91,868
1.1.59-31.3.59	4,789	56,367
1.4.59-30.6.59	2,935	32,181

Piece-goods are easily damaged by rain or by dust thrown up by laterite roads, hence are not basically suitable for long-distance carriage by road. But the carriers introduced covered trucks which could be securely locked against theft and damage, and the railways had to resort to new rate policies in order to remedy this situation.

Transport statistics for Ghana do not indicate strong road competition so clearly as those for Nigeria. Since the resumption of more or less normal conditions after the war, traffic volume has undergone no radical changes, although there has been a definite rise in total demand for transport services. Passenger traffic, after remaining rather static for years, rose by 3.4% between 1958 and 1959. The rise in freight traffic was negligible; but a rise of 4.6% in the average length of haul increased total ton/miles from 183 to 193 million.⁷

Road traffic increased, particularly in the south and above all in the Accra area. This increased utilization of the roads, which was also noticeable in the Kumasi area, must have spelt competition for the railways, as is shown by the increased average length of haul for railway freight. Certain commodities, like petroleum and petroleum products, seem to have been almost totally diverted to the roads. Most of the goods transported on the Ghana Railways are, in terms of weight, typical railway goods. Timber has taken over the first place formerly held by manganese ore. But road competition for timber transport grew rapidly until the regulation prohibiting it (mentioned above) came into force in July 1960. In the cocoa traffic, road competition was also keen. The volume transported by the railways decreased from 17,000 tons in 1949-50 to 13,000 tons in 1957-58; but these figures are also affected by the size of the crop, and last year's bumper crop, for example, con-

siderably increased the volume carried by the railways.

The Ghana Railway's main problem lies in the fact that the principal commodities move north-south, while hauls in the opposite direction tend to be empty. Measures to remedy this situation will be discussed later in another connexion.

In Sierra Leone, the tonnage of export goods (excluding iron ore, for which special transport arrangements are provided) carried by the railways has declined since 1952. This trend has been partly offset by steady increase since the war in the tonnage of import goods carried. Furthermore, imports nowadays exceed exports in volume, whereas the opposite used to be the case. This change is rather symptomatic for West Africa: in Sierra Leone, for example, exports totalled 76,000 and imports 22,000 tons in 1947, but these figures had changed to 40,000 and 78,000 tons respectively by 1956. Exports consist exclusively of agricultural products and minerals, i.e. typical bulk commodities for transport by rail; in these circumstances, it is of interest to note that the Sierra Leone Railway's share in total exports of agricultural produce (mainly palm kernels) has been steadily decreasing since 1951. In that year the Railway's share was still 68.2%; but it had dropped to a mere 29.9% by 1956. The corresponding drop in tonnage was from 65,100 tons to 21,200 tons. (In palm kernels alone the Railway's share declined from 54.1% in 1951 to 17.7% in 1956.) Even allowing for some contribution by river transport to this trend, the main cause was undoubtedly competition from road carriers.⁸

In former French West Africa, the growth of road traffic since the war has also contained a strong element of competition, although undoubtedly much of the growth was attributable to new traffic emerging from a formerly latent demand which could not be met by rail transport.

As previously stated, the Ivory Coast and the Dakar area are the most "motorized" parts of the former French West African territories. In 1955 a thorough study of transport in the Ivory Coast⁹ was made, the conclusions of which permitted an assessment of later developments in road traffic. Of special interest here from the point of view of competition with the railways is the fact that in 1957 the volume of long-distance traffic carried on the country's highways amounted to 160 million ton/kilometres. This traffic consisted mainly of exports and imports via the port of Abidjan. The heaviest traffic (300,000 tons a year) is carried on the Abidjan-N'Douci section: next comes a stretch of 260 km. with a traffic load of 130,000-200,000 tons, the N'Douci-

⁸ D.T. Jack, "Economic Survey of Sierra Leone", 1958.

⁹ This study was conducted by a mission from the "Institut de Géographie de l'Université de Strasbourg", led by Professor J. Tricart. The same Institute also conducted other field studies in Sénégal and Togoland, and on the Niger river traffic.

⁷ "Economic Survey of Ghana in 1959". The monthly average number of passenger journeys was 436,000 in 1948-49 and 432,000 in 1957-58, although a peak of 571,000 was reached in 1952-53 and a "low" of 389,000 in 1953-54.

Toumodi-Yamoussoukro section of which, although not entirely asphalted, carries over 150,000 tons yearly. About 680 km of roads carry some 50,000-100,000 tons a year. This traffic does not include goods moved locally, such as live animals, dried fish, kola nuts, gravel and stones, foodstuffs etc., all of which are transported by rail.¹⁰

The rapid and spectacular growth of road traffic in the Ivory Coast has not been without its impact on rail traffic volume and income. The following table indicates trends:

Year	Passenger Traffic		Freight Traffic	
	Number	Passenger	Tons	Ton/kms
	Passengers	kms.		
	(in 1,000)			
1954	1,409	164,005	448	131,979
1955	1,362	142,736	430	132,458
1956	1,147	117,371	452	145,572
1957	801	93,892	415	139,223

Despite the extension of the system by the 350 km of the Mossi sector, there was a steady decline in passenger traffic. Although the country's general economic development had made strides during the period in question, goods traffic remained static. It was obvious that much ground had been gained by road transport.

Analysis of diverted traffic shows that it mostly arose between the main population and trade centres.

A somewhat special case as regards road-rail competition in West Africa is the groundnut trade. While the railways might normally be expected to have the user's preference in this traffic, except where flexibility is the main desideratum, the fact is that most buyers and shippers of groundnuts prefer road transport, because of the opportunities for extra profit from other business done in conjunction with their main line in groundnuts. This situation is especially noticeable in Senegal, though there the case is somewhat extreme because of the predominance of groundnuts in the country's production and transport. There was a fairly typical year when the railway carried about 335,000 tons and about 200,000 tons went by road. The annual freight capacity of

the Dakar-Niger railway was then something like 900,000 tons; hence although, apart from "feeder" services to railheads, some of the groundnut traffic obviously had to be carried by road in the absence of rail connexions, the railway could clearly have carried far more than it did. Presumably about 2,000 trucks owned by the trade or, to a lesser extent, by professional road carriers shared the 200,000 tons among them i.e. at an average load of not more than 2 tons per truck per trip hardly a very remunerative operation! The average distance seems to have been about 100 km.; but occasionally distances of 200 km. or more were reached.

The costs of the competing modes of transport are naturally affected by the availability of return loads. In this respect rail transport is usually more balanced than road transport, particularly in Senegal, where the transport of phosphates on the Dakar-Niger system, tends to counterbalance the seasonal movements of groundnuts. In the case of road transport, the utilization factor is rather low; for instance, the yearly average truck-load on the Kaolack-Dakar road does not exceed 40%.

In Togo, there is strong evidence of road-rail competition. In terms of tons carried, the railways suffered a steady decline from 1953, when the volume reached 153,432 tons, to 1959, when the figure was a mere 72,400 tons. (A slight recovery took place in 1956-57.) There was also a drop in ton/kilometres over the same period, from 11.59 million to 7.00 million. But not all of this decrease reflects diverted traffic; for example, the cessation of cocoa shipments from Ghana via the wharf at Lomé accounted for a drop of some 10,000 tons.

The number of passengers carried in Togo declined steeply from somewhat over 2 million in 1954 to just over 1½ million in 1955, but has since steadily increased, reaching a new record figure of 2,182,877 in 1959. The passenger/km. figure dropped from 73.2 million in 1954 (the previous peak was 73 million in 1953) to 55.8 million in 1955. A continuous rise thereafter, although less marked than the increase in number of passengers carried, brought the figure to 82.4 million in 1959. While this recovery was partly due to changes in operating methods and to the introduction of better rolling stock, the main reason was the unusual resistance passenger transport in Togo put up to road competition, being a typical kind of "mixed transport", i.e. transport combined with petty trade.¹¹

¹⁰ This local traffic on the Abidjan-Niger railway showed the following changes (in 1,000 tons):

	1956	1957	1958	1959 (estimated)
Live animals	15.0	17.4	17.2	15.8
Gravel, stone	96.7	81.2	67.9	104.0
Kola nuts	6.3	6.3	7.1	8.0

These figures indicate a certain stagnation, except for gravel and stones, a commodity not likely to be transported by private road hauliers except under special contract. The other commodities here listed are all very likely to be diverted from the railways in certain circumstances.

¹¹ It is characteristic of this kind of traffic that the average journey is only 37 km. but the number of journeys great. The traffic is carried by "trains marchés" at very low tariffs. As the roads in the south are usually in a very poor state of maintenance, some types of goods, like sugar, may be damaged by road transport, so the train is preferred. Frequent stops also make petty trading possible at intermediate stations. Revenue from such traffic exceeds that from goods traffic, being e.g. in 1957 (in 1,000 Frs. CFA) 148,960 for the former, as against 52,442 for the latter.

The Togo railways still carry most bulk goods, like limestone, cement and non-perishable foodstuffs, as also nearly all the cotton crop and petroleum products. But the situation is different for coffee, cocoa and copra, which have been largely diverted to road transport. According to some sources, trading firms forward two-thirds of their general merchandise by road.

As the commodities competed for by road transport generally belong to the higher rail tariff classes, the effect of their diversion on railway receipts tends to be more serious than the mere reduction in tonnage would suggest. Togo railway receipts reached a peak of 250.9 million CFA francs in 1954, dropped to 171.3 in 1955, and recovered to 247 million in 1959. But this latter result, which was obtained by a variety of means¹², may not be repeated; recent developments suggest a certain stagnation in railway receipts.

Before any attempt is made to explain how the road-rail competition in West Africa described above has affected the transport policies pursued by the railway administrations and led, *inter alia*, to the adoption of "transport co-ordination" measures, it may be well to make some reference to one of the factors behind that competition, namely user's reasons for his choice of a particular mode of transport.

III. User's choice between rail and road transport

The predominance of bulk goods of low unit value in West Africa's export-import trade, which has been frequently referred to above, would *a priori* make the railways the user's preferred mode of transport. And this might be largely true to-day, were it not that rail transport is not everywhere available and that rising standards of living have brought a marked tendency towards diversification, particularly in regard to import goods, which have tended to grow in volume as compared with exports.

The attractions of road transport in West Africa are to some extent the same as elsewhere, among the most important being its flexibility, in the purely physical sense, and its adaptability to the individual user's requirements.

During the post-war years the railways displayed a certain inability to cope with the traffic offered, and serious bottlenecks due to shortage of locomotive and rolling stock occurred in practically all territories, British as well as French. By the time modernization and reorganization of the railway had remedied this situation, some traffic had been more or less permanently diverted from the railways. (The 10-ton minimum load requirement introduced by certain railway systems for import goods may also have proved difficult for smaller firms to meet and led them to use road transport instead.)

¹² *Inter alia*, reduction of personnel, better rolling stock, improved operation, etc.

The main attraction of road transport in West Africa, however, lies in the very nature of the region's domestic trade — a typical trade-transport, combination that is best served by road transport, which can reach practically every corner of the country. The 3-ton or 5-ton truck (the latter now more common), operating as both bus and truck, conveys the African trader over hundreds of miles, where he was formerly limited to 10-20 miles, while at the same time the weight of freight which can be moved from one domestic market to another has risen from pounds to tons (G. Walker). The possibility of substituting passengers for freight or vice-versa, is a typical feature of outstanding importance for West African road transport, making it more adaptable to changing demand than rail transport could ever be.

Another feature of road, as distinct from rail transport is that it caters for small consignments. Whereas as previously stated, the West African export trade is still concentrated on bulk transport, the trend, with growing diversification, in imports is away from heavy building materials and machinery towards general goods, for which road transport may be preferred to rail. Local goods traffic generally moves in small quantities, so that breaking of bulk is important and there is a need for small transport units. For such trade the small utility vehicle is admirably suited it is "able to bring in the products from the farms adjacent to thousands of miles of "bush roads" in the country (Hawkins).

Avoidance of transloading is another feature in which for quality of service road transport will bear comparison with rail transport. (Even if the railways provide door-to-door service, transloading cannot be avoided.) This factor assumes more importance than usual in West Africa, where freight handling is mostly poor owing to lack of equipment and skill, and there is also considerable risk of pilfering and tampering with loads. In addition uninterrupted transport may eliminate damage due to inadequate storage facilities, and possibly reduce packaging costs by enabling lighter materials to be used.

It should however be observed that, whereas there is little risk of breakage of goods carried by road in countries with a modern network of well-surfaced highways, the same may not apply to regions like West Africa, where road surfaces are generally rough and poorly maintained.

Some commodities may take ill to transport under such conditions (e.g. lump sugar); and for them rail transport may be better in quality of service.

Speed of transport measured in total transport time — especially on a year-round basis — may not always work out in favour of road, as against rail transport in West Africa. For the railways are less influenced by seasonal variations and weather conditions generally than most highways, and less subject to total "wash-out" or flooding. Even in the matter of local bottlenecks and hold-ups road transport may be at a disadvantage as the railways still enjoy priority of passage over many strategically located bridges.

Although competition between road and rail in West Africa is confined, as in most other regions, to the sphere of "quality of service", in the widest sense of the term, direct price competition is by no means unknown, and frequently assumes proportions of serious economic moment to the modes of transport concerned. Wherever any distinct tariff pattern is to be observed in the road transport industry — and this is certainly not the case in local transport, where rates appear to be the result of bargaining — the rates are based on railway rates, and thus reflect not so much true transport costs as the competitive situation. The rule seems therefore to be that, where no competition exists, road carriers apply roughly the same rates as the railways, or use their rates as a guide. Rail rates are nowadays based rather on costs than on "what the traffic will bear"; where this is not the case, the road carriers are likely to adopt a lower rate level.

There is fairly general agreement today that any measures taken to co-ordinate rail and road transport services for the purpose of sharing the transport market must be based on the principle of real transport costs. But such a policy will be very difficult to apply in West Africa, particularly in view of the widely varied nature of transport operations there and of the scant correlation between road transport rates and real transport costs. This is not to say, however, that a better balance could not be struck between road and rail transport, if the road carriers applied better commercial principles, including true cost accounting, and the railways adopted the various measures outlined in the next section, with the possible support of the public authorities in the general interest of transport co-ordination.

IV. Railway policies and road competition

Although sometimes barely able to compete with road transport in quality of service (yet, as will be seen below, far from lacking the means to do so), the railways tend to react quickly to direct price competition, particularly for medium-distance or long-distance high-tariff goods traffic, instances of which have occurred in West Africa since the war — rather extensively indeed, in the three main "railway" countries: Nigeria, Ghana and the Ivory Coast.

The previously noted considerable diversion of kola nuts, piece-goods and motor vehicles from rail to road transport in Nigeria, affecting as it did high-grade goods and long-distance traffic, was a double loss to the Nigerian Railways. The general view was that the diversion was provoked by the raising of railway tariffs in 1958. The then management of the Nigerian Railways certainly to some extent misjudged the situation in assuming that rising expenditure due to increased wages and salaries could be offset by increasing tariffs. Although a high proportion of railway traffic was not affected by the increases and in some cases little or no diversion of traffic to road

transport took place, there were nevertheless many marginal sectors in which there was an immediate and substantial loss, gross revenue declining by about 1 million pounds. Quicker door-to-door service by road may have been one factor in this situation; but cheaper road rates were another. The pressure was such that railway freight rates were reduced to about the same as road transport rates for kola nuts, sugar and piece-goods in the "up" direction, and for groundnuts, groundnut oil and cotton lint (all taken as return freight by road carriers) in the "down" direction¹³. While the full results of this action are not yet known, there is no doubt that the general trend of diversion of these products to road transport has been halted and that some traffic has been recovered.

The above-mentioned experience of the Nigerian Railways, however, indicated certain defects inherent in the tariff system, which has since been reviewed. It was found, for example, that 22.1% of all traffic was carried by the Railways at a loss, 32.8% at cost, and 45.1% at a profit; in other words the Railways were still largely using the *ad valorem* rate system!

Assuming an average vehicle "life" of 3 years, an annual mileage of 49,000 miles and average load of 7 tons (making 343,000 ton/miles), the total cost of transport by road per ton/mile, excluding maintenance costs and any contribution to road construction costs, was worked out at 4.42d by the railways administration, which thereby arrived at the following comparative figures for true costs:

Cost per ton/mile	Miles						
	50	100	200	300	400	700	800
Rail	14.53	7.77	4.39	3.28	2.70	1.97	1.75
Road	4.42	4.42	4.42	4.42	4.42	4.42	4.42

In regard to passenger traffic, the same administration considers the 3rd-class fares charged to be uneconomical under 150 miles and profitable only over 400 miles. This kind of traffic shows wide variations in density according to season and sector.

Although the Nigerian Railways have had some success with the latest tariff revisions and may still have more, particularly by going on to rationalize equipment and operations, the administration holds to the view that direct co-ordination measures must be applied, for the primary purpose of securing, at remunerative rates, most of the additional traffic created by an expanding economy.

Road transport has developed steadily in Ghana, particularly southern Ghana, since the war, and some of the growth has no doubt taken place at the expense of the railways; but it is somewhat difficult to make an accurate estimate of the extent of com-

¹³ Nigerian Railways Corporation, Report and Accounts for the year ended 31 March 1959. The six commodities mentioned accounted for 50% of total freight revenue.

petition. The number of motor vehicles at the end of 1959 was 40,409, which meant an increase of 10.9% over 1958 — a considerable advance over the previous year's increase of only 3.4%. While the greatest increase was noted in the Accra area, traffic density rose steeply in the Kumasi-Konongo road section also; but the Takoradi area showed only a slight rise (some 6%).

This growth in motor traffic was accompanied by a substantial rise in total demand for transport services, the railways benefiting accordingly, and even enjoying comparative prosperity again after the rather poor previous season; their share of the surplus from rail and harbour operations rose from 174,000 pounds (before appropriations for renewals) in 1957-58 to 735,000 pounds in 1958-59, thanks to a rise of 649,000 pounds in receipts and a reduction of 92,000 pounds in operating expenses.

The previous year's mediocre results were largely attributable to the failure of the cocoa crop, the revenue from which was 28.72% below the estimates. Revenue from manganese ore was also disappointing, falling short of the estimates by 8.09%; but even more disturbing element was the drop of 12.72% in general freight receipts, possibly traceable to road competition.

Although passenger traffic rose by 3.4% and goods traffic by 4.6% last year, it is symptomatic of growing road competition that the average length of haul also increased, total ton/miles rising from 183 to 193 million. Certain commodities, like petroleum products, are also known to have been largely diverted to road transport. The keen competition for the timber traffic may be considerably reduced, if not altogether eliminated by the previously mentioned regulation prohibiting the transport of timber by road when rail transport is available.

The Ghana Railways has frequently used tariff measures to combat competition. For example, it has made special agreements granting shippers preferen-

tial rates for specific quantities of goods carried between certain points. Results so far are promising, the increase in freight from this source last year amounting to 80,000 tons.

The previously mentioned relative stagnation in railway traffic in the Ivory Coast was attributed by the administration of the Abidjan-Niger Railway mainly to road competition. The first measure proposed to combat the latter was a general reduction in tariffs; but it was feared that, if the reductions were not radical enough, they would merely be imitated by the road carriers and that, if they were too radical, they might increase traffic volume without increasing traffic revenue correspondingly.

A close analysis of traffic diverted to road transport suggested that it was mainly passenger and goods — and, of course, all kinds of "mixed" traffic between large towns and populated areas, where the road carriers could most readily find freight and facilities for maintaining and repairing their vehicles. The centres where road traffic was found to be most concentrated were Abidjan and Bouaké in the Ivory Coast and Bodo-Dioulasso and Ouagadougou in Upper Volta.

To meet this situation, the railway administration introduced special tariffs.

Reductions of 25-45% in passenger fares (*"prix fermes"*) were offered over certain selected distances on routes where road competition had proved especially acute.

A new special goods tariff (*"Special P.V. No. I"*) was introduced for traffic between certain points, representing reductions averaging 10% scaled according to the degree of competition existing on the route concerned. There were also special substantial rebates on rates for north-south long-distance goods traffic.

Success soon attended these measures and, beginning in February 1958, it was possible to make such striking comparisons as the following:

Route	General tariff	Special tariff	No. of tickets sold 3rd Class, 1.1-30.9	
			1957	1958
Abidjan-Agboville	245	175	22,746	54,459
Abidjan-Dimbokro	550	400	12,087	22,353
Abidjan-Bouaké	950	500	5,343	44,801
Dimbokro-Bouaké	400	275	9,842	20,333
Bouaké-Bobo-Dioulasso	1,440	1,000	2,522	12,657
Bobo-Dioulasso-Koudougou	770	600	7,503	11,700
Bobo-Dioulasso-Ouagadougou	1,050	800	3,704	10,630

The results achieved emerged clearly from the figures for the years 1957, 1958 and 1959 given below:

	1957	1958	1959
Number of passengers	891,000	1,318,000	1,386,000
Passenger/kilometres	93,900,000	170,500,000	194,000,000

Thus the number of passenger/kilometres rose by 160% between 1957 and 1959.

The experience of the Abidjan-Niger Railway in passenger transport is of general interest, especially since similar conditions prevail elsewhere in West Africa, e.g. Ghana and Nigeria, and it illustrates the possibilities of tariff measures as a means of achieving some balance in the rail and road transport supply-and-demand situation.

The results from the Ivory Coast also show that the road carriers pay little attention in their operations to real transport costs. This is especially obvious in passenger transport, where most of the carriers are small operators with usually only one vehicle, which carries 16-20 persons and is more often

than not in poor running condition. It was, in fact, hardly a month from the introduction of the new railway rates before this type of road carrier had to give up trying to compete with the railways.

The above-mentioned "Special P.V. No. 1" freight tariff was first introduced late in 1955. During the period 1955-57 good results were obtained; but the steep increase in the number of road vehicles from 1957 on obliged the railway administration to extend its measures in early 1958 to a reduction of 8-12% in the so-called "tarifs de groupage", i.e. special tariffs for certain commodities on certain routes.¹⁴

These measures led to an appreciable recovery of traffic, as can be seen from the following table:

Year	Total railway traffic		Traffic moved under special Tariff P.V.1.	
	Tons	Ton/kilometres	Tons	Ton/kilometres
1957	414,733	139,220,729	68,138	28,485,738
1958	437,916	159,214,287	93,959	42,688,758
1959	505,000	191,000,000	130,900	66,756,000 ¹⁵

These figures show that the number of ton/kilometres rose by 19% as compared with 1958 and by 37% as compared with 1957. That this increase was partly due to recovery of lost traffic is indicated by the fact that traffic through the port of Abidjan did not rise more than 14% from 1958 to 1959. Recovery was less spectacular in goods traffic than in passenger traffic, which may be some indication of a more economic competitive basis in the goods sector of road transport.

While applying tariff measures mainly as a defence against price competition, the railways have also protected themselves by various methods — some applied in the operating field — against competition in "quality of service".

Important among such measures should be speeding up of the turn-round of rolling-stock and generally increasing capacity. There is also a need for an up-to-date time-table policy taking account of traffic trends and improved traction. In addition, since trains should be made up to suit actual traffic requirements, there should be fast long-distance trains, made up of freight cars and possibly one passenger car, stopping only at main stations. In that connexion, it would probably be necessary to make a thorough study of intermediate stations, to determine whether they should be closed down entirely or as would mostly be the case, kept open only for certain types of traffic.

Again, the use of special equipment, such as refrigeration cars, should be gradually extended, despite the high capital outlay involved. The use of smaller units than ordinary trains, e.g. rail-cars, might prove economical but perhaps not always adapted to the normal needs of "mixed" transport, for which space is more important than speed. Besides the fast long-distance trains mentioned, special

trains for petty retailers stopping at every station would meet an obvious need in many regions, though services would have to be adapted to seasonal variations in petty trade (and could be greatly curtailed during the off-season).

The application of measures such as those outlined above might be simplified if the railway concerned could be made into a corporation with some measure of administrative and financial autonomy, as has already been done in, for example, Nigeria, the Ivory Coast, Senegal and the Mali Republic, or proposed, as in Sierra Leone. The method of financing certain works, like infrastructure, out of Treasury funds rather than railway revenue has been used in some countries, e.g. Ghana.

Railway workshops are of great importance for the smooth functioning of a railway system. Despite good progress made in the region, this problem calls for further study. Some pooling of resources in this field and, as regards e.g. purchase of rolling stock, some sub-regional action might prove possible.

As previously stated, the scope for "co-ordination of transport" in its more formal sense may seem fairly limited in the West African region. The primary object of a transport co-ordination policy should be to keep transport costs to a minimum consistent with adequate and efficient transport services. Where rail and road services are complementary, the problem is of course readily enough solved, although

¹⁴ The road carriers usually quoted the same rates as the railways, but could generally offer better door-to-door service. In addition they often quoted very low rates in order to get return freight.

¹⁵ The figures for 1959 are estimates. Like other information concerning the Abidjan-Niger Railway, they are contained in a paper by M. Bordenave, its Director-General, who has been largely responsible for the Railway's policy.

some planning of services may be needed. For instance, the railway and the road carrier can arrange that rail services will, as it were, be continued by road, in which case the latter operates under an agreement (*cahier des charges*) with the former to carry all rail freight from the railhead to specific destinations. The shipper then has the advantage of uninterrupted transport, transloading at the railhead being the road carrier's responsibility. But such arrangements necessarily commit the road carrier to observe certain rules regarding safety, conditions of service, vehicle maintenance and labour conditions, and their proper observance may necessitate the setting up of some kind of road carriers' association responsible for this type of operation.¹⁶

Where competition exists between rail and road over a certain route, co-ordination will be much harder to achieve. Perhaps, as a general rule, what has been called an "overall set of operational conditions" should be established for the whole transport industry, mainly designed to ensure equality of competitive opportunity, though such all-round equality may be hard to achieve in view of the many "public utilities".¹⁷ To apply the logical solution, i.e. either to burden road transport with similar obligations or to free the railways from them, is often not feasible; but this does not preclude some sort of equalization.

As regards economic commitments, the railways' aggregate revenue must reflect operating costs in full, whereas road carriers' rates do so only in part. Hence, there is some justification for the railways'

common argument that road transport should pay a fair and proper contribution towards the provision and maintenance of roads, as also for their allegation that road traffic in West Africa operates on a false standard of costs, though there seems less ground for the railways' other argument: that transport capacity has been created in excess of total demand. Another point to be decided is whether full allowance has really yet been made for such contributions by road transport as taxes on motor-fuel.

If a better competitive balance could be achieved between railways and road carriers, some criteria for a practical sharing of the market, save in marginal cases, could probably be established on the basis of length of haul. It is pretty generally true, at least in West Africa, that road transport can successfully compete on "economic" terms with the railways over distances up to about 200 miles. The user's choice between the two modes will ultimately be determined by the quality of service offered and the rates charged.

The possibilities of "transport co-ordination" in the formal sense are on the whole somewhat limited in West Africa, especially because much of the transport competing with the railways cannot easily be regulated by licensing and other such measures, professional road transport being less common than transport on own account. However, where public investments in the transport industry are concerned, some measure of co-ordination between the various modes can be introduced in the interest of an integrated transport system.

C. Selective investments in the field of transport

While the question of selective investments in the transport industry in West Africa naturally does not concern only rail and road transport, any more than competition is confined to these two sectors, this aspect of the problem seems to be the most urgent and likewise to contain more competitive

elements than any other combination, such as, for example, rail and inland water transport.¹⁸ Hence this section will make no attempt to cover the whole of the transport industry in West Africa, but will deal principally with the road-rail facets of the question.

The choice, or rather division of emphasis, between road and rail depends on the cost and quality of service. But the situation is complicated by the fact that the cost referred to is the "social" rather than the more narrow "economic" cost and efficiency is viewed from the "economic" rather than the "technical" angle.

¹⁶ When such an arrangement was recently tried in Togo, one of the difficulties in negotiations between Government representatives and individual road carriers was to make the latter understand their obligations under such an agreement. The question under discussion was the establishment of a rail-road service via the railhead at Blitta to Sokodé, the northern trading centre.

¹⁷ Among such "handicaps" are strict government restrictions in regard to safety, regularity of service, labour conditions, etc. Furthermore, the railways have to accept any traffic offered at the official published rates. They are also affected by considerations of national policy like the maintenance of a freight rate structure designed to promote the widest possible development of industry and trade. Again, they may be requested to operate unremunerative passenger services or branch-lines, or grant reduced rates to localities or groups of people, e.g. government employees or workmen. They likewise have to provide facilities for the carriage of all varieties of goods, irrespective of value or type of load.

¹⁸ There is some competition between river transport on the Niger and rail transport; but on the whole river transport acts rather as a "feeder" to the railways. Again the opening up of the Kano-Baro-Niger route will help relieve pressure on the western railway line, where the margin of capacity is narrow. The Kano-Baro rail route is only 349 miles instead of the 700 miles from Kano to Lagos; the shorter route would enable the railway to save expenditure, as it would need fewer locomotives and rolling stock, given quicker turn-round.

Differences in costs as between rail and road can, with certain simplifications, be narrowed down to a question of construction versus maintenance costs, the former dominating the railway picture, the latter being the more important for the road transport industry. Railway construction is on the whole more expensive than main highway construction; but railway maintenance costs are usually less, subject to important qualifications arising out of climatic or topographical factors. According to one expert, the cost of building a single-lane asphalted road in average undulating "bush" country would be 8,000-14,000 pounds a mile; a two-lane asphalted road would cost a further 7,000-9,000 pounds. A railway constructed under the same conditions might cost something like 10,000-20,000 pounds per mile. Construction costs in both cases are greatly affected if permanent bridges have to be built.¹⁹

The question arising for both railways and roads, however is more often the improvement of existing installations than the provisions of new ones. In such cases the railway may only have to lay heavier tracks or modernize signalling and telecommunication systems etc.; but if the permanent way has to be rebuilt to improve profiles or straighten curves, the cost may well come close to that of constructing a new line.

In the case of roads, the cost of upgrading, improving drainage, and providing a good foundation and an asphalt surface ranges from 4,000 to 14,000 pounds per mile.²⁰ In the Ivory Coast, the corresponding cost in Fr. CFA would be 5-6 million per kilometre.²¹

Whilst railway construction costs are, *ceteris paribus*, considerably higher than road construction costs, the opposite is true of maintenance costs. This is mainly due to climatic factors; total "washouts" are more likely to happen on roads than on solid-banked railways, though new "stabilization" techniques in road-building have made good headway and tend to reduce the margin between road and rail in this connexion.²²

Detailed studies of rail and road alternatives in Nigeria have fairly recently been made in connexion with the so-called "Bornu extension", which is partly financed by the Bank, and in the Chad Republic in regard to the Bangui-Chad railway project.

In the former case, construction costs for the railway alternative, including road-bed, bridges, sta-

tion and office buildings, telecommunication system, yards, rolling-stock and housing, would amount to 19.4 million pounds, with interest charges calculated at 5½% (actually they are 5¼% on the Bank loan). The estimates of operating costs and of revenue were based on existing (1955) conditions on the Nigerian Railways, allowance being made for the lighter traffic expected on the extension.

It was calculated that the new rail facilities would be "breaking even" in the sixth year of operation, after payment of all charges, including interest and depreciation.²³

The construction of a highway instead of the projected railway (which is now building) would have involved an estimated capital investment of 9.6 million pounds. The traffic the highway would have carried was estimated at roughly the same as for the railway.²⁴ But it was calculated that, by the sixth year of operation also, the "opening up" of the country by means of a road instead of a railway would result in an annual operating loss of 500,000 pounds, after payment of all charges, including interest and depreciation — this mainly owing to differences between rail and road maintenance costs. Furthermore, the traffic expected was predominantly long-distance direct hauls to the ports²⁵ of low-value goods in full train loads, i.e. the type of traffic in which the railway's competitive position is strongest.

In the case of the Bangui-Chad project, the general situation is rather similar; both maintenance and operating costs have been estimated at much more for a road, and the railway alternative has been recommended.²⁶

The choice, however, rarely be between constructing a railway and building a highway, but rather, in most cases, between investment in road improvement and other uses of capital. The principal aim being to lower transport costs, the effect of road improvement is of special interest. This point will be dealt with more fully in Chapter V.

When the rail and road alternatives were discussed in the case of the Bornu extension and the Bangui-Chad railway, the projected railway extensions were viewed as parts of a general economic development plan rather than as special projects of more limited applications. In both instances, the main purpose was defined as to "open up the country" and to

¹⁹ R.S. Millard, in "Road Development in Overseas Territories", in "Roads and Road Construction", February, 1959.

²⁰ R.S. Millard, *op. cit.*: In Togo the cost for a laterite road would be about 1.7 million Fr. CFA.

²¹ C. Cans, in "Evolution du reseau routier on Côte-d'Ivoire", in "Travaux", August, 1959.

²² In the Cameroons, for example, annual expenditure on railway maintenance was about 180,000 Fr. CFA per kilometre, as compared with some 300,000 Fr. CFA for a road carrying lighter traffic than the railway (R. Devegue, in "La Modernisation de l'entretien de la voie au Chemin de Fer du Cameroun", in "Industries et Travaux d'Outre-mer", 1957).

²³ Sir Ralph Emerson, "Justifying a New Railway" in *Modern Transport*, February 1959. Some of the statements by the former General Manager of the Nigerian Railway Corp., have not gone unchallenged. As shown previously, railway traffic was of a very different pattern in 1958-59 than in 1955, and the basis for estimating the traffic to be expected through the Bornu extension had altered.

²⁴ Passenger traffic was estimated at more than on the railway, but transportation of cattle (4% of total volume) was deducted from possible road traffic.

²⁵ The average haul to Port Harcourt is about 700 miles the commodities being, groundnuts, cotton, timber, palm-oil and palm kernels and cattle.

²⁶ Sautter, *op. cit.*

create transport routes to facilitate marketing of the region's agricultural produce. Most railway projects designed to promote industrialization are connected with mining, as in Sierra Leone or in Liberia.

The creation of new or better transport links is not the only aspect of road building and improvement. The road transport industry does even more than railway construction (or operation) to create employment.²⁷ The building of a highway, however mechanized will itself engage a substantial labour force, and technical progress will provide employment later in both road maintenance and vehicle maintenance and operation (workshops, garages, service stations and rest-houses).²⁸ Furthermore, road transport also fosters certain quite important domestic trades and crafts. For example, in such countries as Nigeria, the bodies of the utility vehicles that carry most of the traffic are built by African specialists.²⁹ One secondary effect of road and rail transport that may be mentioned is the development of local packaging industries using domestic raw materials and labour.

The most important point for economic development is perhaps the fact that road transport, including ancillary services, is one field in which good chances of success await the enterprising African. As previously stated, relations between domestic trade

and road transport are particularly close in West Africa, and investments for road improvement must be considered from that angle. The technical efficiency of the small African transport firms may not always look very impressive as compared with that of the large concerns engaged in the export-import trade. But, allowing for the local combination of trade and transport and for the credit system, under which the buying of a vehicle is a collective (family) rather than an individual transaction, detailed study may well reveal quite a few economical sound little concerns.

One of the main weaknesses affecting road transport in West Africa is the lack of good mechanics, one result of which has been the substitution of the use of spare parts for regular maintenance and running repairs, so that the life-span of vehicles is very short. Better roads will improve this situation, and a concerted drive for better maintenance (e.g. by training more and better motor mechanics) will certainly achieve more efficient service and lower transport costs on the roads. As regards the volume of investment in infrastructures, the order of priority in West Africa will most probably be first road improvements, then road-building, and last new railway construction and improvement of way and structures.

D. Safety of transport

The fact of an increasing volume of traffic using larger, heavier and faster vehicles raises various problems, apart from the additional expenditure, as well as direct and indirect economic gains involved. One problem which tends to assume greater and greater urgency in West Africa is traffic accidents, their cost and their prevention. There is no doubt that the road accident rate has increased steeply over the last decade in practically every country in the region. For example, the number of accidents in Ghana rose from 2,612, involving 268 persons killed and 1,950 injured, in 1950, to 7,011 involving 522 persons killed and 5,079 injured in 1958. In Nigeria, 458 persons were

killed in 3,615 accidents in 1950 and 816 persons killed in 10,745 accidents in 1958.

Accidents are part of the price paid for road transport. They may, as some experts put it,³⁰ "be valued by estimating the cost of damage to property, medical expenses, administrative costs and the value of net loss of output due to injury and death, the loss due to a person's death being the present value of his expected future output less his expected future consumption. Where roads are congested and dangerous, and road transport costs, including accident costs, could be reduced by road improvement by more than the cost of additional road space (and the same result could not be achieved in any cheaper way) then expansion and improvement of the road system is appropriate". Other points meriting study are regulations governing road users' "behaviour" and the expenditure entailed in their enforcement.

West Africa also has a city and suburban traffic problem. Such severe congestion as exists in cities like Lagos and Ibadan in Nigeria, Accra in Ghana, parts of Abidjan in the Ivory Coast and Lomé in Togo is a problem of which account must be taken in city planning.

²⁷ The construction of a railway like the Bornu extension will occupy several thousands of workers for a few years. Labour requirements may sometimes even create a problem, as surplus population is generally located to the north and northerners cannot always stand climatic conditions in other parts of the country.

²⁸ The railways' increased demand for staff may be partly offset by rationalization, which often tends to reduce staff. The increased use of road-building and road-maintenance machinery also reduces manpower needs, but increases the demand for skilled labour.

²⁹ Most commercial motor vehicles are imported as chassis without bodies and often without cab as well (Hawkins, who continues: "A general-purpose wooden body is then built in Nigeria"). Where this system is not yet in existence, it might still offer possibilities, although the trend is away from utility vehicles with removable seats towards specialized vehicles like small buses or trucks.

³⁰ Charlesworth, Reynolds & Wardrop, "Road Improvements. Choosing Priorities by a New Formula", in "Engineering", 1960.

E. Sub-regional transport

In his inaugural address at the fourteenth meeting of the West African Public Works Conference at Accra in August 1959, Dr. Nkrumah said, *inter alia*, referring to international (intra-regional) roads: "We consider such roads as essential, nay an absolute necessity, to the development of our cultural as well as our economical relationships and therefore we are examining most actively the construction of suitable links of roads which will join similar roads in our adjoining territories to form international trunk roads." This meeting broke new ground in that it was the first occasion on which fully accredited delegates from other than Commonwealth countries participated, and thus represented an important step forward in inter-transport relations in West Africa.

The sub-regional aspects of transport problems in West Africa is in fact of fairly recent development. Reference has already been made in this study to the comparative isolation in which the transport systems in the various territories developed and to the distinct

lack of sub-regional links. The opinion has even sometimes been ventured that there is little future in sub-regional trade, since the various territories largely produce the same kinds of goods. But there is surely little need to stress the importance of sub-regional links and the necessity for West-African sub-regional, instead of merely "national", transport routes. There is at present not a single country in West Africa that does not intend to integrate its highway system with international trunk roads in adjoining countries.

One of the main difficulties in trying to assess the actual importance of existing sub-regional roads, not to mention possible but as yet non-existing links, is that very little is known of average daily traffic volumes. An effort to ascertain the facts has recently been made in Nigeria. As the count was taken at census points near the border, the traffic included may not all have been international traffic. With that reservation the general picture, was as follows³¹.

Road Section	Miles	From	Trunk Road	Average daily traffic (Commercial traffic)
Daura-Zinder	84	Kano	A.1	118 (99)
Kiama-Yashikera	187	Illorin	A.13	9 (7)
Katsina-Jibiya	25	Katsina	A.20	162 (111)
Sokoto-Illela	22	Sokoto	A.19	159 (118)
Kaura Namaoda-Jibiya	28	Katsina	B.755	50 (36)
Bama-Mubi	1	Bama	B.115	94 (75)
Maiduguri-Ft. Lamy	69	Maiduguri	B.579	73 (66)
Lagos-Idiroko	23	Sango Otta	A.5	574 (436)

The importance of these road connexions is further enhanced by the fact that the Kano-Katsina-Maradi and Kano-Daura-Zinder roads and the trunk B road from Katsina to the railhead at Kaura-Namaoda carried about 80,000 tons of groundnuts during the 1959 season.

In the north-west corner of Nigeria there is the possibility of a link with Gaya in Dahomey to give the important centre of Sokoto access to Dahomey and, via the coast road, to Ghana.³²

Of particular interest as a sub-regional road is the link (often previously mentioned in this study) between Nigeria and the Chad Republic via Maiduguri (whether the railhead will be moved from Jos) to Fort Lamy. The existing road is poor, especially during the rainy season, and is operated on a one-

way, up-and-down basis. Its importance is shown by the fact that before it was opened annual imports into the Chad via Maiduguri did not exceed 1,000 tons, whereas present traffic is estimated at some 50,000 tons and, according to the Chad Chamber of Commerce estimates, the export-import traffic of the territory using the improved route will reach some 250,000 tons by 1970.

Another possible sub-territorial link would be between Yola and Garoua in the Cameroons, which might eliminate some of the difficulties due to the short shipping season on the Benue.

The main international artery in Ghana is the Afloa (Togo frontier) - Paga (Upper Volta frontier) highway, which has 574 miles of asphalt surface and only 80 miles of gravel surface. Ghana's highway system is designed to link up with international trunk roads in neighbouring countries; for example, four main roads join the Bobo-Dioulasso-Ougadougou road in Upper Volta. The Afloa-Paga trunk road has eight branches into neighbouring countries, and there are also four road links with Togo, which are however, though fairly acceptable on the Ghana side, in poor condition in Togo. The main defect of sub-regional road-links in Ghana is inadequate con-

³¹ Vincent W. Hogg, "Nigeria", in "Road International", Special African roads Number, 1959-60.

³² There might also be a transverse road from Nigeria through Dahomey and Togo to Northern Ghana. The route would be from Gaya in Dahomey by Guessou-Kouande-Djougou to Lama-Kara in Togo and thence by Kabou-Bassari (Togo) to Yendi in Ghana. In Togo, an alternative route would be Sokode-Bassari-Yendi. This link would involve considerable outlay on upgrading some of the existing roads.

nexions with the Ivory Coast. At present there is no road of trunk standard crossing the border, the most serious gap being that between Enchi in Ghana and Abisso in the Ivory Coast. The effort made in Ghana to improve sub-regional road links with Nigeria, Togo and Ivory Coast has produced an increase in the volume of trade, the value of which rose from 2.9 million Gh. pounds in 1950 to 3.4 million in 1957.

The possibility of a transverse link in Togo with Dahomey and Ghana was mentioned above. The stretch linking Djougou, an important trading centre, with Lama-Kara (Togo) could be fairly easily executed; but the Bassari (Togo) - Yendi (Ghana) section would necessitate considerable upgrading of the present laterite road link. A new sub-regional link was opened in March 1960, when the Ougadougou-Tenkodogo highway was connected up with Togo's main north-south trunk road via Timbou and Dapan-go; this link is expected to afford an outlet for agricultural produce from the border districts of Upper Volta.

Road connexions between Ghana and the Ivory Coast are poor; but there are some important links between the latter and Upper Volta (to Bobo-Dioulasso), Sudan (via Sikasso to Bamako) and Guinea (via Danane, to N'zérékére).

Guinea's three-year plan for road development lays great stress on sub-regional links and provides for substantial improvements on the following routes:

1. Conakry-Boké road link with Portuguese Guinea;
2. Conakry-Forecariah road to Sierra Leone;
3. Labe-Tembacounda road link with Senegal;
4. Kankan - Bamako and Kankan - Bougouni roads to Sudan;
5. N'zérékére-Monrovia road link with Liberia.

The Trans-Gambia highway will, when completed all the way from Casablanca to Monrovia, constitute an international link of the same type as the Pan-American Highway. But, as yet only the Dakar-Kaolack-Mansah Konko (Gambia) — Bignona stretch is built up to standard. The West African Transport Conference, convened to Monrovia 23-27 October 1961 agreed *inter alia* on a tentative net of sub-regional roads for the sub-region of West Africa.

The establishment of sub-territorial road links is, however, only one aspect of the "sub-regional" road transport problem.

The construction of better road communications between the West African countries will naturally result in raising the number and average weight of vehicles using them, which will give rise to two sets of problems, one concerning the standard and maintenance of the roads themselves, the other concerning the traffic using them.

Regarding the former, the Public Works Departments of the region have already initiated sub-regional co-operation through their recurrent meetings

(West African Public Works Conference) and have discussed, *inter alia*, the figures quoted for road maintenance, making due allowance for each country's road works accounting system, varying road widths and types of surface. At the fourteenth meeting, held at Accra in 1959, it was agreed that considerable scope existed for a uniform method of presenting road maintenance costs, and that a proform would be circulated to co-ordinate known maintenance costs, with a view to harmonizing the mileage of roads maintained with population and number of vehicles registered. It was clear from the review of the existing road systems in West Africa presented at the fourteenth meeting of their conference that much more detailed information was required before a comprehensive appreciation of sub-regional roads in West Africa could be prepared.³³

Traffic in the various countries is at present governed by a variety of laws and regulations concerning speed limits, axle loads, maximum length and general design of vehicles, road signs and signals etc.³⁴ A review of the relevant legislation should be undertaken in order to achieve homogeneity. A sub-regional road should obviously be constructed to agreed international standards and offer good axle-load facilities, gradients, curves etc. that will ensure high-speed road transport at economic rates. In order to reduce total transport time to a minimum, agreements should also be made in regard to frontier formalities.

ECOSOC resolutions on road transport request ratification of the 1949 (Geneva) Convention on Road Traffic, which is a valuable contribution to the modernization of national highway codes. Among other points to be studied in the interest of uniformity are the selection of distinctive letters of nationality, maximum permissible weights and dimensions, rules governing priority at intersections and uniform driving permits. The above-mentioned Road Traffic Convention has been supplemented by recommendations on road signs and signals and driving licences; but the various regions are left to ne-

³³ It was agreed at this meeting that the services of an international body were needed to standardize the presentation of data for the various countries as a first step towards the wider study of the international aspects of road communications throughout West Africa. The International Road Federation offered to conduct such a survey; but for various reasons it was not undertaken and still remains a felt want. It was however, again taken up by the Monrovia Conference and will presumably lead to some action.

³⁴ There are wide differences throughout the region in regard to width of roads, axle loads etc. Inconveniences caused by varying axle-load regulations emerge clearly in another region, namely the Rhodesias. Southern Rhodesia allows an axle load of only 14,000 pounds, while Northern Rhodesia permits 17,600 pounds. Hence, trucks transporting materials to the Katanga region of the Congo from Durban (where the figure is 18,000 pounds) or Lourenço Marques cannot take a full load because of the restrictions in Southern Rhodesia. As to road signs and signals, Nigeria has adopted British signs, Togo and Dahomey French signs and Gambia international signs!

gotiate agreements embodying these recommendations. Lastly, membership of the various countries of the region in international organizations like ICAO and IMCO may also be of importance in the field of transport.

Most of the afore-mentioned points refer to road transport but the question of sub-regional links and sub-regional transport naturally does not concern only the roads. As stated previously, there is room for some new railway connexions and also combinations between rail and road transport, e.g. the Bornu extension and its continuation, the Maiduguri-Fort Lamy highway.

Perhaps the most interesting sub-regional aspect of railway problems in West Africa lies in the field of transport co-ordination, especially from the

rate-fixing point of view. As pointed out earlier, much the same policy in relation to road competition has been applied in the Ivory Coast and Nigeria, and with the same positive results. A comparative study of the tariff policies applied by railways in West Africa to meet competition including that between railway systems (e.g. Dakar-Niger and Abidjan-Niger) and of railway co-ordination policies would certainly prove rewarding.

International transport policies naturally also apply to river traffic and to its combinations with rail and road transport, many West African rivers being by virtue of conventions and agreements international waterways. The outstanding example is the Niger, whose importance will be enhanced if navigation can be improved on its upper reaches.

Chapter V

TRANSPORT POLICY IN PRACTICAL APPLICATION

A. *Impact of road improvement and its evaluation*

Assuming that improved transport is a prerequisite for general economic development in West Africa, and also that improvements will be largely confined to the roads, the question remains how to evaluate the impact of roads of varying standards on the economic and social development of the territories, areas or communities they serve. To quote again one of the foremost experts in this field,¹ "data on both the short and long-term effects in terms of production, standards of living, population, transport costs, health etc. will be evaluated for different types of economy; this will give the amount and type of return for different roads in varying conditions. With this information available the authorities responsible for road development will be in a far better position to judge what is the correct standard of road, or type of road system, for obtaining the highest return in terms of economic and social development".² While in more advanced countries the effects of road development are likely to be felt mainly in operating costs (in terms of time saved, reduced fuel consumption, less accidents etc.), the economic justification for many road improvements in West Africa will generally be the new traffic they are expected to generate or, in other words, the economic develop-

ment that is likely to ensue. In West Africa, as in many other under-developed areas, this economic development will very probably materialize primarily, although not exclusively, in agriculture.

While the amounts that can rightly be devoted to road construction and improvement in under-developed countries must, as stated above, largely depend on the existing volume and composition of traffic as well as on the anticipated increase, they also hinge on what might be called the "contingent costs" of investment in roads as compared with investment in other sectors. As Professor J. Tinbergen has rightly said, "this insight is not readily available since economic science as a rule disregards the complications of transportation costs and geographical price disparities which are the heart of the problem".³ The Road Research Laboratory of London is trying to develop a technique for the determination of road improvement priorities; but as has aptly been said,⁴ the success of its work will depend on the "provision of the basic factual information relating to design, surface types, surface conditions, accident rates, traffic volume and projections, cost estimates, road life studies and to the planned investments in other parts of the economy". As such data are far from readily available, there would seem to be a need for a concerted effort on the part of the governments concerned to collect analyses and publish them on a sub-regional, comparative basis.

Apart from the efforts of institutions like the Road Research Laboratory of London to establish a method enabling transport planners to assess the possible impact of road improvement on the general economic development of a country or territory, similar work has been done on the basis of empiric material collected in the Ivory Coast.⁵

¹ R.S. Millard, Chief of the Tropical Section of the Road Research Laboratory, Harmondsworth, London. (This institution has worked out a new method of finding a "rate of return on investment" to replace the straightforward cost-benefit analysis. According to this method, net annual benefits are expressed as a rate of return on the initial capital cost of the proposed improvement. This rate of return indicates the relative priority on economic grounds, compared with alternative uses of the capital available for investment. *Vide* "Road Development in the Overseas Territories", by R.S. Millard in "Roads and Road Construction", February 1959).

² A pilot study of this kind was undertaken by N.D.S. Smith of the Royal Research Laboratory in Uganda. This work was conducted in an area where road development was the only major change which had taken place in recent years, so that his findings may be interpreted as showing the minimum benefits of the new roads. It was possible to establish a "distinct association between development and road penetration". What Smith's study particularly shows is that the construction of new roads in Madi and Jonam in the West Nile district was followed by population migration and increases in cotton production and income, although the "statistics available are not sufficient to enable a definite relationship between road miles per square mile and acreage per head to be established".

³ V.W. Hogg, *op. cit.*, The highway planners' main concern is of course that they have, in Hogg's words, to "establish a proper balance between the rapidly increasing traffic volumes and service requirements on certain roads with the increasing general demand for greater expenditure on all roads and for the provision of roads where they do not already exist".

⁴ V.W. Hogg, *op. cit.*

⁵ Most of the facts given here are taken from an internal paper by the Abidjan Public Works Department, "L'Evolution du Réseau Routier en Côte d'Ivoire au cours de la dernière décade". *Vide* also, "Evaluation du réseau routier en Côtes D'Ivoire", by Claude Cans, "Travaux", 1959.

As stated before, for a West African country the Ivory Coast is well provided with trunk roads, though, as has been rightly said, they would be of little help to the economic development of the country if they were not "fed" by a system of secondary roads and "*pistes*" in an adequate state of maintenance. In perhaps no other West African country have the secondary roads so clearly proved their economic significance as in the Ivory Coast, where coffee, cocoa and banana producers in fact entirely depend on ways and means of getting their produce out on to the main transport routes.

In order to assess the general importance of road improvement for the country's economy, an attempt was first made to evaluate its importance for secondary roads ("*pistes rurales*", "*pistes de collecte*", "*routes de desserte*"). Generally speaking, the effect of improving these secondary roads (mostly in the established coffee and cocoa plantation areas in the south) was found to be more or less immediate for the local farmers and rural population.

The most direct effects of better roads as regards the distribution of produce from the plantations are lower transport rates and, consequently higher net profits for the planters. There is a corresponding gain in cheaper transport in the opposite direction, i.e. back to the villages, of goods bought by the planters.

As a secondary effect, better transport services tend to encourage competition, with the result that the producers are offered more favourable prices by the wholesale buyers.

Finally, improved transport will ensure closer contacts with the Department of Agriculture and its services, more openings for technical education, and increased access to health services, general education etc.

So far as concerns motor traffic, improved secondary roads will immediately affect both traffic volume and the types of vehicle used. As to the former, there are cases where the number of vehicles per day has increased by 30-50 in under one year. As to types of vehicles used, the "Jeep" or Landrover is tending to be replaced by the 5-ton truck.

An approximate arithmetical estimate, based on recent conditions in the Ivory Coast, of the gain to be achieved by improving a "*piste*" to the point where petrol-driven or diesel 5-ton trucks can use it works out as described below.

The alternatives prior to possible transport by truck would be portage and/or transport by "jeep" or Landrover.

In the first case, the cost per ton/kilometre, computed at 37 Fr. CFA per hour, would be about 400 Fr. CFA, and no return load could be expected.

For a "jeep", without return load, the cost on a poor road would be around 80-100 Fr. CFA per ton/kilometre as against some 20-30 Fr. CFA for a 5-ton truck using an improved road and normally able to count on return loads of general merchandise, foodstuffs and passengers.

The average reduction in cost per t/km would be around 300-380 Fr. CFA. The total estimated annual cost to the community would amount to some 60,000 Fr. CFA, comprising 42,000 Fr. CFA capital costs at 6% and 18,000 Fr. CFA maintenance costs, per kilometre.

Hence, a traffic volume of 150 tons would more than cover initial outlay, not to mention other indirect but very real benefits; and the volume of traffic to be carried by "*piste*" may often amount to 500-1,000 tons. Indeed, the improvement made on one particular "*piste*" of 25 km. in length resulted in an immediate gain of 4 Fr. CFA per kilo of coffee for the producer.

In order to demonstrate the actual trends in transport rates on main roads in the Ivory Coast an inquiry was conducted by the Transport Section of the Public Works Department in co-operation with the main road carriers and firms engaged in transport on own account or else interested in the rates applied. A theoretical cost was computed from various cost items, such as cost of vehicle, fuel etc., and the actual transport rate compared with this by means of an index, so as to show the true decline in transport rates as an expression of the state of the roads and the freight market. The following table emerged (costs in Fr. CFA):

Year	Cost of new 5-ton Citroen truck	Cost of petrol (litre)	Tyres (230x20)	Insurance (all-risks)	Annual wages (1 driver)	Theoretical cost	Actual rate	Index (A. rate Theoretical cost)
1950	594,000	15.50	22,500	70,000	45,600	5.32	14.10	2.65
1951	865,000	14.65	21,650	90,000	55,200	6.02	15.—	2.49
1952	909,000	15.65	20,300	100,000	55,200	6.24	13.95	2.23
1953	941,000	18.95	20,300	160,000	79,200	7.15	12.50	1.74
1954	941,000	23.—	17,000	175,000	79,200	7.54	10.10	1.20
1955	995,000	23.85	15,500	180,000	85,700	7.79	9.20	1.18
1956	1,000,000	23.65	19,500	180,000	90,000	8.01	9.09	1.13
1957	1,100,000	25.70	23,230	200,000	119,000	9.31	10.50	1.12
1958	1,151,000	30.—	21,945	216,500	149,000	9.93	7.75	0.78

The above table shows the close relationship between the state of the roads and the true cost of transport. The principal improvement works on the main road arteries were carried out between 1951 and 1954, during which period the index showed its most substantial decline.

It has been estimated that, but for the actual improvements made since 1950, the cost per ton-kilometre (assuming the freight market had also remained unchanged) would have been 26.31 Fr. CFA in 1958 (9.93×2.65). However, although the appreciable reduction in transport costs (from 14.10 to 7.75 Fr. CFA) between 1950 and 1958 was largely due to better roads, other factors — not all of them positive — were at work. For example, something in the nature of cut-throat competition among road carriers helped to create rate levels that were possibly not very consistent with economic requirements. In order to assess real gains due to road improvement in the Ivory Coast, the somewhat arbitrary figure of 12 Fr. CFA was taken to represent the true cost per ton/km. On this assumption, the net average reduction per ton/km in 1958 was $26.31 - 12 = 14$ Fr. CFA.

A tentative effort was also made to evaluate the annual gain on total road traffic (except local traffic), derived from improving road conditions between 1950 and 1958,⁶ the sum arrived at being 2,240 million Fr. CFA, which has to be set against the annual capital charges on the investments in road improvement, estimated at 450 million Fr. The first of these sums divided by the second gives a "utility coefficient" of 5.4 for main roads; if local traffic is included, it seems reasonable to assume a coefficient of about 6, which is the figure for metropolitan France.

As already stated, the main, or at least the most immediate, aim of road improvement is to lower transport costs. In Nigeria, the Marketing Boards have (according to Millard) quoted rates of 6.5d. per ton/mile on asphalted roads, 6.0-7.5d. per ton/mile, on gravel roads and 9.0 - 10.0d. on dry - weather roads. In such circumstances the upgrading of a dry-

weather road to all-weather asphalted road may reduce operating costs by 6d. a ton/mile. Given a road with a traffic volume of 100 vehicles a day, this would mean a saving of 900 pounds per mile of road per year.

Benefits which are not always fully taken into account accrue when a road is straightened. A typical example is the Accra-Mankessim project in Ghana, which reduces the distance between Accra and Takoradi by 30 miles. The 60-mile link which had to be built to achieve this cost approximately $1\frac{1}{2}$ million pounds. The traffic density is some 400 vehicles per day, a goodly number of them heavy freight trucks running at an average cost of 2/- per ton/mile. The direct benefit to the user can thus be estimated at some 438,000 pounds a year, which is sufficient to recoup capital costs in 3 years. Among other benefits are the removal of the many traffic hazards on the old road, less wear-and-tear on vehicles, savings in running time and easier access to the fertile food-producing areas served by the road.⁷

In the case of secondary roads (*routes de desserte*), it is often a question of replacing a mere bush-path by a dry-weather road, i.e. of establishing a transport route where for all practical purposes none existed before. Sometimes it is a case of "tapping" existing production and providing facilities for its expansion. In many West African territories fertile valleys are to be found which are blocked by a mountain ridge or otherwise difficult of access. One such is the valley of Fazao in Togo, which is separated from the rest of the country by a mountain ridge. A road piercing this ridge would make it possible to "tap" this rich agricultural area, whose present production is transported to Ghana. Elsewhere, agricultural production may still be in a more or less embryonic state; but though the opening up or improvement of transport routes may stimulate new or increased activities, initial studies must concentrate on the productive sector, transport planning taking second place to agricultural planning.

B. Cost aspects

While the effects of improved road transport may be the most important aspect of transport in relation to economic development in West Africa, there are other aspects that also merit attention. For instance, when the profitability of railway operation is under study, one important factor in comparisons with road transport must be the part played in costs by fixed installations. Special problems may also arise in connexion with expenditure on way and structures taken over as a "legacy" from a past in which the railways enjoyed a transport monopoly.

⁶ The actual investments in road improvement during the period 1950-58 amounted to some 5,300 million Fr., or about 7,500 million in Fr. of 1958, representing annual charges of 450 million Fr. calculated of 6%.

i.e. before the advent of motor traffic on the highways. Motor transport likewise took over a "legacy", in the form of a highway system which had partly to be re-adapted to new needs.

The question arises whether this cost element should be regarded as an item in production costs. In most industries it is assumed that the total cost of fixed installations can be apportioned among the various production units, which, by increasing their output, give increasing returns until the technical optimum is reached. But so long as unused capacity

⁷ The old road permitted only a hazardous 35 m.p.h. over its 100 miles, while the new one allows 50 m.p.h. over its 60 miles, representing one journey every 1 h. 40 min. or 243,000 vehicle/hours a year.

exists it hardly seems economically correct to burden production with the total cost of fixed installations; for the investment is made once and for all and has nothing to do with the actual volume of production, and it remains, as a cost item whether the production be great or small, or even if it cease altogether. Since to regard the cost of fixed installations as a production cost would imply that one item of production costs persists even when there is no longer any production, it seems logical to separate the original expenditure on fixed installations from production costs.

The aim of planning internal transport and the expenditure is of only limited importance when judging how existing installations can best be used. Their availability can be taken as a "*fait accompli*", and the only concern should be the best use they can be put to in future operations. Any decision taken in regard to economic cost, should be based on replacement, not original, cost. Therefore, when transport takes its place in economic development plans, the resources required to provide the necessary services must be assessed and the value of the "goods" foregone if the appropriate measures are to be successfully adopted. Appraisals should naturally include estimates of the cost entailed in renewing the equipment and structures bequeathed from the past that have to be maintained for the operation of the particular service concerned. An estimate should also be made of possible adverse effects on existing facilities, which may be rendered partly or totally obsolete by the new service.

Economic cost calculations should, whatever the premise, indicate which mode of transport will provide a particular service at least cost (cost in this case being understood to include quality of service). The real difficulty in ascertaining transport cost lies in the treatment of permanent way costs. In any comparison of road and rail transport the question arises whether, from the point of view of social costs, road transport should cover not only maintenance costs, but also permanent way costs. In the latter case, charges on road transport in the form of taxa-

tion etc. should be sufficient to cover all expenditure on extensions to the road system, although the charges have no connexion with past investments.

As regards the practical application of transport policies, the emphasis is usually on external transport — (particularly road and rail), among whose functions is that of a link in the distribution or production chains of other industries, although domestic transport and the handling of materials are playing a more and more important part in the same field.

The aim of planning internal transport and the materials handling is to obtain maximum productive efficiency, the latter being measured by the cost and by the amount of time and manpower required per unit of material. The problems involved concern types of equipment⁸ and various aspects of plant design and closely allied to the latter, the optimum size of transport units and its relation to the package unit, hence also to other aspects of packaging like packaging material.⁹

⁸ E.g. fork-lift trucks, pallets, tractors and trailers, conveyers, telfers, ropeways, elevators and containers. Driveways and "aisles" suited to the equipment used are important in warehouse design.

⁹ In many countries certain experiences in transport during the Second World War led to the adoption of new methods, especially in mechanized handling. Domestic transport was perhaps most affected, but the flow of ports operations was likewise extensively re-planned along the lines adopted by the U.S. Navy in the Pacific theatre. (Many of the worst bottlenecks in West African transport operations undoubtedly occurred at ports.) It must be remembered, however, that the uniform character of the goods shipped made the formation of unit loads easy there, and the whole operation in the Pacific was closely adapted to fit rather special circumstances. There is always a potential danger of putting technical before economic efficiency. Sometimes, for instance, mechanization is overdone in regions where the relative cheapness of labour would justify manual operations deemed inefficient in industrially developed countries, where wages are high. There are in West Africa quite a few examples of transport installations created in war-time, when the time element (as opposed to the cost element) was all important, such as port and airport facilities (e.g. at Freetown and Bathurst) provided for traffic far in excess of any peace-time demand.

CONCLUSIONS

The impact of transport improvements

The value of output in the transport industries of West Africa is high in proportion to the gross national product of the region - perhaps some 10% of the total. In addition, there as elsewhere, transport rates are of great importance for their effects on general price levels. It is on the whole true to say that the heavier and more perishable the goods and the lower their intrinsic value, the higher will probably be the share of transport costs in the total cost of the goods, and the same still holds good if they have to be transported over great distances or handled in small units. As most of the goods carried in West Africa answer one or more of those descriptions, better and cheaper transport may logically be expected to have a considerable impact.

Improvements in transport will exert either direct or indirect effects, the former confined to the transport industry as such and reflected in the cost or quality of the services provided or both, the latter manifested of in a variety of ways, economic, financial or social. Technical improvements profoundly affect the traditional patterns of production and living in the native villages, transforming customs and habits. But, on the other hand, improved transport facilities may, by making commercial crops possible in certain areas, help to curtail off-season migration and enable present migrant workers to earn a permanent living in their home country. Again, new secondary roads may help so to increase production in a particular area that it can offer a permanent livelihood to surplus population from over-populated districts, e.g. the overcrowded Kabré of northern Togo, some of whom could be settled in the cocoa and coffee districts in the south-west if secondary roads fostered increased production.

The benefits accruing to existing traffic from road improvements are particularly obvious where asphalt surfacing is concerned. (Some relevant figures were given in the preceding chapter.) Frequently, a reduction of 25% in cost per ton/kilometre can be achieved when the change is from a dry-weather road to asphalt — or 15% when a dry-weather road is upgraded to a gravel road (laterite).

As to railways, dieselization might achieve a saving of up to 40-50% in operating and maintenance costs.

As previously shown, total transport time may be substantially reduced by improvements especially in road transport, port operations and any kind of combined transport. Time saved also means econom-

ies in inventory, storage space and insurance, thus also helping to reduce credit needs. It likewise lessens losses due to deterioration of perishable goods and risks of theft and breakage, both helped by unbroken journeys and avoidance of reloading operations.

One particular result of better transport in West Africa is the substantial increase in the volume of export-import traffic, which is typified by the figures recorded at ports like Abidjan, Takoradi, Lagos and Port Harcourt. If comprehensive figures for the volume of domestic goods traffic could be collected, the increase would be seen to be even more startling. Improved facilities have also brought in certain new traffic items, for which the existing modes of transport were formerly unable properly to cater; witness the increased volume of timber, coffee and bananas carried mainly in the Ivory Coast (and, in the case of bananas, Guinea). The development was primarily due to better road transport providing efficient links between the plantations and the country's trunk roads not to mention improved port installations at Abidjan and Conakry, and making it possible to ship perishable products, like bananas, for which speedy transport is essential. Where speed is important owing to fluctuating market conditions, as in the case of coffee and cocoa, faster transport enables production to pay.

Increased traffic has also made it economically sound to introduce modern handling equipment in ports (including some river ports), especially cranes and fork-lift trucks, so that loading and unloading operations are expedited, the former constant overcrowding on wharfs eased and warehouse space saved.

As already stated, transport improvements have been directly responsible for the raising of new crops, such as bananas, by creating new transport services. But this new departure has not been confined to export crops. Yams, which are widely grown for the domestic market e.g. in Nigeria, are so bulky and of such low intrinsic value that they would hardly ever have been moved in large quantities, as now, from the northern to the western part of the country but for cheap road transport.

Better and cheaper transport, especially of perishable foodstuffs, is of great importance also because it gives the people a chance of a more balanced diet. For instance, air and road transport have brought meat from the north to the forest areas, where it was formerly almost unknown, and also improved meat supplies to the city populations in the south. This development is, however, still in its infancy.

The advent of an expanding road transport industry has likewise created employment, e.g. in the building of bodies for utility vehicles, in the repairing of tyres, and in staffing garages, service stations and rest-houses.

The most spectacular effects will presumably be felt by the people of the northern areas of most of the countries, traffic between which and the more densely populated coastal areas will be facilitated (the trend has of course already started), so that surplus populations from the north will travel to seek employment in the cities of the south. Not only persons and goods, but also ideas, will move more freely as new links are forged between areas formerly cut off from each other. The general lack of telecommunications, which will continue for some time to come, will be partially offset by actual physical contacts between travellers.

Both rail and road transport have been important agents in promoting urbanization. The growth of townships at first largely depended on the location of transport routes, and mostly of railways: centres of population and railheads were always in combination. In recent years, much of this former function of the railways has been taken over by trunk roads. Notable examples from Nigeria of townships that have grown up, not at railheads, but on trunk roads (Lagos and Ibadan are typical rail centres) are Benin and Oye, Onitsha, Owerri and Aba. In former French West Africa, Bamako and Fort Lamy are among the foremost "road towns".

Improved transport must, for its full effect be combined with a corresponding expansion of production and trade. The latter must have reached a certain level before expenditure on infrastructure is contemplated; and to judge when that minimum has been attained is one of the most difficult problems in framing development policies.

The impact of transport improvements, though bound to be felt in the long run, may not be immediately apparent. The populations concerned are almost invariably conservative and tied by habit in production, trade and transport. Should a particular transport improvement, like the construction of a railway or of a trunk road to "open up the country", be thought to imply a change in productive methods or a need to find a new set of customers, there may well be some opposition to the innovation from both farmers and retail traders. The latter may, for example, be obliged to re-organize their business; they may find they need to borrow more; and they may gradually lose their independence by having to take more partners into the business.

However, a slower tempo and less ambitious plans may yield better and more reliable results, for instance if improvements are limited to the mere upgrading of bush-paths to dry-weather roads. Even at best, transport improvements are expensive, and they must therefore be put in proper perspective

against the background of the economic resources of the area concerned.

Political developments since the Second World War have brought sweeping changes to West Africa. Independent states have replaced the old territories which formerly constituted French West Africa and the four British territories. Only now perhaps can one truthfully speak of a region or sub-region, and regional problems are now emerging which may partly supplant former national ones. This is apparent above all in the transport field.

The important role of road transport in the economic development of West Africa has been underlined at various points in this study. In every country of the region road construction, improvement and maintenance absorb a large share of the funds available. Similarly, there are important problems created by increased traffic on the region's highways that call for study.

Generally speaking, one problem common to all countries in the region is how to ascertain what precisely happens on the highways, what volume and what kinds of goods are transported, how many passengers are carried, what types of vehicles are used, how many and what kinds of accidents have occurred, and so on. Some of these questions certainly also arise for sub-regional traffic, but basically they have to be studied on a national level.

Sub-regional road links are, however, of obvious general interest. This is particularly the case when the problem is studied in conjunction with economic development. The structure of the transport systems in West Africa was discussed previously, when it was pointed out that it was primarily devised to serve the export-import trade with comparatively little regard for the needs of domestic markets, which were thereby severely restricted. The lack of transport services between the territories — whether by road, rail, or coastwise traffic — was at least in earlier colonial times, hardly felt to be too much of a drawback. For on the one hand, the political atmosphere during the period of what is sometimes called the "scramble for Africa", was not very favourable to close links between the various colonies, while on the other, as the same type, larger markets for these products were not sought in West Africa. The idea of promoting industrialization in these territories came very late and almost the only concern was the creation of a territorial import market for industrial goods.

Developments since the Second World War and, in particular, the attachment of national independence by the West African colonies and territories have already brought some changes in outlook and will undoubtedly lead to important changes in practice. The newly independent territories have in most cases so far not enough population or purchasing power to support a market for a national industry. Hence, a widening of the market across national

borders is to be recommended, as this would make for a useful division of labour on a regional basis, products being manufactured where the economic conditions are most suitable. But, to achieve this result, improved transport services are imperative. While improvements must mainly take the form of new or better sub-regional road links, other transport links may also enter the picture, e.g. railway connexions or sub-regional coastwise traffic, for instance on the lagoon system of the Guinea coast.

It should be noted however, that the problem is not merely one of linking the various networks but also of laying down international construction and maintenance standards for the sub-regional system (type and dimension of road etc.), together with rules and regulations for traffic (vehicle dimensions, permissible axle-loads, road signs and signals, speed regulations, driver's licences and frontier formalities). A regional code must also be established for the classification of road accidents.

Some of the items mentioned above are already treated, although not very consistently, at the sub-regional level, e.g. at meetings of the West African Public Works Departments, which held their 15th session at Ibadan in November 1960; but a comprehensive study of sub-regional road problems remains to be undertaken.¹

¹ Some practical steps to achieve this have as a matter of fact already been taken. At the Third Session of the Economic Commission for Africa, held at Addis Ababa in February 1961, a resolution was adopted calling for a meeting of the Ministers of Transport and/or Works of the countries of the West African sub-region to discuss:

(a) the general lines upon which the sub-regional transport network should be developed;

(b) and the possibility of standardizing vehicle legislation, and signs and signals traffic using the sub-regional transport network.

This conference met, as stated previously, 23-27 October 1961 in Monrovia and some important resolutions were made. See document E/CN. 14/147 - E/GN. 14/TRANS/WP. 24.

TABLE 1
West Africa :^a
Railway Traffic in Millions of Net Ton/Kilometres

Country	1952	1953	1954	1955	1956	1957	1958
French Cameroons	100	99	101	103	98	110	129
French Equatorial Africa ...	97	84	91	107	129	141	156
French West Africa ^b	461	420	468	530	545	563	598
Ghana	240	264	262	280	323	300	300
Nigeria	1353	1487	1764	1901	2116	2015	2259
Sierra Leone	33	32	28	24	31	33	27
French Togoland	10	111	10	8	6	8	8
Guinea	43	44	42	44	38	37	42
Approx. Total	2337	2441	2766	2997	3286	3207	3519

Source: United Nations Statistical Yearbook, 1958.

^a Figures for Gambia and Liberia are not available.

^b For the former French territories the following figures may be added: ➡

	1938	1948 (x)	1951
French Equatorial Africa	68.8	73.7	98.3
French West Africa	325	366 (x)	512

(x) 1949 in case of French West Africa.

TABLE 2
West Africa :^a
Railway Passenger/Kilometres (in millions)

Country	1952	1953	1954	1955	1956	1957	1958
French Cameroons	96	85	89	90	82	87	105
French Equatorial Africa ...	45	43	40	39	47	51	52
French West Africa ^b	448	451	503	475	423	409	508
Ghana	339	226	204	234	253	247	242
Guinea	37	36	41	39	56	38	43
Nigeria ^c	565	569	562	635	717	738	595
Sierra Leone	54	47	53	65	70	70	68
French Togoland	68	75	73	56	66	70	77
Approx. Total	1652	1532	1565	1633	1694	1710	1690

Source: United Nations Statistical Yearbook, 1958.

^a Figures for Gambia and Liberia are not available.

^b For the former French territories the following figures may be added: ➡

^c Includes British Cameroons.

	1938	1948 (x)	1951
French Equatorial Africa	8.6	26.2	39.6
French West Africa		414	479

(x) 1949 in the case of French West Africa.

TABLE 3
Motor Vehicles in use in certain West African countries.
A. *Passenger cars* B. *Commercial vehicles*
(in thousands)

Country	Code	1952	1953	1954	1955	1956	1957	1958
Cameroon (Fr) ¹	A	2.5	3.3	4.2	5.4	6.0	6.8	8.0
	B	9.5	10.9	12.4	13.5	15.2	16.6	17.9
French Equatorial Africa ¹ ...	A	3.8	4.4	5.3	6.2	7.1	8.4	9.5
	B	8.1	9.0	10.2	11.5	13.1	14.8	16.0
French West Africa ¹	A	12.9	12.8	16.6	...	28.3	34.4	...
	B	22.9	24.6	27.0	...	40.6	46.5	...
Ghana ¹	A	8.1	...	10.7	11.9	13.4	14.5	15.5
	B	9.7	...	12.5	13.5	14.9	15.6	15.3
Nigeria ²	A	10.3	12.5	14.3	17.1 ¹	20.3	22.6	24.0
	B	9.8	11.2	13.2	14.7	16.9	16.5	18.4
Sierra Leone	A	1.2	2.5	3.2	2.8	3.0
	B	0.4	0.8	2.9	2.1	1.8
Togo ¹	A	0.4	0.5	0.6	0.7	0.9	1.1	...
	B	0.7	0.9	1.1	1.4	1.7	1.8	...

Source: United Nations Statistical Yearbook, 1959

¹ Including vehicles operated by police or other governmental security organizations.

² Including British Cameroon.

TABLE 4
Road network position in certain West African countries

Territory and reference year	All-weather roads km.	Dry-weather roads km.	Total (round figs.) km.
Cameroon (Fr.)	(1957) 8,800	1,200	10,000
Dahomey	(1956) 3,972	1,200	5,200
Total French Africa	(1956) 47,176	33,800	81,000
Ghana	(1958)		29,860
Guinea	(1956) 5,092	2,500	7,800
Ivory Coast	(1956) 8,752	8,000	16,800
Liberia	(1958)		1,184
Mauretania	(1956) 2,675	1,000	3,700
Niger	(1956) 3,504	5,000	8,500
Nigeria	(1958)		59,200
Senegal	(1956) 8,658	3,000	11,700
Sierra Leone	(1958)		5,512
Sudan	(1958) 6,162	5,000	11,200
Togo	(1957) 1,176	3,300	4,476
Upper Volta	(1956) 8,361	8,100	16,500

Sources: "Outre Mer", 1958.
Road International, No. 35.

TABLE 5
West Africa: Net Weight of Vessels Entering West African Ports
(in thousand metric tons)

Country	1952	1953	1954	1955	1956	1957	1958
French Cameroons	1,513	1,837	1,793	1,844	1,801	1,912	2,374
French Equatorial Africa ...	—	—	—	—	—	—	—
French West Africa	11,656	12,866	12,630	13,958	16,458	20,016	15,922
Gambia	438	392	405	417	417	372	448
Ghana	3,276	3,622	3,666	3,789	3,725	3,990	4,727
Guinea	1,144	1,679	1,784	1,988	2,005	2,115	2,234
Liberia ^a	892	1,434	2,381	3,997	5,584	7,466	—
Nigeria ^b	2,551	2,988	2,983	3,172	3,284	3,656	4,804
Sierra Leone	2,663	3,001	3,011	3,125	3,648	4,082	4,029
Togoland	815	1,060	1,045	1,041	968	863	1,001
Total	24,948	28,879	29,698	33,331	37,890	44,472	35,539

Source: United Nations Statistical Yearbook, 1959.

^a In the case of Liberia the figures refer to the vessels registered there.

^b Including Cameroons [Br].

TABLE 6
West Africa: Shipping - goods loaded from West African Ports
(In thousand metric tons)

Country	1952	1953	1954	1955	1956	1957	1958
French Cameroons	219	287	296	296	315	359	399
French Equatorial Africa ...	314	444	592	757	747	1,014	1,428
French West Africa	1,921	1,845	2,160	2,056	2,405	2,988	2,491
Gambia	63	54	50	49	41	79	112
Ghana	1,422	1,527	1,625	1,393	1,660	1,824	1,643
Guinea	137	856	1,139	1,177	1,401	1,538	840
Liberia	—	1,312	1,232	1,841	—	—	—
Nigeria	1,565	1,747	2,003	2,010	2,129	2,058	2,654
Sierra Leone	1,490	1,370	1,010	1,396	1,430	1,608	1,475
Togoland	56	62	54	49	48	43	43
Total	7,187	9,504 ^a	9,801 ^a	11,024 ^a	10,176	11,511	11,085

Source: United Nations Statistical Yearbook, 1959.

^a Includes Liberia.

TABLE 7
West Africa: Shipping - goods unloaded in West African Ports
(in thousand metric tons)

Country	1952	1953	1954	1955	1956	1957	1958
French Cameroons	407	315	353	352	377	411	490
French Equatorial Africa ...	275	236	230	249	283	359	385
French West Africa	2,297	2,272	2,511	2,447	2,914	3,514	2,929
Gambia	45	31	38	58	46	60	52
Ghana	1,072	1,176	1,178	1,450	1,397	1,496	1,419
Guinea	206	215	194	243	192	229	347
Liberia	—	165	169	200	—	—	—
Nigeria	1,372	1,556	1,680	2,034	2,287	2,291	2,376
Sierra Leone	181	191	200	274	448	626	620
Togoland	37	47	58	58	55	56	64
Total	5,892	6,204 ^a	6,611 ^a	7,365 ^a	7,999	9,042	8,682

Source: United Nations Statistical Yearbook, 1959.

^a Includes Liberia.