THE PORTS AND TRADE

OF THE

RED SEA BASIN

VOLUME I

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SUBMITTED FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY OF

THE UNIVERSITY OF DURHAM, 1963

Preface

This work attempts a systematic study of the physical and economic factors which have influenced the siting, development and trading relations of the important ports of the Red Sea. Comparative analysis forms an important part of the method.

The information contained in this work derives mainly from field notes, Italian, English, French and Arabic references, and published or unpublished governmental and official records. Field notes and photographs are the result of about three years' field work in 1958-60, and a return visit from England to the Red Sea ports from May to December, 1961. They include information gained from special studies relating to port studies, settlement, population and water supply. Observations and information cover Egypt, the Sudan, Ethiopia, Saudi Arabia and the northern part of the Yemen as far as time and accessibility would allow. In the course of travelling, more than three thousand miles were covered by all means of transport throughout the area.

As an introductory step before embarking on the field work, I made a point of studying the available literature on the Red Sea ports in the United Kingdom and Egypt. This involved a reconnaissance survey, not only of the Red Sea basin, but in some cases of the whole of the Middle East.

A major problem throughout the investigation was the lack of relevant statistical information and literature covering the area. To overcome this, field observation was used whenever possible. The important ports were studied in greater detail.

This research has only been accomplished with the help of so many people that full acknowledgment would require several pages. I thank most sincerely all who have helped me.

First of all, I would like to thank Professor G. H. J. Daysh, B.Litt., who accepted me as a post-graduate research student in his Department of Geography at King's College in the University of Durham. My acknowledgments are in particular rendered to Mr. J. W. House, M.A., F.R.G.S., Reader in Applied Geography, for his invaluable supervision, and under whose guidance my researches have been carried out. Through his kind encouragement and continuous help, all parts of this thesis have been prepared. Thanks are also due to the staff of the Geography Department at King's College, to my research colleagues, and to Miss Anne Crawford.

Of those in Egypt who have helped me, my thanks are due to the Egyptian Geographers, to Professor S. Huzayyin, the Rector of ASYUT University, for his guidance and encouragement, to my father, who has enabled me to come to this country for post-graduate study, and to Mr. K. El Nahas, for his kind help.

I would like to thank the many people who assisted me in the field. Here I can only mention those whose co-operation and help proved indispensable. I am grateful to a great many officials in Egypt, the Sudan, Ethiopia, Saudi Arabia, Jordan and the Yemen, for various information. There are many others, in England and Egypt, too numerous to mention by name.

To all these, I express my appreciation and sincere thanks.

CONTENTS

PART III

LIST OF TABLES

INTRODUCTION

It has been the aim of this study to present a detailed account of the evolution and development of the Red Sea ports, with an emphasis on the physical and economic factors which have influenced the siting, growth and characteristics of these ports and are an essential prelude to understanding their functions, as well as their role in the economic life of the area concerned.

The chapters of the thesis will expand this detailed study and also suggest broadly the manner in which the study fits into the methodological framework of economic geography.

The study of ports has been of interest to geographers for many years, and there is probably as prolific a literature on the subject as on any phase of transportation in relation to urban development. A great number of the cities of the world are located on navigable waterways. In many of them the port function is dominant, not only as a component of the economic base, but also as a major element in the physical pattern. Ports are the meeting places of water and land transportation, where goods are handled. This, in many instances, gives rise to the necessity for a labour force, which in turn requires goods and services, thereby creating a "multiplier" effect which is a major stimulus to urbanization.[1]

There are several reasons for the interest which ports hold for

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1 Mayer, H. & Kohn, C. (Eds.): Reading in Urban Geography, 1960, p. 36

geographers. In the first place, a port is a gateway for serving its hinterland, but it must be many other things as well. Perhaps most important of all, it must be a harbour, that is, a protected area where ships may safely berth, in sufficient water and guarded from the dangers of the sea and bad weather. The necessity of sheltered accommodation may be provided by nature, as in a partially landlocked bay with deep water, a protected sea entrance and some high ground warding off the prevailing wind; or it may be that all these conditions, or as many as possible, have had to be provided by the harbour engineer - breakwaters and piers to ensure sheltered water and dredging to give the requisite depth in the entrance channel, approach channels and the berths. Other man-made safety provisions are lighthouses, fog signals, shore-based radar and wireless telephony, pilotage services, towage facilities, with buoys and beacons to mark dredged channels and underwater perils. Safe entrance and good shelter for shipping are such essential characteristics of a port that without them there can be no port at all.

Secondly, the port is the place of contact between land and sea, and it provides services to both hinterland and maritime organization. It is, therefore, a gateway between land and water. One side of the gateway is used by ships, small craft and sometimes aircraft; the other is used by railways, motor lorries and perhaps barges.[1] Through this gateway inland transport and ocean lines meet and intertwine. Its primary

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1 Bown, A. H.: Port Economics, The Dock and Harbour Authority, No. 502, London, 1962, p. 112.

function is to transfer goods (and people) from ocean vessels to land or to inland carriers, and vice versa. Traffic means life and prosperity not only for the port but also for the city and region around it.

The origin and evolution of a port and its ability to attract traffic of any kind are based on a complex of physical and human factors, which may be categorized, but which in each case must be carefully studied.[1]

O'Dell mentions that the whole history of port development is influenced by the facts of the physical background, and the success or otherwise of adapting that background to meet inevitably changing needs. The part played initially and subsequently by physical facts must be given some priority in a geographical investigation.[2]

Among the physical factors, the site is obviously of outstanding significance. Ideally, a port, aside from sufficient space for its operations, should have among its attributes easy entrance, i.e. deep water, a small tidal range, a climate that will not hamper port operations at any time of the year, and easy land communications with the main hinterland. Rarely can all requirements be met, because maritime services may be needed in locations where human considerations outweigh physical. Sites can be modified by man if the need is great enough. For example, crude oil is loaded by means of pipelines in open roadsteads along the Red Sea Coast in the Egyptian territory, and ships have no protection against wind and sea.

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1 Weigend, Guido G.: Elements in Port Geography, Geographical Review, April 1958, p. 186.

2 O'Dell, A. C.: The physical background to port development. Preliminar Report of the Commission on Industrial Ports, Washington, 1952, p. 7.

However, if physical conditions are more or less satisfied, then _regional conditions_ come into operation, i.e. those concerned with the hinterland.

A commercial port is not a mere shelter that affords reliable anchorage and security from a stormy sea. It is a gateway where import and export meet, and from which they radiate in all directions. In this sense no harbour can develop into a commercial port of consequence unless it serves a favourable hinterland which can support a reasonable export and import trade. An ideal hinterland is, therefore, one which produces in certain sectors more than it consumes, and consumes in some other sectors more than it produces or goods which it cannot produce at all. Relatively easy accessibility to and from a hinterland is essential to a port, otherwise its trade would be diverted to rival outlets.

Site and regional conditions being satisfactory, the importance of a port will be reinforced if the _international conditions_ are also favourable. These are mainly under two headings:

(1) Location upon or close to one of the world trade routes; and

(2) Easy and direct communication with other important commercial centres whose local economies are accessible from the port.

The study of the human factor in port development can also be approached systematically. The human factor is paramount in the rise and decline of ports.[1] Economic, political, and social forces can be distinguished, all operating individually or simultaneously in conjunction.

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1 Weigend, Guido G.: Op. cit., p. 187.

Other minor factors which may facilitate the growth and development of a port include availability of man-power and technical skill, adequate supply of fresh water and nearness of suitable material for building quays.

Classification of Ports

The classification of ports is an important matter that enables a study to be made of the fundamental features of the groups to which they belong and assists in determining the mode of operation which is best applicable to the type.

There are several different ways in which classification may be made, so that ports fall into a variety of categories. But generally there will be some predominant characteristic of one or other of the classes which will form an overruling consideration.

Classification of Ports in Response to Physical Conditions

There have been a number of attempts at a classification of ports on the basis of physical characteristics. Vernon-Harcourt gave the following grouping.[1]

(a) Naturally sheltered embankments.

(b) Estuarine harbours.

(c) Harbours with a backwater.

(d) Harbours partly sheltered by nature.

(e) Harbours protected solely by breakwaters.

(f) Harbours with detached breakwaters.

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1 Vernon-Harcourt: Harbours and Docks, 2 Vols., 1885, Vol. 1, p. 67.

It will be noticed that the categories are not mutually exclusive, but owing to the geographical similarity of their sites there is a community of problems in each group. There are obviously some difficulties of interpretation, as for instance in group (a), while for group (b) it would be more satisfactory to read "river ports situated within an estuary".

One can also classify ports according to the nature of operations which take place in them. In this case it is essential to distinguish between regional, industrial and commercial functions and characterise a port by its dominant function. The loading and unloading of merchandise for the use of the hinterland corresponds to the regional function of the port. In this case, the port is only a place of transit. The operations which take place there are the trans-shipment of merchandise from one means of transport into another. The regional function is often the most important.

The trans-shipment of goods which are the raw materials or the manufactured articles of factories established in the port area itself, which is directly accessible to sea-going vessels, corresponds to the industrial function. It would appear to be useful only to consider as participating in the industrial function those factories which are directly accessible to sea-going vessels. Limited by these terms, the industrial function generally resolves itself into a small fraction of the movements of the large port.

It is difficult to measure the importance of the industrial function of a port, because statistics do not usually give the quantities of goods which interest the factories working in the port itself. This industrial or commercial operation only interests, in general, a small fraction of the transit which crosses a large port. It is by comparing the number of workers employed in these factories with the number of workers in the port itself that one is able to take account of the importance of the industrial function.[1]

Merchandise is attracted to a port to become the object of a commercial transaction, for instance, to become available for sale at a public auction. Thus the port fulfils its commercial function. It is difficult to make a simple classification of ports based on their trade in commodities, since most ports trade in a variety of commodities to a greater or lesser degree. Relatively complex classifications, based on the dominance of one or more commodities in the export or import traffic of specific ports are, however, useful tools of comparison. One can see that this classification has nothing definite. It is a useful means of analysing the traffic of a port and of making comparisons, but it does not allow for the arranging of ports in distinct classes. For all merchandise the port is the place where trans-shipment occurs. The industrial or commercial operations which may be undertaken there do not diminish the essential transit functions of the port.

One cannot therefore class ports according to these functions; one could, however, class the merchandise on this basis and, by this means, the traffic.

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1 Delmer, A.: La classification des ports. Report for the International Geographical Congress, Washington, 1952.

A classification of ports by the site factor is the basis for such terms as "river port", "coastal port" or "lake port". World, national or local patterns of human activity yield a classification of ports as international, colonial, national, regional or local. With respect to the port's radius, such classification is based on the extent of its hinterland and foreland.[1]

Another classification of ports can be made according to the importance and the nature of their relations, or connections.[2] There are certain ports which are linked to almost all parts of the world. They are connected with the large maritime world traffic. Other ports are not connected with vast circulation except through the intermediary of a large port of which they are the satellites. They are visited by coasters, but rarely by ships on long voyages. Certain large ports have no hinterlands to support their traffic, but they fulfil a function of redistribution of maritime traffic. They are often to be found at cross-roads of maritime routes, e.g. Aden port.

It is economic activity which provides the widest variety in the nomenclature of ports. The name of the principal commodity handled may be applied, such as petroleum, ore, coal, or fish. What is done with the greater part of the cargo may determine whether the port is industrial, commercial, transit, or trans-shipment. Ports have also been classified

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1 Weigend, Guido G.: Op. cit., p. 190.

2 Delmer, A.: Op. cit.

according to the type of carrier that predominates in their traffic patterns, such as Tramp, Tanker and Liner. The majority of medium-sized and large ports may include among their activities any of the functions which have been mentioned above, but it is not these functions which make them into the ports they are. They participate to a varying degree in the three great divisions of sea trade - the tramp trade, the tanker trade and the liner trade.[1] An analysis in these terms is justified because it is a functional analysis, it will tell us a great deal about ports in relation to their nature and size, and it will tell us what ports do.

Each of these classifications is based on specific criteria which presumably characterize the port according to a predominant function. However, the same port can be put into more than one classification. Thus an ore port may also be a local or a regional port, and a liner port may be composed of an industrial port, a petroleum port and a section where commercial activities predominate, perhaps within a free port or foreign-trade zone. Many ports are, in fact, collections of adjoining ports in a functional sense. A simple classification is impossible, for comparatively few ports perform only one function and the multiplication of functions usually increases as the activity of the port increases.[2]

The geographer in studying ports must have statistics bearing on well-defined unifying factors. Where possible these should be the same, but if not they should be capable of conversion to some common medium.

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1 Morgan, F. W.: Op. cit., p. 78.

2 Morgan, F. W.: Op. cit., p. 70.

Port Statistics

Port statistics usually consist of three separate sections:

(1) concerning transport, i.e. statistics of movement of goods;

(2) concerning traffic, i.e. statistics of movement of ships; and

(3) concerning the structure of the harbour, comprising the technical equipment of the harbour, i.e. length of the quays, number of mobile and other cranes, area of the sheds, etc.

The Statistical Office of the United Nations has, however, since the Second World War, in the "Monthly Bulletin of Statistics", given monthly records on:

(i) International seaborne shipping: entrances and clearances of vessels with cargo in external trade;

(ii) International seaborne shipping: goods loaded and unloaded;

(iii) Coastwise shipping: goods unloaded; and

(iv) Inland waterways traffic: freight net ton-kilometres, goods loaded and unloaded.

These records are, however, not specified for individual ports, but figures for each port are as a rule available in national publications or as unpublished records.

In general the data are separated into two groups, foreign and domestic. In some countries there is a third group, "in transit and trans-shipment".

The term foreign in port statistics applies to traffic between foreign ports and the national port in question. The term domestic applies to different types of traffic and transport: coastwise, lakewise, internal, intraport and local.[1]

Coastwise - this applies to traffic receiving carriage over the sea, viz. the Gulf of Suez, i.e. traffic between the Red Sea ports in the Egyptian territory and Suez Port is termed "coastwise".

Lakewise - this term applies to traffic between, for example, ports on the Great Lakes.

Internal - traffic between a port and a tributary waterway is termed "internal".

Intraport - traffic between the several arms or channels of a port, as at New York, for each of which a separate report is made, is termed "intraport". The receipts and shipments balance and one half of the total represents the net traffic.

Local - movements within the confines of a port, except car ferry, general ferry, and cargoes in transit, are termed "local".

The transit information is in many cases excluded from the printed port statistics, in particular in countries where the transit traffic is of minor importance. The transit traffic consists of two parts, (a) in transit and (b) trans-shipments, which cover the direct transit through a country and the re-export.

The traffic data can be expressed in weight, volume and value.

For the purpose of determining the relative importance of a number of

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1 Svendsen, A. S.: A Note on Port Statistics, Report on Industrial Ports, Washington, 1952.

ports the net tonnage figure[1] of shipping using the port is better than the weight or value of cargo loaded and discharged, for several reasons. It applies to all ports except naval ports and includes all ships which come to a port.[2] It includes all classes of traffic. The net tonnage figure of shipping using a port is the most comprehensive figure for evaluating ports as places concerned, above all, with the coming and going of ships from the sea. It is from this point of view that the ports of the Red Sea will be considered.

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Hinterland and Foreland

The Hinterland

A "hinterland" can be described as organized and developed land space which is connected with a port by means of transport lines, and which receives or ships goods through the port. The word hinterland has been taken over into the English language to denote the land area from and to which the commerce of a port moves.[3] The back country of any port may be restricted by natural conditions.

The hinterland, however, can scarcely be stipulated with exactitude

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1 Net tonnage (B.R.T.): Total cubic contents available for cargo and passenger after deducting space for machinery, stores, fuel, chart-rooms, etc., divided by 100.

2 Morgan, F. W.: Op. cit., p. 17.

3 MacElwee, R. S.: Port Development, 1925, p. 3.

and in the opinion of Sargent, who made a thorough study of seaports and hinterlands, "it is impossible in most cases to define an actual boundary of a hinterland or part of a hinterland".[1] Boerman states that the distribution between the major and the minor port, whether inland or coastal, is frequently explained by reference to the hinterland. It is the hinterland combined with transport links, that gives the key to growth of port trade and development of port studies. No port structure can be understood when not seen together with its "hinterland", this being used not in the sense of a fixed and unchanging territory but as possibly differing according to the commodities handled at different times.[2] Eugene Van Cleef divides the hinterland into three sections: the "Umland", the continuous hinterland, and the discontinuous hinterland. The "umland" involves the area immediately adjacent to the political limits of the city or trade centre. The continuous hinterland extends as far as the satellites; its limits, like those of the "umland", involve an irregular zone at some points reaching beyond the satellites, at other points falling short. Identification of a discontinuous hinterland takes into consideration the fact that some regions are economically closely associated with a primary centre but that the intervening territory has no particular interest for the centre. For example, Columbus, Ohio, is in the discontinuous hinterland of New York City.[3]

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1 Sargent, A. J.: Ports and Harbours, London, 1938, p. 50.

2 Boerman, W. E.: The need for a special examination of particular aspects of Port Geography. Report on Industrial Ports, Washington, 1952.

3 Van Cleef, E.: Hinterland and Umland. Geographical Review, April 1941, pp. 308-311.

Van Cleef states: "The hinterland of a port may be viewed as the area that utilizes the port for both export and import of commodities, services, or ideas. In the absence of political or other arbitrary limitations, the hinterland coincides with the area of the port's ready accessibility." Each commodity has its own hinterland, but the hinterlands of many commodities using a port may coincide. In his emphasis on hinterlands, Van Cleef completely ignores the possibility of a port with certain advantages, e.g. favourable location, lower port charges, handling and freightage costs, being able to compete with another in particular goods.

Morgan states that a port generally has a different hinterland for each commodity which enters into its trade, and has thus an enormous number of hinterlands. The nature of the structure and the areal extent of hinterlands are subject to variations arising from three main factors: the nature of commodities, the mechanism of sea transport, and the influence of political policies. As a result of the interplay of these factors hinterlands show variations, not merely in extent, but also in complexity.[1]

The French school, led by Amphoux,[2] go to the other extreme, believing that the hinterland will be found to have a very secondary role because of its restricted relationship to the port. They stress that the hinterland emerges as an important factor only in the transportation of bulk products

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1 Morgan, F. W.: Op. cit., p. 111.

2 Amphoux: "<u>Géographie portuaire et économie portuaire</u>", Vol. 7, No. 70.

and the choice of a port of entry for such products depends on the nearness of the market and the ease and relatively low cost of land transportation. With the utilisation of regular maritime routes and the increase in the size of merchant ships, Amphoux argues that there has been an increasingly greater concentration of shipping in fewer and larger ports. Consequently, the significance of the hinterland in relation to the port has rapidly declined.

Weigend, a leading figure in this field, notes that: "Neither hinterland nor foreland can be delimited with precision. The hinterland is not merely an area which ports serve, nor can it be considered the key to port development. The hinterland represents organised and developed landscape which is connected with one or several ports, which in turn are points of contact between land and maritime space and provide services for both hinterland and maritime organisation."[1]

So the definitions of both Weigend and Amphoux are of contemporary value, for they initially deal with the importance of the hinterland. However, neither attempts to analyse the various aspects of the hinterland. It might thus be added: the hinterland of a port may be regarded as a market, an area upon which the economic and commercial existence of the port depends. It must always be kept in mind that the "hinterland" may be different for each commodity which is or can be handled in the port or is produced or required, and that a hinterland is never unchangeable.[2]

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1 Weigend, Guido G.: "Some elements in the study of port geography". Geographical Review, Vol. 43 (1958), pp. 191-192.

2 Boerman, W. E.: Op. cit., p. 5.

The Foreland[1]

As an equivalent to the term hinterland denoting the land areas served by the port, the foreland has been suggested to include all other areas which trade with an individual port, and with which the port is connected by ocean carriers.[2]

The French school, led by Amphoux, has emphasized the relationship between the port and its maritime connections with the growing importance of liners and the increasing size of vessels.[3]

However, the study of a foreland can be approached either in terms of the port's shipping connections as expressed by a number of shipping lines, the number of departures, or net tonnage moving in certain directions, or in terms of the origin and destination of cargo moving through the port.

Three main aspects may be noted in the study of the foreland. Such areas will be two-fold, viz. the coastwise foreland and the overseas foreland. The latter is the more readily distinguishable and its effects are more easily calculated, since it comprises a separate physical entity. The effects and influence of the coastwise foreland are much harder to assess for this involves a thorough knowledge of the import and export traffic of other surrounding ports, and the sources and destinations of this traffic so as to establish the spheres of influence of their market-hinterlands in relation to the individual port being studied.

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1 The foreland of a port is that area to which the exports are sent and from which the imports are derived.

2 Weigend, Guido G.: Op. cit.

3 Amphoux: Op. cit.

Secondly, the influence of the foreland is two-fold. In the first place in its effect through a simple direct transaction between the foreland and the port being studied; in the second place, there is an effect by indirect means through the significance and competition of neighbouring ports and their market-hinterlands. The latter may have larger, but not necessarily adjoining, hinterlands, better port facilities, services, etc., and so attract goods to and from the foreland which might otherwise have entered via another port with its own hinterland but with fewer facilities. Such is the case in Suez, for the ports of Alexandria and Port Said attract goods to and from the Suez hinterland. But, as might be expected, this influence is extremely difficult to assess, for it involves the study of factors far beyond the scope of this dissertation.

Lastly, it is suggested that the foreland is more of a "passive" partner in the economy of the port, for the latter is not simply dependent upon one geographically distinct foreland (i.e. one individual country), except in unusual circumstances, but upon many; and thus there is little influential and direct effect of any one particular foreland upon the port. This is in direct contrast to the market-hinterland, which plays an "active" role in the port's economy by directly influencing the flow of commodities; thus the port is unusually dependent upon the hinterland, which is for most commodities delimited by the hinterlands of adjoining ports.

The foreland of one port thus becomes the hinterland of another or of a group of others, if traffic flow is considered from the opposite shore.[1]

Whatever classification is devised and in whatever detail, the basic concept of "foreland" remains valid and useful in Port Geography.

Maritime Space

Between port and foreland lies maritime space. This space has been organized, not for itself, but as a reflection of economic activity in adjacent land areas. Ships ply the waters of some parts of this space more regularly and with greater frequency than others. They thereby create a pattern of sea lanes that become avenues of traffic; these in turn attract traffic from adjacent land areas and promote economic progress. Ports on or near these avenues have an advantage over ports in "backwaters". Port competition is keenest in regions of converging sea lanes.

Blockage of an important ocean highway has repercussions on the economic well-being of all states participating directly or indirectly in ocean traffic. The closure of Suez Canal in 1956-57 is an outstanding example, because Europe depended on the Middle East for most of its crude oil; even the United States imported oil from that area. However, when this vital ocean highway was severed, the oil movements of the world had

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1 Weigend, Guido G.: The problem of hinterland and foreland. Economic Geography, Vol. 32 (1956), p. 16.

to be temporarily readjusted, and tankers began to move eastward from the United States, and also around the Cape of Good Hope, in an attempt to fill the fuel gap in Europe.

Organisation of the Thesis

Perhaps the most common approach in port studies is from a statistical viewpoint. It is necessary ultimately to turn to a full analysis of geographical conditions upon which economic, social and cultural influences, which shape port characteristics, depend, and from a review of all the available evidence to discover which of these operate in a particular case. In this way the growth of the ports is followed through the continued and often changing evolution of the local natural advantages.

The investigation will have the following parts, in order to serve most effectively the aim and content of the study. Firstly, an <u>analysis of the physical setting</u>, to establish the geographical background to the growth of port facilities and to explain the natural resources available locally for trade. Physical geography is considered only in so far as it has influenced the development of the ports, and not systematically on its own account.

The <u>historical background of trade</u> in the Red Sea is divided into two chapters, the first part dealing with ancient trade through the Red Sea up to the opening of Suez Canal in 1869; the second part deals with trade up to 1960. In a detailed study it must be assumed that it is not possible fully to understand the complexities of port development without considering historical development under the widest range of indigenous and external influences that can be assembled. These two chapters will include a comparative study of the local, inter-regional and international transit trade via the Suez Canal and the Red Sea.

Thirdly, a causal study of economic activity must be the aim of the economic geographer studying ports. Thus an economic study of the hinterland, i.e. its potentialities in relation to agriculture or industry, the presence of raw materials, etc., is necessary. An assessment of the comparative status of individual ports and their role in the economic life of the area concerned must also be made. The study of a port town is essentially two-sided, as one has to study the town as an urban centre and as a port for handling trade.

Lastly, the study is planned to classify the ports of the Red Sea according to the functions which they perform. In some instances classifications have been developed in terms of attributes, as, for example, classification of ports according to their sites. In other instances, on the assumption that differences are relative and not absolute, classifications have been developed in terms of variables. Examples of such classifications include those based on size of population and on functions.

However, the complications in this respect are so great that it is impossible to establish a single satisfying classification. Under the different points of view from which they can be considered, ports have characteristics by which they may be distinguished, and which are emphasized by their geographical positions. Finally, a brief epilogue is intended to accentuate the main conclusions of the thesis, with reference to some of the general principles of port studies and to point out the features peculiar to Red Sea ports, with a comparison of ports in terms of handling equipment, type of harbour, size and character of towns.

Chapter I

PHYSIOGRAPHY

The physical setting of the Red Sea - its character as a complex rift valley - evolution through geological time - the physiographic divisions of the shorelands and the Red Sea basin - consideration of distinctive coastal and marine land-forms: raised beaches, coral formations, natural inlets.

PHYSIOGRAPHY

GEOGRAPHICAL SETTING OF THE RED SEA

The Red Sea lies between the parallels of 30° and 12° N., and between the meridians 32° and 44° E. It is about 1,200 miles long from Suez to Ras Bab-al-Mandeb; its greatest width is 190 miles in the southern part near Massawa and it narrows to about 14 miles in Bab-al-Mandeb.

On the African side a ridge some 20-30 miles inland runs roughly parallel to the coast for most of its length. It is about 3,000 feet high north of 23½° N.; from here to about 16° N. it remains over 3,000 feet, with considerable stretches rising to above 4,000 feet, but there is a gap in the barrier near Tokar breached by the Baraka valley at about 18° N. South of 16° N. the mountains of Abyssinia are above 6,000 feet. From 15° N. the eastern limit of the main mountain mass runs almost due south, so that Bab-al-Mandeb is nearly 200 miles from it. In the middle of this last 300-mile stretch of coast there is about 100 miles of ridge, the general level of which is over 3,000 feet, 20 or 30 miles inland. From Suez to about 16° N., to the west of the narrow mountain barrier, there is desert which slopes down gradually from the barrier to the Nile valley.[1]

On the Arabian side, there is also a barrier of high ground which is a good deal broader than on the African side. It exceeds 4,500 feet from the north end of the Gulf of 'Aqaba to about 27° N.; from here to

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1 Western Arabia and the Red Sea, Geographical Handbook, Naval Intelligence Division, 1946, p. 58.

Jidda it is mostly somewhat above 3,000 feet, but at some points it is as low as 2,000 feet. South of Jidda it is over 6,000 feet. The coastal plain below 3,000 feet is 20-60 miles wide, but is wider in the Hejaz in the north where there are some breaks in the barrier.[1]

At the northern end of the Red Sea the high ground of Sinai peninsula lies between the Gulfs of Suez and 'Aqaba, rising generally above 3,000 feet at a distance of 20 or 30 miles from the coasts and above 8,000 feet in places further inland.[2]

The Red Sea Rift or Trough-Fault

The Red Sea appears as a belt of narrow, straight-sided troughs, and it is not surprising that this striking feature is assumed to be due to the sinking of a strip of the earth's crust as a rift valley between parallel faults whose orientation is identical with that of the existing Arabian and north-east African shore lines.

Suess was the first to bring this suggestion into prominence and to assign to it a fundamental significance in world tectonics.[3] Gregory accepted and amplified the conception of Suess and postulated the existence of a series of connected rift valleys extending from the Jordan valley southward to Lake Nyasa in Africa by way of the Gulf of 'Aqaba

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1 Western Arabia and the Red Sea, Geographical Handbook, Naval Intelligence Division, 1946, p. 58.

2 See the Physical Maps of the Red Sea, Figs. 2-12.

3 Suess, E.: Das Anlitz der Erde, Leipzig, 1909.

and the Red Sea.[1]

Ball denies that either the Nile valley or the Gulf of Suez are other than erosional features.[2] He claims that the present extent of the Red Sea has been caused by a great general subsidence of the land, and not by trough-faulting.

Barron and Hume, on the other hand, appear to hold that the Red Sea is a trough-fault feature.[3] Gregory believes that the Red Sea occupies a tectonic depression, bounded by powerful faults, formed at intervals between the oligocene and the present time.

Crossland explains that the Red Sea was broken up by the sinking in of a long strip of the earth's crust and it is part of the Great Rift valley, which extends from Jordan to Tanganyika. Part of this valley was filled by sea water and became the Red Sea.[4]

The Geographical Handbook of Western Arabia and the Red Sea explains that the Gulf of 'Aqaba and the Red Sea lie in rifts which are part of a ramifying system, extending from southern Syria to Tanganyika Territory. The deep Gulf of 'Aqaba lies in the lower part of the Syro-Palestinian rift, while the deep Red Sea, and its shallow northern continuation the

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1 Gregory, J. W.: The Great Rift Valley and the Geology of East Africa, London, 1921.

2 Ball, J.: The Geography and Geology of South Eastern Egypt, Cairo, 1912.

3 Barron, T. & Hume: Notes on the Geology of the Eastern Desert of Egypt, London, 1912.

4 Crossland, C.: Desert and Water Gardens of the Red Sea, 1913, p. 154.

Gulf of Suez, lie in the Red Sea rift or 'Eritrean trough-fault', one of the most important clearly-defined members of the whole system.

Lamare, as a result of his geological studies in Yemen in the south-eastern part of the Red Sea littoral, mentioned the cause of the Red Sea trough as being "a succession or alternation of folding and tension".[1]

Therefore, it appears that the Red Sea depression has been considered by previous workers to be (1) a graben, with downfaulted centre block, resulting from compressive forces, or (2) a paar, or depression caused by the moving apart of two crustal blocks, and thus essentially a tensional feature. It is to the second hypothesis that Swartz and Arden subscribe. It is suggested that movement took place between four blocks: Block I, north-east Africa west of Suez-Red Sea and north of the Ethiopian rift valley; Block II, the Arabian peninsula; Block III, the Sinai peninsula; and Block IV, the "Horn of Africa" east of the rift valleys. All of the structural features of the region may be related to various movements between these blocks, including the Gulf of Aden, the rift valleys of Ethiopia, the Dead Sea depression, and the mountains of the Levant.[2]

The following physiographic features must be taken into account in any explanation of the history of the Red Sea basin.

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1 Lamare, Pierre: Structure Géologique de l'Arabie, Paris, 1936.

2 Swartz, D. & D. Arden: Geologic History of the Red Sea Area. Bulletin of the American Association of Petroleum Geologists, 1960, Vol. 44, No. 10, p. 1621.

1. The Red Sea is a tectonic trough about 1,200 miles long, attaining a maximum breadth of 250 miles. At its northern end it divides into two branches, the Gulf of Sues and the Gulf of 'Aqaba.

2. Except at the south-west, the Red Sea is surrounded by the highlands of the Arabo-Nubian shield. Along both coasts mountains run parallel to the Sea, each with a steep face to seaward and a gentler slope away from the trough.

3. In the south-west the volcanic region of Ethiopia is crossed by a north-eastward trending rift which leads into a low triangular flat land bordering the Red Sea opposite the south-western corner of Yemen. The flat land is a unique feature in the region, and because of its physiographic expression has been called the "funnel". It ranges in elevation from 380 feet below sea-level to 1,000 feet above. It is covered by lava flows and contains numerous craters; near the coast a band of Jurassic hills rises through the lava.[1]

4. The most striking and obvious physiographic feature is the perfect fit of the two shores of the Red Sea. If the Arabian peninsula were moved a little south and then rotated southwest, southwestern Yemen would fit into the "funnel"; and opposing bays and promontories of the Red Sea would match. A similar match between opposing Gulf of Aden coasts would occur if Somaliland were rotated slightly north-east.[2]

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1 Swartz & Arden: Op. cit., p. 1622.

2 Ibid.

GEOLOGICAL EVOLUTION OF THE RED SEA: GENESIS OF THE RIFT

Swartz and Arden[1] show how most of the geologic features of the Red Sea area can be fitted properly into a logical sequence of events. A brief recapitulation shows that the most important earth movements of the Mesozoic were epeirogenic. Faulting occurred in the northern regions, as evidenced by Jurassic and Cretaceous volcanism, and can also be observed in the south as north-south-trending "East African" faults. Some volcanism is associated with these fault movements in the "funnel" of Ethiopia and formerly adjacent Yemen.

Compressional stress developed in the northern regions at the end of lower Eocene time, while tensional stresses developed in the south. The result of these stresses caused the opening of the Gulf of Suez-Red Sea paar, and instigated folding movements in the eastern Mediterranean countries. Strong northwest-southeast faults - "Red Sea" faults - developed in the southern regions, where they were accompanied by basalt extrusions in the "funnel" of Ethiopia. Folding and faulting of the northern region were accompanied by one or more periods of epeirogenic uplift which caused widespread unconformities at (1) the end of the lower Eocene, (2) the end of the middle Eocene, and (3) the Oligocene. The net effect was that as the Red Sea paar gradually widened and deepened, its surrounding areas were increasingly elevated. By Oligocene time volcanism occurred in the Gulf of Suez region.

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1 Swartz, D. & D. Arden: Geologic History of the Red Sea Area. <u>Bulletin of the American Association of Petroleum Geologists</u>, 1960, Vol. 44, No. 10, pp. 1621-1637.

The tectonics within the paar are not completely understood, but can be explained in several ways. In general, it is believed that the initial separation was accompanied by much block slumping along the edges, particularly in the northern regions of the Red Sea and in the Gulf of Suez; slumping became less important farther southward, the reason being that strong compressional and tensional stresses were active in the Gulf of Suez region, whereas only tensional stresses were active farther south. Hence, the initial movement was not simply a matter of gradual separation, but of opening and closing which haphazardly elevated and depressed the slump blocks. This early stage of development in the Gulf of Suez was an ideal time for the development of vulcanism, but this did not develop in the region until the following epoch.

In the funnel area of Ethiopia the first stages of separation were accompanied by basalt flows. This was an area of tensional stress only. Because early Tertiary vulcanism in the form of extensive surface flows is lacking throughout the length of the Red Sea, it must be concluded that the internal forces deep within the earth were not sufficient to force flows above a certain level which, in this area, was below the land surface. Thus, it is visualized that as the paar widened, viscous material rose along the widening fracture and solidified. This surface may or may not have been covered by subsequent marine or littoral deposits. Later movements caused by the renewed drifting apart of the blocks would create a new rupture which would become partly or wholly filled by rising magma. The previously solidified area now became the site of large-scale block faulting where, under certain conditions, reefs could develop along the high parts of the tilted blocks. These faults may have been caused by adjustments to epeirogenic uplift, or as compensatory movements caused by the relief of old stresses. This process was presumably repeated many times during the development of the Red Sea depression, and explains how the separation of large blocks can be accomplished by the creation of a self-healing rupture.[1]

Whatever the mechanics of the origin of the Red Sea may be, the fact remains that normal faults control almost the entirety of its coasts. In many areas there occur several step faults affecting different formations, a phenomenon which may suggest that the formation of these grabens must have continued for a long time after their inception in lower Tertiary time.[2]

PHYSIOGRAPHY OF THE COASTAL BELT

It is convenient to divide the coastal belt of the Red Sea basin into four major parts. These are the Gulfs of Suez and 'Aqaba, and the African and Arabian coasts.

The Gulf of Suez

The Gulf of Suez stretches between Latitudes 29°58' N. and 27°49' N. (Fig. 2). It extends about 175 miles south-south-eastward from the town

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1 Swartz, D. & D. Arden: Op. cit.

2 Said, R.: The Geology of Egypt, 1962, p. 35.

of Suez to the south-eastern extremity of Shadwan Island. Southward of Suez bay it varies in width from about 10 to 25 miles. The Gulf may be viewed as a great elongated depression separating the massifs of central Sinai from those forming the backbone of the Eastern Egyptian Desert.[1] The land on either side is chiefly made up of rocks of Miocene and younger age.[2] The relief is broken by elongated ridges, composed of Eocene or Cretaceous strata with occasional outcrops of basement rocks. Outside the depression the rocks forming the high ranges are crystalline rocks in the south followed to the north by Paleozoic to Cenozoic sediments.[2] Both sides of the Gulf are bordered by coral reefs.

The western coast of the Gulf of Suez is in general low and sandy, the coastal plain is arid, varying from 2 to 20 miles in width, extending inland to the hills and mountains which form the eastern rim of the Egyptian desert. West of these coastal ranges the desert plateau slopes away to the Nile valley between the latitudes of Cairo and Asyut.[3] The watershed between the Gulf and the Nile follows a winding course, generally nearer the Nile in the north, but approaching the Gulf in the south, so that the southern wadis of the coastal belt are shorter and steeper than those nearer the head of the Gulf.[4] In two places broad gaps of

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1 Said, R.: The Geology of Egypt, 1962, p. 152.

2 See map of the geology of the Red Sea basin (Fig. 1).

3 Western Arabia and the Red Sea, Geographical Handbook, Naval Intelligence Division, 1946, p. 83.

4 See physical map of the Red Sea (Fig. 2).

relatively low country lead inland from the coast to the Nile valley. Elsewhere the much eroded but still rugged ranges, chiefly of granite or schist, with limestone in the north, buttress the desert plateau as a barrier between the Gulf and the Nile.[1]

This stretch of coast is almost without economic activity. Communications are still poor, for access to the Nile valley, where the economic life of Egypt is concentrated.

Along this stretch of coast there are few anchorages, only where mineral wealth is being exploited, as at the oilfield on Ras Gharib, and near the limestone quarries of Jebel 'Ataqa.

Suez bay, at the head of the Gulf of Suez, extends 6 miles southward to Cape Adabiya. The north-west shore is low and sandy. In the south, where reefs and banks fringe the coast, the limestone hills of Jebel 'Ataqa rise abruptly from the sea, trending north-west and reaching a height of 2,857 feet 10 miles west of Suez. Suez lies on the north shore of Suez bay, on the flat sandy desert plain, north-west of the mouth of Suez bay.

The Eastern Coast of the Gulf is formed by the west coast of Sinai, the general trend of which is north-north-west to south-south-east (the direction of the Eritrean series of faults).

The coastal plain varies in width from a narrow central strip hemmed in by the coast range to broad belts 15 to 20 miles wide at the northern

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1 Western Arabia and the Red Sea: Op. cit.

and southern ends.[1] In the north, between the escarpment of the central limestone highlands and the Gulf, the plain is undulating and sandy, broken by wadis that have cut through the escarpment from the El Tih plateau. In most of these wadis springs and wells yield good supplies of water, although much of it is brackish.

The gulf coast is bordered for 20 miles from the Wadi Feiran south, almost as far as the village of Tor, by a coast range consisting of two parallel ridges, the westernmost of which faces the shore with abrupt cliffs of red granite. Wadi Feiran is the largest wadi in this section of the coast. Between the coast range and the Sinai Mountains is the northern end of the low, sandy plain of Qa'. Averaging 15 to 20 miles wide, this plain extends 80 miles to Ras (Cape) Muhammad at the tip of the peninsula. South of Tor it forms the coastal plain.[2]

Along the coast, there are small capes which afford some shelter for vessels at anchor, i.e. Abu Zenima, which is about 70 miles south of Suez. It is the port of manganese, which is found nearby at Umm Bogma. The port is considered the best on either side of the Gulf.[3] Coral reefs are, however, more in evidence here than on the opposite side of the Gulf. In the Strait of Jubal, the name given to the south-eastern end of the Gulf of Suez (Fig. 3), and in the Gulf generally, there are outlying patches.

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1 Platt, R. R. & M. Hefny: Egypt - A Compendium, 1958, p. 99

2 Ibid., p. 100.

3 For detailed study see "The settlement of the Red Sea Coast in Egypt" by M. Seteha (M.A. Thesis in Alexandria University, in Arabic), 1960.

The Gulf of 'Aqaba

The Gulf of 'Aqaba resembles that of Suez in filling the end of a rift and in being bounded by faults, but it differs from the shallow Gulf of Suez in being deep and almost without reefs. At its head there is a shallow step, then an abrupt descent to about 2,160 feet; 4,600 feet is reached half-way down the Gulf, while the floor shallows again to 2,400 feet abreast of Ras Fartak (Fig. 4).[1]

Between latitudes 29°33' N. and 28°05' N. it is 110 miles long from north-north-east to south-south-west, the breadth varying between 7 and 17 miles. Mountain ridges leave only a narrow strip of coastal lowland on both sides. The ridges continue beyond the head of the Gulf, enclosing Wadi al-'Araba, to the Dead Sea, 1,290 feet below the level of the Mediterranean.[2] In many places the mountains rise like walls, and passage over them is very difficult. Anchorages are few, and most of them are exposed to southerly winds. Native shipping makes little use of the Gulf, partly because the coast is barren and desolate.

The western coast of 'Aqaba Gulf

All along the Gulf the Sinai Mountains present a precipitous wall, leaving nowhere more than a narrow passageway and in places none at all. Only three wadis break through the mountain barrier to this coast: Chowi, Watir, and Dahab, from north to south. The scarcity of mineral resources, fresh water and of inlets for anchorage, and the generally rough sea under

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1 Western Arabia and the Red Sea: Op. cit., p. 91.

2 Ibid.

the prevailing northerly winds add to the desolateness of the region.

The eastern coast of 'Aqaba Gulf

The broad coastal lowland along the head of the 'Aqaba Gulf joins the narrow strip along the east side of the Gulf, forming a long promontory less than 650 feet high. This ends in a double prong, with the rounded cape of Ras Fartak on the north and Ras Kasba on the south at the entrance to the Gulf. Mountains, seamed with deep or shallow wadis, continue close to the coast along the northern part of the Gulf.[1] South of Bir Marsha the mountains rise steeply from the sea, and the coastal strip is crossed obliquely by wadis draining south-westwards. On the coast of the Gulf there is little of interest. Sherm Dhaba and Sherm Mujawan, two small coves 12 and 17 miles north of Ras Fartak, provide anchorage for small vessels. Lack of water and minerals are two important factors which make settlements turn their backs on this poor coast.

East of the Gulf of 'Aqaba, two important watersheds lie roughly parallel to one another and to the Gulf; (i) immediately behind the coastal lowlands the ridge of Al Farwa separates the wadis which cut westward through the coastal ridge to the Gulf, from those which drain southwards to the Red Sea east of Ras Fartak, the chief of the latter wadis being Wadi al Abyadh, which in its lower reaches broadens and is called Wadi al Efil; (ii) the ridge of Al Mu'affara, dividing the valleys running south to the Red Sea from those running inland.[2]

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1 Western Arabia and the Red Sea: Op. cit., p. 93.

2 Ibid., p. 40.

The Strait of Tirān, between Ras Nuzrani and Tirān Island, is 4 miles wide at its narrowest and full of reefs. Tirān Island, irregular in shape and about 7½ miles long from north to south, lies in the middle of the entrance of the Gulf of 'Aqaba, forming the east side of the strait. Sanafir Island is 2 miles east of Tirān. These islands are under Egyptian control.[1]

The African Coast of the Red Sea

The coast of Egypt: South of the strait of Jubal, Egypt has a coast-line of over 330 miles on the Red Sea between the points 27°20' N., 33°42' E., and 23°09' N., 35°35' E. Throughout its length the Red Sea hills rise from a narrow coastal plain, carrying the watershed between the Nile and the sea at varying distances (20-50 miles) inland; these hills are much broken on the seaward side by short steep wadis, and are composed mainly of granites, schists, and other crystalline rocks. The Miocene limestones and gypseous beds which border the hills on the seaward side die out at Ras Benas. The general slope of the coastal plain is considerably steeper than the slope down to the Nile valley on the other side of hills, hence the watershed lies much nearer to the sea than to the Nile.[2]

The minerals in the igneous rocks of the Red Sea Mountains and the value of the rocks themselves for building and sculpture have attracted

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1 See Fig. 3.

2 Western Arabia and the Red Sea: Op. cit., p. 99.

exploitation since the earliest times.[1] Mineral deposits, gold, copper, iron and phosphates exist in the Red Sea hills and on the coastal plain, some of them exploited in antiquity, but the only modern workings are the phosphate mines near Safaga and Quseir (Fig. 5).

Reefs border the coast everywhere except at a few favoured harbours, making it dangerous for shipping. Apart from Hurghada, Port Safaga, and Quseir, there are very few permanent settlements near the coast. The strip between the mountains and the sea is a desert plain with rainfall so slight as to be negligible. Thus it is difficult to maintain centres of population, and most of the inhabitants of this part of the Red Sea basin are semi-nomadic Arabs.[2]

<u>The coast of the Sudan</u> stretches from Bir Shalatein to Ras Kasar (23°09' N., 35°35' E. to 18°00' N., 38°32' E.), a distance of over 420 miles. The coast is more complex in outline than that of Egypt, and in addition it contains nearly all of the twenty-six inlets listed as true sherms on the African side of the Red Sea. The whole coast is studded with reefs and islets, between which and the mainland is a protected channel extending southwards from Rawāya (Ras Abu Shagara), half a mile wide in the north, but considerably wider south of Suākin (Fig. 6). Gaps in the reefs give entrance to the channel from seaward, those off Port Sudan and Suākin being important factors in the location of those

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1 Platt, R. R. & M. Hefny: <u>Op. cit</u>., p. 85.

2 For details see Seteha, M.: <u>Op. cit</u>.

ports. The coast is generally low and sandy, backed by a plain which varies from 8 to 20 miles in width and behind which lie rocky mountain ranges, the high eastern rim of the Nubian desert, where several summits exceed 7,000 feet. The coastal belt may be divided into four roughly parallel north-south strips. The seaward fringe is impregnated with salt, and contains salt pans devoid of vegetation; occasionally mangroves line the water's edge. About a mile inland is a belt of hard sand dunes, and behind that a zone of coarse hard sand with fine gravel, overlaid in places with soft sand which occasionally forms dunes. The last strip is the stony belt adjoining the foothills, bare of vegetation except in the wadis.[1]

So far no sediments older than 'Plio-Pleistocene', by analogy with those of the southern part of the Gulf of Suez in Egypt, have been found along the coastal strip of the Sudan. These Plio-Pleistocene beds are of limestone, often shelly or coralline, shales, marls, clays, grifts, conglomerates, and gypsum beds. They are overlain by recent (raised) coral reef, and near the foothills by thick and very coarse angular river-terrace deposits.[2]

However, the coast line is almost featureless except that it is broken north of Port Sudan by small hills of limestone sometimes with gypsum, among which the most notable is Saghum some 50 miles south of Muhammad Qōl.[3]

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1 Western Arabia and the Red Sea: Op. cit., p. 107.

2 Andrew, G.: Geology of the Sudan, in Agriculture in the Sudan, (Edited by J. D. Tothill), London, 1952, p. 105.

3 Grabham, G. W.: The physical setting of the Sudan, The Anglo-Egyptian Sudan from Within, 1935, p. 273.

Several large Khors carry the drainage from the Red Sea hills to the coastal plain. Torrential floods may occasionally reach the Red Sea but the water is usually absorbed by the sediments of the plain.[1] These, especially in the north where rainfall is slight, carry little silt and, splitting into many channels on leaving the foothills, lose themselves in the sand of the coastal plain. But in the south, with heavier rainfall, there are several longer watercourses, such as the Arba'āt and the Baraka, which rise well behind the mountains, break through the range, and reach the sea through deltas. These, especially the Baraka, bring down much silt, which is spread out over the plain when the rivers flood.

The coastal plain north of Port Sudan has few settlements and little cultivation, but south of Port Sudan rainfall increases and there is a good deal of cultivation. Economically, the Red Sea coast of the Sudan is important for the cotton produced in the Tokar district, and for salt which is extracted from some of the lagoons, i.e. south of Port Sudan. Mineral wealth is known to exist along the coast in the mountains, but mining is not well developed. Thus in future the exploitation of minerals along the coast may help in the development of new ports, which should serve these minerals as is the case in some of the Egyptian ports, and this will assist the increase of settlement in these areas.

The coast of Eritrea: in the north-east Eritrea touches the Red Sea for nearly 425 miles between Ras Kasar, in about latitude 18° N., and

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1 Hebbert, H. E.: The Port Sudan Water Supply, S.N.R., Vol. XVIII, 1935, Part I, p. 91.

Ras Dumeira to the south-east (Figs. 7 & 8). Along this coast there are two ports, Massawa Port (Lat. 15°37' N., Long. 39°28' E.) and Assab Port (Lat. 13°00' N., Long. 42°44' E.).

The coastal area is bounded on the east by the Red Sea, on the west by the main hill massif, to the north by the Sudan and to the south by French Somaliland.

The area is naturally divided into three zones approximately parallel to the coast: the shore, the coastal and sub-coastal plains and the hill massif with its associated stony pediments. These basic divisions are particularly clear to the north of 15°45' N., whereas further south the pattern is more complex, due to the presence of a sub-coastal range and the approach of the massif to the coast.

The shore consists largely of raised quaternary coral reefs often from a low cliff up to 5 feet (1.5 m.) in height along the beach, and locally an underwater shelf.[1] The exact width of these reefs is difficult to ascertain as their inshore edge is normally overlaid by a sand mantle extending from the sandy coastal plains, but at no point are they seen to extend for much over 1 mile (1.6 Km.) from the sea. A characteristic feature of these coral areas is the presence of white dunes, along the shore close to the sea, consisting of minute sea-washed coral fragments.[2]

At a few isolated localities within this coral section of the coast

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1 Dainelli, G.: <u>Geologia dell'Africa Orientale</u>, Rome, 1943.

2 <u>Ibid</u>.

there are small bays of which the entrances are partially blocked by contemporary coral reefs; these bays provide many good harbours such as Massawa Port and Assab Port. In the south the shore mainly consists of salt flats, periodically flooded either by rain or by the sea. The salt flats are frequently separated from the sea by a narrow sandy belt of soft low dunes extending up to about 200 yards (180 m.) in width.

The coastal plain averages 15-20 miles (24-32 Km.) in width and consists of a vast deposit of mixed sandy and stony alluvium derived from the ancient basement massif which lies to the west. The present situation on the plains is a complex mosaic of basement pediments, stone mantle areas produced by deflation of mixed alluvial deposits, consolidated sands appearing as plains and dune remnants, and loose sand occurring either as a mantle of variable depth or in the form of mobile dunes.[1] Northward from Massawa, the country for many miles from the sea is covered by an accumulation of pebbles and boulders of metamorphic rocks and trop. From the quantity of boulders and pebbles, and the scarcity of corals and shells, it appears that this plain has not been formed by the sea, but is a deposit from the wash of rain and floods from the hills.[2] The coastal plain is interrupted between the main hill mass and the coast by a broken line of isolated limestone hills running approximately parallel to and generally less than 10 miles (18 Km.) from the coast line. These hills

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1 Hemming, C. F.: The coastal area of Northern Eritrea; The Journal of Ecology, Vol. 49, 1961, p. 58.

2 Blandford, W. T.: Geology of Abyssinia, London, 1870, pp. 105-115.

are the dissected remnants of a more extensive Pliocene deposit.[1]

In the area west of Massawa there is an intermediate range of hills, so that there is also a sub-coastal plain centred about 23 miles (37 Km.) from the coast and lying at an approximate altitude of 1,000 ft. (300 m.). Between this sub-coastal plain and Massawa there is a wide area of rough stony country consisting of the dissected remnants of alluvial gravel banks, with some small mounds and banks of rotted lava. In these areas of rotted lava the soils are very variable in colour.

<u>The third zone</u> is the hill mass which is composed of ancient rocks of the basement complex, principally quartz, gneisses and schists. This region is unsurpassed in its wild ruggedness and chaotic topography, its eastern slopes being the Pendici Orientali of Italian geographers.[2] Near Massawa the land rises steeply from the coastal plain to the level of 3,035 ft. (at Ghedem, S. by E. of Massawa), and the country further west attains the height of 8,760 ft.[3]

Contrasting sharply with the coastal plain and the Asmara plateau is the topography lying between Massawa and Asmara, consisting of a maze of precipitous hills and deep tortuous ravines. This zone presents a formidable barrier to communications between the interior and the coastal zone. An idea of the difficult territory can be shown from the

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1 Hemming, C. F.: <u>Op. cit</u>.

2 Abul-Haggag, Y.: <u>A Contribution to the Physiography of Northern Ethiopia</u>, London, 1961, p. 101.

3 Gregory, J. W.: <u>The Rift Valley and Geology of East Africa</u>, London, 1921, p. 329.

circuitous route which the road and railway between Massawa and Asmara are forced to climb up the slopes in an amazing succession of zigzags, covering the distance between the two localities - less than 70 Kilometres from point to point - in 120 Kilometres. This zone is a belt which varies from place to place but is rarely less than 30 Kilometres in width. West of the Gulf of Zula the width generally is about 50 Kilometres, while the belt is even more extensive in the north.[1] Storms on the mountains cause the wadis to flow rapidly for short periods. These wadis are deeply incised into the plains and their flood waters seldom reach the sea. The water is gradually absorbed by the sandy substratum and in the lower reaches the rivers break up into numerous small streams watering extensive areas which are used for cultivation and as water supply for both Massawa and Assab. The coastal plains are crossed by about twenty wadis, which vary greatly in size from small ones flowing for an hour or two at a time to wide ones deeply incised into the plains. Most of these wadis do not flow as far as the sea, but are largely absorbed by the plain and finally cease to have any definite watercourse.[2] The most important wadis are the Wadi Falcat, Karora, Hum, Abdibabo, Misho, Wakiro, Desset, and Lebca. Agriculture in the coastal lowlands depends on the floods caused by summer rain in the highlands. Of economic importance in the coastal zone are the fishing and salt industries, the former carried on almost entirely by Arabs. Salt extraction from lagoons

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1 Abul-Haggag, Y.: _Op. cit._

2 Hemming, C. F.: _Op. cit._

at Massawa, Assab, and Ouachiro is the most important mineral industry in the maritime zone.

Dahlak Archipelago, with its reefs and banks, extends for nearly 200 miles parallel to the coast of Eritrea. The islands are mainly of coral, Dahlak being the largest island. The north and west coasts of the island are deeply indented, and contain most of the settlements. The chief village is Dahlak Kabir, on a small bay on the south-west coast, round a few good wells. Limestone is quarried in these islands for building in Massawa. None of the other islands is of special significance, because of their lack of water.

The Arabian Coast of the Red Sea

The coastal zone on the Arabian side differs from that on the African side in several respects. One is that the coast itself is everywhere low and flat, with no headlands or cliffs of any height. Further, the coastal plain is generally wider than on the African side, extending as a continuous strip for the entire length of the sea. Thirdly, the mountain rampart, compared with the African side, rises to higher summits latitude for latitude behind most sections of the Arabian coast and has fewer gaps leading to the interior. Water-supplies on both coasts of the Red Sea are scanty, but they are greater on the African side of the Red Sea coast.

The Arabian side of the Red Sea basin is composed largely of igneous and volcanic rocks, many of which have undergone a great transformation - that is, have been 'metamorphosed' by tremendous torsion and twisting, caused by the formation of the great mountain range, a thousand miles long, which rises in a line parallel to the Red Sea.[1] To the east of the mountains, numerous geologically recent volcanic cones and lava are scattered along the coast, lying, however, almost wholly in Yemen.[2]

The coast of Saudi Arabia: this section, between points 28° N., 34°40' E. and 16°27' N., 43° E., is about 1,050 miles long. It has three geographical divisions, which are Midian, Hejaz and 'Asir.

(a) The coast of Midian: this section, between points 28°03' N., 34°40' E. and 26°15' N., 36°25' E., is about 200 miles long (Fig. 9). In the north the coast is low and sandy, fronted by coral reefs and islands.[3] South of Ras Abu Massarib, steep overhanging cliffs of coral and sandstone, less than 100 feet high, rise directly from the water. The coastal plain to the south of Ras Abu Massarib widens gradually until at Al Wejh it is 25 miles across.[4] However, access to it from the sea is difficult. Steep coral cliffs, with rocky ledges at their feet, and off-shore reefs and islets are all obstacles in the way of the establishment of good harbours. The Midian coast contains thirteen sherms, which are useful for providing anchorages for small native boats. This stretch of coast is very poor in water resources and there are no settlements until Al Wejh, which is a small harbour for small craft and dhows. The town is

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1 Twitchell, K.: Saudi Arabia, p. 13.

2 Lamare, P.: Structure geologique de l'Arabia, 1936.

3 Western Arabia and the Red Sea: Op. cit., p. 126.

4 Twitchell, K.: Op. cit.

connected by tracks to 'Aqaba (270 miles), Al 'Ulā (130 miles), Al Madina (265 miles) and Yenbo' (190 miles).

(b) <u>The Hejaz coast</u>: this section, stretching between Al Wejh, Lat. 26°15' N., and Jidda, Lat. 21°30' N., is over 400 miles long (Fig. 10). The coast is bordered by reefs, it is low and swampy, and edged with mangroves. The coastal plain, known as the Tihama, is of varying width, for several highland massifs, aligned from north to south, come close to the coast between Yenbo' and Mastura, 180 miles to the south-east. Inland from Yenbo' it is about 15 miles wide, with a surface of sand and shallow valleys.[1] In the Hejaz there are many more settlements than in the preceding section, both on the coast itself and following the wadis inland among the hills. Besides the seaports of Yenbo' and Rābigh, there are seven other sherms of typical structure, five of which provide anchorages, and it is through this section of coast that Al Madina maintains contact with the sea, through Yenbo' Port.[2] Two important wadis crossing the plain in this stretch are, in the north, Wadi Hamdh, with the greatest valley system anywhere in Arabia, and in the south, Wadi Yenbo', which opens to the plain where it forms a delta similar to that of Wadi Hamdh. Inland the wadi contains nearly a score of villages, set among small agricultural areas where wells tap the water of the wadi bed. Another line of villages occupies a similar position in Wadi Hamra, which reaches the coast near Ghubbet ar Raus. Jidda and its surroundings are described in Part III (Jidda Port).

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1 Lipsky, A.: <u>Saudi Arabia</u>, 1959, p. 23.

2 <u>Western Arabia and the Red Sea</u>: Op. cit., p. 128.

(c) <u>The coast of 'Asir</u>: this section, which is about 450 miles in length, lies between Jidda (Lat. $21^{\circ}30'$ N.) and Meidi (Lat. $16^{\circ}27'$ N.). The coastline appears to be parallel to the plateau margin (Fig. 10). The characteristic broadening of the shallow-water step in this section is obvious from the innumerable reefs, banks and islands which lie off-shore and extend many miles out to sea; the chief island group is that of Farasān Bank.[1] The coastal plain to the north of Al Qunfidha, ($19^{\circ}08'$ N., $41^{\circ}04'$ E.), is low and sandy, with many small bights in the narrow fringing reef, some of which are used as anchorages, although usually without much shelter. A string of tiny villages follows the shore, behind which the monotonous sand-wastes of the Tihama swallow the water brought down in wadis from the hills, here about 20 miles inland. Al Līth (20 09 N., 40 16 E.) is a small town, with an anchorage. It stands on an island in Wadi Līth, the channels on either side being dry except after rain. The inhabitants are chiefly fishermen. The plain is only about 10 miles wide, the escarpment behind rising to over 6,500 feet. From Al Qunfidha to Meidi the coastline is more diversified, for an intricate system of faults breaks up the highland interior as well as the maritime fringe, and the region has also been affected by volcanic activity. The mountains of the interior, much higher than those farther north, receive a heavier rainfall, and as a result many wadis cross the coastal plain, expanding in deltas where they reach the sea. Cultivation

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1 <u>Western Arabia and the Red Sea</u>: Op. cit., p. 131.

2 <u>Ibid</u>.

is more abundant, and natural vegetation thicker. But in its human affinities there is little to distinguish this from the preceding section of the Tihama and its highland border. There is the same line of fishing villages along the coast. However, one feature distinguishes this part of the coast from the last; it contains seven sherms, these providing more sheltered anchorage than most of the inlets. As far as Jīzān, the coast is low and sandy, but southward of Jīzān rocky cliffs rise from the water.[1] The Farasān Islands lie about 30 miles off-shore from Jīzān. Like their counterpart on the opposite side of the Red Sea, there are several fishing villages and anchorages on these islands.

The Yemen coast: the Yemen has a coastline of about 280 miles on the Red Sea, between latitudes 16°27' N. and 12°40' N. (Fig. 11). The general trend is slightly east of south, but there are many irregularities. Sandy, mangrove-bordered beaches slope gently up to the coastal plain, an undulating, almost waterless expanse about 15 miles wide. Behind this is the upper Tihama, a much broken zone of foothills about 30 miles wide, seamed with stony valleys.[2] Behind this again, towering to heights of over 9,000 feet, the Yemen highlands dominate the scene, their crystalline, volcanic and limestone rocks carved into a great variety of forms by the effect of the plentiful rains of summer monsoons.[3] The lower Tihama misses the summer rainfall, being too low and hot for condensation

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1 Western Arabia and the Red Sea: Op. cit., p. 134.

2 The Red Sea and Gulf of Aden Pilot: London, The Hydrographic Dept., 1955, p. 8.

3 Western Arabia and the Red Sea: Op. cit.

to take place, but the scanty population make use of such water as reaches the plain in the wadi beds. The commerce of the more productive highlands is carried on through the seaports of Meidi, Luheiya, Hodeida and Mocha.

LAND-FORMS OF THE SHORELINES

Raised Beaches

The raised beaches of these coasts may be classed in three categories: (a) those formed by abrasion, wearing down of the local rock or of terrestrial or marine deposits; (b) those formed by the piling up of material, for instance at the coastal edge of river deposits, large quantities of which were laid down at the foot of the ranges during ancient pluvial phases of climate; and (c) old coral reefs. The form of the land above and below sea-level has determined which type should prevail at any point.[1]

Studies in the northern Red Sea indicate that a raised beach at an average height of 50-65 feet is the most uniformly distributed. The southern point of the Sinai peninsula exhibits three beaches, mainly of ancient coral reefs. The uppermost, probably late Pliocene, is between 200 and 300 feet above sea-level, the second between 30 and 80 feet; the lowest is 20 feet below the present fringing reef.

On the Sinai coast of the Gulf of Suez, particularly south of Tor,

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1 Geographical Handbook Series - Western Arabia and the Red Sea, 1946, p. 62.

two raised beaches are recognizable (Fig. 12, a), but they do not correspond in level with those on the west coast of the Gulf opposite. North of Tor the raised beaches are less easy to trace, since two isolated land-steps separate the coast from the broad coastal plain; but two old coral reefs raised respectively 35 and 750 feet above sea-level have been found on Jebel Hammam Musa.[1]

On the southern part of the African coast of the Gulf of Suez (Fig. 12, b), and on Jubal and Shadwān Islands (Fig. 12, c), raised beaches are again visible; on the flank of the Zeit hills there are three beaches raised respectively at about 80, 250 and 500 feet; on Shādwan Island, besides these three, there is a fourth at nearly 700 feet above present sea-level.[2]

In the Gulf of 'Aqaba on the Arabian coast between 'Aqaba and Haqal three or four beaches are recognizable, consisting of sand and coarse pebbles, with reefs and fragments of coral. Their nature indicates formation by successive shrinkings of the sea rather than by uplifts of the land.[3]

The position of the highest raised beach varies greatly in different parts of the Red Sea coast. On the Egyptian coast it ranges between 230 and 790 feet above sea-level. Two beaches occur on the Eritrean coast near Massawa, the upper 330 feet above sea-level. Along the Danakil

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1 Western Arabia and the Red Sea: Op. cit., p. 62.

2 Ibid.

3 Ibid., p. 64.

coast the raised beaches slant upwards from south-east to north-west, from a point 30-60 feet above sea-level near Assab to about 590 feet above sea-level at Adailo.[1]

On the Arabian coast, raised beaches have been traced only in parts. In the north, a cliff between 80 and 100 feet high, extending from the mouth of the Gulf of 'Aqaba to Al Wejh, seems to represent the lowest beach. Higher ones are recognizable in places. The lowest also occurs on the islands off the coast, which, like the outer part of the coastal plain, consist of uplifted coralline limestone. Near Jidda there is no obvious trace of the three beaches so plainly developed farther north, except a low cliff 12-20 feet high (the same applies to the vicinity of Port-Sudan, on the opposite African shore, though here the sandstone steps of the coastal plain, and old coral reefs, appear to be raised to nearly 1,000 feet). Farther south, near Hodeida, no clearly defined raised beaches are visible; there is only a sharp rise or cliff between 12 and 20 feet high, at the coast, though the surface of the coastal plain, consisting largely of wind-borne deposits, bears also beds of marine shells. These, of species still living in the Red Sea, occur as far as 12 miles inland, and nearly 200 feet above sea-level. These raised beaches are quarried for building purposes along the coasts of the Red Sea.[2] The Farasān and Kamarān Islands consist mainly of recent (quaternary) coral reefs and other marine deposits, elevated usually only

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1 Western Arabia and the Red Sea: Op. cit., p. 64.

2 Barron: Topography and Geology of the District Between Cairo and Suez, Cairo, 1907, p. 20.

3-15 feet, though reaching 260 feet in the highest hills of the Farasān Islands.[1]

Coral Formations

The Red Sea, though generally speaking of considerable depth, is encumbered in places with rocky inlets and coral reefs, which extend far into the central or main ship channel. They are most plentiful in the middle section of the Red Sea, rather less so in the south, despite the great breadth of the shallow-water coastal step and the number of rocky islands. In the north, less favourable climatic conditions partly account for their paucity in the Gulfs of Suez and 'Aqaba, but this cause will not entirely explain their relative scarcity in the northern part of the main Red Sea.[2] Speaking generally, they extend in long strips parallel to the coast, and divide the Red Sea into a deep central channel and two inshore channels, of which the central alone is suitable for through navigation by large vessels. The reefs are, on the whole, more numerous on the Arabian than on the African side. The inshore channel on the Arabian side is wide, formed partly by small detached reefs and sunken rocks, partly by more extensive reefs and islands; many of its anchorages are insecure. The inshore channel on the western side is similar, but much narrower. Both these channels are connected with the central channel by openings in the reefs which, especially in the northern part, are in some cases very wide. Approach to the shore is

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1 Western Arabia and the Red Sea: Op. cit., p. 65.

2 Crossland, C.: Desert and Water Gardens of the Red Sea, 1913, p. 152.

frequently difficult owing to the great extent of reefs, but good anchorages are found behind them in a number of places. Across the entrance to the Gulf of Suez from the Red Sea there are numerous islands with reefs which obstruct the entrance to the Gulf of 'Aqaba, and the channels here are narrower and more difficult.

Crossland observed that there are three successive systems of barrier reefs along the Red Sea coast, which by continual uplift have become: (a) a range of sandstone hills rising from the alluvial maritime plain; (b) a fringe of limestone along the present coast-line; and (c) the present barrier system. These three ridges were formed by tho faulting of sedimentary rocks which overlay the bases of the Archaean hills at the time of the great movements which opened the sea section of the Great Rift Valley.[1]

The Residual Sandstone Hills

These are particularly interesting in that one finds a regular layer of coral on their summits, which shows that they were once nearly level with the sea, and are in fact coral reefs which have been elevated to heights of from 100 to 1,000 feet. From seaward these hills are very easily distinguished from the archaean rock, the true boundary of the rift valley, by their flat tops and the light yellow colour of their cliffs, and also by their generally being nearer the sea even than the great mounds of gravel which sometimes descend from the foot-hills of the mountain range.[2]

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1 Crossland, C.: Op. cit., p. 154.

2 Ibid.

Coral of the Coast Line

Around the whole of the shores of the Red Sea is a belt of sand and gravel, sloping inward from high-water mark to a distance varying from some hundred yards to that of many miles. It abounds with shells and corals, identical with those in the sea itself, and is obviously an upheaved beach of comparatively modern date.[1]

This band of elevated coral is never wide, about a mile at Suakin, exclusive of the reef, and rather less at Port-Sudan. At Suakin, and to the south, it is very slightly raised above sea level, but at Port-Sudan and generally to the north it is from 10-20 feet higher. North of Jidda it is from 50 to 100 feet above sea-level, south of Jidda it is very slightly raised above sea-level. The coral is usually separated from the gravel plain by a depression a few hundred yards wide. This depression is often very near sea-level and floored with mud.[2]

This section was once beneath the sea, and nearly all rocks were formed beneath the water, as the ground is entirely formed of corals and shells.[3] All the shells and most of the corals are exactly like those now living on the Red Sea reefs, and so one can deduce the fact that the uplifting of the original coral reef has been geologically recent. The breadth of the maritime plain is further evidence of the same fact, for no such plain can be formed on a sinking coast-line; on such sinking

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1 Buist, G.: On the Physical Geography of the Red Sea; Geography Journal, 1854, p. 234.

2 Crossland, C.: Op. cit.

3 Ibid., p. 131.

coast-lines the successive deposits of sand and gravel from the hills are submerged, and the following deposits form layers on the top of the preceding ones, and therefore cannot be carried out beyond them to form a plain.

Barrier Reefs

The barrier system is not a single linear reef, or line of reefs, but rather a line of areas of shallow water full of reefs of all sizes, generally more or less crescentic or ring-shaped. The origin of both barrier and fringing reefs is identical with that of the coast-land, and is not to be looked for in any laws of coral growth, or marine sedimentation and abrasion, these factors having merely affected the summits of submarine hills hundreds of miles long, nearly two thousand feet high, often peculiarly narrow, and always more or less parallel to the axis of the sea-filled Rift Valley.[1]

The sandstone ranges, coral coast-line, and barrier reefs are then three parallel repetitions of the same structure extending with great regularity along the sides of the Rift Valley from the entrance to the Gulf of Suez to Suakin, a distance of about 700 miles. Southwards of this point, similar structures occur, but without this extreme regularity.[2]

Their formation is due to the opening of the Rift Valley, which

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1 Crossland, C.: *Op. cit.*, p. 141.

2 *Ibid.*

resulted in these sandstones being thrown into a series of steps, as it were, along each side of the trough (Fig. 1).

The further history of the three steps or ridges has been as follows. The highest are formed by the present sandstone hills and ridges of the maritime plain. The coral caps on these were formed when the sea reached to the bases of the Archaean hills, the sandstone range No. 1 being a line of barrier reefs off the mountainous coast-line. The mountains then, as now, were broken down by the action of the weather, and the resulting sand and gravel were washed down into the sea as the beginning of the maritime plain (Fig. 13).[1]

Meanwhile, organic remains were accumulating on ridge No. 2, and as elevation brought this within fifty fathoms or so of the surface, reef corals took possession and covered the summits one after another as elevation proceeded, so that when ridge No. 1 emerged from the sea altogether, and its bases were surrounded by the gravel from the hills, No. 2 was a second barrier reef out at sea.

The same process has been repeated, so that coral growth and levelling have made ridge No. 3 into the present barrier system and the maritime plain has reached the one-time barrier No. 2 and so made this the present coast-line. During the last of these elevations a good deal of breaking and cracking of ridges Nos. 2 and 3 took place. <u>The harbours of the coast, which are so interesting in themselves as to deserve</u>

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1 Crossland, C.: <u>Op. cit</u>., pp. 143-145.

separate consideration, were formed also at this time.[1]

In short, the relief of the sea floor near the coast may be compared with that of the coastal plain. Even below sea-level, isolated mountain chains and single mountains lie parallel to the main line of faulting of the coastal range. These submerged mountains are mostly step-formations like those on the land. They form the bases of most of the coral reefs (except the simple reefs fringing the coasts), hence the steep slope of the reefs on their outer side. The submerged ranges would also appear to have a fairly uniform elevation, so that they only reach the surface in a few places.

Just as the raised beaches provide evidence of uplifts of the land or former sea-levels higher than the present one, so the existing coral-reefs give some indication of conditions in past ages below the present sea-level. The reefs are still, however, incompletely known in many parts of the Red Sea, especially those remote from important harbours.

Natural Inlets (Harbours)

Very characteristic of the Red Sea, and closely connected with coral formations, are certain long narrow inlets of deep water, penetrating nearly perpendicularly into the coast for some distance, then throwing out deep lateral gulfs, often at right angles, so that the whole inlet in many cases assumes a cross- or T-shape.[2] These inlets comprise the

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1 Crossland, C.: Op. cit., pp. 143-145

2 Western Arabia and the Red Sea: Op. cit., p. 68

most important harbours of the Red Sea as well as many smaller anchorages. They are known variously as sherm (or sharm), mersa (or marsa), and khor.[1] In some cases, though not all, the mouth of a wadi opens at the back of each branch of the inlet; but under present climatic conditions such wadis only discharge rain-water into the inlet at long and irregular intervals.

It has been suggested that these inlets are the results of catastrophic action involving breaking and the faulting down parts of the reefs.[2] The possibility of such faulting may be supported by its association with movements which have raised the coral reefs and which are relatively modern.[3] On the other hand, the association of these inlets with streams is significant and perhaps there is no need to invoke fractures of the land at so many places along both sides of the Red Sea coast. It is more likely that the inlets were carved by streams at a period when the sea stood at a lower level.[4]

Several theories have been advanced to explain their origin, the cause of which is probably not the same in every case. Some may be valleys drowned by subsidence, for instance those in which wadis open into the lateral gulfs, as at Port-Sudan. In a past climatic phase of

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1 Though there is no fixed rule, the term 'mersa' is more frequently used on the African coast, 'mersas' and 'khors' being interspersed in the southern part. On the Arabian coast, 'mersa' is comparatively seldom used; 'sherms' succeed one another in the north, 'khors' in the south.

2 Grabham, G. W.: The physical setting of the Sudan; The Anglo-Egyptian Sudan from Within, London, 1935, p. 275.

3 Ibid.

4 Ibid.

greater rainfall, fresh water discharged from these valleys would kill the coral of the fringing reef and form a gap, while the setting in of a later dry phase would check this process and allow the growth of the small fringing reefs along the sides of the inlets. If submergence of valleys explains these cases, a slight later uplift is required to explain the low cliffs along the sides of the inlet, such as at Port-Sudan.

However, Crossland mentioned that these canal-like inlets are not the ends of rivers past or present, for present rivers there are none, and no river, flowing over a wide plain, through loose and heterogeneous materials, could cut out such a channel, but would end in a wide shallow estuary or delta, if it formed a definite mouth at all.[1] He added that the forms of all the harbours of the coast can be reduced to one plan more or less easily, that of a cross with arms parallel and at right angles to the coast-line, and are in fact formed by two cracks in the earth's surface nearly at right angles. In the case of Port-Sudan the former arm is the largest, it is two miles long, the other arm, which connects this with the sea and forms the shallower branch harbour, being much the shorter. The same applies, for instance, to Wiai, Fijab, Salak Seghir and Ankeifal Kebir, whereas in the case of the narrower harbours like Suākin, Arūs, Shinab and its neighbours, the arm at right angles to the sea is the longest, and the plan of the inlet is more like the conventional cross.[2]

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1 Crossland, C.: Op. cit., pp. 143-145.

2 For detailed information, see Crossland, ibid.

The two best-known 'sherms' are those of Port-Sudan and Suākin (Fig. 14). The inshore channel along the coast (within the barrier reef) north and south of Port Sudan reaches great depths. At Port-Sudan a channel between 600 and 700 feet deep penetrates the outer edge of the coral reef fringing the coast. The gap in the reef is still over 200 feet deep at the level of the coast itself. The inlet penetrates the land obliquely north-westward, then forks into two narrow branches, a longer and a shorter, extending approximately north-west and south-west. A dry wadi opens at the head of each branch. The water is still nearly 90 feet deep at the point of bifurcation, and depths of over 30 feet continue deep into the land along either branch. The banks of the harbour mostly form a low cliff some 6 feet high; there is usually a narrow fringing reef, at the edge of which is a sudden descent to a depth of about 30 feet.[1]

At Suakin, a deep narrow channel crosses the fringing reef from north-east to south-west, between 200 and 300 feet deep at the outer edge of the reef, and still nearly 100 feet some distance in. The channel penetrates south-westward into the land at right angles to the coast, being still over 60 feet deep some way within the harbour mouth. It bifurcates into a northern and a southern branch, each broader than those at Port-Sudan, and with an islet lying at the point of bifurcation; the southern branch again bifurcates, two deep channels with broad heads being separated by another islet, linked to the town of Suākin by a narrow causeway (Fig. 14).

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1 <u>Western Arabia and the Red Sea</u>: Op. cit., pp. 68-75.

The cross-shaped form is shown best by Khor Shin'āb, on the African coast, a little north of Ras Rawāya (Fig. 14).[1] Here a channel nearly 100 feet deep cuts across the fringing reef and is continued as a narrow inlet perpendicular to the coastline; the inlet, after a sharp bend, branches into three at its head. Outside the fringing reef the sea-floor falls away to a depth of nearly 800 feet.[2]

Many variants of the typical cross-form occur. Thus Mersa Gwiyai, one of a number of inlets north of Port-Sudan, has the form of an irregular L (Fig. 14). Sherm Jubba, on the Arabian coast, is T-shaped, with a channel nearly 100 feet deep at its mouth, and over 40 feet deep where the arms branch out (Fig. 14). At Rābigh, on the other hand, the harbour appears at first sight to be a large, roughly triangular, expanse of water, connected with the sea by a narrow channel below the surface; slight subsidence may have caused the broadening of the sheet of water above (Fig. 15). The two most important harbours on the north Arabian coast, Yenbo' and Al Wejh, are designated sherm by the Arabs. The former, though appearing as a broad open harbour, is a true sherm, of rather irregular shape, in which the south side of the narrow deep inlet is formed, not by the coast, but by a wide fringing reef on which an islet rests (Fig. 15). Al Wejh has a broader inlet, more rounded in outline, into which deep water penetrates in a broad tongue (Fig. 15).[3]

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1 Crossland, C.: Op. cit.

2 Western Arabia and the Red Sea: Op. cit., pp. 68-75.

3 Ibid.

These deep inlets, of great economic importance as anchorages, occur on almost every part of the Red Sea coast.

Chapter II

ECONOMIC MINERALS

Mineral deposits exploited on a large scale: petroleum, phosphates, manganese, salt, sulphur - metals utilized on a small scale: iron, zinc and lead, gold, asbestos and vermiculite - ores unexploited at present: copper, chromite, nickel and peridot - other mineral resources.

ECONOMIC MINERALS

There are numerous occurrences of mineral deposits along the Red Sea; a number of these have been known and exploited since ancient Egyptian times.

The economic importance of the Red Sea coasts is related to the presence of ample mineral resources, the impact of which has led to the creation of ports. Exploited on a large scale, the minerals certainly cause a revolution in all aspects of life in the area concerned.

The major mineral deposits may be grouped as follows:

(1) Mineral deposits exploited on a large scale.

(2) Metals utilised on a small scale.

(3) Ores unexploited at present.

MINERAL DEPOSITS EXPLOITED ON A LARGE SCALE

These are principally petroleum, phosphates, manganese, salt and sulphur.

Petroleum

Intensive oil exploration along both sides of the Red Sea basin resulted in the discovery of oil in Yemen and in Egypt. In Egypt, oil exploration started as early as 1868, when oil seeped to a tunnel dug for sulphur in Gemsa hills on the Red Sea coast at the entrance of Suez Gulf. Further exploratory operations resulted in the discovery of twelve oilfields situated along the coastal plain of the Gulf of Suez.

Fig. 16[1] gives the locations of these fields (Baker, Karim, Gharib, Gemsa, Hurghada, Sudr, Matarma, Asl, Rudeis-Sidri, Feiran, Bala'eem, and Abu Durba). These are the only known Egyptian oilfields. Most authorities relate these oil accumulations to the structural and basin conditions of the Suez graben during the Tertiary period when it was actively subsiding. According to Weeks (1952)[2] the source of this oil is in the Miocene sediments which accumulated in a basin with favourable conditions for oil occurrence. Thus during the Miocene the Gulf of Suez embayment was not only regionally silled, but many of the blocks sank at different rates, producing ideal subsidiary silled sinks. In these were accumulated thousands of metres of Miocene marls and shales.[3]

Furthermore, the fault blocks and horsts that sank in the Gulf of Suez graben provided ideal structures with sandstone and/or limestone porosity. These structures were effectively trapped by the overlying Miocene marls and shales. From these latter, oil is assumed to have moved out of the basin along the bedding into any coarser porosity that it met. Thus in Ras Gharib it moved into Carboniferous and lower Cretaceous Nubian sandstone and Miocene reefs. In Sudr, Asl, and Matarma it moved up to the Miocene sands or to the weathered Eocene unconformity. In Bala'eem it moved to the Miocene sands in the

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1 See also Fig. 17.

2 Said, R.: The Geology of Egypt, 1962, p. 276.

3 Ibid., pp. 274-282.

evaporites or in the marl, and in the Rudeis-Sidri field to the basal Miocene conglomerates. In Feiran it moved to the Miocene sands; in Baker and Karim the oil is found in Cretaceous sands and Eocene limestones.

Fig. 18 gives, in diagrammatic form, a section of this type of fault block oil occurrence, exemplified by the Ras Gharib oilfield. All the oilfields have certain common features. They have a trend which is almost parallel to the axis of the main graben (north-west to south-east). They all consist of structures that are made of one or a series of strongly broken and faulted pre-Miocene structures, which are overlaid unconformably by less rigid Miocene sediments. These, upon renewed post-Miocene movements, reacted by flexuring and faulting, so that the surface has in many places the shape of an anticline. These surface structures, however, reflect little if any of the older and buried structure. Some of the fault blocks are tilted toward the axis of the graben (Sudr, Asl, Matarma, and Gharib blocks), while others are tilted away from this axis (Gemsa, Rudeis-Sidri, and Feiran). Horsts are not uncommon (Sudr and Hurghada). The accumulation of oil is either on the upthrown side of the block (Asl, Sudr, Gharib, Gemsa and Hurghada) or on the downthrown side of the block (Feiran, Bala'eem and Rudeis-Sidri).[1]

Thus the coastal strip along the Gulf of Suez region which lies

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1 Weeks, L. G.: Factors of sedimentary basin development that control oil structure; Bull. Am. Assoc. Petrol. Geologists, 36, 1952, pp. 2071-2124.

between the waters of the Gulf and the major African trending faults represents one of the most promising areas for the finding of future oil-fields. The presence of twelve proved oilfields is significant. The following are the dates of discovery: Gemsa (1909); Hurghada (1913); Abu Durba (1918); Ras Gharib (1938); Sudr (1946); Asl (1947); Ras Matarma (1948); Feiran (1949); Bala'eem (1955); Rudeis-Sidri (1957); and Baker (1958). The presence of other structures similar to those which favoured this oil accumulation is likely. The area is highly faulted and consists of a jumble of fault blocks which seem to be effectively trapped by thick Miocene sediments. A cumulative thickness of over 5,000 metres of these Miocene sediments is recorded.[1]

Apart from the coastal strip of the Gulf of Suez region, the shelf beneath the waters of the Gulf seems to be a very promising area for further research. In fact, part of the Bala'eem field seems to be beneath the waters of the Gulf. The Miocene as well as all other sediments are believed to be even thicker than those of the coastal strip and their geological evolution and structure are not very different.[2]

Total production in 1960 was 3.6 million cubic metres from the Egyptian oil fields of the Red Sea and Sinai. It is still true that nothing conclusive can be known about the oil content of the Red Sea basin until considerable drilling has taken place. However, exploration work

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1 Said, R.: _Op. cit_.

2 _Ibid_.

is in progress all over the area, and this will determine what reserves of oil are available.

Phosphates

Along the coast of the Red Sea in Egypt, phosphate deposits have a wide distribution and are known in the Quseir-Safaga region of the Red Sea, in the mouth of Wadi Qena, where the geological formations are characterised by a limestone rich in phosphate.[1]

In the Quseir-Safaga district, strike faults gave rise to a remarkable topographical complexity in which the pre-Miocene (Cretaceous and Eocene) strata are preserved, forming limestone plateaus of which Gebel Duwi is conspicuous. The Duwi range consists of a long, sharp ridge which drops precipitously to the southwest and slopes gently to the northeast. The sedimentary rocks of this region are separable into two great divisions: the Cretaceous lower Eocene group and the group consisting of the Miocene and later sediment groups. The latter division exhibits a practically continuous succession from the middle Miocene onward. In the isolated outcrops of Gebel Duwi and their continuation across the Qena-Quseir road at Gebel Atshan (Fig. 16), as well as in the Safaga district (Fig. 16), the succession is as follows, from top to bottom:[2] Thebes formation; Esna shale; chalk; Dakla shale; Duwi (phosphate) formation; Quseir variegated shales; and Nubian sandstone.

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1 Said, R.: Op. cit., p. 277.

2 Ibid., p. 111.

However, the phosphate bands in the Quseir area can be grouped into at least three horizons. The top phosphatic bed in this formation, the so-called 'Atshan bed', is exploited in Atshan, El Daba, and El-Nekheil mines in the Quseir area.[1] The thickness of this bed varies from 160 to 170 cm. and the tricalcic phosphate content is between 65% and 70%. The middle phosphatic bed, which lies below the Atshan bed, is exploited at the Duwi mine. It has a thickness of 150 cm., and has a tricalcic phosphate content of about 70%. The lower phosphatic bed is being exploited at Hamadat mine, where it has a thickness of about 300 cm.; it has a tricalcic phosphate content of 60-64%. Here the phosphatic rock is dark grey in colour and has some silicified phosphatic nodules.

The age of the phosphate formation in Safaga is lower Maastrichtian.[2] In the phosphate mining district of Safaga, a Cretaceous-Eocene section is found.[3] The section consists of the Nubian sandstone followed conformably by a series of variegated shales, over 180 metres thick, and contains numerous sandstone interbeds. The upper 30 metres of the succession, however, include a rich ammonite fauna; this indicates, according to Faris and Hassan, an age 'much older than the Maastrichtian'. This unit is comparable in many ways to the Quseir variegated shales of the Quseir district.

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1 The section at Quseir is described by Barron and Hume (1902), Beadnell (1924), Youssef (1949, 1957), and Said (1962).

2 Faris and Hassan: Report on the stratigraphy and fauna of the upper Cretaceous-Paleocene rocks of Um el-Huetat, Safaga area; Ain Shams Society, Bulletin, Cairo, 1959, No. 4, pp. 191-207.

3 Ibid.

The phosphate bands in Safaga are on top of this unit, there being three phosphate bands, from base to top, of 2, 1.3 and 1.8 metres thickness respectively. These are separated from one another by laminated grey clays and chert beds with occasional thin bands of hard phosphatic rocks. This unit is comparable to the Duwi formation of Quseir.[1]

Sporadic phosphate beds have also been noted in the Gulf of Suez region, e.g. Sudr area. These beds are also associated with shallow-water sediments and have abundant vertebrate remains; their origin may not be very different from the more developed and distinct beds of the phosphate formations.[2]

Total production in 1960 was 286,225 tons from El-Quseir, and 100,214 tons from Safaga for the same period.

Manganese

Manganese occupies an important position among the Red Sea ores, second only to phosphates. The ore exists in the Sinai peninsula, at Um Bogma,[3] Bir Nassib, and Sharm el-Sheikh, as well as in the Eastern desert in the Jebel Elba region and Eish-el-Mallah. The ore exists also in the region to the north of Port Sudan and the region north of Massawa Port.

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1 Faris and Hassan: Op. cit.

2 Said, R.: Op. cit., p. 133.

3 See Fig. 16.

The bulk of the ore is manganiferous iron, whilst manganese dioxide exists in small quantities. In the former case, the manganese is of low grade, in which the percentage of manganese element varies between 22% and 24%, with the iron element between 34% and 36%, whilst in the latter case the manganese is of high grade, the percentage of manganese dioxide being between 80% and 95%.[1]

The productive and important manganese-iron deposits of west central Sinai occur in isolated lenses and lenticular or tabular bands selectively replacing the dolomite and dolomitic limestone intercalations of Carboniferous through feeders along fault plans of Miocene age. In Sinai the chief and abundant ore mineral is ferruginous pyrolusite in diverse habits: massive, concretionary, finely or coarsely-crystalline (up to 10 cm. long).

Although the main mineralization took place in the Miocene, there is evidence in west central Sinai of protracted periods of mineralization or of renewed surges or rather different hydrothermal activities. These are suggested by the alternation of faulting and mineralization, by the rejuvenation of faults, etc.[2]

Manganese-iron deposits in the Elba region of the Eastern Desert occur as pyrolusite, hematite, and other minerals associated with calcite that fills fissures and fault fissures of late Miocene age.

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1 El-Zoghby, M. E.: Development of the Mining Industry in Egypt, Cairo, 1956, p. 19.

2 Said, R.: Op. cit., p. 271.

Total production in 1960 was 283,844 tons, coming mainly from the Sinai Peninsula.

Sodium Chloride (Table Salt)

There are salt works in the Sudan, at Port Sudan, and in Ethiopia, at Massawa Port and Assab Port.

The process of extracting sodium chloride from sea-water actually depends upon natural means, and no special devices are used to promote the evaporation and the consequent speed of precipitation of the salt. The production depends largely on the heat energy from the sun, the surface areas of the water reservoirs and salt basins, together with the time of exposure of the water to natural heat. The only manual work entailed is the moving of the sea water from one basin to another to condense it to the level where salt begins to precipitate. In the final stage, the salt is collected in its coarse state and crushed by rollers to give it a finer texture.

Sodium chloride, besides its normal domestic use, is also used in industry, as a raw material for caustic soda production, or the manufacture of chlorine, which is produced by electrolysis, and is mainly used in the purification of supplies of drinking water and in the preparation of many disinfectants. The caustic soda is an important component for many industries, such as soap, artificial silk, weaving and paper industries.

Sulphur Deposits

These are found as lenticular bodies and bands replacing the gypsiferous series or dolomites of the Middle Miocene at Gemsa and Ranga on the Red Sea (Egypt). The Gemsa sulphur deposit is believed to have been formed by ascending hydrocarbons carrying sulphur in solution. The sulphur seems to have been connected with faulting, and its presence below cap-rocks of shales and clays attests to its having been formed by ascending solutions. The sulphur at Ranga seems to be of the same origin and it seems to have replaced gypsum and anhydrite along traces of bedding planes and banding.[1]

There are deposits of gypsum on the Red Sea coast containing on average 15-18% of sulphur. During the Second World War, sulphur was produced from this rock, and some was shipped abroad. Usually the rock was hand-picked so that the average sulphur content was about 25%. Sulphur deposits thus far identified do not appear economic and would only be of use in emergencies.[2]

METALS UTILIZED ON A SMALL SCALE

A variety of metals and other minerals are won on a comparatively small scale from resources scattered along the coasts of the Red Sea.

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1 Said, R.: Op. cit., p. 270.

2 Little, A.: Opportunities for Industrial Development in Egypt, Cairo, 1955, p. 29.

Iron Ore Deposits

These metamorphosed, well-bedded iron-ore deposits occur as haematite-magnetite-quartz bands in metamorphosed country rocks. The deposits are generally restricted in the eastern desert to an area south of Quseir where occurrences are known in the following localities: Wadi Karim, Um Shaddad, Um Nar, Um Ghamis, Siwiqat Um Lassaf, Dabbah, and Um Hagalig. In the Sudan the deposits of iron are to the south of Haleib. There are resources of iron ores - mostly specularite - and large slag dumps at Aqiq in the vicinity of Mahad Dhahab, near Jidda, but no large deposit has been seen as yet.[1]

The Wadi Karim ore is believed to have a marine sedimentary origin and to have been derived originally from the weathering of volcanic surface iron deposits or basic igneous rocks which were later slowly metamorphosed.[2] The origin of these deposits is assumed to have been laid down within the succession of sedimentary rocks of the Precambrian basins and later to have been subjected, together with other sediments, to regional metamorphism.[3]

Recently, Egypt has embarked upon the exploitation of iron deposits on a relatively large scale, as it is the most important of metals, being the backbone of industrialization. However, in the Red Sea area, the deposits amount to 30,000,000 tons, with an average metallic content of

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1 Twitchell, K.: Saudi Arabia, Princeton, 1958.

2 Said, R.: Op. cit., p. 266.

3 Ibid.

44% iron and 25% silica, and a low content of both sulphur and phosphates.[1] Thus it is expected that when the Egyptian Iron and Steel Company's production is in full swing it will meet all the local demand.[2]

Zinc and Lead Ores

On the Red Sea coastal strip in Egypt, between Quseir and Berenice (about Latitudes 26° N. and 24° N. respectively), zinc ore is found mixed with lead in the vicinity of Om Gheig, Zoag-el-Baher and Gabal-el-Rossas, and mixed with copper at Om Sambuki. Zinc and lead occur together, but not in comparable proportions,[3] and the extraction of both has to be carried out at the same time, as extracting one along would render the process uneconomic.

Amin describes these zinc-lead deposits; he considers them to be of a telethermal replacement origin, and he summarily relates them to Tertiary volcanic activities.[4]

As the percentage of zinc in the ores is, on average, more than four times that of lead, the average annual production from 1951 to 1955 amounted to 2,047 tons of zinc against 469 tons of lead.[5] As there are resources of unknown quantity in the Red Sea basin, it is apparent that

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1 El-Zoghby, M.: The Mineral Resources of Egypt, Cairo, 1953, p. 20.

2 Industry after the Revolution, and the Five Year Plan, Ministry of Industry, Cairo, July 1957, p. 34.

3 At the Om Gheig mine, for example, the estimated reserves of zinc ores total about 380,000 tons, whilst the lead resources (galena and urrasite) are estimated at not more than 20,000 tons.

4 Amin, M. S.: Geological features of some mineral deposits in Egypt; Bull. Inst. Desert Egypt, 1955, pp. 209-239.

5 Industry after the Revolution, and the Five Year Plan, Op. cit., pp. 308-309.

these require further investigation with a view to assessing the feasibility of exploiting them on a large scale.

Gold

Gold mining is one of the oldest mining activities in the Red Sea basin. It is widely distributed in the Eastern Desert in Egypt, and at Mahad Dhahab, near Jidda (Saudi Arabia).

In the Eastern Desert, gold veins occur in rocks ranging from early Precambrian schists to late Gattarian granites. This is perhaps the most widespread mineralization in the Eastern Desert; it involves the formation of at least forty-five occurrences of gold deposits. Most of these were extensively worked by the Ancient Egyptians, and some are still worked today. The mines working at present are El-Aridiya, El-Sid and the government mines at Om Ud and Hanglia. Also, several other mines at Attala and Barramia appear to be promising. The El-Sid mine is the richest in Egypt.[1]

At Mahad Dhahab (Saudi Arabia), the mine hill itself is a felsite and highly metamorphosed sediment overlain by a basaltic flow. The mine mountain is andesitic, cut by quartz veins and partly overlain by a rhyolite flow. The Mahad Dhahab Mine was unique in that it had three classes of ore. First came the tailings; secondly, there was a certain amount of low grade ore lying at the surface between the ancient stopes, much of which has already been cheaply mined by quarry methods; and

1 Said, R.: Op. cit., p. 264.

thirdly, there was the underground ore.[1] Recently diggings have been abandoned, as accessible lodes were exhausted.

The exploitation of gold is not conducted, at present, on a large scale because of transport difficulties and the relatively small returns. It would seem worth while to investigate the present potentialities of the ancient gold mines, which have not yet been exploited to any great depth.

Asbestos and Vermiculite

Considerable deposits of anthophyllite asbestos associated with vermiculite are found in the Hafafit area in the Eastern Desert. They occur as masses at the periphery of pegmatite veins cutting serpentine lenses. The deposit is believed to have been formed by the transformation of serpentine during the emplacement of the pegmatites. The pegmatite veins are probably sweatout fluids formed by selective refusion of the country rock. Within the serpentine the veins are made of feldspars and vermiculite bordered by anthophyllite asbestos.[2]

The only type of asbestos found in the Eastern Desert is of short, stable type, used for compressed plates, cement products, vermiculite insulating concrete, and other uses in connection with sound insulation.

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1 Twitchell, K.: Saudi Arabia, Princeton, 1958, p. 248.

2 Said, R.: Op. cit., p. 236.

ORES UNEXPLOITED AT PRESENT

There are many sources of minerals in the Red Sea basin, which are not as yet used, or have not been fully exploited.

Copper Ores

Copper ores are scattered in many areas around the Red Sea basin. The main deposits of copper ores known to exist in the Red Sea area (Egypt) are at Om Sambuki; it is also believed that the ores exist in quantities which may be sufficient to justify their economic exploitation in Sinai.[1]

Copper deposits are mesothermal deposits formed by the filling of fractures in various Precambrian rocks. The copper minerals are mainly represented by chalcocite and its oxidation products. Examples of the deposits considered occur in Sinai at Regeita, Abu el-Nimran and Samra.

The Om Sambuki ore is very complex[2] and hard, requiring heavy crushing and grinding as well as flotation. According to analysis, the ore gave the following main metallic content:[3]

Zinc	27.96%
Copper	3.6%
Sulphur	18.5%

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1 Industry after the Revolution, and the Five Year Plan, Op. cit., p.2

2 This ore includes malachite and azurite, chalcopyrite, bornite, tetrahedrite, galena, zinc blende, pyrites and limonite.

3 El-Zoghby, E.: The Mineral Resources of Egypt, Cairo, 1953, p. 12.

Hence, the mines can be regarded as combined zinc and copper mines.

The copper ore reserves are not yet fully explored in the Red Sea basin, and they should be assayed to ascertain their suitability for economic exploitation.[1]

Chromite

Deposits of chromite are found in the Eastern Desert at Baraniya and near Gabal Elba. The Baraniya deposit occurs as segregations of lenticular shape in an ultra-basic igneous intrusion. Big lenses have been worked, some of them giving more than 1,000 tons. Deposits were formed by magmatic concentration from ultra-basic rocks. The most important chromite occurrence is in the Barramia-Salatit range.[2]

However, there is no local consumption of chromite at present in the area of the Red Sea basin, although it is expected that the ore produced locally will be required for the new, developing industries in the countries of the basin.

Nickel and Peridot

These are localized in the ultra-basic rocks of St. John's Island in the Red Sea. Nickel is present as garnierite traversing the ultra-basic rocks of St. John's Island; it was probably formed by the concentration of small amounts of nickel from the ultra-basic mass. Peridot

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1 El-Bakary, F.: Mining Policy and Legislation in Egypt; L'Egypte Contemporaine, Cairo, 1958, No. 292, p. 36.

2 Said, R.: Op. cit., p. 262.

occurs as a stockwork of veinlets or pockets in serpentinized dunite. It was probably formed by the crystallization in cracks of silicates derived from the partly consolidated ultrabasic rock.[1]

The nickel ores have not been exploited for a considerable time, so there is no local production of this ore in the area of the Red Sea; it is entirely imported to meet local consumption. The quantity and quality of the reserves are high, and they deserve further consideration.

OTHER MINERAL RESOURCES

The Red Sea basin is rich in limestone, granite, basalt, coal, Kaolin, glass sand, sandstone, marble and beryl. Exploitation has taken place recently along the Red Sea coast in Egypt and in the Yemen. There has been a marked change in modern quarrying methods as compared with those used in earlier years, and it seems that the development and the exploitation of the resources depends largely on diverting more capital into the industry and to making the quarrying areas accessible.

With the exception of manganese, phosphate, gypsum and gold, however, it is difficult to assess accurately either the amount of mining activity or the number of establishments engaged in mining. Many mining activities are carried out sporadically. Practically all estimates of mineral reserves have been based on surface outcroppings and are therefore only slightly indicative of the actual reserves.

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1 Said, R.: Op. cit., p. 262.

Chapter III

CLIMATE AND OCEANOGRAPHY

Climate: temperature - rainfall - pressure - winds - the water supply; oceanography: currents - tides - sea temperature - difference between sea and air temperature - the submarine contours.

CLIMATE

One of the chief features of the climate and weather in the Red Sea is its lack of variability; apart from the seasonal reversal of wind direction in the south, the changes which occur are slight compared with those of more northerly latitudes. As would be expected, contrasts are generally greater in the north than in the south, both from season to season and from day to day.

Temperature

Average temperature is high in all months in all parts of the Red Sea basin, except in the adjoining gulfs northward of about lat. 26° N., where it is relatively cool from December to February (see climatic table for Suez); the coldest month is January (a mean daily maximum of 68°F. (20°C.) and minimum of 49°F. (9.5°C.)). The highest temperature is reached in June (107°F. (41.5°C.)). 'Aqaba Port is similar in conditions to Suez, where it is relatively cool from December to February (see climatic table for 'Aqaba - Table 11). The highest temperature reached in July is 112°F. (44.5°C.).[1]

Southward of lat. 26° N., temperature increases rapidly, and that part of the Red Sea which lies south of about lat. 18° N. is among the hottest regions in the world. At Massawa the mean annual temperature is 86°F. (29.7°C.), which is the highest for any regular meteorological

1 Red Sea Pilot: Hydrographic Department, Admiralty, London, p. 36.

station.[1] This high mean is due mainly to the high temperature in the winter months and not to exceptionally hot summers. The hottest months are July and August, when the mean daily temperature is 95°F. (34.7°C.), and the coldest month is February, with a mean daily temperature of 77°F. (25°C.). The average daily range of temperature throughout the year is only 13°F. (7°C.).[2]

The only data available for comparing the temperatures on the opposite shores of the Red Sea are those for Dongonab on the west and Jidda on the east.

TEMPERATURE AT JIDDA AND DONGONAB[3] (°F.) TABLE 1

Temperature	Jidda				Dongonab			
	Jan.	April	July	Oct.	Jan.	April	July	Oct.
Mean	75	81	89	84	71	77	89	82
Mean daily maximum	84	91	98	95	79	88	102	92
Mean daily minimum	65	70	79	73	63	66	77	72
Extreme maximum	92	104	108	105	87	100	116	105
Extreme minimum	49	54	70	68	45	49	65	60

Periods: Jidda, 1941-45; Dongonab, 1908-19.

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1 Massawa, (Meteorological Office, 1958), Ethiopia.

2 Red Sea Pilot: Op. cit., p. 36.

3 Meteorological Office, Air Ministry: The Red Sea, etc., p. 41.

Thus at about 21° N. the eastern shores of the Red Sea are somewhat hotter than the western for most of the year, but there is little difference in the middle of the hot season.[1]

Rainfall

The average rainfall per month at coastal stations is given in Tables 5-12. Very little rain falls in this region, particularly in the hot season.

The western shores of the Red Sea north of about 22° N. are almost rainless, with an average of less than 0.99 inches (25 mm.) per year, except on the highlands of Sinai Peninsula; in the extreme north, the Gulfs of Suez and 'Aqaba receive a little winter rainfall as depressions pass across the eastern Mediterranean. Only between Port Sudan and Massawa is there more than 4 inches (100 mm.).[2]

As is usual in very dry climates, monthly averages of rainfall give little idea of the amount that may be expected in a particular month in any one year. For example, at a place where no rain has fallen in, say, July in ten or even twenty successive years, there might be a substantial fall in a squall or thunderstorm in July of the following year.[3] Even the annual rainfall is subject to great variation from year to year. There appear to be regions where a few inches of rain are probable in most years, and from the rather scanty information available it seems

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1 See Tables 5-12 for climatic data.

2 Meteorological Report on Abyssinia, Eritrea and Somaliland: Aviation Met. Rep., Meteorological Office, London, No. 10, 1941.

3 Red Sea Pilot: Op. cit.

that in most of the coastal regions of the Red Sea, the greater part of this rain falls, apparently, in November and December, but owing to the mountainous character of much of the hinterland, great local differences of seasonal variation are to be expected.

It appears to be characteristic of the whole area for rain to be mostly in the form of showers of short duration, often associated with squalls and thunderstorms, and occasionally with dust storms. In the Gulfs of Suez and 'Aqaba the showers, which are very frequent, are generally confined to the period November to March, and are mostly associated with the cold fronts of Mediterranean depressions.[1]

The average annual rainfall at Suez amounts to only 0.8 inches (21 mm.), distributed over six months, from October to March, with two maxima of 0.2 inches (5.1 mm.) as monthly averages, one in November and the other in March.[2] Along the western coast of the Red Sea the shore-line, represented by the two ports of Port Sudan and Suākin, receives the main part of its rainfall during the winter season - October to January (Mediterranean affinity). As the prevalent continestal northerlies pass over the warm water of the Red Sea, they absorb a considerable amount of moisture.[3] Though the coast is shut off from the summer monsoon influence by mountain barriers, yet local penetration due to low

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1 Red Sea Pilot: Op. cit.

2 See Table 5.

3 Kassas, M.: The Ecology of the Red Sea Coastland; Journal of Ecology, 1957, p. 189.

topography may bring summer (July-August) cloudbursts.[1] This rain is partly convectional and partly orographic, the proportion of the latter increasing inland as the coastal plain merges into the Red Sea Hills. Sea breezes occur along the coast between May and October. The Port Sudan rainfall ranges from 16.8 inches (422 mm.) in 1925 to 0.75 inches (19 mm.) in 1919. A conventional numerical expression for the rainfall variability is 56 per cent. for Port Sudan, which is the highest in the whole country.[2]

The coastal and sub-coastal regions of Eritrea are generally hot and dry. The weather of the coastal and sub-coastal plains is considerably affected by topography. The plains are bounded on the west by the Ethiopian massif and the distance between this and the sea is an important factor affecting the rainfall.[3]

The main rains occur in the winter months, when Massawa, with a mean annual rainfall of 6.5 inches (165.4 mm.), receives 4.69 inches (119.1 mm.) (72%), in the five-month period October to February.

During the winter months the Eritrean coast-line lies in an area of convergence between the dry north-west monsoon and a south-easterly wind which brings moisture from the Indian Ocean. Rain on the Red Sea coast reaches a maximum at Massawa, possibly due to the proximity of the massif to the south-west and the added orographic effect of Jebel Ghedem, the

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1 Ireland, A. W.: The Climate of the Sudan in <u>Agriculture in the Sudan</u>, (edited by J. D. Tothill), London, 1952, p. 68.

2 <u>Ibid</u>.

3 Hemming, C. F.: The coastal area of northern Eritrea; <u>Journal of Ecology</u>, 1961, p. 60.

foot of which lies only 9 miles (14 Km.) to the south-east of Massawa.[1] It should be noted that rainfall in arid and semi-arid areas is very erratic and the figures probably do not apply to the country a few miles away from the rainfall station. In the 13-year period, 1945-57, the annual totals for Massawa fluctuated between 55% above and 59% below the mean value and monthly variation is even greater, e.g. December maximum is 7.4 inches (188 mm.) and minimum is nil.[2]

Table 2 shows the mean annual rainfall for stations on the western shores of the Red Sea, from north to south.

TABLE 2: VARIATION OF RAINFALL WITH LATITUDE

Station	Latitude	Mean Annual Rainfall
Suez	$29^\circ 56'$ N.	0.83" (21 mm.)
Port Sudan	$19^\circ 37'$ N.	4.22" (107 mm.)
Suākin	$19^\circ 07'$ N.	5.87" (148 mm.)
Tokar	$18^\circ 25'$ N.	3.55" (90 mm.)
Massawa	$15^\circ 37'$ N.	6.50" (165 mm.)
Thio	$14^\circ 40'$ N.	4.10" (104 mm.)
Assab	$13^\circ 02'$ N.	1.07" (27 mm.)

1 Hemming, C. F.: Op. cit., p. 60.

2 Meteorological Report on Abyssinia, Eritrea and Somaliland: Op. cit.

On the eastern coast of the Red Sea, the coastal plain and highlands to the north of Jidda receive some rain from the westerly depressions which may be attracted by the low pressure over the Red Sea, but which are few in number. However, the precipitation is supplemented by rains brought in winter and spring by southerly winds from the Red Sea, the effect of which must be enhanced by orography in the Hejaz highlands.[1] The southern part of the Hejaz highlands extends into the Yemen, which receives summer rains from the south-west monsoon, but these rains hardly extend to the east of the watershed. Monsoon rains are expected during August. The coastal plain around Jidda receives only irregular rains which probably depend on the southerly winds blowing up the Red Sea. Rainfall here is said to be very irregular. The data for Jidda show that there are only about 1.97 inches (50 mm.) per year, much of which falls in December (see Table 12).

Over the Red Sea as a whole, rainfall is mainly convectional, falling in thunder showers. The warm-front type of continuous rain, preceded by drizzle, and the stratocumulus type of drizzle, are unknown, except perhaps occasionally in the extreme north.[2]

Snow is unknown in the Red Sea basin; so also is hail in the central and southern parts, but hail falls occasionally in the belt of variable

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1 Vesey-Fitzgerald, D. F.: The vegetation of the Red Sea coast, north and south of Jidda (Saudi Arabia); Journal of Ecology, Vol. 43 (1955), Vol. 45 (1957), pp. 477-547.

2 The Red Sea Weather: Meteorological Office, Air Ministry, London, 1951, p. 39.

winds at about 19° N. to 22° N., and also to the north of the rainless belt during the cool season.[1]

Pressure

In the Red Sea basin, northward of about lat. 20° N., the wind blows mainly from between north-west and north in all months. Over the rest of the Red Sea, such winds are predominant from June to August; from October to April the wind blows mainly from between south and south-east.

The average distribution of pressure undergoes a seasonal change, due to the alternation of high and low pressure over Asia and the movement northward and southward of the low-pressure system of Central Africa.[2] The average distribution in January, typical of the north-east monsoon, shows an extension of the Asiatic anticyclone across Central Europe and another area of high pressure over the Sahara. Pressure decreases gradually southward towards Central Africa and across the Arabian sea. The average distribution in July is typical of the south-west monsoon. Pressure decreases eastward and northward towards the Asiatic low-pressure system over the north-western part of the Indian sub-continent and Persia. In general, average pressure falls gradually from January to July and rises from July to January. The general distribution of pressure in January, April, July and October is shown in Figs. 19 and 20.

Deep depressions do not occur in the region, so that variations in

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1 The Red Sea Weather: Op. cit.

2 Red Sea Pilot: Op. cit., p. 31.

pressure are much less marked than further north. At Suez the highest and lowest values likely to be recorded in any year are 1033 mb. and 1006 mb.; further south, at Kamaran Island, values of 1018 mb. and 1000 mb. are likely in any year.[1]

Winds

Over the open waters of the Red Sea, winds from between north and north-west predominate in all seasons northward of lat. 20° N., and do so very markedly northward of lat. 25° N. from May to October. Between lats. 15° N. and 20° N. winds from directions between about west and north are the most frequent from May to September, and those between south and south-east are the most frequent during the rest of the year.

In January the only region in which the frequency of such winds exceeds 5% is in the the Red Sea from the vicinity of Perim Island northward to about lat. 17° N.; the wind direction on these occasions has always been between south-east and south. Between Suez and about 22° N. an occasional southerly wind of force 7 has been encountered between December and March, with damp weather and a widespread fall of pressure.[2]

In the Gulf of Suez and in the Red Sea northward of about lat. 22° N. "Khamsin" gales generally occur several times per month between February and May or June. The wind is southerly at first and veers to south-westerly or westerly, and as it strengthens, sometimes to a gale, there

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1 The Red Sea Weather: Op. cit., p. 12.

2 Red Sea Pilot: Op. cit., p. 32.

is usually a sandstorm.[1]

At Port Sudan and Suākin squalls occur, mainly from between the south-east and the west; those from the west often carry much sand and are known locally as "Haboobs".[2]

The Water Supply

The water resources of the Red Sea basin, like those of almost every other part of the world, are dependent upon climate, geological formations and topography. At the present day the greater part of the Red Sea basin is a land of 'episodic rivers',[3] i.e. of valleys which are dry on the surface, or contain only isolated pools, during the rainy season, but these almost countless dry wadis may carry torrents (sēil), sudden and violent, after rainstorms. These dry wadis are also important because they almost always carry underground water, to be reached by wells sunk in their beds; when it is near enough to the surface, chains of oases result, e.g. Wadi Fatimā, lying between Jidda and Mecca.

The whole basin is flanked by a network of such wadis. The general direction of these is at right angles to the coast, but there are exceptions, as in the basin of Al Madina, where some of the principal wadis run from north-west and south-east roughly parallel with the coast; another example, on a much smaller scale, is Wadi Watir in eastern Sinai.

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1 El-Fandy, M. G.: The formation of depressions of the Khamsin type; Quart. Journal Royal Met. Soc., London, Vol. 66, 1940, p. 323.

2 Schempe, H.: On haboobs in the Egyptian Sudan; Bull. Amer. Met. Soc., Milton, Mass., Vol. 24, 1943, p. 371.

3 Western Arabia and the Red Sea: Op. cit., p. 22.

Many of these Red Sea coastal valleys are routes inland, some even feasible for motor traffic; e.g., Yenbo' to Al Madina by Wadi Hamra, and Al Līth to Mecca by Wadi Yalamlan.[1]

The settlements along the coasts of the Red Sea depend entirely on ground water. Their wells and springs are of varying depth, but occasionally between 60 and 70 feet deep.

Since the water supply is of great importance along the coasts of the Red Sea, and it is closely linked with the human history of the area concerned, it will be referred to again in the individual chapters dealing with the ports of the Red Sea.

OCEANOGRAPHY

Many suggestions have been put forward to explain the reason for the name Red Sea. Some have claimed that it arose from the colour of the shores, or possibly the colour of the sunsets, which are so magnificently red in this region. The most satisfactory explanation, however, seems to be that it was called "Red" on account of the colour of its waters. Although the waters of the Red Sea are by no means always red, it is one of the many places in the world where a phenomenon called "water bloom" occurs. These manifestations are responsible for imparting a variety of colours to the sea.[2]

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1 See Fig. 10.

2 Currie, Ronald: The 'Red' Sea?; National Institute of Oceanography, Wormley Survey, England, December 1955, Vol. 3, No. 96, p. 1.

Currents

The currents in the Red Sea are influenced by the general monsoons of the northern part of the Indian Ocean. The effect of the north-east monsoon is to produce a west-going current in the Gulf of Aden, the water thence passing up the Red Sea. The effect of the south-west monsoon is to produce an east-going current in the Gulf of Aden, which draws water out of the Red Sea.[1] The effect of the monsoon is, however, that more currents set along the axis of the sea than in any other direction. The following table shows that in the Red Sea, north of the 20th parallel, rather less than one quarter of all currents observed on the main shipping tracks flow in the axial direction of the sea under the monsoon influence, throughout the year. South of the 20th parallel, the proportion is between one quarter and one third.[2]

CURRENTS OF THE RED SEA FLOWING UNDER MONSOON INFLUENCE TABLE 3

No. of Currents Setting Between N. & N.W. Inclusive (% of all Currents)		No. of Currents Setting Between S. & S.E. Inclusive (% of all Currents)	
November-January	February-April	May-July	August-October
(a) 23	(a) 22	(a) 24	(a) 24
(b) 31	(b) 27	(b) 28	(b) 32

(a) = Red Sea north of lat. 20°N.; (b) = Red Sea south of 20°N.

Throughout the year the prevailing winds in the Red Sea, northward of the 20th parallel, are between north and north-west, a definite

1 Red Sea Pilot: Op. cit., p. 13.

2 Ibid., p. 14.

monsoonal alteration of wind (south-east to north-west) being confined to the sea south of that parallel. The local winds oppose the general monsoonal flow of water in the northern part of the sea in the season from November to April; during the rest of the year in this part of the sea, and during the whole year in the southern part of the sea, the local winds oppose the general monsoonal flow. The transition months, when the flows in the direction of the axis of the sea are least frequent, are April and May, before the south-west monsoon is established, and October, before the north-east monsoon is established. At these times there is little or no current through the Straits of Bab-al-Mandeb. The outgoing south-easterly currents are most frequent, in proportion to other currents, in September (northward of lat. 20° N.) and in July and August (southward of lat. 20° N.). The proportion of in-going north-westerly currents is more evenly distributed over the months of the north-east monsoon period.[1]

The rate of the majority of currents in any direction does not exceed one knot, and on only extremely rare occasions does the rate exceed two knots. The variability of the currents of the Red Sea is to be explained partly by the narrowness of the sea and its irregular coastline.[2]

The change of sea level in the Red Sea during the year is slight, and is accounted for by greater evaporation during the summer.

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1 Red Sea Pilot: Op. cit., p. 14.

2 Ibid.

Tides

The tide of the Indian Ocean does not enter the Red Sea, where a local oscillatory tide, of semidiurnal type, is developed; this oscillation is such that it is high water at the southern end of the Red Sea whilst it is low water at the northern end and vice versa. Spring range at the north is about 2 feet; at the southern end of the sea, at Massawa and Kamarān Bay, spring range is about 3 feet.[1] Range decreases from the northern and southern ends to the central area, where, near Suākin and Jidda, there is no appreciable semi-diurnal tide. The Red Sea oscillation enters the Gulfs of Suez and 'Aqaba and causes tides in these gulfs. In the Gulf of Suez high water is nearly simultaneous over the whole area northward of Ras Gharib, and occurs about six hours later than at Shadwān Island; the spring range at Suez is about 4½ feet, and the extreme range about 6½ feet.[2] In the Gulf of 'Aqaba high water is nearly simultaneous over the whole gulf, and occurs from about one to one and a half hours later than at Shadwān Island, with spring range of from 2 to 4 feet. Meteorological conditions, barometric pressure and wind, may also cause appreciable local variations, and in any case one of the usual two tides of the twenty-four hours is practically suppressed, the water remaining near high tide level until it falls for the next day's tide.

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1 Red Sea Pilot: Op. cit., pp. 20–21.

2 Goby, J.: Marées de la Mer Rouge a Port-Tawfiq et de la Méditerranée a Port Said. He mentions that the Canal has to some extent reduced the amplitude of tides and, likewise, the range between the highest water and the lowest water has diminished.

In the summer the average level is lower than in winter and the tidal effects are partially masked by the results of the peculiar climatic conditions.[1]

Sea Temperature

In all months the temperature rises southwards from the Gulf of Suez; it reaches a maximum somewhere between Lat. 20° N. and 14° N., and then falls again towards Bab-al-Mandeb. Fig. 21 shows the sea isotherms for February and August, the months of lowest and highest temperature over much of the sea. Approximate values of the mean monthly range in each 2°-zone of latitude are also given on Fig. 21. The position of the zone of maximum temperature has a regular annual variation. In the middle of the cool season it lies in about 18-20° N., in the zone of variable winds separating the northerly and southerly winds, i.e. in the zone of thunderstorms and squalls. In the middle of the hot season it is in about 14-16° N.[2]

Difference Between Sea and Air Temperature

North of about 18° N. the sea is 1°F. or more warmer than the air in the cooler season (December-January in the south, November-February in the north); north of about 22° N. the mean differences amount to 2°F. and in the Gulf of Suez they reach 3-4°F. In the hot season (June-August in the south, April-September in the north) the air is at least 1°F.

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1 Crossland, C.: Desert and Water Gardens of the Red Sea, London, 1913, p. 121.

2 The Red Sea Weather: Op. cit., p. 43.

warmer than the sea and the difference exceeds 3°F. in the Gulf of Suez.[1] South of about 18° N. the air tends to be warmer than the sea throughout the year; the difference is greatest in July and August when it amounts to 2-3°F.

AIR TEMPERATURE OVER THE RED SEA (°F.)[2] TABLE 4

	Sea		Land	
	Jan.-Feb.	July-Aug.	Jan.-Feb.	July-Aug.
North	68	84	62	85
Centre	76	88	75	92
South	78	90	79	92

During the cool season, depressions occasionally cross the north of the Red Sea, and the combination of comparatively high sea temperatures with high humidity leads to an intensification of activity.[3] During the hot season the increased stability of the lower air over the sea tends to prevent the dispersal of suspended dust, and leads to the persistence of hazy conditions. This effect is particularly noticeable in the southern half of the sea, where duststorms are frequent along the shores.

The Submarine Contours

The submarine contours are roughly parallel to the shores; north of

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1 The Red Sea Weather: Op. cit.

2 Ibid., p. 41.

3 Ibid.

20° N., most of the Red Sea is deeper than 100 fathoms, and south of this latitude rather less than half the sea reaches this depth. Deeper areas occur along the axis of the sea; the only area where the depth exceeds 1,000 fathoms lies roughly between latitudes 19° N. and $22\frac{1}{2}^{\circ}$ N.[1]

The Red Sea, though generally speaking of considerable depth, is encumbered in places with rocky islets and coral reefs, which extend far into the central or main ship channel. They are more numerous in the southern than in the northern part of the sea, the principal being Dahlak Bank and Farasān Bank and those in the vicinity of Zuqar and Hanīsh Islands.[2]

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1 The Red Sea Weather: Op. cit., p. 5.

2 Red Sea Pilot: Op. cit., p. 10.

SUEZ. 29°56'N., 32°33'E., 33ft. TABLE 5

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind								Relative humidity %
		Average	Mean of		Mean of		Extreme				Percentage of Observations from								
			Daily max.	Daily min.	Highest	Lowest	Highest	Lowest			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1018	58	68	49	74	43	79	35	2	0.1	28	9	7	9	10	7	5	13	74
February	1016	60	70	50	79	43	87	37	2	0.1	28	12	5	8	11	3	5	17	71
March	1015	65	75	54	89	47	94	38	4	0.1	34	8	4	6	6	5	2	24	69
April	1013	71	83	59	97	51	109	46	1	.1	44	6	4	5	8	2	1	23	64
May	1012	78	90	65	101	58	111	51	1	.1	53	7	1	2	7	2	1	23	62
June	1010	82	95	70	107	64	110	60	tr.	tr.	61	7	1	2	2	.5	1	21	63
July	1007	85	97	73	105	68	108	65	0	0.0	68	8	0	.6	.3	0	.2	18	69
August	1008	85	97	74	103	69	109	66	0	0.0	69	6	.6	.2	.2	0	0	21	71
September	1011	81	92	71	101	65	104	60	0	0.0	71	5	0	.5	1	0	.3	18	73
October	1014	77	88	67	96	60	109	54	2	0.1	54	9	1	2	2	1	.7	25	74
November	1016	70	80	60	89	51	106	47	5	0.2	44	9	2	5	3	2	2	25	74
December	1018	61	71	52	78	44	86	38	4	0.1	33	15	4	5	4	1	3	16	73
Year	1013	73	84	62	108	41	111	35	21	0.8	49	8	2	4	5	2	2	20	70

Source: London, Admiralty, Hydrographic Department. Red Sea and Gulf of Aden Pilot. 9th edn., London, 1944.

TABLE 6

HURGHADA. 27°17'N., 33°46'E., 2ft.

Month	Average Pressure at M.S.L.	Air Temperature Average	Mean of Daily max.	Mean of Daily min.	Mean of Highest	Mean of Lowest	Extreme Highest	Extreme Lowest	Average Rainfall		Wind: Percentage of Observations from N.	NE.	E.	SE.	S.	SW.	W.	NW.	Relative humidity %
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1017	59	68	50	80	43	81	38	0	0.0	.6	.3	0	0	2	2	78	17	61
February	1017	58	68	49	77	42	81	40	0	0.0	0	0	0	1	3	2	67	27	52
March	1014	62	71	53	80	46	83	42	0.6	.1	3	0	0	1	2	3	32	52	55
April	1012	68	77	60	89	50	92	48	0	0.0	27	1	2	1	.7	0	7	58	59
May	1009	76	83	69	96	61	99	59	2	.1	34	2	3	4	.4	0	1	50	61
June	1007	80	86	73	92	67	99	65	0	0.0	50	1	0	0	0	0	0	48	64
July	1005	83	89	76	98	69	100	67	0	0.0	48	2	.6	0	0	0	1	47	63
August	1005	84	91	77	98	71	99	70	0	0.0	32	0	0	0	0	0	1	63	62
September	1008	80	86	74	91	68	92	68	0	0.0	20	0	0	0	0	0	.7	79	66
October	1012	75	83	68	92	59	100	57	0	0.0	9	0	0	0	0	0	16	65	61
November	1014	69	78	60	89	54	92	51	0	0.0	.7	1	0	0	0	.7	57	38	60
December	1016	63	71	54	79	48	81	46	5	0.2	0	0	0	0	2	1	85	12	63
Year	1011	71	79	63	-	-	100	38	8	0.3	19	.6	.5	.6	.8	.7	29	46	60

Source: MS. data supplied by the local Meteorological Service.

QUSEIR. 26°08'N., 34°18'E., 23ft.

TABLE 7

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind								Relative humidity %
		Average	Mean of		Mean of		Extreme				Percentage of Observations from								
			Daily max.	Daily min.	Highest	Lowest	Highest	Lowest			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1017	65	73	57	83	50	91	39	0	0.0	10	2	.4	.4	2	2	46	35	50
February	1015	66	74	58	83	51	94	46	0	0.0	12	2	.4	0	1	4	39	40	44
March	1013	69	77	62	90	56	99	51	0	0.0	38	.6	.5	.5	1	2	20	33	42
April	1012	75	82	67	91	62	109	58	0	0.0	51	2	2	3	1	.6	8	27	41
May	1010	81	88	74	97	68	103	63	0	0.0	70	2	.8	2	1	0	2	19	44
June	1008	85	91	78	100	74	118	70	0	0.0	83	2	0	0	0	.2	.7	13	46
July	1006	85	92	79	100	76	104	73	0	0.0	78	4	.6	.2	0	0	2	15	48
August	1006	87	93	81	99	77	106	69	0	0.0	80	2	.6	0	0	0	1	16	45
September	1009	84	90	78	96	74	101	71	0	0.0	79	2	0	0	0	0	1	17	48
October	1012	81	87	74	93	70	101	66	1	.1	56	1	.5	1	1	.3	7	30	47
November	1014	75	82	68	89	62	93	58	2	.1	33	2	.8	.2	.5	1	19	41	47
December	1017	69	76	61	83	53	86	49	1	.1	16	1	.5	.6	.6	2	37	42	50
Year	1012	77	84	70	102	48	118	39	4	0.2	51	2	.6	.7	.7	1	15	27	46

Source: London, Admiralty, Hydrographic Department. Red Sea and Gulf of Aden Pilot. 9th edn., London, 1944.

PORT SUDAN. 19°37'N., 37°13'E., 18ft. TABLE 8

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind: Percentage of Observations from								Relative humidity %
		Average	Mean of Daily max.	Mean of Daily min.	Mean of Highest	Mean of Lowest	Extreme Highest	Extreme Lowest			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1015	74	81	68	86	61	89	50	7	0.3	56	7	0	1	.7	2	1	31	66
February	1014	74	81	66	86	59	90	52	4	0.2	44	10	1	1	1	4	3	35	65
March	1012	76	84	67	90	60	95	53	1	.1	55	16	1	2	2	2	2	16	65
April	1010	80	89	71	96	63	101	58	1	.1	48	23	3	4	2	2	1	11	56
May	1009	85	95	75	104	68	111	59	1	.1	28	20	12	9	7	6	3	11	47
June	1006	90	102	78	112	73	117	68	tr.	tr.	21	17	16	8	5	11	4	11	39
July	1005	94	106	83	113	75	117	68	6	0.2	5	9	10	16	9	19	17	11	39
August	1005	95	105	84	112	78	117	67	4	0.2	5	8	8	13	12	17	21	12	41
September	1007	90	100	79	109	74	113	57	0	0.0	27	12	8	5	7	9	11	15	46
October	1011	85	93	76	100	72	107	61	14	0.6	43	15	10	7	2	5	2	14	65
November	1013	81	88	74	92	69	96	52	45	1.8	51	17	3	2	.7	3	3	20	69
December	1014	77	83	71	88	64	93	53	26	1.0	59	9	1	.8	.3	1	.3	28	68
Year	1010	83	92	74	114	58	117	50	109	4.3	37	14	6	6	4	7	5	18	55

Source: London, Admiralty, Hydrographic Department. Red Sea and Gulf of Aden Pilot. 9th edn., London, 1944.

MASSAWA. 15°36'N., 39°28'E., 50ft. TABLE 9

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind								Relative humidity %
		Average	Mean of		Mean of		Extreme				Percentage of Observations from								
			Daily max.	Daily min.	Highest	Lowest	Highest	Lowest			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1013	77	84	71	89	65	92	59	48	1.9	3	2	2	4	5	2	40	25	75
February	1012	77	83	72	88	65	93	57	21	0.8	0	0	2	0	2	2	34	52	78
March	1010	79	85	74	93	66	99	57	35	1.4	2	9	11	3	0	0	23	39	73
April	1009	83	89	76	96	72	103	64	1	.1	0	7	0	10	3	0	15	35	71
May	1007	87	93	80	100	73	105	64	0	0.0	2	21	0	3	0	0	14	31	64
June	1005	93	100	85	108	80	109	73	0	0.0	12	10	8	2	3	0	10	32	42
July	1004	93	99	87	108	82	111	76	0	0.0	3	8	23	5	12	0	12	17	50
August	1004	92	98	86	107	78	109	75	2	.1	0	8	8	10	20	3	39	5	50
September	1007	91	98	84	103	77	109	73	4	0.2	3	7	2	5	3	5	18	27	61
October	1010	87	95	80	98	75	102	70	25	1.0	3	0	3	0	13	2	29	18	74
November	1011	81	89	74	95	70	97	62	0	0.0	5	5	2	7	0	0	29	28	69
December	-	77	85	70	90	64	92	61	-	-	-	-	-	-	-	-	-	-	-
Year	-	85	91	78	109	61	111	57	-	-	-	-	-	-	-	-	-	-	-

Source: London, Meteorological Office, MS. data.

ASSAB. 13°01'N., 42°43'E., 18ft. TABLE 10

Month	Average Pressure at M.S.L.	Air Temperature: Average	Air Temperature: Mean of Daily max.	Air Temperature: Mean of Daily min.	Air Temperature: Mean of Highest	Air Temperature: Mean of Lowest	Air Temperature: Extreme Highest	Air Temperature: Extreme Lowest	Average Rainfall		Wind: Percentage of Observations from N.	NE.	E.	SE.	S.	SW.	W.	NW.	Relative humidity %
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1013	78	83	73	86	69	90	66	0.8	.1	2	16	8	36	32	1	0	0	72
February	1012	79	84	74	86	71	91	68	1	.1	5	16	4	33	30	1	1	5	73
March	1011	82	89	76	97	72	102	70	0.3	.1	8	1	0	43	32	2	2	8	71
April	1009	85	92	78	97	75	99	74	0	0.0	7	1	3	46	32	1	0	7	72
May	1007	89	96	81	99	79	104	77	0	0.0	8	5	6	43	24	0	0	11	67
June	1005	91	98	84	104	80	107	77	0	0.0	40	10	9	8	6	1	1	21	64
July	1003	94	101	87	106	81	109	77	0	0.0	31	4	13	3	4	2	8	28	57
August	1004	94	101	87	105	81	107	75	0	0.0	42	7	9	4	3	5	9	16	62
September	1005	91	97	85	102	82	104	81	0	0.0	26	6	11	18	4	4	4	16	66
October	1010	86	93	80	98	75	102	72	0.2	.1	3	1	19	37	29	1	0	6	70
November	1012	81	87	76	91	71	93	64	4	0.2	4	3	28	46	14	1	0	0	73
December	1013	77	84	69	88	65	91	65	14	0.6	0	6	8	57	24	2	0	0	71
Year	1009	86	92	79	-	-	109	64	20	0.8	15	6	10	31	19	2	2	10	68

Source: London, Meteorological Office, MS. data.

'AQABA BAY. 29°33'N., 34°58'E., 10ft. TABLE 11

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind								Relative humidity %
		Average	Mean of		Mean of		Extreme				Percentage of Observations from								
			Daily max.	Daily min.	High-est	Low-est	High-est	Low-est			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1015	59	70	49	76	42	76	42	1	.1	41	47	1	0	0	1	2	3	63
February	1013	60	72	48	81	42	89	40	4	0.2	42	40	0	0	1	2	4	5	59
March	1013	65	78	53	90	46	101	43	6	0.2	40	49	2	0	1	2	0	3	56
April	1011	74	87	61	98	51	98	49	0.3	.1	44	52	1	0	0	0	0	2	45
May	1009	82	95	69	107	61	109	59	0.4	.1	43	48	1	0	2	4	1	1	41
June	1007	86	100	72	107	65	110	63	0	0.0	46	52	0	0	0	1	1	0	38
July	1004	91	104	77	110	73	110	72	0	0.0	47	50	0	0	0	1	1	1	35
August	1004	91	105	76	110	70	114	68	0	0.0	45	54	1	0	0	0	0	0	34
September	1008	87	100	75	109	72	109	71	0	0.0	51	49	0	0	0	0	0	0	51
October	1012	79	91	67	103	60	105	60	0.5	.1	50	50	0	0	0	0	0	0	55
November	1014	72	84	60	91	54	91	52	0.6	.1	42	50	1	0	2	4	1	0	61
December	1014	61	73	50	81	41	83	41	6	0.2	45	47	1	0	0	1	1	1	60
Year	1010	76	88	63	-	-	114	40	19	0.7	45	49	1	0	0	1	1	1	50

Source: MS. data supplied by the Palestine Meteorological Service from data obtained from Messrs. Palestine Potash, Ltd.

JIDDA. 21°28'N., 39°10'E., 20ft. TABLE 12

Month	Average Pressure at M.S.L.	Air Temperature							Average Rainfall		Wind								Relative humidity %
		Average	Mean of		Mean of		Extreme				Percentage of Observations from								
			Daily max.	Daily min.	Highest	Lowest	Highest	Lowest			N.	NE.	E.	SE.	S.	SW.	W.	NW.	
	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	mm.	in.									
January	1013	75	84	65	90	54	92	49	2	0.1	12	12	8	4	3	5	14	40	58
February	1012	75	84	65	93	54	95	52	0.7	.1	17	12	4	3	2	3	17	39	52
March	1011	77	87	67	97	58	101	55	0	0.0	13	9	3	3	2	5	18	44	52
April	1009	81	91	70	99	59	104	54	2	0.1	13	4	2	2	2	3	26	44	52
May	1007	85	95	75	102	67	108	65	0.1	.1	11	1	2	.4	.9	3	35	44	52
June	1004	86	97	75	108	69	117	67	0	0.0	14	3	.7	.2	.7	1	26	52	56
July	1004	89	98	79	104	72	108	70	0	0.0	13	5	1	1	2	3	29	45	55
August	1004	89	99	80	105	75	108	74	0	0.0	13	5	.4	1	2	1	32	45	59
September	1006	87	96	77	103	72	108	70	0	0.0	13	1	.4	1	.2	2	28	52	65
October	1010	84	95	73	103	69	105	68	0.2	.1	10	6	3	.6	.9	2	37	40	60
November	1011	81	91	71	97	65	105	63	11	0.4	12	8	9	3	1	4	34	26	55
December	1013	77	86	67	92	59	93	50	34	1.3	12	15	12	2	2	4	20	31	55
Year	1009	82	92	72	110	52	117	49	50	2.0	13	7	3	2	2	3	26	42	56

Source: Khartoum, Sudan Meteorological Service. Climatological summaries for Jeddah 1941-5. Khartoum, 1944-6.

PART II

Chapter IV

EARLY HISTORY

Historical geography of trade in the Red Sea basin until 1869 - Ancient trade - the Ptolemaic period (300-30 B.C.) - the Roman period - the Arab period - commerce during the Arab period - the discovery of the Cape route (1498) - the Turkish period - the struggle for the Red Sea Trade, 1500-1869.

Early History

Historical geography of trade in the Red Sea basin until 1869

Ancient Trade

The Red Sea acquired importance in wprld trade at an early period of history. The region was flanked on either side by Egypt and Arabia, two of the most ancient centres of wealth and civilization, while the African coast of the Red Sea was relatively easy of access and provided tropical products much prized in the ancient world. The Red Sea was, moreover, an important channel for trade between the Mediterranean basin and India, two regions of vastly different civilization which were nevertheless linked by commercial ties from earliest times.(1)

The first people to tell us about Red Sea trade were the Egyptians who appear to have referred to parts of Eritrea and Somali coast as the land of Punt.

Egyptian vessels may have reached Punt before the time of the first Dynasty.(2) Egypt had need of imports for which she had to,turn to countries other than nearby Phoenicia. Every year

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(1) Toutain,Jules. The Economic Life of the Ancient World, 1930 page 155

(2) Crowfoot,J.W. Some Red Sea ports in the Anglo-Egyptian Sudan. Geog. Journ., May 1911. page 524

enormous amounts of incense, myrrh and frankincense were burned on her altars. These products were available only from the East African coast and Southern Arabia.[1]

For centuries supplies had come overland, maintained by countless small traders who passed the merchandise along from hand to hand. The earliest Pharaohs set themselves the job of cutting out these middlemen. In so doing they created one of the first great stage-operated maritime enterprises.

The task was not easy. The only alternative to the overland route was by water down the Red Sea.[2] But Egypt's centres were all strung along the banks of her great river, the Nile, separated from the Red Sea at the closest point by an eight-day march across desert. The Pharaohs had to set up shipyards, build a fleet and lay out harbours. The earliest route from the Nile to the Red Sea was along a gorge in the desert called Wadi Hammamat, leading directly from Coptos (near the present Qena) to the Red Sea where present Quseir lies. On the rocks lining the gorge at one point Henu, minister of Pharaoh Mentuhatep III, some two thousand years before the birth of Christ inscribed an account of his services to the state. In a few bald sentences he reveals graphically the difficulties that faced the founders of such a trading venture.

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(1) Casson, Lionel. The Ancient Mariners.

(2) Casson, Lionel. Op. cit. pp.10-11.

"My lord sent me", he writes, "to despatch a ship to Punt to bring him back fresh myrrh........".

Not very long after Henu had accomplished his mission, in the middle kingdom 2000-1800 B.C.), the Pharaohs sent further naval expeditions. This intercourse with East Africa is reflected in a contemporary Egyptian legend describing how the only survivor of an Egyptian ship wrecked in the Red Sea was cast upon an island two months' journey from Thebes. The serpent upon the island, claiming to be the prince of Punt, sent the sailor off with a full cargo of incense(1).

The importance of the Red Sea at this time can be seen from the fact that it was considered worth while to cut a canal between it and the Nile, probably during the reign of Sesostris (1980-1935 B.C.), a Pharaoh of the Twelfth Dynasty. The ancient canal left the Pelusiac branch in the neighbourhood of Bubastis, following Wadi Tumeilat up to the head of the Gulf of Suez, where now lies Lake Timsah. After the Gulg had retreated leaving behind enclosed lakes, canals were cut out to connect them together and with the head of the retreating Gulf (2). To augment the water current in the canal, Trajan led water to it by another canal taking from the Nile itself near Babylon (old Cairo) and passing by modern Belbeis. During the subsequent Hyksos invasion of Egypt and the

(1) Ermen, A. The Literature of the Ancient Egyptians, London,1927.pp.29-35.
(2) Ali Shafei, Bulletin of the Egyptian Geog.Soc.,Vol.XXI

period of Disturbances (1801-1584 B.C.), however, Egyptian commerce with the southern Red Sea area ceased and the canal gradually silted up. The filling up of the canal, however, revived the interest in the routes crossing the eastern desert to the southern ports of the Red Sea. The shipping of incense, as centuries before, was once again carried on overland routes.

Trade with Punt was nevertheless quickly resumed in the new kingdom. Queen Hatshpesut sent an important expedition to Punt, probably in 1495 B.C. It is recorded on the walls of the temple of Deir-el-Bahari. This record tells of one of the great achievements of her rule, a large-scale trading voyage to Punt.(1)

Egyptian records tell us that Thutmose III (1501-1447 B.C.) of the Eighteenth Dynasty sent another great expedition to Punt which brought back the usual commodities: ivory, black wood, panther skins, gold, and over two hundred and twenty three bushels of Myrrh, as well as male and female slaves and many cattle.(2) Some three decades later after a further interval of disturbances in Egypt, Ramses III (1198-1167 B.C.) dispatched another large fleet to Punt. The canal from the Nile through the Wadi Tumeilat to the Red Sea was now apparently in disuse, for it is recorded that the fleet, after a successful voyage, returned to a harbour somewhere on the Red Sea coast where the entire cargo was landed; it was then

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(1) Breasted, J.H. A history of Egypt, 1952. page 127.

(2) Ibid, page 305.

carried in donkey-packs to Coptos where it was loaded on to Nile boats and floated down the river to the capital in the eastern delta.(1) Ramses IV continued this traffic with the land of Punt, but was apparently the last Pharaoh to do so.

Although Pharaohic Egypt had contracts with the eastern coast of the Red Sea and the East African coast beyond the Red Sea, the south Arabian state of Ausan carried on trade there.(2) Ausan was stated by the author of the 'Periplus Maris Erythraei', about A.D. 60, to have been for a time first among the south-west Arabian states, and to have possessed the African Coast about Zanzibar.

After the decline of ancient Egypt the Phoenicians emerged as important mariners in the Red Sea. In the Book of Kings it is stated that King Soloman (c.974-932 B.C.) made a navy of ships in Ezion-Yeber, which is beside Elath on the shore of Aqaba Gulf at the modern Tellal-Khulayfah west of Aqaba. Hiram (King of Tyre) sent in the navy his servants, shipmen who had knowledge of the sea, with the servants of Solomon. They came to Ophir and fetched thence gold, four hundred and twenty talents, and brought it to King Solomon.(3) The exact location of Ohpir is uncertain though it was probably somewhere on the Red Sea coast of Africa.

There is little evidence of maritime activity in the Red Sea during the Neo-Babylonian period (626-539 B.C.), but the subsequent

(1) Breasted. op. cit. p. 385.
(2) Wainwright, G.A. Early Foreign Trade in East Africa. 1947. p.174
(3) Ibid.

period of Persian greatness saw a considerable expansion of trade as the Persians united Western Asia and Egypt, thereby increasing the economic importance of the Red Sea area which lay between the two parts of their empire. Daruis the Great (521-485 B.C.), realizing the value of linking Persia with Egypt, sent a fleet round Arabia and along the Red Sea. The canal from the eastern branch of the Nile through the lakes of Suez, which was cut at first by Necho II (614-608 B.C.) attracted his attention and he ordered it to be re-excavated. He introduced many improvements but succeeded only in connecting the Bitter lakes with the Red Sea by minor canals unfit for navigation except during the period of the Nile flood.[1] Through the canal he sent a fleet from the Nile to the Red Sea and thence to Persia.

The Ptolemaic Period (300-30 B.C.)

Two centuries later the conquests of Alexander the Great, and his founding of Alexandria, had a profound effect on the economy of the area. The city rapidly emerged as a great commercial centre whose trade, assisted by the statesmanship of the Ptolemies and the energy of the Greek merchants, extended along the entire length of the Red Sea and thence to Persia, India and even China. Many records about trade through the Red Sea and provided by the Greeks, and trading activities since their time may be divided into definite phases.[2]

(1) Sharp, S. History of Egypt. page 343

(2) Hebbert, H.E. El Rih - A Red Sea Island. S.N.R. Volume XVIII(1935)p.11

The first of these, from about 300-30 B.C., was the Ptolemaic concerned only with the coastal strip and leaving fairly detailed accounts of that coast and of their trading enterprises.(1)

The navigation of the Red Sea, along which the wind blows hard from the north for nine months in the year, was found so dangerous by the little vessels from the south of Arabia, that the merchants always chose the most southerly port in which they could meet the Egyptian buyers. The merchants with their goods found a journey on camels through the desert less costly than a coasting voyage.(2)

Ptolemy II (Ptolemy Philadelphus, 285-247 B.C.) made a new port on the rocky coast of the Red Sea, nearly two hundred miles to the south of Quseir, and called it Berenice.(3) (Lat. 23° 56' N. Long. 35° 36' E.) In Egypt the land-routes chiefly served to maintain communications between the valley of the Nile and the coast of the Red Sea. Thus when Ptolemy II had founded several ports on the Red Sea coast, it was necessary to connect them with the river on whose banks the life of the country centred. Coptos, at the point where the Nile came nearest to the Red Sea, stood at the head of a number of roads from Berenice, Myas Horomos and

(1) Ibid

(2) Sharpe, S. op. cit. page 344.

(3) Toutain, J. The Economic Life of the Ancient World. New York 1930, page 146

fallen into disuse; western exports - wine, gold, bronze, tin and various manufactured articles were therefore taken up the Nile to Coptus and were carried thence overland to Myus Hormus or Berenice on the Red Sea[1]. Traders from Egypt were content with reaching the Gulf of Aden[2], where they met Arabian and Indian traders and exchanged goods with them.

India seems to have been known only to the Greeks as a country that by sea was to be reached by the way of the Euphrates and the Persian Gulf! The long voyages of Solomon and Necho had been limited to Africa; hence it was that the court of Ptolemy VII, Eudoxus Cyrzicanus, came to Alexandria to persuade Ptolemy VII to give him the command of a vessel for a voyage to discover India. He reached India by the Red Sea route [3].

These attempts at maritime discovery were efforts to find a cheaper means of obtaining the Indian products. The art of navigation was so far unknown that but little use was made of this voyage; and hardly more than twenty small vessels ever went to India in one year during the reigns of the Ptolemies[4].

The results of these voyages of discovery were not only of a geographical kind. The Greeks henceforward knew much more about

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(1) Hourani, G.F. Arab Seafaring in the Indian Ocean in Ancient & Early Medieval Times, 1951. page 29.
(2) Huziyen, S., Arabia and the Far East. Cairo 1942, page 86.
(3) Strabo
(4) Strabo Ibid

Lancas Limen. The biggest and most used was that from Berenice.(1) Ptolemy II also built a city on the sands and named it Arsinoi (Suez), and he again opened the canal which Necko II and Dorins had begun, by which ships were to pass from the Nile to Arsinoi on the Red Sea. His action was a clear indication of the importance he attached to Red Sea trade. He extended Egyptian trade as far as Cape Guardapin devoting much attention to the Red Sea coast of Africa(2) whence he obtained supplies of elephants which he used in his wars against the Seleucids of Syria. So he built several stations for that purpose, the most important of these being Ptolemais (3) and Adulis (4).

Ptolemais is identified with Er-rih island, 18° 9' N., 38° 27' E.; the southern portion of the Tokar delta. It was fortified by Ptolemy Philadelphus (285-247 B.C.) and became the centre of elephant trade. Adulis which was one of the colonies of Ptolemy Philadelphus was always of commerical importance because it was a natural port in the Abyssinia-Sudan area. The ruins of Ardulis are situated on the left bank of the River Hadase, about three miles west-north-west of Malcatta, and the modern village of Zula.

His successor, Ptolemy III (247-222 B.C.) was equally familiar with the Red Sea coast. On a tablet he erected at the port of Ardulis, the inscription implies that he had apparently established a

(1) Toutain, J. The Economic Life of the Ancient World. New York 1930, p.146
(2) Wainwright. op. cit. p.114.
(3) Cosmos, The Christian Topography of Cosmos.(Ed.by J.W.McCrindle) 1929. pp.57-59.
(4) For details see - The Periplus of the Eryehrean Sea.(Translated by W.H.S.Schaff,1912).

trading station in the port. His father and he were the first to capture big hunting elephants from Traglodytes and Ethiopia which they took down to Egypt and there had them trained for employment in Sara against the Seleucids of Syria[1].

The Red Sea trade was at this time treated as a royal monopoly of the Ptolemais; their expeditions read like echoes of the earlier Pharaonic visitations to Punt[2].

Long voyages were wholly unknown and, though the trading wealth of Egypt had mainly arisen from carrying merchandise of India and Arabia Felix from the ports on the Red Sea to ports on the Mediterranean, the Egyptians seem to have gained no knowledge of the countries from which these goods came. They bought them from the Arab traders who came to Qusseir and Berenice from the opposite coast. The Arabs had probably bought them in their turn from the caravans that had carried them across the desert from the Persian Gulf; these land journeys across the desert were both easier and cheaper than a coasting voyage[3].

Commerce between the Mediterranean and eastern worlds continued to expand, though during the reign of Ptolemy VII (146-116 B.C.) there is evidence of direct sailings between Egypt and India. By this time the canal between the Nile and the Red Sea appears once again to have

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(1) Cosmos. op. cit.
(2) Thomson, J.O. History of Ancient Geography, 1948. p.29
(3) Sharp, Samuel. op. cit. page 345.

the natural riches of these new areas and the great routes of penetration and communication by land and sea which converged on the Mediterranean from Western Asia, India, Arabia and East Africa had become familiar to them[1]. Before these voyages, the Eastern Mediterranean had been for Greek economic enterprise a blind alley jealously guarded by the Egyptians, Phoenicians and Persians [2]. After the voyages that enterprise found the road lying wide open to the markets of Central Asia by the Red Sea route to India, Arabia and the east coast of Africa.

The Roman Period

The next phase was the Roman, and it is apparent that conditions had very much altered. The overland route to the Far East having now been closed, the sea route was of vital importance and during this period nearly all developments were towards its improvement[3]. The Romans, being pre-occupied with the richer region beyond, did not take much interest in the Red Sea coast and they have left little record of their occupation, if any, and of their activities there.

When Rome came into possession of Egypt, its commercial intercourse was conducted chiefly through the port of Berenice, while the port of Myas Hormus was in a great measure abandoned[4].

(1) Toutain, J. op. cit. page 85
(2) Ibid page 169
(3) Hebbert, H.E. op. cit.
(4) Lindsay, W.S. History of Merchant Shipping & Ancient Commerce. Vol.4 pages 106-107.

Yet some trade was still carried on from this port as also from Leuke Kome, on the north-eastern coast of the Red Sea, near the entrance to the Gulf of Aqaba. All these ports were under Roman possession. Caravans from Petra and from the shores of the Mediterranean brought to Leuke Koma the manufactures and other produce from the north, destined for shipment to the east, while Berenice became the chief port for the manufactures of Rome(1).

The Emperor Augustus dispatched an expedition to South Arabia in 25-24 B.C. which was led by Aelius Gallus. Its object was admittedly to capture those transport routes monopolized by the South Arabians and tap the resources of Al-Yaman for the benefit of Rome, but the expedition proved a signal failure(2).

The south western corner of the Arabian peninsula was the early home of the Sabaeans. The fertility of that Felicitous rain-favoured land, its proximity to the sea and its strategic location on the India route via the Red Sea were all determining factors in its development. Here were produced spices, myrrh and other commodities; foremost among these was incense, that most valuable commodity of ancient trade(3).

The Sabaeans knew the routes, reefs and habbours of the southern sea and the Red Sea and thus monopolized its trade. (The Periplus of the Erychraean Sea, a trade manual written in the 1st Century

(1) Ibid pp 106-107
(2) Hitti <u>History of the Arabs</u> pp.44-45
(3) Hitti op. cit. page 49.

suggests that the Romans occupied the port of Arabia Endaemon (Aden) during the reign of Claudius (A.D.41-54) or slightly earlier, and thus had considerable influence in South Arabia[1].

The author of the Periplus[2] was apparently a merchant engaged in the trade between India and Egypt and his work has the value of an ancient consular report on the merchants who trafficked between Egypt and the Red Sea ports on the one side, and between the latter and India on the other.

The discovery of the monsoonal winds by Hippalus, a pilot in the Indian trade, directed the attention of the Romans to India and the Far East. The Roman mariners of the Red Sea thus advanced to India after they discovered the use of the monsoons in navigation about the middle of the first century A.D.[3] A more southerly route utilised the Indian Ocean and Red Sea as far as the Gulfs of Suez and Aqaba. From the latter point transhipment then took place by way of Petra to the south Syrian ports[4].

Pliny remarked the importance of India's trade with the west, that in no year did India absorb less than fifty million sersteus (about £425,000) of the Roman Empire's wealth, and that it sent back merchandise which sold at a hundred times its prime cost.

Because of the monsoons vessels left Egypt for India and the

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(1) Periplus. <u>The periplus of the Erythraean Sea</u> (translated by W.H.Schoff) 1912, page 24

(2) Periplus. op. cit.

(3) Huziyen, S. op. cit. page 22.

(4) Fisher, W.B. <u>The Middle East</u>. page 132.

East at midsummer and reached the Arabian port of Cella or Crane (Hisn Ghoreb) near Aden after seven to ten days voyage. The return journey from India usually started at the beginning of December, never later than the sixth day of Mechir (13th January)(1).

The most valuable addition to knowledge made by the Roman writers is the light thrown upon a local intermediate commerce which arose, or continued, as complementary traffic, to the great Indo-Egyptian trade.

The third phase began with the rise of the Kingdom of Axum, which reached its political zenith some three or four centuries later at a time when Roman Egypt had fallen. The rulers of Axum claimed dominion over both shores of the Red Sea, till the arrival of the Arabs.

The Arab Period.

The fourth stage is that of the Arabs. It may be assumed to have begun about 640 A.D. when the Arabs conquered Egypt, Syria and Iraq. They drove the Christian races out of Arabia and by 641 A.D. had annexed all these countries. The Arabs, who came south along the Red Sea coast, settled and intermarried with the local inhabitants. The new religion replaced the old one, and the Arabs, knowing something about the sea, were likely to

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(1) Pliny, VI, XXVI, 101-2, 104, 106. See Rackham edition, 1947.

appreciate and to take advantage of the trading facilities that the old coastal settlements offered(1).

The Red Sea ports soon became centres of flourishing trade. Egypt's products were exported to central and western Arabia instead of to northern countries. This change, which took place in her commercial orientation after the Arab conquest, was primarily concerned with the trade of her own produce and not with her function as a thoroughfare for Eastern wares(2). Amru, after his return to Fostat, facilitated the transport of corn from Egypt to the Hejaz, by reopening of the ancient communication between the waters of the Nile and those of the Red Sea at Suez at 21 A.H.- 542 A.D.(3). The canal left the eastern Branch of the river at Balbeis and cut out eastwards along the Wadi el Toumeilat to the salt lakes near Timseh, reached the Red Sea by what is now the lower portion of the Suez Canal. This canal was called the canal of the Caliph and was in use for about 150 years. In 776 A.D. the Abbasid Caliph Abu-Dj al Mansur ordered it to be obstructed to prevent its use for the transport of supplies to the people of Medina who had rebelled against his authority. The connection between the two seas was then interrupted for eleven centuries(4).

As regards the transit trade, the quick expansion of the

(1) Crowfoot. op. cit. page 528
(2) Huzzayen, S. op. cit. page 29.
(3) Muir, William. The Caliphate, its rise, decline and fall. page 171.
(4) Suez Canal report, 1957.

Moslem empire stretching from Central Asia to North Africa inevitably imposed a barrier between West Europe and the Indian Ocean through Asiatic routes. A transit trade between the Mediterranean and the Red Sea through the Isthmus of Suez was opened by Jews to the African Coast of the Mediterranean, to Faroma and thence overland to Qulzum, while Egypt had the control over the Red Sea. It should be noted, however, that in classical and medieval times both the land and sea routes were equally difficult and perilous[1].

Religious divisions brought the Red Sea once more into prominence as a trade and pilgrim route between the African and Arabian sides. The Fattemide Court in Egypt in 973 became the centre of an African concert of powers, extending eastward to rule Hadjaz and Yemen. The Red Sea became under their control; Qulzum regained its importance as the port of intercourse with Western and south-western Arabia being this time the main port of the Fattemide kingdom.

However, prosperous days did not last long for in 1172 A.D. Salah-Eldin invaded Nubia and Jerusalem. The capture of Jerusalem by the Moslems attracted the attention of the European powers and was the main cause of the Crusades[2]. The closer contact brought about between the west and the east by the Crusades changed the picture at

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(1) Huzzayen, S. op. cit. page 29.

(2) Gleicher <u>The Anglo-Egyptian Sudan</u>. Vol. II, p.228

last and resulted in a flush of European-Asiatic trade channelled mainly via Egypt and the Red Sea. It remains to be noted that the ports of the Red Sea did not profit as much as before.

The Memlouks of Egypt, in order to control the traffic of northern Arabia and the commercial exchange between Hedjaz and Syria, transferred the Egyptian Customs house to Tor near the southern end of the Gulf of Suez.

The rise of the Mongolian Empire and its rapid expansion to Mesopotamia early in the second half of the 13th century dealt a serious blow to East-West trade via Egypt by the Red Sea route. Despite that, Suakin and Jidda were, for a short period, left to carry on a small trade of their own with the ships which came up the Red Sea from India, China and Ceylon. Aidhab port to the north of Suakin (about 30 miles south-east of Rao Alun Daja) had lost some of its importance because of the hostility of the tribes which inhabited the desert around. These Arabs robbed and murdered the traders and pilgrims on their way to Mecca[1]. Thus the pilgrim routes of the north were gradually abandoned and followed the new trade routes to Suakin and thence across to Jidda. These routes were preferable as the sea-crossing was shorter than that of Aidhab which was sacked in 1428 by one of the Mameluke kings of Egypt. Suakin took on the trade and importance of Aidhab, it became the principal port for Egypt on the western Red Sea coast. The pilgrim

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(1) Bloss, J.F.E. <u>The story of Suakin</u> <u>S.N.R.</u> 1937 page 288

and trade routes from Egypt to Arabia and the Yemen all went through Suakin which gradually rose to a position of importance which it retained unchallenged till the rise of Port Sudan[1].

The Egyptians gradually lost control of their empire and the fall of Constantinople in 1453 heralded the rise of the Ottoman Empire. The capture of Constantinople by the Turks closed the Bosphorus, thus cutting off the Black Sea and the northern parts of the old Asian Trade route.

Commerce during the Arab period.

Without some knowledge of the Red Sea trade during the Arab period, the political and economic history of the sixteenth century is unintelligible. The extent of the empire, annual pilgrimages to Holy Cities, and the wide diffusion of the Arabic language stimulated commerce under the early caliphs. The trade of Mecca, however, declined rapidly. The city had become economically less important after the centre of the Caliphate ceased to be situated in the Hejaz, its leaders had left, and the old fairs were discontinued. As, however, the Ahbesid Caliphate in Baghdad declined and security diminished, trade was diverted to Aden which became a great entreport, goods being brought across the Indian Ocean and transferred there to small vessels which took them to the Red Sea ports[2]. Still later, because of exactions

(1) Ibid.
(2) Western Arabia to the Red Sea. pp. 237-254

at Aden, ocean-going ships often sailed on to Jidda bringing prosperity to that port. When the Crusaders held Aqaba they cut the caravan road from the Hejaz to Egypt; but they were far from consistently hostile to Moslem trade from which they also derived both revenue and supplies, while the fashions and tastes which they adopted among themselves and popularized in Europe increased the already considerable demand for oriental products.

The commodities sent to the western markets were mostly natural products either of Arabia itself, or of India, Ceylon, or south-eastern products - spices, drugs, dyes, and precious stones, but there were some manufactures such as textiles. The chief Arabian products concerned were frankincense, myrrh, precious stones and balm. The use of coffee, introduced from Abyssinia, was established in Arabia by 1500 but it was not yet exported to Europe[1]. Europe sent in return gold, silver, slaves from eastern Europe, copper, tin, brass, woollens and cloth goods, much of which passed through the Red Sea. Arabia imported cotton goods, rice and sugar from the east. The Arabs also took clocks from Aden, Indian cotton goods, copper and spices to Africa in exchange for gold, slaves and ivory. Horses were the chief Arabian export to India, and Malaya controlled most of the trade of the Indian ocean. The colonies of Arab merchants in South China moved to Malaya about 900, but there was direct communication by sea between Arabia and China until the fifteenth

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(1) Ibid

century.

When the Egyptians had taken Acra in 1291 and the failure of the Crusades was complete some Europeans, who understood the dependence of Moslem power on this trade, made suggestions for its destruction. They thought that Egypt would be ruined in six years if this were done and if spices were bought through Baghdad, then in Mongol hands(1).

The discovery of the Cape route (1498).

The discovery of the sea route to India by Vasco da Gama in 1498 had immense significance for the Moslem countries which lost much strategic and commercial importance when European ships could visit any seaport in Asia. The new route diverted the Red Sea trade southward round the Cape of Good Hope to Europe(2). Up to that date the Arabs had been the agents of all commerce passing through the Red Sea. Aden, with its commanding and favourable position, was the centre of that trade and maintained close commercial relations with Egypt, Abyssinia, Persia and India. Jidda had become another centre of exchange on the eastern side of the Red Sea.

To the Europeans of the middle ages the southward extent of Africa was unknown. During the fifteenth century the Portuguese had made many attempts to find a route round Africa in the hope of spreading Christianity, of joining the Eastern Christians in an attack on Islam, and of securing for themselves the profits of the Eastern trade.

(1) Ibid
(2) Lane. Poole. History of Egypt page 350

By 1509 the Portuguese had defeated a great Muslim fleet at the battle of Diu on the north coast of India and controlled most of the African coast north of the Horn of Africa as well as of considerable areas of coastal India and Arabia(1). The Portuguese also made efforts to establish trading stations along the coast of the Red Sea, of which latter only Massawa was satisfactory because much of the coast was held by Moslems. However, they never succeeded in getting further north than Abyssinia and their station, Massawa, soon had to be abandoned.

The Turkish Period

From the beginning of the sixteenth century, when the Turks occupied Jidda, Suakin, Massawa, Mocha, they closed the Red Sea to all vessels except those of the Sultan. The foreign trade of the Red Sea thereafter suffered greatly from the Portuguese conflict with the Turks.

The Struggle for the Red Sea Trade, 1500-1869

In the struggle now beginning, the Portuguese were hampered by lack of numbers, resources and capital, by business inexperience, and distance from home. The Egyptian and Turkish galleys were better suited to the Mediterranean. The Arab merchants opposed the Portuguese from the first, while the Venetians were as hostile as

(1) Pankhurst, R. The Economic History of Ethiopia. 1961. page 72

their European policy allowed[1]. The Portuguese, envying the commercial experience and unequalled knowledge of spices possessed by the Venetians, urged them to transfer their business from Egypt to Lisbon, but the Venetian Council of ten considered that such a diversion of trade would be disastrous. In 1504 the Council considered suggesting to the Sultan the digging of a canal from the Mediterranean to the Red Sea, but later omitted this part of their envoy's instructions[2]. Nevertheless, a traveller in 1529 found 20,000 men working at Farama on a canal; it was never finished though the project was again considered by the Turks in 1586. When at last the Sultan decided on war with Portugal, Venice, as a Christian state, declined to give him active help[3].

In 1507 an Egyptian fleet was built and left Suez under the governor of Jidda. It defeated the Portuguese in the harbour of Chaul, south of Bombay (1508), but was badly beaten by Diu, west of the Gulf of Cambay (1509). The Portuguese planned to occupy strategic points for the control of trade and saw that Aden was the key to the Red Sea. Aden was well fortified and, as a refuge from the Portuguese warships, it had become prosperous. The Portuguese attacked it without success in March 1513; entered the Red Sea burning Arab ships but failed to reach Jidda. Meanwhile the Mamluks

(1) Western Arabia & the Red Sea op. cit. page 257
(2) Ibid page 258
(3) Ibid

had decided the conquer the Yemen, either as a base to use against the Portuguese or as a refuge for themselves if the Ottoman Turks invaded Egypt. A fleet sailed from Suez in 1515 but failed to take Aden and returned to Jidda. Two years later Selim I, Ottoman Sultan of Turkey, occupied Yemen. When the Portuguese reached Aden in the same year (1517) they discovered that Aden was strong enough to resist and therefore withdrew. Later Portuguese expeditions were sent primarily to investigate or interrupt Turkish naval preparations to regain sea-power. In 1529 and 1530 two fleets left Suez but were defeated by local population at Aden and by the Portuguese in the Indian Ocean. In 1541 Estenao da Gama, Vasco da Gama's son, sailed from Goa for Suez; he went on to Suakin, Quseir and Tor, but the sight of the defences and the Turkish fleet at Suez caused him to retreat(1).

In 1580, 1584 and 1589 the Turks made several attacks on Muscat and on the Portuguese colonies in East Africa. Portugal was now declining; her union with Spain in 1580 brought trouble and war with the new naval powers, England and Holland, who infringed her commercial monopoly. After her expulsion from Hormuz in 1622 by the English and Persians she was of no importance in Arabian affairs, though she shared in the trade of Mocha till the middle of the eighteenth century. Communication with Abyssinia

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(1) Western Arabia & the Red Sea op. cit. page 260

became very difficult and Portuguese influence on that side of the Red Sea ended with failure(1).

Thus the foreign trade of the Red Sea suffered greatly from the Portuguese conflict with the Turks. Moreover the Portuguese, who were mainly interested in the Indies, never really replaced the Arabs as a trading power in the Red Sea and the East African waters(2). By developing the trade route round the Cape of Good Hope they caused commerce in the Red Sea and the Gulf of Aden to decline(3). Ports like Massawa, Jidda, Suakin, Suez, and Mocha had flourished when international trade passed by their shores, fell on leaner days as the seas in question became backwaters of world commerce. Despite all these events Suez became once more an important Red Sea port. Girard thinks that pilgrimage was the principal reason and may have been the only cause for the continued prosperity of Suez(4), thus overlooking the very simple fact that a port had been there before the rise of Islam.

However, it was neither the trade between Europe and India nor pilgrimage to Mecca which alone necessitated the existence of the ports along the Red Sea basin since the Red Sea countries had their own trade with south-eastern countries of Asia.

In the seventeenth century the Dutch and English diverted

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(1) Ibid.
(2) Pankhurst, A. The Economic History of Ethiopia, 1961. page 360.
(3) Kennedy, Cooke. The Red Sea Coast, 1540. S.N.R. Vol. XVI, 1933
(4) Description de l'Egypte XVIII, quoted by Londet 1.12.

most of what was left of the Red Sea trade to the Cape route[1]. The English first brought spices from the Levant in English ships in 1511, but they also bought them in Lisbon and tried to obtain them from Persia across Russia; they did not enter the Indian Ocean till Drake's voyage of circumnavigation (1577-1580). The union of Spain and Portugal (1580), the closing of Lisbon markets, and the rout of the Spanish Armada (1588) were additional incentives to the venturesome English merchants to compete for trade in eastern waters[2]. The East India Company was chartered in 1600 and, in the attempt to force a way into the Indian trade against Portuguese and Dutch resistance, expeditions were sent to Aden and the Red Sea. Aden was visited yearly by a few small ships from India and the Persian Gulf, bringing turban cloths and cotton goods and returning with gum arabic, frankincense, myrrh and madder[3]. Mocha, on the other hand, was increasingly important being frequented by merchants from many parts of the Middle East and from India. The Indian merchants, bringing iron among other things, sailed with the first of the easterly winds, remaining during the winter and through most of the south-western monsoon, and leaving for India towards the end of the latter, in late August; during their stay they tradedwith the merchants who sailed from Suez to Mocha with the north-westerly

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(1) Lybyer, H. The Ottoman Turks and the Routes of Oriental Trade, 1940.
(2) Handbook of Arabia and the Red Sea. op. cit. page 252
(3) Ibid.

winds, and returned to Suez with the first easterly winds of autumn. The commanders of the East India Company thought that Mocha offered scope for the sale of English commodities. Coffee, not mentioned in the Company's sale lists until 1660, had already become by far the most important export of Mocha(1).

The first Dutch voyage to the East was made in 1595-1597 and the Dutch East India Company was chartered in 1602. Most of its efforts were concentrated in the East Indies, Sumatra and Ima. In 1616 a Dutch commander visited Mocha which had grown from a fishing village to a prosperous town in half a century! In 1618 their ambassador secured permission for the Dutch to stay in Yemen ports, but advised them to avoid the northern Red Sea ports. Spasmodic trade continued until in 1663 the first important cargo of coffee was sent to Holland. In 1708, at the request of the Imans (now independent of the Turks), a factory was opened at Mocha and given the right to export 600 bales of coffee annually free of duty. Coffee was now being grown in Java, and in 1738 the Dutch East India Company decided to close the Mocha factory, although ships still made occasional calls(2).

A private French voyage to the East was made in 1529 and in 1619-1620 Beaulieu sailed along the south coast of Arabia. Later the French hoped, with the help of Turkey, to revive the Red Sea

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(1) Handbook of W. Arabia and the Red Sea. page 264

(2) Ibid.

trade and wanted to have Consuls in the ports.(1) In 1708-1709 French ships called at Aden and Mocha and a commercial treaty was made. In 1711 other ships called and procured coffee bushes to plant in Reunion. The Imam refused a Turkish request that he should stop trading with Europe, but the French were offended when their goods were paid for only indirectly by remitting future customs dues; therefore, in 1737, they bombarded Mocha. Though coffee sold in France for about twice its cost in Arabia, the trade ceased to be profitable and was gradually abandoned.

Some of the smaller European nations also took part in that trade, i.e. Belgium, Sweden and Denmark.(2)

During the eighteenth and nineteenth centuries the Turks were still in nominal control of the Red Sea and the countries bordering on it. The major trade mainly consisted of slaves; other trades gradually declined on account of the presence in the Red Sea of Turkish pirates and the oppressive methods of Turkish rulers at their ports. Bruce, a Scottish traveller, gives a good account of the Red Sea and its trade in the story of his travels to discover the source of the Nile in the years 1768-1773. He described the Turkish invasion and occupation, and how under their control the trade and riches of the Red Sea declined.(3) His description confirms other known facts of the Turkish regime in the Red Sea.

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(1) Ibid
(2) The Handbook of Western Arabia & the Red Sea. page 265
(3) Bruce, Vol. VII. p.90.

The Turks, in trying to take all, lost all, and their inability to maintain order inland lost for them what might have been a valuable asset. As a result they lost control over this part of their empire and the Red Sea trade entered upon a period of decline.

One element in the long-continued decline of Ottoman power was the control gained by foreigners over much of the economic life of the Turkish state. As the result of Ottoman indifference to commercial development the way had been largely left clear for activities by outsiders[1]. Even in the sixteenth century, when Turkish power was at its height, commercial treaties were negotiated with France by which French merchants enjoyed special privileges within Turkish dominions. During subsequent years other European nations followed the French lead. Despite all these rights, the Red Sea, as a measure of safeguarding the sacred Moslem places against the European Christians[2] was barred to European vessels to the north of Tidda[3]. This prohibition aginst European navigation in the Red Sea remained in force up to the 19th century.

In 1887, B. Sylde, a merchant in Suakin and Tidda, described the trade of the Red Sea and reported that the time had not come when the hinterland of the eastern coast of the Red Sea could be

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(1) Fisher, W.B. The Middle East page 144.

(2) Ibid

(3) The Portuguese succeeded in reaching Suez despite this prohibition. See Zimmerer. La Mer Rouge. L. Abissynia, etc. I. III, Chapitre IV.

exploited. There were only a few unimportant European trading houses at Jidda and Hodeidah and no other centres of trade where a European could reside(1).

"The glories of old Mocha have gone, and the town is in ruin. There are hardly 300 souls living there, when but a few years ago it was a busy, thriving city of nearly 20,000".(2) The trade of the town port was largely destroyed during the wars between the English and the Moguls in 1687, being diverted to several other ports in the Red Sea; i.e. Suakin and Jidda(3).

Yembo, the seaport of Medina (24° o4' N. 38° o2'E.) exported a few skins and dates in large quantities to Egypt and to Sudan. Imported grain, rice and wheat, mostly from Jidda, which arrived from the Persian Gulf, Bombay and Calcutta, cloth and hardware from England, the continent, India and Singapore(4). After 1948 Yenbo port declined because Jidda took its place as the chief port through which most good and pilgrim traffic passed. Hodeidah port had taken the place of Mocha, the main exports here, besides coffee, being hides, skins, gum and pearls. The coffee mostly found its way to the continental markets. In exchange for the exports English goods were taken and Indian produce, especially rice. Before the Suez Canal was opened Hodeidah was the market for a good deal Red Sea ports(5).

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(1) Wylde, A.B. The Red Sea Trade. Journal of Manchester Geogr.Soc. Vol.III,1887. pp.181-201.

(2) Foster, W. The Red Sea & Adjacent Countried at the close of the 17th Century. London 1949. page 175.

(3) Wylde op. cit.

(4) Ibid.

(5) Ibid.

Throughout the first half of the 19th century, European maritime countries fell into two groups, the Mediterranean countries led by France who desired a short route to India by direct communication between the Mediterranean and the Red Sea; and Britain, who had always been resisting the latter idea as it would afford better chances for France in the keen competition for commercial supremacy in India and the Far East.

At last the French succeeded in persuading the ruler of Egypt to allow the cutting of the Suez canal.

Chapter V

THE RED SEA AFTER THE OPENING OF SUEZ CANAL

1869 - 1960

Introduction - colonial interests in the Red Sea - evolution of traffic through the Suez Canal and the Red Sea, 1870-1960 - goods traffic through the Red Sea - south-bound main goods traffic - classification of southbound goods traffic - northbound main goods traffic - classification of northbound goods traffic - traffic by nationality - traffic by category of vessels.

THE RED SEA AFTER THE OPENING OF SUEZ CANAL

The Red Sea is now one of the world's highways, but before the Suez Canal made it such, it was a cul-de-sac. The opening of the Canal in 1869 made the Red Sea a channel for a number of converging routes (Fig. 23). From the west there is a continuous stream of traffic from Western Europe through the Strait of Gibraltar; other routes from Marseilles, Genoa and Trieste converge on Port Said, at the entrance to the Suez Canal. Passing through the Canal and down the length of the Red Sea, the stream of traffic emerges into the Indian Ocean to divide into four branches, one going east-north-eastwards via Aden to Bombay and Karachi, another to the Persian Gulf ports and a third to the south to serve the eastern coast of Africa; the main stream crosses direct to Colombo, Ceylon. Here again the route forks, one branch going to Madras and Calcutta, a second to Rangoon, a third to Singapore, Hong Kong and the ports of China and Japan, and a fourth to the Australian ports.

Obviously the Canal gives considerable advantages to the Red Sea route. It has shortened the voyage from Europe and the Mediterranean to the East and Australia; for instance, the route is 4,000-5,000 miles shorter between Western Europe and India than the Cape route. The actual distance saved depends upon the ports at each end of the journey; between London and Bombay, for example, the saving is 4,450 miles, while the saving between London and Melbourne via the Red Sea route and Suez Canal is only 900 miles.

To André Siegfried, the sea route to India via Suez and the Red Sea is probably the most important of all the great routes of the world, for it joins East and West, Asia and Europe, that is, the two most thickly populated continents, having the most ancient civilizations.[1] It is not merely a matter of a route which joins East and West, but also of one which joins tropical and monsoon countries on the one hand with those of the temperate and cool zones on the other. In other words, it joins countries of widely different production. This route is thus likely to maintain its importance even if, as some predict, East-West trade diminishes and there remains only the North-South trade based upon climatic contrasts.

The possibility of picking up cargoes along the Red Sea route is an important factor for the flourishing of its ports. Half-empty tramps naturally adopt a course where intermediate ports may help them in this, while others that are fully laden will make for harbours where they can get rid of some of their freight. During the Suez Crisis, the Red Sea obviously lost status as a major transit route and its ports declined because (a) shipping space in the world as a whole became scarce, and vessels were usually filled completely at terminal points, and (b) even if a ship were only 80-90% filled, it would have been uneconomical for it to call at Aden or a Red Sea port, because that would have been far out of the way in relation to the Colombo-Cape line, which became dominant in traffic between South-East Asia and Northern Atlantic destinations; it would then have been preferable to call at Mombasa.[2]

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1 Siegfried, A.: Suez and Panama, 1940, p. 21.

2 Ethiopia Observer: August 1958, Vol. 11, No. 7, p. 243.

To Great Britain, more than any other country, the Canal and the Red Sea route have been of great commercial and strategic importance from the beginning, as the "Key to India" and Britain's other far-flung territories in the Far East.[1] The opening of the Suez Canal increased the importance of all the Red Sea ports, and it was not long before European merchants as well as the Egyptians settled in some of the ports, such as Suez, Suākin, Jidda and Massawa.

During the decade 1872-1882, after the opening of Massawa and Suākin ports to European trade, the importance of Jidda and Hodeida as marts for Sudan produce declined, and in 1882, just as the Mahdis troubles commenced, there only remained to them a slave trade, a little ivory, ostrich feathers, gold and gold dust, and musk, very valuable commodities and of little bulk, which could be carried with the slave caravans, whose slaves were used as transport; on these slaves the greater profits were realised.

After the revolution in the eastern Sudan, conditions at Suākin deteriorated rapidly. The Red Sea littoral was divided into four sections, with centres at Aqīq, Suākin, Muhammad Qōl and Haleib, at each of which stations police posts were established. All merchandise arriving at Suākin had to be inspected.[2] The merchants of Jidda and the Sudan further developed a large smuggling trade and the slave trade again increased greatly.[3]

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1 Woytensky, W. & others: World Commerce and Government, New York, 1955, p. 439.

2 Bloss, J. F. E.: The Story of Suakin; S.N.R., 1937, p. 272.

3 Wylde, A. B.: The Red Sea Trade; Journal of Manchester Geog. Soc., 1887, p. 183.

In 1895, trade once again increased; during the interval, the possibilities of developing Suākin as a port had been thoroughly investigated. The town and harbour presented many problems. The harbour entrance was narrow, and difficult for large vessels. In 1904 suggestions were put forward for creating another port, some 40 miles to the north of Suākin, at Mersa Barghout (later called Port Sudan).[1]

COLONIAL INTERESTS IN THE RED SEA

The opening of the Suez Canal in 1869 caused the Red Sea to be regarded as a promising field for colonial expansion, of great commercial and strategic importance. The Egyptian Government claimed the coast of the Western Red Sea from Cape Guardafui to Suez, to secure an administration more conducive to the promotion of trade in the Red Sea area than that of Turkey.[2]

The Red Sea was of particular interest to Italy, since her metropolitan territory had no port outside the Mediterranean, a handicap which she has constantly tried to overcome, either by acquiring some measure of control at the outlets of the Mediterranean and the Red Sea, or by securing a strip of land extending from the north coast of Africa to some point on the Indian Ocean.

In 1865 Guiseppe Sapeto, a former missionary who knew the Red Sea well, stated in his "L'Italia e il Canale di Suez" that the opening of

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1 Bloss, J. F. E.: Op. cit., p. 276.

2 Wylde, A. B.: Op. cit., p. 188.

the Canal would benefit Italy more than the nations of Northern and Western Europe, as it would greatly shorten her communications with the East. He stated that there were great possibilities for coastal trade and for fishing in the Red Sea, and urged the Italian Government to conclude commercial treaties and establish a naval station there.[1] In 1869 the Rubettino Company acquired a lease of the Bay of Assab. Sapeto suggested that Assab might replace Jidda as the centre of entrepôt trade in the Red Sea, being much nearer to Mocha and Hodeida. The Italians, who only had the small settlement at Assab Bay, claimed the coast from opposite Perim round Annesley Bay to Massawa, and again north of Massawa to Mersa Mobarack, quite close to Aghig. The territory was declared an Italian Colony in 1882.

In 1882 the British Government had taken control of Egypt, and with the passing of the Sudan into the hands of the British and Egyptians, Suākin as its only port naturally commanded a good deal of attention.[2] As the only port of the Sudan, Suākin was of great value: for Egypt, it centrally placed for trade from India, Abyssinia, Arabia and the Yemen, and was the main port for Sudanese and West African pilgrims. The British took over Berbera and Zeita in 1884 to secure the Red Sea trade; the French occupied Obok and Tajura in the same year, and Jibuti on the African coast in 1888. Italy had herself taken advantage of the Egyptian Collapse to occupy Massawa in 1885. The Italian Government

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1 Sapeto, G.: L'Italia e il Canale di Suez, 1865.

2 Bloss, J. F. E.: Op. cit., p. 273.

tried to show that the policy they advocated would not involve rivalry with Britain, whose aims were strategic, whereas Italy's were commercial. The Italian Government saw the possibilities of trade with Arabia and also hoped to annexe a strip of territory to join Eritrea to Italian Somaliland, but both projects failed after the disaster of Adowa in 1896. It was nearly decided to abandon Eritrea, and colonial policy was for a time discredited in the Red Sea area.

The twentieth century has witnessed great changes in the Red Sea area. The decline of the Ottoman Empire, which had been in progress for two centuries, gained momentum in the twentieth, and by joining the Central European Powers in the War of 1914-1918 the Empire signed its death-warrant. The Italians withdrew from Eritrea after the Second World War (1939-45); the British withdrew from the Sudan in 1955, and from Egypt in 1956.[1] Since that year the Red Sea area has been freed from external domination.

EVOLUTION OF TRAFFIC THROUGH THE SUEZ CANAL AND THE RED SEA: 1870-1960

As a commercial venture, the Canal has been an outstanding success over most of its period of existence. In 1870 vessels carried, roughly, 436,600 net tons; in 1900, 3,441 vessels paid tolls on 9,738,000 net tons; in 1920, when traffic had nearly resumed normal proportions

1 Fisher, S. N.: The History of the Middle East, 1959.

following the First World War, 4,009 vessels passed through the Canal with 17,574,650 net tons of cargo.[1] In 1937, the last year of normal use prior to the opening of World War II, vessels carried 36,491,000 net tons. Canal traffic was irregular during World War II, and although the Canal was closed to use by enemy action only for a total of 76 days, transits were greatly reduced in number during the years 1941-1944, and a considerable proportion of the shipping of those years was related to the conduct of the war. In 1947 Suez Canal transits numbered 5,972, with a net tonnage of 36,576,600; by 1950, with a cold war rapidly developing, vessels passing through the Canal numbered 11,751, an average of more than 32 vessels a day throughout the year. Total net tonnage for the year reached 69,752,300 tons, one hundred and sixty times the weight of goods transported between the Mediterranean and the Indian Ocean eighty years earlier. In 1960, 18,734 vessels carrying 185,322,000 tons passed through the Canal.[2]

During the years 1956-60, the evolution of the daily average number and net tonnage of transiting vessels was as follows.[3]

TABLE 13

	1956	1957	1958	1959	1960
Daily average number of vessels	43.6	46.6	48.9	48.6	51.2
Daily average net tonnage (000 tons)	351	393	423	448	506

1 Hoskins, H. L.: The Middle East, London, 1954, p. 47.

2 See Table 38.

3 Suez Canal Authority, 1961.

TABLE 14

CHANGING PATTERNS OF SOUTHBOUND GOODS TRAFFIC (Thousand Tons)

Year	Petroleum	Cement	Fertilizers	Coal & Coke	Railway Stock	Fabricated Metals	Wood Pulp & Paper	Salt	Cereals & Derivatives	Others	Total
1921	211	214	129	1,122	554	1,127	115	341	-	2,763	6,576
1922	282	307	153	1,663	647	1,402	208	380	-	3,151	8,193
1923	287	434	226	589	578	1,736	263	350	-	3,242	7,705
1924	304	356	317	662	622	2,016	307	472	-	3,762	8,818
1925	322	376	393	680	643	1,903	291	457	-	3,743	8,808
1926	297	393	462	294	628	2,450	322	418	-	4,540	9,804
1927	347	545	509	667	900	2,531	294	534	-	4,755	11,082
1928	346	700	752	606	865	2,986	343	581	-	4,784	11,963
1929	350	774	845	771	638	3,588	431	481	-	5,018	12,896
1930	398	552	679	450	425	2,613	368	432	4	3,513	9,434
1931	367	343	702	296	229	1,905	387	258	30	2,860	7,377
1932	518	270	463	178	126	1,738	430	256	7	2,328	6,314
1933	627	313	462	177	160	2,241	443	239	207	2,334	7,203
1934	635	402	464	144	437	2,316	450	348	344	2,444	7,984
1935	759	524	502	240	275	2,590	514	323	270	2,927	8,924
1936	707	571	563	216	244	2,542	530	324	63	3,069	8,829
1937	360	582	879	473	321	2,890	690	408	67	3,487	10,157
1938	283	561	655	208	255	1,954	390	349	73	3,040	7,768

TABLE 14 (Contd.)

CHANGING PATTERNS OF SOUTHBOUND GOODS TRAFFIC (Thousand Tons) (Contd.)

Year	Petro-leum	Cement	Ferti-lizers	Coal & Coke	Railway Stock	Fabri-cated Metals	Wood Pulp & Paper	Salt	Cereals & Deri-vatives	Others	Total
1939	229	586	584	273	193	1,686	362	583	105	2,916	7,517
1946	73	404	515	18	114	668	178	131	1,236	2,658	5,995
1947	94	599	508	45	123	1,210	254	655	1,313	3,020	7,821
1948	70	1,056	367	191	198	1,682	334	951	1,132	3,735	9,716
1949	166	1,326	673	161	329	2,642	452	1,136	1,668	4,475	13,028
1950	111	1,110	1,089	549	377	2,725	450	161	779	4,790	12,141
1951	1,931	1,207	1,085	328	308	2,788	510	835	2,215	6,213	17,420
1952	6,415	1,701	1,593	406	304	2,529	441	393	2,176	6,043	22,001
1953	7,231	1,587	2,065	72	268	3,052	608	406	1,468	5,761	22,518
1954	6,086	1,990	2,089	75	385	3,169	568	470	504	7,036	22,370
1955	1,905	2,683	2,454	116	467	3,759	611	497	489	7,101	20,082
1956	1,755	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	16,352	18,107
1957	847	1,285	1,935	61	426	3,514	367	182	1,046	4,441	14,104
1958	2,376	1,379	3,685	149	760	5,331	506	404	3,937	6,416	24,943
1959	2,494	1,684	3,905	225	376	5,484	620	530	3,870	7,317	26,505
1960	3,007	1,131	4,002	458	354	5,644	649	679	4,686	8,643	29,253

(1) Cannot be classified due to absence of the Captains' Declarations of July 1956 (Suez crisis).

Source: Suez Canal Management, Statistical Dept.; Suez Canal Report, 1960.

TABLE 15

CHANGING PATTERNS OF NORTHBOUND GOODS TRAFFIC (Thousand Tons)

Year	Petro-leum Products	Cereals	Ores & Metals	Oil Seeds	Textile Fibres (raw)	Others	Total
1921	1,313	2,957	847	1,413	887	3,516	10,933
1922	2,001	2,127	1,447	2,332	1,358	3,904	13,169
1923	2,152	3,027	1,610	2,679	1,456	4,149	15,073
1924	2,322	3,632	1,472	2,797	1,640	4,848	16,711
1925	2,661	3,857	1,511	3,079	1,661	5,007	17,776
1926	3,019	2,091	1,448	2,841	1,480	4,726	15,605
1927	3,158	3,417	1,686	3,139	1,864	5,177	18,441
1928	3,342	3,186	1,932	4,234	1,956	6,009	20,659
1929	3,714	2,610	2,189	4,688	2,024	6,395	21,620
1930	4,062	2,154	1,837	3,577	1,745	5,702	19,077
1931	3,310	2,840	1,179	3,847	1,520	5,259	17,955
1932	3,823	2,441	933	3,522	1,304	5,295	17,318
1933	4,933	2,477	1,009	4,024	1,769	5,500	19,712
1934	5,136	2,760	1,245	3,807	1,619	5,897	20,464
1935	4,285	1,972	1,385	2,588	1,832	5,342	17,404
1936	4,216	2,270	1,306	2,754	1,530	4,651	16,727
1937	5,705	3,406	2,121	3,439	1,673	6,275	22,619
1938	5,220	3,216	1,387	3,907	1,372	5,909	21,011

TABLE 15 (Contd.)

CHANGING PATTERNS OF NORTHBOUND GOODS TRAFFIC (Thousand Tons) (Contd.)

Year	Petro-leum Products	Cereals	Ores & Metals	Oil Seeds	Textile Fibres (raw)	Others	Total
1939	4,989	2,113	1,055	2,874	1,142	4,988	17,161
1946	8,371	244	1,151	499	979	4,687	15,931
1947	13,846	516	1,578	920	1,068	4,839	22,767
1948	28,937	1,910	1,405	923	1,241	5,237	39,653
1949	36,976	1,492	1,933	984	1,316	5,326	48,027
1950	47,526	2,061	2,212	1,444	1,489	5,736	60,468
1951	42,873	3,072	2,592	2,083	1,549	7,164	59,333
1952	45,933	1,824	3,731	1,531	1,409	7,019	61,447
1953	49,420	2,068	5,049	1,734	1,817	7,793	67,881
1954	56,978	2,189	4,552	1,765	1,629	7,398	74,511
1955	66,893	2,488	5,300	1,803	1,744	9,198	87,426
1956	65,777	(1)	(1)	(1)	(1)	17,099	82,876
1957	54,051	1,146	4,344	1,153	999	5,526	67,219
1958	94,401	1,681	5,602	1,594	1,766	9,386	114,430
1959	98,721	2,991	5,671	1,991	1,953	10,422	121,749
1960	114,419	2,673	8,257	1,883	1,808	10,590	139,630

(1) Cannot be classified due to absence of the Captains' Declarations of July 1956 (Suez crisis)

Source: Suez Canal Management, Statistical Dept.; Suez Canal Report, 1960.

From the above table it is clear that the number of vessels and net tonnage increased from 43.6 vessels in 1956 to 51.2 in 1960, and the net tonnage has increased from 351,000 tons in 1956 to 506,000 tons in 1960. It is clear that in general, so far as transits and net tonnage are concerned, growth continued after 1872 and through the eighties; there was a stagnation in the nineties, a rather slow growth from 1900 to 1910, a rapid increase from 1911 to 1913, followed by a decline during the First World War and a rapid rise after 1918.

From the beginning the amount of northbound traffic has exceeded southbound, a gap which has steadily increased (see Figs. 26 & 29). In 1910 southbound cargoes amounted to 8,429,000 tons (38% of the total traffic) and northbound to 14,006,000 tons (62%).[1] In 1955 the proportion was 20,082,000 tons southbound (18%) to 87,426,000 tons northbound (82%).[2] The character of the cargoes through the Canal and the Red Sea has changed radically through the years. In 1910 four groups of products accounted for 68% of the northbound tonnage: cereals (23%), oil seeds (23%), textiles and fibres (13%), and ores and metals (9%). Coal and coke ranked first in southbound traffic, contributing 12% of the total.

World market and production changes have from time to time altered the character of the cargoes in one direction or the other.[3] The

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1 Hallberg, C. W.: The Suez Canal, London, 1931, p. 379.

2 Mountjoy, A. B.: The Suez Canal at Mid-Century; Economic Geography, Vol. 34, 1958, p. 156.

3 See Fig. 24 and Tables 14 & 15.

amount of coal being shipped was still far superior to oil on the eve of the First World War, but a decline became noticeable after the Second World War, reflecting both Britain's changing situation as the world's premier coal exporter, and a decline of coal-fired shipping, resulting in decreasing demand for bunker coal. The exploitation of petroleum in the Persian Gulf area is responsible for the most radical shift of all. In 1910 petroleum constituted only 1% of the northbound tonnage. By 1939, 29% of the northbound tonnage was crude oil, in 1955 it was 72%, and in 1960 it formed 82% of the total traffic in this direction, (Fig. 29). That means that the Persian Gulf area is the source of origin of two-thirds of the traffic through the Red Sea, and during the Suez Crisis the significant influence of the Suez Canal was greatly reflected in the economies of many nations, particularly those of Western Europe.[1]

As the Red Sea is fed by the trade currents of the whole world, so there can be no better barometer for measuring its trade than the Suez Canal.

Of the two traffic currents, the northbound is the simpler, being chiefly made up of raw materials. The southbound traffic is more complex, as it comprises not only manufactured goods, but also certain raw materials that have been partially processed.

The question is: Which of these Canal statistics is likely to be the best indicator of the general trend of international trade? The net tonnage figure mainly discloses the level of shipping activity, whereas the volume of goods corresponds to commerce.

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1 Mountjoy, A. B.: Op. cit., p. 156.

GOODS TRAFFIC THROUGH THE RED SEA

The difference between the northbound and southbound traffic through the Red Sea enables us to examine the nature of the trade that is taking place. The volume of goods moving in both directions in 1960 amounted to 168,883,000 tons, including 117,426,000 tons of oil products (Fig. 25).

TABLE 16: DAILY AVERAGE TONNAGE OF GOODS IN TRANSIT

	1956	1957	1958	1959	1960
Oil products	221.4	243.6	265.1	277.3	320.8
Other commodities	109.7	111.6	116.7	128.9	140.6
Total	331.1	355.2	381.8	406.2	461.4

This comparison shows that oil traffic increased by 45% between 1956 and 1960, whereas other goods expanded by only 28% within the same period.

TABLE 17: ORIGIN AND DESTINATION OF GOODS TRAFFIC NORTH OF THE RED SEA

	1960	
	000 tons	%
North & West European Ports & U.K.	95,615	56.6
Baltic Sea Ports	3,957	2.3
North Mediterranean Ports	29,535	17.5
East & South-east Mediterranean Ports	2,953	1.8
West & South-west Mediterranean Ports	4,077	2.4
Black Sea Ports	5,086	3.0
American Ports	18,050	10.7
Other Areas	9,610	5.7
Total	148,254	100.0

Of this traffic, 136,966,000 tons, or 81% of the total transit traffic, was shared by the ten countries listed in Table 18.

TABLE 18:[1] DISTRIBUTION OF TRANSIT TRAFFIC OVER WESTERN EUROPE THE UNITED STATES & RUSSIA

Country	000 tons
United Kingdom	38,744
Italy	21,411
Holland	17,540
France	14,986
U.S.A.	13,836
Germany	13,078
Belgium	5,785
Spain & Canary Islands	4,701
Russia	3,720
Sweden	3,165
Total	136,966

1 Suez Canal Authority: Suez Canal Report, 1960, U.A.R., p. 103.

SOUTHBOUND MAIN GOODS TRAFFIC[1]

TABLE 19: 1960

(in thousand tons)

LOADING REGIONS

	Fab. Metals	Cereals	Fertilizers	Cement	Machines	Chemicals	Wood Pulp & Paper	Sugar	Salt	Fuel Oils	Railway Stock
W. & N.W. European Ports	2,648	213	2,195	425	866	519	438	350	19	266	295
Mediterranean European Ports	397	143	556	152	54	26	36	74	200	5	13
African Ports	9	157	129	232	-	1	-	-	297	-	-
Baltic Sea Ports	446	142	63	235	39	19	9	92	19	25	3
American Ports	237	3,919	69	24	101	229	21	314	-	159	7
Other & Unspecified regions	625	112	990	63	222	115	145	99	144	24	36
Total	4,362	4,686	4,002	1,131	1,282	909	649	929	679	479	354

UNLOADING REGIONS

	Fab. Metals	Cereals	Fertilizers	Cement	Machines	Chemicals	Wood Pulp & Paper	Sugar	Salt	Fuel Oils	Railway Stock
E. Africa & Red Sea Ports	168	303	167	175	66	17	22	202	12	14	23
Arabian Gulf Ports	605	179	22	539	113	71	47	265	2	27	59
S. & S.E. Asian Ports	1,209	3,863	1,380	309	318	453	219	183	12	242	178
Far Eastern Ports	1,284	192	2,187	17	104	98	82	228	633	42	56
Australia & Pacific Is.	284	16	76	15	264	77	153	2	8	12	1
Other Regions	812	133	170	76	417	193	126	49	12	142	37
Total	4,362	4,686	4,002	1,131	1,282	909	649	929	679	479	354

1 Suez Canal Authority: *Op. cit.*

From the above table it is clear that most of the southbound traffic came from Western and North-western European countries and the United States, and went to the Far Eastern countries and to South and South-eastern Asia, as is also shown in Fig. 26.

For areas situated to the south of the Canal, the distribution of goods traffic from and to them is as follows.

TABLE 20: ORIGIN AND DESTINATION OF GOODS TRAFFIC SOUTH OF THE RED SEA

	1960	
	000 tons	%
Red Sea Ports[1]	4,166	2.5
East African Ports & Aden	4,566	2.7
India, Pakistan, Burma & Ceylon	17,511	10.4
Arabian Gulf Ports	113,037	66.9
South-east Asian Ports	6,567	3.9
Far Eastern Ports	12,122	7.2
Australian Ports	4,807	2.8
Other Areas	6,107	3.6
Total	168,883	100.0

Of this traffic, 136,306,000 tons, or 81% of the total transit traffic, was shared by the ten countries listed in Table 21.

1 Suez Canal Authority: Op. cit.

TABLE 21: DISTRIBUTION OF TRANSIT TRAFFIC OVER ASIA, THE FAR EAST AND THE PACIFIC

Country	000 tons
Kuwait	53,725
Iran	23,466
Saudi Arabia	18,149
India	12,217
China	6,115
Iraq	5,501
Qatar	4,809
Australia	4,802
Japan	3,769
Bahrein	3,753
Total	136,306

The daily average of southbound goods in the last five years has evolved as follows.

TABLE 22

	1956	1957	1958	1959	1960
(Thousand tons)	59.4	56.5	68.3	72.6	79.9

Goods traffic expansion between 1956 and 1960 has thus been in the region of 34.5%. This expansion has extended to all main commodities except cement (see Fig. 27).

CLASSIFICATION OF SOUTHBOUND GOODS TRAFFIC

Oil Products

Oil products traffic southbound in 1960 was 3,007,000 tons. Russia and Rumania head the list of countries exporting through the Red Sea, with 2,448,000 tons, equal to 81.4% of the total southbound oil traffic. This volume includes 98.3% of the crude oil in 1960, 97% of the gas oil, 67% of the motor spirit, 64% of the fuel oil and 48% of the kerosene.

The principal loading areas in 1960, and quantities shipped (in thousand tons) were as follows: Black Sea ports - 2,448; European ports - 429; American ports - 85, and the total was 3,007.

Great Britain comes next with 237,000 tons exported, representing 7.9% of the total quantity passing in 1960. Caribbean exports amounted to 70,000 tons.

Japan leads the list of receiving countries with 1,136,000 tons, or 38% of the total quantity in the considered direction. This, entirely originating from Russia, includes 927,000 tons of crude oil, 116,000 tons of gas oil and diesel oil, 79,000 tons of fuel oil and 11,000 tons of motor spirit. The U.A.R. (Port of Suez) comes next in 1960 with 731,000 tons unloaded there, representing 24.3% of the total southbound quantity. Russia exported to the U.A.R. 640,000 tons, representing 87.6% of the total quantity of oil received by the latter, of which 474,000 tons were crude oil constituting the whole quantity of this product arriving at Suez, and 166,000 tons were of refined products; 77,000 tons of kerosene came from Rumania, 7,000 tons from the U.K. and 7,000 tons of fuel oil from Italy.

China received 353,000 tons through the Red Sea. Of this, 323,000 tons, or 88%, were from Rumania. Chinese imports included 122,000 tons of motor spirit, 109,000 tons of gas oil and 81,000 tons of kerosene. Malaya imported through the Red Sea 226,000 tons of refined oil products, of which 119,000 tons were from the U.K., 34,000 tons from France and 18,000 tons from Italy.

Other Commodities

The volume of southbound commodities, excluding oil, amounted to 26,246,000 tons, compared with the figure for 1955 (18,177,000 tons), the increase being 44.4% within the five-year period.

Fabricated metals, machines and railway stock: this category constitutes the main part of the southbound goods, with 5,998,000 tons or nearly one quarter of the total quantity. The distribution of this traffic in 1960 by areas situated to the south of the Red Sea was as follows: Red Sea, Aden and Africa - 258,000 tons; Arabian Gulf - 777,000 tons; India, pakistan, Ceylon and Burma - 1,411,000 tons; South-east Asia - 295,000 tons; Far East - 1,444,000 tons; Australia - 531,000 tons, and other areas - 1,282,000 tons.

Fabricated metals amounted to 4,362,000 tons in 1960, the distribution among areas situated to the south of the Suez Canal being as follows: Far East - 1,284,000 tons; India, Pakistan, Ceylon and Burma - 1,001,000 tons; Arabian Gulf - 605,000 tons; Australia - 272,000 tons; South-east Asia - 208,000 tons; Red Sea, East Africa and Aden - 168,000 tons, and other areas - 824,000 tons. The volume of fabricated metals included

1,720,000 tons of iron and steel, 1,033,000 tons of sheets and plates, and 703,000 tons of pig iron. European ports shipped 3,046,000 tons, or 70% of the total quantity, including 793,000 tons from Britain, 368,000 tons from Belgium, 267,000 tons from Spain, 94,000 tons from Holland and 91,000 tons each from Germany and Italy. Black Sea ports shipped 446,000 tons and American countries 237,000 tons.

Japan was among the main metal-importing countries, with 723,000 tons unloaded in its ports in 1960, followed by China with 437,000 tons, and India with 432,000 tons.

Machines and parts amounted to 1,282,000 tons in 1960. This exceeds by 254,000 tons (24.7%) the figure for 1955.

European countries exported 921,000 tons, of which 489,000 tons were from Britain; American ports shipped 101,000 tons, of which 95,000 tons were from the U.S.A. The main unloading areas were: South and South-east Asia - 318,000 tons; Australia - 257,000 tons; Arabian Gulf - 113,000 tons; Far Eastern ports - 104,000 tons; Red Sea ports and East Africa - 66,000 tons, and other areas - 424,000 tons.[1] India received 105,000 tons or nearly one third of the quantities shipped to South and South-east Asian ports.

Railway stock amounted to 354,000 tons in 1960. Europe exported 308,000 tons, or 87% of the total quantity. Britain's exports of railway stock through the Red Sea were 101,000 tons; Poland's amounted to 31,000 tons, France's were 27,000 tons and Belgium's were 26,000 tons.

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1 Suez Canal Authority, Statistical Dept., 1961.

South and South-east Asian ports unloaded 178,000 tons of railway stock, Arabian Gulf ports received 59,000 tons, Far Eastern ports received 56,000 tons and the Red Sea and East African ports received 23,000 tons.[1]

Cereals: a great expansion in the traffic of cereals was registered in 1960. Quantities in transit through the Suez Canal in that year were 4,686,000 tons, nine and a half times those of 1955, which amounted to 489,000 tons. The U.S.A. exported through the Red Sea 3,740,000 tons or about 80% of the total quantity. European ports shipped 356,000 tons, Canada 164,000 tons, and the U.A.R. 146,000 tons. India received 2,867,000 tons, Pakistan 851,000 tons, Japan 110,000 tons, and Ceylon 47,000 tons.

Mineral fertilizers: the traffic in this commodity climbed from 2,454,000 tons in 1955 to 3,905,000 tons in 1959, and reached 4,002,000 tons in 1960; hence there was an expansion of 1,548,000 tons between 1955 and 1960. Mineral fertilizers originating from European countries amounted to 2,668,000 tons, including 754,000 tons from Belgium, 593,000 tons from Germany, 449,000 tons from Italy, 304,000 tons from Holland and 176,000 tons from Britain. African countries shipped 949,000 tons through the Red Sea in 1960, including 818,000 tons from Morocco and 83,000 tons from Tunisia. Traffic in fertilizers from American increased from 22,000 tons in 1959 to 69,000 tons in 1960. China received 38.4% of the total quantity of fertilizers, amounting to 1,536,000 tons in 1960. India received 607,000 tons, Japan 482,000 tons and Ceylon 143,000 tons.

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1 Suez Canal Authority, Statistical Dept., 1962.

Cement: the traffic in cement regressed by 57.8% between 1955 and 1960 (1,131,000 tons in 1960 as compared with 2,683,000 tons in 1955). The U.A.R. headed the list of cement-exporting countries, with 219,000 tons shipped from the Mediterranean ports, followed by Russia (143,000 tons), Britain (117,000 tons), Yugoslavia (113,000 tons), Rumania (82,000 tons) and France (79,000 tons). The main areas receiving cement were as follows: Arabian Gulf (539,000 tons); India, Pakistan, Ceylon and Burma (252,000 tons); and East African countries (140,000 tons)

Sugar: the transit traffic in sugar showed an increase in 1960 of 70% on the figure for the previous year (929,000 tons in 1960 compared with 547,000 tons in 1959). European countries shipped 423,000 tons in 1960, including 182,000 tons from Britain, 39,000 tons from Holland and Belgium, and 26,000 tons from Germany. Caribbean Sea exports via the Red Sea registered 312,000 tons in 1960. Black Sea ports exported 92,000 tons and East and South Mediterranean ports 59,000 tons. Arabian Gulf countries received 265,000 tons of the transit traffic in sugar. Red Sea ports unloaded 148,000 tons, of which 64,000 tons were for the Sudan. South and South-east Asian ports received 183,000 tons, of which 74,000 tons went to Malaya, and 55,000 tons were unloaded in East African ports.[1]

Chemicals: the total transit traffic in 1960 amounted to 909,000 tons, of which more than half was comprised of export trade from Europe (545,000 tons), including 239,000 tons from Britain, 35,000 tons from

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1 Suez Canal Authority, Statistical Dept., 1962.

Holland, 24,000 tons from Germany and 18,000 tons from Italy. Exports from American ports totalled 229,000 tons in 1960, 204,000 tons of which were from the U.S.A. South Asian ports received 378,000 tons, of which 256,000 tons went to India, Far Eastern ports received 98,000 tons, Australian ports 76,000 tons and South-east Asian ports 75,000 tons.[1]

Salt: the transit trade in this commodity increased by 36.6% between 1955 and 1960 (497,000 tons in 1955 increasing to 679,000 tons in 1960). The U.A.R. was the main exporter of salt in 1960 with 287,000 tons, followed by Spain with 196,000 tons, Britain with 12,000 tons and Tunisia with 10,000 tons. Japan was the main importer, receiving 631,000 tons, or 93% of the transit traffic.

Wood Pulp and Paper: the traffic in this category in 1960 registered an increase of 38,000 tons as compared with 1955 (649,000 tons in 1960, 611,000 tons in 1955). European countries, which were the main source, exported 474,000 tons, or 73% of the total transit traffic; 60,000 tons were from Britain, 58,000 tons from Sweden, 37,000 tons from Germany and 26,000 tons from Italy. Australia received 153,000 tons, Pakistan, Burma and Ceylon 152,000 tons, Far Eastern ports 82,000 tons and South-east Asian ports 67,000 tons.[2]

Other goods: lubricating oils increased to 499,000 tons, an expansion of 34.6% compared with the figure of 356,000 tons for 1955. Britain exported 183,000 tons, or 38.2% of the total transit traffic, and India was the main importer with 143,000 tons.

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1 Suez Canal Authority, Statistical Dept., 1962.

2 Ibid.

The transit traffic in coal also expanded to 458,000 tons, nearly four times the figure for 1955 (116,000 tons). Poland exported 256,000 tons, or 55.9% of the total amount, and Pakistan received 245,000 tons, or about half of the total.

Timber traffic increased from 165,000 tons in 1955 to 200,000 tons in 1960.

Textiles increased from 177,000 tons in 1959 to 203,000 tons in 1960.[1]

NORTHBOUND MAIN GOODS TRAFFIC

Northbound traffic, from its very nature (heavy raw materials and bulk foodstuffs), has always been greater in weight than the southbound flow, which consists principally of manufactured articles, machinery and fertilizers.[2]

The flow of goods traffic northward amounted to 139,630,000 tons in 1960, topping by 79,162,000 tons the total amount for 1950. This expansion was mainly due to the increased traffic in oil products, metals and ores (see Figs. 28 & 29).

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1 Suez Canal Authority, Statistical Dept., 1962.

2 Mountjoy, A. B.: The Suez Canal at Mid-Century; Economic Geography, Clark University, U.S.A., April 1958, Vol. 34, No. 2, p. 156.

TABLE 23: NORTHBOUND MAIN GOODS TRAFFIC, 1960[1]

(in thousand tons)

	Metals and Ores	Cere-als	Oil Seeds	Tex-tile Fibres	Rubber	Oil Seed Cakes	Sugar	Wood	Fruit
LOADING AREAS									
E. Africa & Red Sea Ports	680	166	318	301	3	175	407	24	109
Arabian Gulf Ports	120	6	11	30	-	22	-	1	104
S. & S.E. Asian Ports	6,007	507	223	800	931	649	9	381	74
Far Eastern ports	958	708	1,218	109	46	113	101	90	111
Australia & S. Pacific	637	1,232	45	453	-	6	315	25	262
Other & un-specified areas	85	54	68	115	186	50	33	226	71
Total	8,487	2,673	1,883	1,808	1,166	1,015	865	747	731
UNLOADING AREAS									
W. & N.W. Euro-pean ports	5,399	1,731	1,193	939	381	897	625	397	457
Mediterranean European ports	1,487	351	279	115	73	19	53	100	102
African ports	38	14	6	10	5	-	4	1	3
Black Sea ports	470	258	65	43	103	-	-	7	22
American ports	679	44	53	116	227	1	101	5	52
Other & un-specified areas	414	275	287	585	377	98	82	237	95
Total	8,487	2,673	1,883	1,808	1,166	1,015	865	747	731

1 Suez Canal Authority: *Op. cit.*

The daily average of northbound goods in transit has evolved as follows during the years 1956-1960 (see also Fig. 30).

TABLE 24

	1956	1957	1958	1959	1960
(Thousand tons)	272	299	314	334	381

It thus appears that northbound goods traffic in 1960 had increased by 69% as compared with 1956.

Oil Products

Northbound goods traffic in 1960 included 114,419,000 tons of oil products, representing 82% of the total quantity of goods passing in this direction. The figure for 1950 was 47,526,000 tons, and the great expansion in oil traffic has been due mainly to the increase in oil exports from the Persian Gulf countries over the last few years.

The daily average of oil products in transit has steadily increased, as shown by the figures for the years 1956-1960 (see also Fig. 30)

TABLE 25

	1956	1957	1958	1959	1960
(Thousand tons)	216	240	259	270	313

This comparison reveals that oil traffic northward expanded by 45% between 1956 and 1960. During the period before this expansion occurred oil accounted for only 24% of northbound cargoes by weight. The fact that the traffic in oil is one-way (tankers returning in ballast) has accentuated the disparity between northbound and southbound trade.[1]

1 Mountjoy, A. B.: Op. cit.

The following table gives the distribution of quantities in 1960, by loading areas and the proportion of each to the total quantity (see also Fig. 31)

TABLE 26

Persian Gulf Countries	000 tons	% of total quantity
Kuwait	55,547[1]	48.5
Iran	22,744	19.9
Saudi Arabia	17,904	15.6
Republic of Iraq	5,184	4.5
Qatar	4,779	4.2
Bahrein	3,673	3.2
Other areas	53	0.1
Total	109,884	96.0
Other Countries		
Aden	1,570	1.4
U.A.R.	1,470	1.3
Singapore & Sunda Islands	1,379	1.2
Others	116	0.1
Total	4,535	4.0 [2]

1 Including: 1,433,000 tons from Mina Abdulla and 664,000 tons from Mina Saud.

2 Suez Canal Authority, Statistical Dept., 1961.

By comparing the figures for 1960 with those for 1955, it appears that the increase of exports from Kuwait reached 31%; exports from Iran were about four and a half times the quantities for 1955; those from Saudi Arabia increased by 266%, from Qatar by 34%, from Iraq by 21%, from Bahrein by 84% and from Aden by 112%. Exports from the U.A.R. in 1960 were ten times those of 1955, whereas those from Singapore and the Sunda Islands dropped by 30%.

The distribution of northbound oil products, by unloading areas, in 1960 was as follows (See also Fig. 31).

TABLE 27

European Countries	000 tons	% of total quantity
U.K.	30,214	26.4
Italy	18,356	16.0
Holland	14,033	12.3
France	13,746	12.0
Germany	10,114	8.8
Spain & Canary Islands	4,029	3.5
Belgium	3,958	3.5
Sweden	2,918	2.6
Greece	1,341	1.2
Portugal	1,114	1.0
Turkey	770	0.7
Finland	445	0.4
Others	491	0.4
Total	101,530	88.8

TABLE 27 (Contd.)[1]

American Countries	000 tons	% of total quantity
U.S.A.	7,357	6.4
Canada	2,447	2.1
Caribbean Sea ports	592	0.5
Others	32	-
Total	10,428	9.0
African Countries		
U.A.R.	846	0.7
Others	551	0.5
Total	1,397	1.2
Other Areas	1,064	1.0
Grand Total	114,419	100.0

Comparison of the above figures with those for 1955 shows that European imports increased by the following amounts: British, 47%; Italian, 50%; Dutch, 91%; French, 13%; Belgian, 93%, and Swedish, 47%. On the other hand, quantities imported by the U.S.A. dropped by 15%.

Crude Oil

The volume of crude oil in 1960 amounted to 103,281,000 tons, or 90.3% of the total volume of oil products in transit. The following

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1 Suez Canal Authority: *Op. cit.*

table gives the distribution of quantities in transit by loading areas.

TABLE 28[1]

Persian Gulf Countries	(1960) 000 tons	% of total quantity
Kuwait	53,285	51.5
Iran	21,436	20.7
Saudi Arabia	16,996	16.5
Republic of Iraq	5,184	5.0
Qatar	4,779	4.6
Bahrein	45)	
	)	0.1
Undetermined areas	53)	
Total	101,778	98.5
Other Countries		
U.A.R.	834	0.8
Singapore & Sunda Islands	597	0.6
Others	72	0.1
Total	1,503	1.5

The geographical distribution of crude oil in transit by origin and destination in 1960 was as shown in Table 29.

1 Suez Canal Authority: _Op. cit_.

TABLE 29[1]

Country of Origin	Europe 000 tons	American Countries 000 tons	Africa 000 tons	Others 000 tons
Kuwait	47,217	5,891	137	40
Iran	19,577	1,859	-	-
Saudi Arabia	16,307	641	19	29
Republic of Iraq	4,927	257	-	-
Qatar	4,122	657	-	-
U.A.R.	510	324	-	-
Singapore & Sunda Is.	526	71	-	-
Others	140	30	-	-
Total	93,326	9,730	156	69

Quantities received by the various countries comprising the above groups are shown in Table 30.[2]

TABLE 30

European Countries	000 tons	% of total
U.K.	27,516	26.6
Italy	17,820	17.3
France	13,644	13.2
Holland	12,102	11.7
Germany	10,045	9.7
Belgium	3,729	3.6
Spain	3,497	3.4
Sweden	2,061	1.2
Portugal	1,042	1.0
Finland	445	0.4
Others	162	0.2
Total	93,326	90.3

1 Suez Canal Authority: *Op. cit*.

2 *Ibid*.

TABLE 30 (Contd.)

American Countries	000 tons	% of total
U.S.A.	6,709	6.5
Canada	2,426	2.3
Caribbean Sea Ports	565	0.6
Others	30	-
Total	9,730	9.4
African Countries		
U.A.R.	156	0.3
Others	69	
Grand Total	103,281	100.0

It is clear from the above tables that the main destination of the northbound oil products is European countries, with 88.8% of the total traffic in oil. The main sources of this oil are the countries of the Persian Gulf, which provide 96.0% of the total (Fig. 31).

CLASSIFICATION OF NORTHBOUND GOODS TRAFFIC

The commodities moving through the Red Sea from south to north consist mainly of raw materials (e.g., iron ore, sugar, tea, etc). Some of these, such as iron ore and sugar, are available in other parts of the world, but there is no substitute for Indian and Ceylon tea, and Malayan tin and rubber are not easy commodities for which to find substitutes. Subject to these reservations, the following are usually the most important raw materials moving northward through the Red Sea. The main categories are metals and ores, cereals, oil seeds, oil seed cakes, rubber, raw textiles, jute fabrics, sugar, fruit, tea and timber; this traffic totalled 20,325,000 tons, or 80% of the total volume of goods in transit (excluding oil products), in 1960. The following is a brief analytical review of the traffic in each of these commodities in that year.[1]

Metals and Ores

Iron ore was the most important commodity in this category, with 57.4% of the total trade in metals and ores, 4,737,000 tons. The main loading and unloading ports for iron ore in 1960 are shown in Table 31.

TABLE 31

Main Loading Ports	000 tons
Indian ports	4,100
Chinese ports	356
Main Unloading Ports	
Dutch ports	1,304
German ports	898
Italian ports	704
Polish ports	659
Rumanian ports	259

1 Suez Canal Authority: Op. cit.

Manganese ore, which comes next in importance, registered 1,465,000 tons in 1960. India was the main exporter, with 1,077,000 tons, or 73.5% of the total traffic in this commodity. The U.A.R. exported 202,000 tons, or 13.8% of the total amount in transit. The main importers of this ore were American ports (408,000 tons), Dutch ports (225,000 tons), and British ports (203,000 tons).[1] Other items in this category include tin from Malaya, chrome and copper from East Africa, zinc from Australia, manganese from India and some iron from Malaya. The total amount of metals and ores in transit in 1960 was 8,257,000 tons, or nearly one third of all goods in transit other than oil products.

The most important ores, other than iron, together with the quantities in transit in 1960, are shown in Table 32.[2]

TABLE 32

	000 tons
Chrome and its ores	492
Ilmenite	424
Zinc and its ores	375
Lead and its ores	208
Copper and its ores	168
Tin and its ores	103

The Philippines exported 199,000 tons, or 40% of the total quantity of

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1 Suez Canal Authority: Op. cit.

2 Ibid.

chrome and chrome ores in transit northwards through the Red Sea in 1960; Mozambique exported 114,000 tons (23%). In the same year, 149,000 tons were unloaded in British ports and 73,000 tons in Norwegian ports.

India exported through the Canal 231,000 tons of ilmenite, and Australia 104,000 tons, whilst Great Britain received 192,000 tons and the U.S.A. 108,000 tons.

Cereals

The northbound volume of cereals in transit through the Red Sea in 1960 was 2,673,000 tons. Australia exported 1,222,000 tons via this route, including 689,000 tons of wheat and flour. Cereal exports from China amounted to 697,000 tons, including 436,000 tons of rice, i.e. 45% of the total quantity of this commodity in transit in 1960. Table 33 gives the amounts of the various types of cereal in transit in that year.[1]

TABLE 33

	000 tons
Rice	975
Wheat (milled & unmilled)	787
Barley	358
Maize	162
Others	391
Total	2,673

1 Suez Canal Authority: Op. cit.

Cereals shipped from South-east Asian ports via the Red Sea in 1960 were 259,000 tons. India, Pakistan and Burma shipped 248,000 tons, of which 226,000 tons came from Burma (including 216,000 tons of rice). East African ports exported 87,000 tons of cereals in 1960.

European ports were the destination of the major part of the transit traffic in cereals (2,081,000 tons); Black Sea ports received 258,000 tons. Table 34 shows the most important cereal-receiving areas in 1960.

TABLE 34

	000 tons
British ports	729
German ports	279
Italian ports	269
Russian ports	193
Polish ports	156
Belgian & Dutch ports	150

Oil Seeds and Vegetable Oils[1]

Northbound transit traffic in oil seeds through the Red Sea in 1960 amounted to 1,883,000 tons. Far Eastern ports were the main shippers of oil seeds, with 1,218,000 tons, or 65% of the total traffic. China's share in these quantities amounted to 797,000 tons, and that of the Philippines to 405,000 tons. Red Sea and East African ports shipped 318,000 tons in 1960, of which 184,000 tons was from the Sudan. Indonesia exported 89,000 tons, and Malaya 42,000 tons.

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1 Suez Canal Authority: Op. cit., 1962.

European ports were the destination of 1,473,000 tons, or 78% of the transit traffic in oil seeds in 1960, 274,000 tons of which went to Holland, 234,000 tons to the British Isles, 205,000 tons to Italy, 174,000 tons to Germany, 105,000 tons to Denmark and 81,000 tons to Poland.

South-east Asian countries exported 141,000 tons of vegetable oils, through the Red Sea, the main exporters in this area being Indonesia (80,000 tons) and Malaya (57,000 tons). China exported 73,000 tons, India 72,000 tons and Ceylon 31,000 tons.

The total amount of vegetable oils moving northward in 1960 was 369,000 tons, of which 235,000 tons were unloaded in European ports, 52,000 tons in American ports and 10,000 tons in Black Sea ports.

Oil Seed Cakes

Transit traffic in 1960 was 1,015,000 tons. India, Pakistan, Burma and Ceylon exported 608,000 tons. India alone is credited with 344,000 tons and Burma with 130,000 tons. Red Sea and East African ports exported 175,000 tons, of which 60,000 tons was from the Sudan. East and South-east Asian ports shipped 154,000 tons and the Philippines 91,000 tons. European ports received 917,000 tons, 90% of the total transit traffic in 1960.[1]

Sugar

The total transit trade in 1960 was 865,000 tons, of which 397,000 tons came from Malagasy ports, 315,000 tons from Australian ports and

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1 Suez Canal Authority: Op. cit.

68,000 tons from Philippine ports. Of the total amount, 679,000 tons went to European ports (including 467,000 tons to British ports and 141,000 tons to French ports). U.S.A. imports amounted to 91,000 tons.[1]

Fruit

The northbound traffic in fruit in 1960 amounted to 731,000 tons. Australia exported 262,000 tons, Arabian Gulf countries 104,000 tons, East African ports 103,000 tons and China 73,000 tons. European countries received 76% of the transit traffic in fruit, and American countries 7%. Great Britain imported 233,000 tons, Italy 99,000 tons, and a total of 59,000 tons was imported by Germany, Holland and Belgium.[2]

Textile Raw Materials

Transit trade in textile raw materials amounted to 1,808,000 tons in 1960. India, Pakistan, Ceylon and Burma exported 741,000 tons, or 41% of the total quantity (including 396,000 tons from Pakistan and 149,000 tons from India). Australia and the Pacific Islands exported 453,000 tons, whilst Red Sea and East African ports shipped 301,000 tons. European ports were the destination of 58% of the total quantity in transit through the Suez Canal (1,054,000 tons), of which 326,000 tons went to British ports and 104,000 tons to the U.S.A.[3]

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1 Suez Canal Authority: Op. cit.

2 Ibid.

3 Ibid.

Jute Fabrics

The total northbound transit trade in 1960 was 408,000 tons, including 399,000 tons from India, Pakistan, Ceylon and Burma. American ports received 204,000 tons and European ports 75,000 tons.[1]

Rubber

Transit trade in rubber in 1960 amounted to 1,166,000 tons, of which 892,000 tons, or 77%, was exported by South-east Asian countries. European ports imported 454,000 tons, of which 103,000 tons went to British ports. American ports received 227,000 tons, and Black Sea ports 103,000 tons.[2]

Timber

The total volume of northbound transit trade in timber in 1960 was 747,000 tons, of which 308,000 tons was exported by South-east Asian ports, 90,000 tons by Far Eastern countries, 73,000 tons by India, Pakistan, Ceylon and Burma, and 24,000 tons by Australia. 496,000 tons were unloaded in European ports, including 169,000 tons in British ports and 76,000 tons in Italian ports. The U.S.A. received 5,000 tons.[3]

Other Commodities

Other commodities in transit northward through the Suez Canal in 1960 included Tea (403,000 tons), Natural Fertilizers (368,000 tons),

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1 Suez Canal Authority: Op. cit.

2 Ibid.

3 Ibid.

Meat (292,000 tons), Fabricated Metals (230,000 tons), Tobacco (102,000 tons), Coal (17,000 tons) and others (3,877,000 tons).

The main tea-exporting countries were India and Ceylon, with 261,000 tons, and China with 26,000 tons. European countries imported 223,000 tons via the Red Sea, of which 135,000 tons went to Great Britain and 36,000 tons to American ports.[1]

Fertilizers from 'Aqaba Port in Jordan amounted to 148,000 tons; 78,000 tons were exported from India and Pakistan and 49,000 tons from the Pacific Islands. Yugoslavia received 121,000 tons, British ports 80,000 tons and Rumania 58,000 tons.

Australia exported 162,000 tons of meat and China 68,000 tons. Most of this amount went to European ports; Britain imported 123,000 tons, Germany 22,000 tons and Poland 19,000 tons.

In general, the northbound transit traffic is composed chiefly of bulky products in the raw state, for after all Asia and Australasia are still fundamentally agricultural. Although industialization has been rapid in parts of Asia, it has as yet had little effect on northbound traffic through the Red Sea. Thus the complementary nature of the trade between Europe and other continents still exists almost in the same way as before industrialization. However, the order of importance of the Red Sea "hinterlands" has changed markedly. The bulk of the early trade through the Red Sea and the Suez Canal came from the British Indian Empire and the Far East. To-day, the Persian Gulf is the source of more

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1 Suez Canal Authority: Op. cit.

than two thirds of the total traffic, whereas the former Indian Empire, despite a minor increase in amount, now accounts for a mere 8% of the total traffic.

TRAFFIC BY NATIONALITY

In the first decade of the existence of the Suez Canal, British shipping exercised a virtual monopoly, four out of every five vessels in transit being British. The development of the merchant navies of other powers has led to a decline in the share of Canal traffic under the British flag. In 1955, only 28% of the net tonnage in transit was under the British flag, and by 1960 this figure had declined further to 21.4%

TABLE 35: PROPORTIONS BY FLAG OF VESSELS USING THE CANAL, 1960

Flag	%	Flag	%
British	21	Swedish	4.2
Liberian	15	Greek	3.8
Norwegian	12	Panamanian	3.8
French	8.8	Danish	2.9
Italian	7.1	U.S.A.	2.5
Dutch	4.3	Others	9.3
German	4.2		

The above table indicates the growing use of flags of convenience to avoid taxation.[1] It would appear from the table that the 2.5% of ships

1 Mountjoy, A. B.: Op. cit., p. 155.

using the Canal under the U.S.A. flag is not a very large proportion, but this is explained by the fact that the vast majority of Panamanian and Liberian ships using the Canal are American-owned.

TRAFFIC BY CATEGORY OF VESSELS

Both the number of vessels using the Red Sea and their size is far greater today than before the Second World War[1] (see Table 38). In 1935 5,992 ships passed through the Red Sea, whereas by 1955 the number had risen to 14,666, and in 1960 it reached 18,737 (see Fig. 32). The average gross tonnage per ship in 1935 was 7,695, but in 1955 it was 10,542. In 1935 almost two fifths of the vessels were between 6,000 and 8,000 tons, but by 1955 only one sixth were of this size, whilst one quarter were between 10,000 and 12,000 tons. There are also a good number of dhows serving the coastal traffic between the Red Sea countries, but unfortunately there are no statistics concerning them. These dhows serve the pilgrim traffic between the African coast and the Arabian coast, as well as goods traffic.

Tankers

According to the evolution of the oil trade from the Persian Gulf, tanker net tonnage represented 71% of the total net tonnage in transit in 1960. The daily average number and net tonnage of tankers over the period 1956-1960 was as shown in Table 36.

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1 Schonfield, H. J.: The Suez Canal in World Affairs, 1952.

TABLE 36

	1956	1957	1958	1959	1960
No. of Tankers	24.2	25.5	26.3	25.2	26.7
Net Tonnage (000 tons)	244	275	295	313	362

It would thus appear that tanker net tonnage has increased by nearly 50%, whereas the increase in the number of tankers has only been 10%. This indicates the growing trend towards larger tankers.

Vessels Other Than Tankers

The number of vessels other than tankers which passed through the Red Sea in 1960 was 8,978 units, totalling 52 million tons. The daily average number of vessels and net tonnage during the period 1956-1960 was as shown below.

TABLE 37

	1956	1957	1958	1959	1960
Daily average No. of Vessels	19.4	21.1	22.6	23.3	24.5
Daily average Net Tonnage (000 tons)	107	118	128	134	145

The daily average number of vessels has thus increased by 26%, and net tonnage by 36%.

Coastal Traffic

In addition to coastal trade, the Red Sea is of potential importance as a cheap means of transport serving the local trade of those countries

NUMBER OF TRANSITS AND NET TONNAGE THROUGH THE RED SEA

TABLE 38

Year	No. of Transits	Net Tonnage (Thousand Tons)	Year	No. of Transits	Net Tonnage (Thousand Tons)	Year	No. of Transits	Net Tonnage (Thousand Tons)
1911	4,969	18,325	1928	6,084	31,906	1945	4,206	25,065
1912	5,373	20,275	1929	6,274	33,466	1946	5,057	32,732
1913	5,085	20,034	1930	5,761	31,669	1947	5,972	36,577
1914	4,802	19,409	1931	5,366	30,028	1948	8,686	55,081
1915	3,708	15,266	1932	5,032	28,340	1949	10,420	68,811
1916	3,110	12,325	1933	5,423	30,677	1950	11,751	81,796
1917	2,353	8,369	1934	5,663	31,751	1951	11,694	80,356
1918	2,522	9,252	1935	5,992	32,811	1952	12,168	86,137
1919	3,986	16,014	1936	5,877	32,379	1953	12,731	92,905
1920	4,009	17,575	1937	6,635	36,491	1954	13,215	102,494
1921	3,975	18,119	1938	6,171	34,418	1955	14,666	115,756
1922	4,345	20,743	1939	5,277	29,573	1956	13,291	107,006
1923	4,621	22,730	1940	2,589	13,536	1957	10,958	89,911
1924	5,122	25,110	1941	1,804	8,263	1958	17,842	154,479
1925	5,337	26,762	1942	1,646	7,028	1959	17,731	163,386
1926	4,980	26,060	1943	2,262	11,274	1960	18,734	185,322
1927	5,545	28,962	1944	3,320	18,125			

Source: Suez Canal Management, Statistical Dept.; <u>Suez Canal Report</u>, 1960

GOODS TRAFFIC (Thousand Tons) TABLE 39

Year	South-bound	North-bound	Total	Year	South-bound	North-bound	Total	Year	South-bound	North-bound	Total
1911	9,496	15,052	24,548	1926	9,804	15,605	25,409	1947	7,821	22,767	30,588
1912	9,782	15,662	25,444	1927	11,082	18,441	29,523	1948	9,716	39,653	49,369
1913	11,320	14,456	25,776	1928	11,963	20,659	32,622	1949	13,028	48,027	61,055
1914	9,039	12,296	21,335	1929	12,896	21,620	34,516	1950	12,141	60,468	72,609
1915	5,365	9,774	15,139	1930	9,434	19,077	28,511	1951	17,420	59,333	76,753
1916	3,415	7,178	10,593	1931	7,377	17,955	25,332	1952	22,001	61,447	83,448
1917	1,339	5,436	6,775	1932	6,314	17,318	23,632	1953	22,518	67,881	90,399
1918	1,610	6,222	7,832	1933	7,203	19,712	26,915	1954	22,370	74,511	96,881
1919	3,762	10,211	13,973	1934	7,984	20,464	28,448	1955	20,082	87,426	107,508
1920	6,318	10,729	17,047	1935	8,924	17,404	26,328	1956	18,107	82,876	100,983
1921	6,576	10,933	17,509	1936	8,829	16,727	25,556	1957	14,104	67,219	81,323
1922	8,193	13,169	21,362	1937	10,157	22,619	32,776	1958	24,943	114,430	139,373
1923	7,705	15,073	22,778	1938	7,768	21,011	28,779	1959	26,505	121,749	148,254
1924	8,818	16,711	25,529	1939	7,517	17,161	24,678	1960	29,253	139,630	168,883
1925	8,802	17,776	26,578	1946	5,995	15,931	21,926				

Source: Suez Canal Management, Statistical Dept.; Suez Canal Report, 1960.

bordering it. Some of the Red Sea ports act as collection and distribution centres for other small ports, e.g., Suez serves this coastal traffic as a port of collection and distribution for other small Egyptian ports along the Red Sea coast, since Suez is the largest in the area and the nearest to Suez Canal, where liners connect local trade with international trade.

Thus the Red Sea route via Suez Canal is one of the longest ocean trunk routes, and next in importance only to the North Atlantic. Its importance as an international trade route helps its ports to flourish, because, although the great bulk of the ships passing through the Red Sea are tankers, cargo ships of 6,000 to 20,000 tons are also well represented. When it is not possible to fill these completely at terminal points, they can call at intermediate stations, such as Port-Sudan, Massawa, Assab, etc. The Red Sea has also been an important sea route for pilgrim traffic as well ascoastal traffic from ancient times, although the latter has tended to decline because of competition from inland transport and the pipelines which compete with coastal tankers.

PART III

INDIVIDUAL STUDIES OF THE RED SEA PORTS

Introduction

PART III

THE PORTS OF THE RED SEA

INTRODUCTION

It is clear that ports must be studied and analyzed not as isolated phenomena. The basic function of ports is to provide facilities for the two-way exchange of traffic between inland and sea transport. Most ports of the Red Sea have a long and complicated history of development dating back to the time when they provided no more than simple landing places for loading and unloading goods from sailing ships. Their subsequent development has been influenced by a number of factors - the geographical characteristics of their site and situation, their proximity to sea lanes serving other countries, the improvement of inland transport facilities serving the hinterland, and the growth of trade and industry within the immediate port. Thus the following method is adopted in the study of each port of the Red Sea.

(a) Geographical Aspects of the Port and Town

For the analysis of the port, it is essential to study the location of the port and its town. Four aspects of the port's location must be borne in mind: the actual area chosen for the installations on land and their immediate physical surroundings (land site); the position with relation to the physical geography of the hinterland which the port is designed to serve (land situation); the harbour (water site); and the nature of the water approaches from the nearest sea lanes (water situation). As a port grows bigger these four locational aspects will have to be studied over larger areas.[1] The effect of physical conditions on port development is described, especially the artificial changes in the navigable channels, i.e. man's control of the physical factors. Thus it is essential to study the historical development of the port and its installations as well as the port town, its growth and its functions. A principle of urban geography is that, as a town grows larger, so its many functions, and the areas, or precincts, of the town which they occupy, grow more distinct and separate. The geographical aspects of the settlement will be studied, as the population at or near the port itself contributes greatly to the growth of a port town.

Secondly, although the economic aspects may be the most fundamental, it is also true that in an economically underdeveloped area, the setting up of a port tends to raise the standard of living of those working in the area. This in turn would create a consumer demand leading to a diversification of the functions of the port. It is desirable, therefore, to treat the wider influences in the economic, social and political spheres as they are reflected in the growth of population and settlement.[2]

(b) <u>External Relations</u>

The external relations, i.e. the relation of the port with the hinterland, and the volume and character of these spatial inter-changes must be studied. Thus the external relations depend on the economy of

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1 Bird, J.: <u>The Major Seaports of the United Kingdom</u>, London, 1963, pp. 21-27.

2 see Elliott, N.R.: Tyneside, a study in the development of an industrial seaport. <u>Ph.D.Thesis, Durham Univers</u> 1955.

the hinterland, for example its potentialities in relation to agriculture or industry, the presence of raw materials, etc. A close relationship exists between port and hinterland, on the one hand, and port and maritime organization and foreland, on the other. Effective organization and utilization of the land exert a powerful influence both on the evolution of ports and port functions and on the organization of maritime space, and the character and growth of a port play a leading role in the development and prosperity of the hinterland and maritime organization.[1] Inland communications may have an effect on the urban growth, although also affecting the port traffic by facilitating the hinterland accessibility. Thus the inland transport system is a critical factor in port efficiency. Trade routes which compete with the port will be carefully studied, in order to give an idea about the port's position in relation to these routes. The traffic pattern on the other hand is obviously determined by the interchange of goods between foreland and hinterland. Due to less direct effects and because of the difficulty of obtaining detailed information regarding the foreland, it is more difficult to assess its influence upon a port than to assess the influence of the hinterland. Thus it has been attempted to make the best of statistics which have only recently become available, although these are certainly still inadequate for a standard study.

In studying the traffic pattern at the ports of the Red Sea, it is

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1 Weigend, G.: Some elements in the study of port geography. <u>Geographical Review</u>, April 1958, pp. 185-200.

important to distinguish between three different aspects of the port traffic:

a. The navigation traffic, i.e. the number and tonnage of vessels attending the port;

b. The goods traffic, i.e. the volume of goods loaded or landed, including external trade, and coastwise transport as well as goods in transit; and

c. The port's position in the external trade of the country with regard to both volume and value.

On the seaward side no such differentiation can be made. All cargo arrives or leaves the port in vessels, and attention must thus be focussed on types of carriers and forelands.

In applying these three categories to port analysis, it is essential to distinguish between imports and exports, and, more specifically, between types of merchandise.

It remains as a necessary preliminary to define the hinterlands of the Red Sea ports, and to comment briefly upon their significance, since no port structure can be understood when not seen together with its hinterland.[1]

The study of a foreland can be approached here either in terms of the port's shipping lines, number of departures, or net tonnage moving in a certain direction, or in terms of the origin and destination of

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1 Boerman, W.: The need for special examination of particular aspects of port geography. <u>Preliminary Report of the Commission on Industrial Ports</u>, Washington, 1952, p. 5.

cargo moving through the port. However, it is clear that net tonnage is least satisfactory in this study to define the foreland of each port.

Although these factors may be applied to all ports, it is interesting to examine factors which have influenced each Red Sea port.

CHAPTER VI

THE PORT OF SUEZ

THE PORT AND TOWN

The physical setting of Suez - Historical development - Layout of the port - Growth of the town - Urban functions - Population: growth and structure - Public utility provision.

EXTERNAL RELATIONS

Transport and trade routes - The traffic pattern of the port - Hinterland - Maritime traffic and Forelands of Suez.

THE PORT AND TOWN

PHYSICAL SETTING

The town stands on mudflats on the south-west bank of Suez Creek, into which the Sweet Water Canal opens. The harbour is an artificial construction built on land reclaimed from the sea. It consists of an island joined to the mainland by a stone causeway across the shallows at the head of Suez Bay.

Suez Bay, at the head of the Gulf, extends six miles southward to Cape Adabiya. The north-west shore is low and sandy, backed by a desert plain across which roads and railways connect Suez with Cairo and the Nile Delta.[1] In the south, where reefs and banks fringe the coast, the limestone hills of Gebel 'Ataqa rise abruptly from the sea, trending north-west and reaching a height of 2,857 feet ten miles west of Suez. Cape Adabiya is a low sandy spit which forms the eastern side of Adabiya Bay, a good and almost landlocked anchorage, protected by 'Ataqa Reef, in the south of Suez Bay. The eastern side of Suez Bay is low and sandy, and approach to the Canal is made difficult by patches of coral (Fig. 34). Kad al Marakib and Ras Misalla are two low sandy points eight miles apart, between which is a shallow bay backed by a sandy, shell-strewn plain, gently undulating and covered in places with detritus washed down from the older rocks of the interior.

The north-eastern end of Suez Bay penetrates in a narrow apex, by a

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1 Western Arabia and the Red Sea: Op. cit., p. 85.

channel of about one mile in length, to a marshy area about two miles from east to west and some three to three and a half miles from north to south. The western side of the channel is formed by a peninsula of firmer land jutting eastward, with a surface at a relatively higher level (reaching five metres above sea level) upon which lies the old core of present-day Suez (29°26' N., 32°38' E.). A channel about 90 metres wide with a depth ranging between one and two metres at low water leads from the Bay through mud flats to the eastern end of this peninsula and thence continues northward. The Suez Canal enters the Bay from its north-eastern corner and has almost a common mouth with Suez Creek.[1]

About a mile inshore from the middle of the Bay lies the oasis of 'Ayūn Musa ('The Springs of Moses'), on the brow of a slope.[2] For a long time it was a place of importance and the chief source of fresh water for shipping in the Red Sea and the main source of water for Suez, being abandoned for this purpose after the completion of the Sweet Water Canal.

To the north, the contour lines on both sides of the Suez Canal generally run in a north-south direction; on the eastern side they are spread regularly and parallel to the canal; on the western side, which is more relevant to the study of the port and town of Suez and the setting of its communications with the interior, contours are not so regular (Fig. 33). On this western side, between the Bitter Lakes basin and the

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1 <u>The Red Sea Pilot</u>, 1955: Op. cit., p. 65.

2 <u>Western Arabia and the Red Sea</u>: Op. cit., p. 77.

Gulf of Suez, three hills may be noticed particularly, all running in a north-west to south-east direction. The northernmost of these hills is Gebel Genefa and the second is Gebel Shalloufa, which lies in line with the bold escarpment of Gebel Genefa, some 12 miles to the north of Suez and about 2 miles to the west of the Canal. Between these two hills and the depression occupied by the Canal and the Lakes run the Sweet Water Canal and the roads, which since early historic times linked Suez with the Nile Valley and Delta, via Wadi Tumeilit.[1] The shorter desert routes between Suez and Cairo lie between the two hills already mentioned and the third, a higher area known as Gebel 'Ataqa, which dominates the immediate physical environment of Suez.[2]

Faults represent a general feature at 'Ataqa, the main fault as described by Barron having a throw of 270 metres. The whole of Gebel 'Ataqa is covered by lower Moqattam beds (Eocene), underlaid by Upper Cretaceous.[3] At the quarries of 'Ataqa, a ridge of lower Moqattam is let down against the Cretaceous by the main fault. The cliff of Gebel 'Ataqa is believed to be the remains of a broken anticline, the easterly limb of which has been thrown down.[4]

Some of the numerous wadis dissecting the north-east ridge are

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1 Abu-Bakr, A.: Suez; M.A. Thesis, London University, 1959, p. 52.

2 Said, R.: The Geology of Egypt, 1962, pp. 161-165.

3 Barron, T.: Topography and Geology of the District between Cairo and Suez, Cairo, 1907, p. 21.

4 Ibid., p. 95.

historically known to have been among the scanty sources of water supply for Suez.[1]

Between the latitude of Suez and that of the southern end of the Bitter Lakes it is found that the western contour line of 90 metres lies almost parallel to the Canal at some 9 miles to the west, running from the eastern feet of Gebel 'Ataqa to the eastern end of Gebel Genefa, whence it turns north-westward following the general trend of the Bitter Lakes basin (see Fig. 33). The area enclosed between this contour line and the Suez Canal, with the exception of Gebel Shalloufa, is generally a gently undulating desert sloping gradually towards the Canal. The slope to the Canal from Gebel Shalloufa is steep, but to the north of Suez the contours swing westward giving the site of Suez a flatter, more gently sloping and accessible character.[2]

From the southern end of the Little Bitter Lakes the Canal trends nearly 6½ miles southward, when it turns 8° eastward, and continues straight for about 5 miles; it then curves gradually south-westward for a distance of 3 miles into Suez Bay, which it enters, passing westward of Qad-el-Marakeb (a low sandy point covered at high water).

A triangle, with the last 3 miles of the Canal as base and Tell Qûlzum as apex, is occupied by the northernmost extension of the Gulf of Suez, represented here by shallow and marshy lagoons, and contains a few low islands lying opposite Suez. The Suez Creek is the only navigable

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1 Barron, T.: <u>Op. cit</u>.

2 See Fig. 33.

channel here where small barges still penetrate up to Suez itself. The small island known as Tell-el-Yehoudiyah (Hill of the Jews), just opposite Tell Qulzum and only some 250 metres offshore, had some historical importance as it served as a port and depot for Jewish trade during the first era of Islamic Egypt.[1]

HISTORICAL DEVELOPMENT

The site of Suez is historic, for the mound immediately north of the town is thought to mark the ruins of the Ptolemaic fortress of Clysma, and possibly an earlier settlement of the period of the Pharaohs. It is the site of Qulzum (Clysma), a seventh-century trading centre at the end of the Canal which then joined the Red Sea to the Nile.[2] By the thirteenth century Suez had replaced Qulzum, and after the Ottoman Conquest of Egypt in the sixteenth century Suez became a naval station. It was of little importance when the French occupied it in 1798, and the battles which followed the English occupation in 1800 ruined it. Before the Suez Canal was built, it was a miserable Arab village, obtaining its water from 'Ayūn Musa until the Sweet Water Canal from the Nile at Cairo was opened in 1863.[3]

The apex of the Nile Delta is identified with the whole of Egypt. This may be due to the particular configuration on the inhabitable part

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1 Bourdon, C.: Anciens carraux, anciens sites, et Port de Suez, Cairo, 1925, pp. 149-154.

2 Western Arabia and the Red Sea: Op. cit., p. 85.

3 Ibid.

of Egypt, the Nile Valley and Delta, which made the apex of the Delta an essential focus for the whole country. It may also be partly due to the general inclination towards centralisation which has always been discernable in Egypt throughout its long history.[1]

"The Isthmus of Suez has never given rise to ports which are important in themselves or by virtue of their commodities. Its northern coast along the Mediterranean is low, lagoonus and sandy; at the head of the Gulf of Suez it is no better, and fresh water from natural local sources is almost entirely lacking. It is almost towards the Nile, and more particularly towards the capital of lower Egypt, that the traffic flowed."[2]

This is historically true, and the port at the head of the Gulf only flourished during periods when transit trade between Europe and the East, through Egypt, was flourishing. Egypt's own trade with the eastern countries could not, by itself, support the existence of an important port.[3]

The location of Suez has always been important for human movements since prehistoric times. It formed the only land passage between Europe, Asia and Africa at a time when seas were effective barriers against human movement. When the sea was finally subjugated by man, the Isthmus of Suez formed the only land obstacle in the way of the shortest sea passage

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1 Western Arabia and the Red Sea: Op. cit.

2 Kammerer, A.: La Mer Rouge à travers les âges; Mem. de la Soc. Royale de Geog. d'Egypte, Paris, 1925, Vol. I, p. 5.

3 Abd-el-Aty, A.: Suez, p. 82.

between the complementary economies of Western Europe and South Eastern Asia. In 1869 the obstacle was overcome by the construction of the Suez Canal, and the port of Suez started to play its present role.

The problem of supplying Suez with fresh water, which had always been the most serious limitation upon the full growth of Suez as a town, was solved in 1863 by the extension of the Sweet Water Canal to the head of the Gulf of Suez.[1]

It is said that favourable conditions for the growth of great trade centres are especially to be found at the end of a barrier, where routes of travel converge as they are forced to go round the obstacle.[2] Suez is of significance in this sense, in relation to the Red Sea as a barrier, yet Suez owes the continuity of its very long existence to its being situated also at a place where land routes continued to converge at times when commercial vessels had practically ceased to appear in its waters. The evolution of Suez as a town has, however, always been primarily influenced by the degree of its importance as a port.[3] For this reason the town, developing on a favourable site, has many times advanced southward towards the retreating Gulf, or in response to the developing requirements of navigation, changing its name in the process.

After the deliberate destruction of the Canal link from the Nile during the period 760-770 A.D., there was no need to maintain a port at

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1 Western Arabia and the Red Sea: Op. cit., p. 85.

2 Finch & Trewarcha: Elements of Geography, New York, 1940, p. 662.

3 Abu-Bakr, A.: Op. cit., p. 83.

such a northerly site as that which was occupied by Qulzum (Greek, Clysma). Besides Qulzum being deprived of the main source of its fresh water, it seems that the northern part of the Suez creek was becoming silted. In these circumstances the port was re-located about three-quarters of a mile to the south. It is said that the term Suez was first used at the beginning of the Fifteenth Century.[1]

Qulzum and Suez continued as independent settlements for some centuries, the former as a fishing village, the latter as a commercial and naval port to serve the trade of the Red Sea which declined drastically after the discovery of the route around the Cape of Good Hope during the late Fifteenth Century. With the course of time, Qulzum was abandoned and left to fall into ruins (Tell-el-Qulzum) (see Figs. 35 & 36).

Up to the Nineteenth Century, vessels could berth along the shore at Suez; their draught was shallow and Suez Creek seems to have been deep enough for most of the Red Sea sailing vessels of that age. When British commercial steamships started a regular service between Bombay and Suez in about the eighteen-forties, they had to lie at anchor at the roadstead of Suez, passengers and goods being conveyed inshore by smaller boats.[2]

It was only in the fifties and early sixties of the last century that modern port facilities developed at Suez to serve the growing traffic with India, and detailed surveys of Suez Bay were carried out by both the

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1 Jondet, G.: Le Port de Suez, Cairo, 1919, p. 1.

2 Ibid., p. 22.

3 Gaby, J. E.: Marées de la Mer Rouge à Port Tawfig et de la Méditerranée; Bulletin de la Société d'Etudes Historiques et Geographiques de l'Isthme de Suez, Tome III, 1945, p. 50.

Egyptian Government and the Canal Company for the purpose of improving access.

In 1862 the Egyptian Government signed a contract with the Messageries Imperiales (the present Messageries Maritimes), for the construction of a dry dock. The site was to be in the then open sea, nearly at the head of the sandbank extending south-south-eastwards from Suez, at 3.5 kilometres from the town. The dock was finished in May 1864, and was linked by a causeway to the town, the first step in the creation of an outer port for Suez.[1] Measured at three metres below the level of high water, the internal dimensions of the dock were 120-125 metres long and 25 metres wide. At the time of its construction it was considered to be one of the largest and most complete docks in the world, but owing to the remarkable development which has taken place in the size of ships since that date, the value of the dock has declined, although it is still the largest dock on the Suez Canal and Red Sea highway. In 1935 the dock was lengthened and deepened to become 484.2 feet (about 147 metres) long with a front depth of 22 feet and a back depth of 26.3 feet, both at mean high water. It can receive vessels up to 9,000 tons.[2]

In 1867 a contract was signed for the construction of two basins under the name of Port Ibrahim; one for the state services with an area of 16 hectares (17 acres) to serve commercial needs, and with a mole dividing the space of water stretching between the two basins.[3]

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1 Jondet, G.: Op. cit., p. 27

2 Suez: Published by the Government of Egypt in 1949, in Arabic.

3 Jondet, G.: Op. cit., p. 28.

'Ataqa quarries were first exploited in 1862 for the construction of the graving dock and for nearly all natural-stone quay-building along the Canal, especially at Suez.

LAYOUT OF THE PORT

The harbour is an artificial construction built on land reclaimed from the sea. Port Tawfiq, the property of the Suez Canal, lies on the east and south-east of the artificial island, stretching about a mile along the Suez Canal. The main function of Port Tawfiq is to serve the Suez Canal traffic. Port Ibrahim has two sections, known as the old harbour (divided into the Commercial and Arsenal Basins by a mole about 600 yards long) and the New Port.

Approach: vessels usually anchor opposite the Canal entrance; the bottom there is stiff clay and the depth is from 5 to 5½ fathoms. New Port Rock and spit buoy are dredged to a uniform depth of 37 feet. Vessels with deep draft usually anchor at the outer anchorage west of New Port Rock.[1]

The entrance channel to Port Ibrahim was dredged to a depth of 27 feet in 1955, with depths of from 26 to 27 feet in the North basin, and of 24 feet in the South basin, (except at its north-eastern end near the dry dock, where there were depths of from 8 to 18 feet with soft mud over rock, and of from 17 to 21 feet immediately in front of the dock entrance.[2]

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1 Maxwell, D.: The Ports of the World, 15th Edition, 1961.

2 The Red Sea and Gulf of Aden Pilot, 1955: Op. cit., p. 70.

The new port, (El Mina el Gedida),[1] lies close west-north-westward of Port Ibrahim, and is enclosed by a detached breakwater extending 5½ cables westward from a position about one cable westward of the head of the southern entrance mole at Port Ibrahim, and another breakwater extending about one mile south-eastward from the coast to the south-west end of the detached breakwater; the entrance between the two breakwaters is 1,460 feet wide, with a depth in 1939 of 26 feet. The Petroleum basin lies at the north-western end of El Mina el Gedida, with an entrance of 328 feet (100 metres) in width, and with a depth, in 1948, of 29 feet. The petroleum basin has stone quays, 1,608 feet (490 metres) in length on its northern side, 1,375 feet (419 metres) in length on its western side, and 2,247 feet (684 metres) in length on its eastern side. There are four concrete jetties for the use of petroleum vessels, two concrete jetties for bunkering purposes, all with depths of 28 feet (8 metres) alongside in 1951, and one concrete jetty with a depth of 20 feet (6 metres) alongside in 1951, for the use of cattle steamers. The petroleum jetties and bunkering jetties can accommodate tankers of up to about 18,000 tons.

Quays

The North Quay, on the north-western side of the North basin in Port Ibrahim, is built of stone; its south-western port has depths of from 15 to 16 feet alongside, and its north-eastern port has depths of from 27 to 30 feet. It is connected with the railway system.

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1 See the chart of Suez Bay (Fig. 34).

Near the middle of the north-western side of the central mole, there is a wooden jetty, 251 feet in length, with depths of from 23 to 29 feet.[1] About half a cable south-westward of the wooden jetty the bottom is uneven to a distance of 60 feet from the mole and has depths of from one foot to 17 feet; this uneven ground extends round the end of the central mole and for a distance of about 400 feet along its south-eastern side, where the depths are from 6 to 15 feet. Berths Nos. 7 and 8, about 250 and 260 feet in length, on this uneven ground round the end of the mole, had depths of 27 feet alongside in 1951, except for the north-eastern end where depths were of from 12 to 16 feet alongside. There is a small jetty about half a cable within its south-western end. The south quay is connected with the railway system.

Adabiya Quay, about 1¾ miles west-north-westward of Ras el Adabiya,[2] extends about 2½ cables south-eastward from the coast, and had, in 1944, a depth of 29 feet (8 metres) alongside on each side for a distance of 1,000 feet (304 metres) from its head. A lighter wharf, with a depth of 8 feet, (2.84 metres), alongside extends southward from the root of the quay with a jetty extending north-eastward from near its southern end. The maximum draft (1961) permitted alongside is 26 feet.[3]

The quay and wharf are connected with the railway. In 1961 there were several cranes of from 3 to 15 tons capacity on the quay and several cranes of from 2½ to 5 tons capacity on the lighter wharf at Adabiya;

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1 Red Sea and Gulf of Aden Pilot: Op. cit., pp. 70-73.

2 See the chart of Suez Bay, 1955 (Fig. 34).

3 Maxwell, D.: Op. cit., p. 803.

water is laid on to the quay.

'Ataqa Wharf: there is a lighterwharf at 'Ataqa, about 1½ miles north-north-westward of Adabiya Quay. It is protected by a breakwater situated close to it on its eastward side; the wharf is connected by a tramway with 'Ataqa quarries, which are about a mile inland.

All quays and wharves from Port Ibrahim to Adabiya are connected with the railway system.

Future Development

The new berth for oil tankers is now under construction by the General Petroleum Authority, facing the Government Petroleum Refinery at Suez. This berth is being erected in the sea at a distance of about 3 miles from the shore. The depth of water around the quay will be 46½ feet (14 metres). The quay will be equipped for, and will be capable of accommodating two tankers of 65,000 tons each, and will be connected with the Suez refinery by means of seven pipelines, four of 20 inches diameter, two of 16 inches, and one of 4½ inches.[1]

THE TOWN OF SUEZ

Up to the Nineteenth Century, Suez was just a small fishing village, limited in its population and in its water supply, near an earlier settlement called Qulzum.[2] Qulzum was later deserted and Suez grew in the later Nineteenth Century to become the major town of the area.

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1 Maxwell, D.: Op. cit., p. 803.

2 Platt, R. R. & M. Hefny: Egypt - A Compendium, New York, 1958, p.358.

Suez was built at the northernmost portion of the Gulf, where water was deep enough to receive the Red Sea sailing craft. The north-western side where Suez lies was naturally the best place adapted to serve the purpose, as it was easily accessible from both sea and land, besides affording safe and sure anchorage as well as good protection against the relatively high waves of the open sea. The old Suez was built along the coast to form the core from which present-day Suez grew.

Suez has had an unusually fluctuating history. It was more than once left to decay, and as many times rejuvenated in response to the changing conditions and demands of navigation, governed often by political issues as well as the more normal politically superimposed factors rather than economic events.[1] Moreover, the different functions of Suez (as a commercial and industrial town as well as a port) are carried out at scattered locations within the general urban area.[2]

At the beginning of the last century, Suez was limited by Suez Creek on its north-eastern side and by sandbanks not far from the southern end of the settlement. Suez was physically bound to grow only north-westward and westward. Other physical as well as cultural factors influenced this growth to start in the former of these two directions. The land route, as well as the early railway from Cairo, both came from that direction and converged at Bir Agroud,[3] some 20 kilometres to the west-north-west of Suez; the easy supply of building material from the Qulzum mound, the

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1 Abu-Bakr, A.: Op. cit., p. 17.

2 Ibid.

3 Bir = well.

nearness of the seaboard with its fish resources, and last, but not least, the extension of the Sweet Water Canal to the northern end of Suez Creek, a little north of old Qulzum (Fig. 35) were all contributory factors.

The village of El-Arb'ein, more than a kilometre to the north-west of the old core of Suez, opposite the mound of Tell-el-Qulzum, was separated to the west of the railway line and grew as an outlier of Suez until it later joined the new quarters of Suez growing rapidly on the same side of the railway.

Most of Suez, with the exception of the old core, lies at present within the 5 metres contour which generally follows the direction of the shoreline at a distance ranging from one to two kilometres.[1] Suez has made good use of this spacious flat area for its expansion. The sandbank which extends to its south-east and dries at low water affords still more room for expansion, and Suez has lately encroached upon it.

The recent expansion of Suez[2] is now influenced by three factors, each working independently; these are port traffic, the oil industry and agriculture in the surrounding rural areas.[3]

After the construction of Port Tawfiq and Port Ibrahim to the west, the increase of traffic at the adjacent entrance of the Canal attracted expansion of the town southward towards the sea. The growth of the town in this direction entails the reclamation of sandbanks and is encouraged by the Suez Municipality, which seems to be aiming at amalgamating the

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1 Abu-Bakr, A.: Op. cit., p. 17.

2 Seteha, M.: Op. cit., p. 108.

3 See Fig. 36.

town and its southern suburb of Port Tawfiq, reclaimed from the sea during the last century to serve the new port and the growing Canal traffic. Effective land reclamation has been in progress only during the last twenty-five years, by the construction of several embankments, the last of which is about 900 metres long, completed in 1959 and connecting the easternmost corner of the town with the causeway of Port Tawfiq.

In 1910 production began in the Egyptian oilfields on both sides of the Gulf of Suez and along the Red Sea Coast. It was natural that the oil industry should grow in Suez for two reasons:

(a) proximity to the oilfields;

(b) regular trade with centres which consume the refined oil.

Thus Suez added an industrial function to its commercial life, and the town has had to develop in response to this new function.[1]

On Suez Bay the coast extends south-westwards from the town, with ample open space for the location of the new industry. The first oil refinery in Egypt, built by the Anglo-Egyptian Oilfields Company, was constructed in 1912 and now occupies an area extending some 1,550 metres along the shores of Suez Bay, about 1,200 metres to the west of the town.

On the north, the fresh water conveyed from the Nile to the Suez Creek by the Sweet Water Canal has enabled the reclamation of some thousand hectares of desert land for cultivation. Agricultural settlement has taken place at the village of El-Ganayen (i.e., the gardens). Vast

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1 Handy, A.: The Development of Suez Town; M.A. Thesis (in Arabic), Alexandria University, 1953, pp. 116-117.

stretches of poor rural housing have grown at the northern end of Suez and the town has thus a very irregular layout in that direction.[1]

A second extension to the town has taken place to the north-west, along the road and the railway extending to Cairo, linking El-Arb'ein to the isolated settlement of Kafr-Shemeis. This expansion was due to the increasing number of poorer people, mostly migrants from Upper Egypt and the Eastern Delta, coming to work in the industrial establishments in Suez.

A third expansion of the residential area has developed to the west, towards the new industrial area, based on the two oil refineries.

In the map of 1930,[2] the effects of these new extensions to Suez can be seen: a new road from Suez parallel to the coast and many houses for the employees of the oil refineries are included: besides these there is the Maghraby Canal, seen in the map of 1930 for the first time, running generally south-south-westward with the main road (which serves the oil refineries and other institutions) under the name of Zeitiya Canal. Smaller canals take off from El Maghraby Canal to irrigate farmlands on both sides, and Suez is thus surrounded on its inland side by a semi-circular belt of farmland, broken for only a short distance in the north-west by the railway and motor road leading to Cairo.

It is clear from the Suez map of 1930 that the town was in process of extension in several new directions.

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1 Abu-Bakr, A.: Op. cit.

2 Survey Dept.: Map of Suez, 1926 & 1930, Scale 1:25,000.

From 1936 Suez flourished and developed rapidly after the Treaty of Defence between Egypt and Great Britain. The British military forces established many centres in Suez and along the Suez Canal, a major element in the then Imperial strategy. Many people came as migrants from all parts of the country, especially from Upper Egypt, to settle in Suez, where they could find employment in the British bases. Most of these people settled in the El-Arb'ein quarter, since it was the major working-class area and was nearest to the bases. The El-Arb'ein quarter thus grew to become the largest quarter in Suez.

The presence of the British Forces in Suez led to the construction of modern high buildings, for residential use by the British families in Suez; many families also settled in Port Tawfiq.[1] Other factors which combined to make the town grow more rapidly included increased commercial activity, industrial development, and the discovery of oil-producing areas, as well as the mining and quarrying on Sinai on the Red Sea Coast. All these centres are connected with Suez by modern motor roads extending along both sides of the Gulf of Suez and along the Red Sea Coast. In return Suez has to supply all these centres with fresh water and with food. Due to all these factors, Suez has flourished and it is now the largest town in the Red Sea area.

By 1961,[2] Suez extended far to the north to include a large number of farms and small villages, such as El-Ganayen. It had also extended

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1 Seteha, M.: Op. cit., p. 108.

2 Survey Dept.: Map of Suez, 1942, Scale 1:25,000.

to the north-west, towards the railways, to include Kafr-Shemeis and the El-Arb'ein quarter, Kafr Rashed and El-Dresha. To the west, Suez extended along the Bay of Suez to include the Mellaha quarter and the industrial quarter, El-Zeitiya,[1] an extension due to the stimulus given to the economy by the fact that Suez was needed and used for Second World War purposes.

Recently the town has continued to grow rapidly under a planned programme.[2] The expansion of the port as well as of industry will affect the economic development of the town, increasing the need for proper town planning. Consequently, the town will attract more functions, creating greater needs for housing development and business centres.

PORT TAWFIQ

The outport of "Port Tawfiq" was an artificial creation, constructed in the open sea to serve the modern vessels which could no longer berth along the shores of Suez, and those intending to pass through the new maritime canal (Suez Canal).

The suburb of Port Tawfiq was built at the end of the shallow bank extending from Suez to the south-east. Here was heaped the material excavated by the dredgers working in the basins of Port Ibrahim and at the entrance of Suez Canal. Port Tawfiq thus owes its origin to the

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1 See Fig. 34.

2 See Figs. 36, 37 & 38.

cutting of the Canal and is, therefore, only about ninety years old.[1]

Figure 35 represents Port Tawfiq as it stood towards the end of the last century. About one half of its present area was not yet reclaimed from the sea, and the part already reclaimed had only very few buildings. During the years 1915-1917, the remaining parts of the present Port Tawfiq were reclaimed, and in 1926[2] the settlement took the shape shown on Fig. 35 (4), and remained nearly the same up to the present day, except for the encroachment of buildings filling up the reclaimed spaces.[3]

Port Tawfiq can be divided into three sections, apart from the Customs area encircling the port quays. The most important section is essentially the business area which serves the port traffic and falls in its turn into two parts. The larger and more important is the strip extending along the south-eastern side of the Customs area, where we find big warehouses, offices of shipping agencies and transport companies. The second part of the business section lies to the north-east of the Customs area and contains those stores and shops meeting the direct needs in goods and services of the people whose work is connected with the port. The Marine Trades School, lying immediately to the north-east of the Customs area, can be assigned to this section not only on a functional basis but also because its purpose is to produce well-trained marine artisans for the port.[4]

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1 Abu-Bakr, A.: Op. cit., pp. 34-35.

2 Ibid.

3 See Fig. 35.

4 Abu-Bakr, A.: Op. cit.

Next in importance, though first in area occupied, is the residential area for the Canal officials and labourers. The streets here are wide and the buildings are on European lines, as they were originally built for Europeans. The southern, and older, part of this section borders the entrance of the Suez Canal, while its northern part borders the South Basin (the Canal Authority Repair Dockyard) and the entrance of Suez Creek, where a private club and bathing beach are reserved for the Canal employees. This section is well served with other social and recreational activities, while a dispensary with a bazaar nearby, in the southern part, provides the inhabitants with their food requirements. South-westward of the signal-mast lie the few offices of shipping agencies. This section is limited to the west by the railway connecting Port Tawfiq with Suez as well as by the buildings of the first section.

The third section is confined to the triangle enclosed between the railway to the east, the sea to the north, and the second part of the business section to the south-west. This is the private residential section which, together with the Canal employees' accommodation, forms a typical residential belt flanking the business core.

At the seaboard end, and especially in the T-shaped peninsula jutting into the sea, there are two or three rows of small and tidy summer houses. A recently reclaimed plot at the northern corner of the section in question now supports a number of beautiful villas owned by the Municipality of Suez and rented to private individuals. Up to five years ago, the inland part of this section had no harmony with the rest of Port Tawfiq. New modern buildings were surrounded by a greater number of untidy and ill-constructed ones.[1] As the Suez Municipal sewage system did not extend to Port Tawfiq, while the former Canal Company restricted its sewage system to the houses of its own employees, the private residential section had to make use of individual underground sewage cisterns, septic tanks, a procedure which would not permit the development of big buildings. However, since the handing over of the Canal Company's sewage system to the Suez Municipality, the conduits have been extended to this section during the last two years. The low and inconvenient buildings of the inner part were consequently removed and large blocks of flats have since appeared.

URBAN FUNCTIONS

The main function of Suez is that it serves as the only gateway to and from Egypt on the Gulf of Suez. It is also an important centre serving the transit trade between east and west. The need for such functions were the main reasons for which the town was established. The performance of these functions at an increasing rate contributed to the rapid growth of Suez.

The real development of Suez began after the opening of the Suez Canal and the establishment of the new port of Suez, together with the consequential rapid increase in the external trade of Egypt during the last hundred years, even though there have been many factors to interrupt the

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1 Abu-Bakr, A.: Op. cit.

steady evolution of this external trade. As an example, the last two wars have had a distorting influence upon the external trade of Egypt.

The establishment of the port and the installation of the railway line connecting the port with the other urban centres of the country attracted the first settlers. They formed the first nucleus of the town which little by little grew and expanded. More functions were then created and an additional number of people moved into the town. All these functions are nevertheless of secondary importance and would not have been developed if the first two functions did not exist.

The secondary functions of Suez include its position as a commercial and business centre, mainly in connection with the port trade, and as the administrative centre of its district; however, the significance of the latter function is enhanced by the existence of the port. The town of Suez is now also an important industrial centre, the chief industries being oil, fertilizers and shipbuilding. Lastly, Suez is the educational centre of the Governorate of Suez.

The main and secondary functions described above will continue to develop in the near future, unless other unforeseen factors intervene to govern the future development of the town. There is good reason to believe that the port activities will grow in proportion as the country develops. The overall development will create an increased demand for services. It is expected that secondary industry will grow, and the majority of the labour force will become employed therein.

Today, Suez can be divided roughly into four districts: commercial-residential, industrial, agricultural and residential.[1]

Commercial-Residential District

This district lies along both sides of the railway in the old quarter of Suez, and there is also another area to the north-west in El-Arb'ein along the railway to Cairo. Most of the shops lie in these districts, the area in old Suez being the larger, with the main market centre located there; it is intermingled with the administrative buildings and residential areas; commerce, the control of import and export trade, are found in the same area in old Suez. The majority of these establishments are connected with the port activities. The other district, in El-Arb'ein, is mainly to serve that quarter, and there is no connection between it and the port from the commercial point of view.

Industrial District

This district lies to the west of the town of Suez and is called Zeitiya. It is occupied by the oil refineries and oil stores, and extends nearly four and half kilometres west-south-westward along the shore from the Slaughter House. The Egyptian refinery stretches westward for about 1½ kilometres and southward for about one kilometre to the petroleum basin where the petroleum quay juts out into the sea. The refinery looks northward on to the main road, with a few blocks of flats built as accommodation for its non-manual-working officials. There is also a company

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1 See Fig. 36.

which manufactures fertilizers some 12 kilometres to the west of Suez, in the desert. The shipbuilding industry is in Port Tawfiq; other industries are found intermingled with the residential districts in old Suez and in El-Arb'ein.

Agricultural Areas

Agricultural areas are found in two places, the one at the north end of Suez being known as the village of El-Ganayen (i.e., the gardens). Fresh water is conveyed from the Nile and has enabled the reclamation of some thousands of acres of desert land for cultivation along both sides of the Sweet Water Canal almost as far as Shalloufa, some 15-17 kilometres to the north. Between El-Arb'ein and the El-Maghraby Canal there are still remnants of farm land, while on the western side of the Canal, farms extend westward almost as far as the Anglo-Egyptian refinery. An agricultural area lies to the north-west of Suez, which is known as Kafr Rashid.

Residential Districts

These are scattered throughout Suez. The residential area of old Suez is mainly for employees and the Middle Classes. The second district is the El-Arb'ein quarter, which has a peculiar position; about a hundred years ago it could be considered as a mere suburb of Suez, but now it forms a big, and rather poor, quarter of the present large town.[1] The extension of this poor residential district is due to the pressure of the

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1 Abu-Bakr, A.: Op. cit., p. 24.

rapidly increasing number of poorer population, mostly migrants from the Eastern Delta and Upper Egypt.

To the south, certain areas have been reclaimed. About 19 hectares were enclosed for reclamation in 1958, and more than 4 hectares of that area have since been reclaimed and modern blocks of residences erected thereon. To the west of this area, the stretch of land covering about 5 hectares, which was reclaimed a few years earlier, has afforded sites for better and higher blocks (6-7 storeys), served by rather wide and tidy streets. These newly reclaimed stretches form the purely residential belt of the high-income classes of Suez. The residential section in Port Tawfiq also includes another purely residential zone, of high-quality housing for the upper-income groups. To the western side of Suez town, a few blocks of flats were built as accommodation for non-manual workers. Other residential areas are scattered in the north-west in the poor sector of Kafr Rashid.[1]

INDUSTRY

Industrial activity in Suez is mainly connected with Egypt's two oil refineries,[2] but two industries at Suez, oil refining and the production of fertilizers, should be specially mentioned as they are carried out on such a large scale.

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1 See Fig. 38.

2 Little, A.: Op. cit., p. 94.

Mineral-Based Industry

Petroleum Refining: two factors worked together to make Suez the oil port of Egypt; these were the discovery of oilfields on both sides of the Gulf of Suez, and the easy accessibility of further oil supplies from the huge reserves of the Persian Gulf area.

Crude oil was first produced in commercial quantities in Egypt in 1910 from the Gemsa area on the western side of the Red Sea, immediately to the south of the Gulf of Suez. The Anglo-Egyptian Oilfields Company, formed to prospect and exploit oil in the area, decided to construct a refinery at Suez to process the Gemsa crude oil. Although the production from Gemsa dropped very quickly, the development of the neighbouring Hurghada Oilfield, discovered in 1914, was such that the capacity of the Suez refinery was enlarged in 1918-19 to 300,000 tons per year.

The declining production from Hurghada during the early thirties was insufficient to keep the plant on full load and foreign crude oil was imported from the Persian Gulf area.

The discovery of Ras Gharib oilfield in 1937, however, marked a turning point in the history of the refinery. Not only was the importation of foreign crude oil discontinued, but also the plant had to be expanded once again, this time to about 1,300,000 metric tons annual turnover.

After the end of the Second World War, the resumption of exploration activities in Egypt led to the discovery of the Sinai Oilfields of Sudr and Asal on the eastern side of the Gulf of Suez. The resulting increased production necessitated further alterations to the crude distillation units at the refinery. Since 1950, the plant's intake has averaged 6,500 tons per day, with a yearly turnover of approximately 2,000,000 tons.[1]

In 1922, the Government constructed at Suez a refinery designed originally as a small experimental unit, to process crude oil from the Egyptian Oilfields. The total output per year was under 8,000 tons.

The development of crude oil production in Egypt following the successive discoveries of Ras Gharib and Sinai oilfields prompted the Egyptian authorities to enlarge the plant and enable it to process the larger amount of the royalty crude oil accrueing to the Government; in 1936 the turnover was increased to 90,000 tons per year, and again in 1949 it was raised to a capacity of about 400,000 tons per annum.[1]

A further major expansion was decided in 1948 and completed in the autumn of 1954. The Government refinery now has a total capacity of 1,300,000 tons per year.[2] The total refining capacity established at Suez now amounts to about 3,300,000 tons per year.[3]

More than 6,000 people are now employed by the two oil refineries. Each refinery has its own electric generators and is equipped with its own barrel factory to supply the necessary containers. Production is marketed by Shell Co. of Egypt and the Petroleum Co-operative Society.

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1 Information taken from a paper puboished by Shell Co. of Egypt under the title: "Information on Petroleum", Cairo, 1952.

2 Information has been obtained from the pipelines department of the Egyptian Oil Authority, Cairo, 1962.

3 Little, A.: Op. cit., p. 95.

A 6-inch pipeline, 135 kilometres (76 miles) in length, with an annual discharge capacity of 600,000 tons, was laid down in 1942 between Suez and Cairo by the British authorities. After the Second World War the pipeline was operated by the Shell Petroleum Co. for the benefit of the British authorities, but was ceded later to the Egyptian Government, under whose auspices the Shell Company continued to operate the line.

A new pipeline, of 12 inches diameter,[1] with an annual discharge capacity of 2,250,000 tons, was laid down by the Government to conduct heavy black oils from Suez to Cairo, and went into operation in July 1956.

Two other oil distribution companies have their stores erected on the land between the two refineries, in which they store their imports of refined oil, products for distribution in Egypt, or for ship fuelling at Suez. Total ship fuelling at Suez now runs at more than 150,000 tons per year. The oil refineries and stores at Suez are well served with roads, railways and port facilities.

Crude oil obtained from Egyptian oil fields is sufficient at the present time to supply the two refineries at their present rated capacity. The additional requirements beyond this figure are at the moment made up of imports of refined products. The import of equivalent quantities of crude oil will be necessary when the expansion of the refineries has been completed, unless increased production can be obtained from Egyptian oil fields.[2]

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1 Information obtained from the Pipelines Department, Egyptian Oil Authority, Cairo, 1962.

2 Little, A.: *Op. cit.*, p. 96.

Fertilizers: Egyptian agriculture is dependent on the relatively heavy use of fertilizers to maintain crop yields and the cultivable area in Egypt is physically limited.[1] To cope with the rapid growth of population, farm output has to be steadily increased, either in area or in intensiveness. Horizontal expansion requires expensive irrigation and drainage works, whereas the vertical increase can be realised by less expensive methods of improving the yield per unit of land. First among such methods is the application of fertilizers, which Egypt used to import in great quantities from Chile and Germany up to the outbreak of the Second World War. During war-time, negligible quantities were imported owing to shipping difficulties, and the Egyptian soil suffered much deterioration. It was then decided to produce calcium nitrate locally from the raw materials which are available at Suez.

A company was formed in 1946 which erected a factory in the desert, some 12 kilometres to the west of Suez for the production of calcium nitrate (15.5%), apart from other by-products. The factory did not begin to operate until 1951, when it produced 80,000 tons, which increased gradually to 225,000 tons in 1958, and is likely to attain the full capacity of 250,000 tons within a short time. For its raw materials the factory depends on the gas obtained from the oil refinery and on the limestone quarried at 'Ataqa. Recently designed expansion (now under construction) will raise the factory's productive capacity to 275,000 tons of calcium nitrate and 100,000 tons of ammonium sulphate.

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1 Little, A.: Op. cit., p. 97.

The factory[1] now employs some 1,650 people and has regular bus and railway services with Suez. A nearby housing estate, occupying some 21 acres, has been created where lodging, food and recreation are afforded for those employees who prefer to live near their work. Sewerage is conducted southward through underground pipes to be lost under the hot desert sand.

Other Industries: of the other industries at Suez, the most important is the engineering industry, mainly carried on at Port Tawfiq. The dry dock at Port Tawfiq (the only one in Egypt at present, and the largest throughout the Red Sea) is equipped for the repair of ships drawing up to about 27 feet. The building of wooden fishing boats is carried on at two places on the north-eastern waterfront at Suez.

There are three ice factories, including the municipal one, and with the rising population, the building as well as the furniture industries have become important and prosperous.

A new company with a paid-up capital of £400,000 has recently been formed to establish a factory for the manufacture of Kraft paper, with a planned annual output of 15,000 tons. This industry is expected to become one of the leading industries at Suez.

POPULATION: GROWTH AND STRUCTURE

The commercial activity in Suez from early times attracted many settlers both from Egypt and from abroad.

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1 Information obtained from the factory and from Company Head Offices in Cairo, Annual Reports.

During the period 1835-1960, the population of Suez has been on the increase. European attention was strongly directed to Suez after the French Expedition.[1] In 1835 the population of Suez was only 3,500 persons.[2] After the opening of the overland route for European trade with India and the Far East area via Suez in 1839, the execution of major works at that port during the early sixties, and the extension of the Sweet Water Canal to the Gulf of Suez, there started a new phase in the town's history. With the opening of the Suez Canal in 1869, the modern development of Suez was initiated and the town began to attract new settlers. By 1882 the population of Suez had reached 11,175.[3] According to the latest complete census of 1960,[3] the population of Suez Governorate (including Suez, Port Tawfiq, and El Ganayen with its surrounding villages) amounted to 203,000 persons. The following table[5] shows the development of the population of Suez from 1882 to 1960.[6]

TABLE 40: DEVELOPMENT OF THE POPULATION OF SUEZ, 1882-1960

Sex	1882	1897	1907	1917	1927	1937	1947	1960
Male	5,975	9,298	9,907	18,177	22,176	26,159	56,791	105,000
Female	5,200	7,881	8,440	12,819	18,347	23,527	50,453	98,000
TOTAL	11,175	17,173	18,347	30,996	40,523	49,686	107,244	203,000

1 Description de l'Egypte, État Moderne, pp. 89-90.

2 The Suez Canal Authority: The Suez Canal, Cairo, 1952.

3 El Kashef: Census of 1882, part II, & Census of 1960 (Statistical Department), unpublished.

4 Censuses of Egypt for the years 1897, 1907, 1917, 1927, 1937, 1947, (Statistical Department).

5 See Fig. 39.

From this table it is clear that the increase during 1897-1907 was 1,174 persons, or about 6%; between the censuses of 1907 and 1917 the increase was 12,649, also about 6%. This latter increase was abnormal since it was due to the migration to Suez after the development of the oilfields along both the Gulf of Suez and the Egyptian Red Sea Coast. The oil refining industry started during that time and the First World War was also an important influence because of the activity of military transport in Suez.

After the First World War the population of Suez grew steadily, as shown by the censuses of 1927 and 1937. At the former census the annual increase reached 3.1%, whilst in the second case it was 2.3% per annum. The increase between 1937 and 1947 was 57,558 persons; or 11.6% per annum, which was the highest in all Egypt during that period. Many factors were responsible: first it included the Second World War, which led to the construction of a large strategic base in Suez. This encouraged many people to come to Suez to work in the British camps. Commercial life also became very active during the Second World War, and this attracted many people, both from Egypt and from abroad, to settle in the town. The second factor contributing to the abnormal increase was the development of oil refining in Suez, and because of discoveries of more oilfields at Feran and Bala'im on the eastern side of the Gulf of Suez, and the discovery of the mineral centres along the Red Sea Coast in Egypt and in Sinai. All these influences attracted a large body of labourers to Suez.

The growth of population between 1947 and 1960 may give a picture which is nearer to normal, although the withdrawal of Egyptian workers from the British Camps in 1951 and the partial emigration caused by the Suez Campaign of 1956 had an adverse effect. The population of Suez showed an overall increase during these fourteen years of 95,756 persons, at least half of this being the result of migration to Suez.

Sex Structure

From Table 40 it can be seen that there is a very high percentage of male population. Although there are no striking differences in ratios between persons under puberty, there are huge numerical differences between sexes in the adult population. This striking phenomenon is due mainly to the character of migration to Suez. Economic conditions prevailing in Suez seem to attract large numbers of males towards the town in search of employment, a view confirmed by the fact that the main suppliers of migrants to Suez have been Qena and Girga, two distant provinces where inhabitants are known to be generally poor and adventurous.

TABLE 41: DIFFERENTIAL STRUCTURE OF POPULATION OF SUEZ[1]

	Males		Females		
	Under Five	Over Five	Under Five	Over Five	Total
Population	19,369	86,083	18,195	79,976	203,610

Additional proof is given in the age and sex structure shown in the above table. It will be noted that the male population is larger than the

1 Census of Suez, 1960.

female one. It is evident that the rapid increase of population cannot be explained by the rate of natural increase alone (excess of the birth rate over the death rate), for this is only slight.

Residence and Birthplace

The analysis of the place of residence compared with the place of birth gives further evidence concerning migration to Suez. From Table 42 it is clear that a high proportion of the people living in Suez were born outside its area. This fact justifies the view that the growth of population is due in a large measure to immigration.

TABLE 42: ANALYSIS OF BIRTHPLACES OF RESIDENTS IN SUEZ, 1960

Place of Birth	Males	Females	Total
Cairo	3,454	3,654	7,108
Alexandria	1,489	1,617	3,106
Port-Said	1,797	1,860	3,657
Ismailia	1,982	1,920	3,902
Suez	56,027	53,700	109,727
Damietta	567	604	1,171
Daqahliya	2,514	2,500	5,014
Sharqiya	5,111	4,966	10,077
Qalybiya	1,282	1,207	2,489
Kafr El Checkh	206	211	417
Gharbiya	1,338	1,412	2,750
Munifiya	1,904	1,721	3,625

/Contd.

TABLE 42: Contd.

Place of Birth	Males	Females	Total
Beheira	347	399	746
Giza	534	482	1,016
Beni-Suef	561	494	1,055
Faiyum	559	499	1,058
Minya	618	525	1,143
Assyut	2,111	1,588	3,699
Sohag	8,445	6,771	15,216
Qena	10,050	8,244	18,294
Asswan	1,302	953	2,255
Red Sea	686	641	1,327
Southern Desert	532	446	978
Western Desert	49	38	87
Sinai	726	604	1,330
Arab Countries	462	300	762
Foreign Countries	373	390	763
Others Unspecified	426	412	838
Total	105,452	98,158	203,610

Source: Department of Statistics, Cairo, 1962: 1960 Censis of Egypt, Suez.

OCCUPATIONAL STRUCTURE

TABLE 43: OCCUPATIONAL STRUCTURE ACCORDING TO CENSUS OF 1947

Occupation	Male	Female	Total	% of Total Occupied Population
Persons Over Five Years	47,965	14,712	89,677	-
Agriculture	3,284	1,852	5,136	6.9
Mining and Quarrying	101	1	102	-
Industry	4,353	93	4,446	6.0
Building and Construction	1,059	3	1,062	1.4
Commerce	8,952	180	9,132	12.3
Public and Private Service	7.283	147	7,430	10.0
Service of Persons	2,817	24,940	31,957	42.8
Transport	4,340	50	4,390	5.9
Others	8,320	2,527	10,847	14.5
Unproductive	7,406	7.719	15,175	-

Source: Census of Suez, 1947; Department of Statistics, Cairo.

TABLE 44: OCCUPATIONAL STRUCTURE ACCORDING TO CENSUS OF 1960[1]

Occupation	Male	Female	Total	% of Total Occupied Population
Persons Over Five Years	82,379	76,627	159,006	-
Agriculture and Fishing	4,989	74	5,063	10.7
Mining and Quarrying	847	7	854	1.8
Industry	8,115	52	8,167	16.8
Building and Construction	3,779	2	3,781	7.8
Commerce	8,934	138	9,072	18.4
Public and Private Service	11,829	1,621	13,450	27.6
Service of Persons	509	-	509	1.2
Transport	5,993	27	6,020	12.4
Others	1,702	160	1,862	3.7
Unproductive	35,682	74,546	110,227	-

In 1947 the population engaged in commercial activities was 12.3%; this figure had increased by 1960 to 18.4%, which can be explained by the fact that Suez has recently risen in stature as a commercial and business centre, mainly in connection with the port trade. 4,446 persons were en-

1 Census of Suez, 1960: Department of Statistics, Cairo.

gaged in industrial activities in 1947, about 6%, and by 1960 the percentage had risen to 16.8. The establishment of the two oil refineries and the fertilizer industry attracted many people from Upper Egypt to work in these new industries; in future Suez will be one of the most industrialized centres of Egypt, and it is expected that the ship-building industry may also expand there. It is likewise anticipated that secondary industry will grow at a fast rate. The concentration of a large number of people during recent years, and the rise of the average income per capita has already increased the local demand for industrial and consumer goods.

According to the Census of 1960, the proportion of persons engaged in agriculture and fishing was 10.7%, in mining 1.8%, in building and construction 7.7% and in transportation 12.4%. An analysis of the future functions of the town shows that Suez will enlarge and, as a healthy urban community, will do so at a very fast rate. The port town is now passing through a period of development which will result in the improvement of its social and economic structure. The improvement of living conditions and the standard of living generally may affect the natural increase of population, which is at present 2.2% per annum. It is also expected that the influx of people from Upper Egypt and of the rural population into Suez will continue. Migrants who come alone for work will eventually bring their families and tend to settle permanently, while the importance of the port and town will attract new settlers from other Egyptian towns. The population of the town in 1947 was 107,244 persons; by 1960 it had risen to 203,000 persons, that is, it had nearly doubled in twelve years. If this rate of growth is continued, the population of the town will have doubled again by 1973. However, this prediction may be treated as only being approximate since, as has already been stated, many independent factors will influence the growth of the town, making planning for the town of the future more difficult.

PUBLIC UTILITY PROVISIONS

Water Supply

Suez lies in a desert and the problem of water supply is fundamental. From the Eighth Century up to the opening of the new fresh-water canal eleven centuries later, this region had been dependent on water brought from wells lying on both sides of Suez, at distances ranging from 6 to 36 kilometres. In 1862 the Sweet Water Canal was extended to Suez, and the problem was partly solved; fresh water had still to be purified and distributed on a modern basis. Three years later a European company secured a concession for the distribution of pure water at Suez, but early in 1877 its works passed by public auction to the former Canal Company.[1]

The present system was extended to Port Tawfiq and to the private houses at Suez in 1903. A network of water-pipes now extends as far as the fertilizer factory some 12 kilometres to the west of Suez. The

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1 Farag, F.: Egyptian Cities, (in Arabic), Cairo, p. 402.

waterworks have been strengthened to attain a capacity of 35,000 tons per day, which is far beyond the present requirements, as total annual consumption at both Suez and Port Tawfiq, including ship supplies, stands now at around seven million tons.

The regular supply of fresh water afforded by the recutting of the Sweet Water Canal from the Nile to Suez brought new life to large-scale agriculture in this hot desert setting. A strip of flat land extends northwards from Suez some 12 kilometres along the Sweet Water Canal, varying in width between 1,000 and 1,500 metres, and lying within the 5-metres contour line. This area was brought under cultivation and was given the name of El-Ganayen.

In order to meet the greater part of the requirements of the rapidly growing population of Suez, fresh water was led south-westward by other minor canals to bring further areas under cultivation. The most important of these canals is the Maghraby Canal which, taking off from the Sweet Water Canal some 900 metres before the mouth of the latter, conveys fresh water to the area around the slaughterhouse and the oil refineries as already mentioned.

Sewerage and Electricity

Sewerage and electricity do not represent problems of such difficulty as the supply of fresh water. The organised sewerage system started in 1920 and was operated by the municipality as from four years later.

Originally confined to the main streets of Suez and El-Arb'ein, the central sewerage system now serves the greater part of the town, while there are designs for a further comprehensive expansion. The refuse is carried westward to fertilize an oasis-like farm of about 50 acres created at a little more than 1 kilometre to the north of the Government oil refinery. At Port Tawfiq, the eastern part was served from the beginning by a special system extended recently to the western part which, up to five years ago, was served by private underground sewage cisterns.

A Power Station was established at Suez, also by a European company, in 1920, and was bought by the municipality in 1925, on the expiry of the company's concession. Since then, certain improvements have been made and new generators have been added as follows: one of 800 h.p. in 1932, one of 1,200 h.p. in 1950, two of 1,200 h.p. each in 1952, and another two of similar output in 1956. Total horse-power now amounts to about 8,000 h.p. installed capacity, which is still below the requirements of Suez.

The Anglo-Egyptian Oilfields refinery has its own generators, with a capacity exceeding the requirements of the refinery, and therefore sometimes resorted to by other institutions. The Government refinery also has recently contracted for the installation of electricity generators for its own use, while the fertilizer factory still depends on the current procured from the special generators of the Adabiya quay.

EXTERNAL RELATIONS

TRANSPORT AND TRADE ROUTES

In 1858 a single track between Suez and Cairo was completed. Receipts from this line proved to be little, while its maintenance entailed many difficulties, especially in connection with the transport of water. As the line was mainly meant to attract and serve transit traffic, the cutting of the Suez Canal in 1869 dealt it a death blow, and the rails between Cairo and Suez were removed in 1878. However, another railway link with Cairo had been completed eight years earlier (1870), via Ismailia on Lake Timsah and Zagazig, thus following the traditional Wadi Tumeilat route. It was much longer (247 kilometres as opposed to 144), but as it served local requirements[1] throughout its length, receipts could reasonably cover maintenance expenses. The direct desert line was restored only in 1930 when commerce at Suez grew to such an extent as to necessitate and pay for a direct link with Cairo. It is served now by modern diesel units, and competes favourably with the modern cross-desert motor road which runs almost parallel to it further south. The line via Ismailia and Zagazig is also still in use, serving traffic with the Canal Zone. This line too is supplemented by a modern motor road. Motor roads from Suez to the Delta and Cairo are well served with regular buses and heavy trucks.[2]

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1 Abu-Bakr, A.: Op. cit.

2 See Fig. 40.

The Government has given much attention to road transport projects. A public organization for inland transport has been founded to formulate plans for the transport of passengers and goods by road, because of the discovery and exploitation of oilfields and the development of mining industry along the Gulf of Suez and the Egyptian coast of the Red Sea.[1] The Government is carrying out the first stage of the plan for macadamization of the roads leading to mining industrial areas which will be connected with Suez. The network in the Red Sea Governorate, at a cost of £E3,000,000 and a length of 450 kilometres, is reaching the final stages of completion.[2] In addition there is the highway leading from Ras Benas to Aswan at a length of approximately 220 kilometres, a highway from Ras Gharib to El Minia at a length of nearly 120 kilometres and a highway from Ghardaka to Kena via Kilo 80 Station, on the Safaga-Kena road, 80 kilometres long. These roads will help in future to bring the Nile Valley nearer to the Red Sea ports in Egypt and this means the changing of the orientation of Upper Egypt towards the Red Sea ports. Thus the small ports on the Egyptian coast of the Red Sea will serve, in the near future, not only the mining industries but also an increasing part of the country's external trade. The efficiency of the port of Suez is vitally dependent on the efficiency of the inland transport system which serves it.[3]

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1 U.A.R.: <u>The Year Book, 1962</u>, p. 227.

2 <u>Communications in the U.A.R.</u>: Information Department, Cairo, 1962.

3 See Fig. 41.

Trade Routes in Egypt

It might be argued that as Suez is a port on the Gulf of Suez, the Egyptian ports of the Mediterranean should also be compared with Suez rather than simply those on the Red Sea in Egypt. The ports to the south of Suez play a less significant part in influencing the trading position of Suez than do the other northern ports, i.e. Alexandria and Port-Said. Despite that, there is no serious competition between Suez and the other Egyptian ports on the Mediterranean, because of the peculiar geographical situation of Egypt with two seaboards, one on the south looking towards the Eastern countries and the other facing Europe.

Suez, being the nearest port to Eastern countries, attracts a good deal of bulky imports coming from that direction together with crude oil and oil products. The recent growth of traffic through Suez is due to economic development in the Far East and in the Red Sea countries. It is also due to the quantitative as well as the structural evolution of Egypt's foreign trade and its re-orientation during recent years. The Far East and Red Sea countries represent a good market for Suez for manufactured goods, because of geography and the cultural ties between these countries and Egypt. Through Suez Port, Egypt is already in a position to export textiles, leather products, printed material, and some building materials, and in future, when the country's industry as well as the port industry is more advanced, it can add fertilizers, paper products, tyres and rubber goods, a wider range of textiles, perhaps some processed foods and possibly a limited volume of iron and steel products.[1]

Statistics of Egypt's imports and exports by ports from 1950 to 1960 appear in Tables 45 and 46; both value and volume of trade are shown. It is clear that Alexandria accounts for about 80% of the value of all imports and some 85% of the value of all exports. As regards volume, it accounts for about 65% of all imports and 40% of all exports. Suez accounts for only about 9% of all imports and even less than 3% of exports by value, while it accounts for about 35% of imports and 30% of exports by tonnage. Port-Said accounts for 9.7% of the value of all imports and 2.6% of all exports, while as regards volume it accounts for about 8% of all imports and about 22% of all exports. The rest of the foreign trade of Egypt goes through other outlets, such as Quseir. Exports there account for 194,000 tons (mainly phosphate), Quseir being a port of export only. Other trade routes use aerodromes and the land route via Wadi Halfa, exports thereby accounting for £E5.2 million in 1960 and imports £E2.9 million. With regard to volume, these routes accounted for 143,000 tons and 18,000 tons of exports and imports, respectively.

Thus it is clear that Alexandria is the main trade route in Egypt followed by Suez and Port-Said.

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1 Little, A.: Op. cit., p. 132.

THE TRAFFIC PATTERNS OF SUEZ

Both Suez and Port-Said owe their importance to the Suez Canal, through which over 90% of the ships calling at either harbour pass. Both are among the main fuelling stations on the Europe-Asia route, supplying both coal, imported from Western Europe, and oil, imported mainly from the Middle East. Besides the vessels which stop at Suez for goods or passenger movement, or to be fuelled or supplied with fresh water and provisions, vessels just passing through the Canal from south to north often have to lie at anchor at Suez waiting for entrance.

The Port Traffic

From the "Returns of Shipping" which represent the actual entries to ports including the local coastwise traffic, it appears that the average daily number of commercial non-sail vessels entering the port of Suez increased from 18.8 in 1939 to 41.3 in 1955, and 51.2 in 1960, the daily average tonnage increasing from 351,000 net registered tons in 1956 to 506,000 in 1960.[1] Further augmentation during 1961-62 is indicated by the continuous growth in the number and tonnage of ships passing through the Canal. In 1955, 418 vessels with 537,000 net registered tons stopped at Suez without passing through the Canal. This figure has hardly changed from the pre-war level. The small volume of traffic can be explained by the low level of exchange of goods between the ports of the Red Sea. The small average tonnage of vessels carrying out the non-

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1 Dept. of Statistics and Census: Annual Return of Shipping, 1962.

EGYPT'S IMPORTS BY PORTS: 1950 - 1960

TABLE 45

Year	Alexandria		Port-Said		Suez		Others (x)		Total	
	1000 tons	million £	1000 tons	million £	1000 tons	million £	1000 tons	million £	1000 tons	million £
1950	3093	144.6	461	29.6	843	18.7	38	22.4	4435	215.3
1951	3686	187.0	241	26.7	933	15.9	33	15.5	4893	245.0
1952	3389	192.2	211	13.6	695	11.8	32	9.4	4327	227.0
1953	2564	146.5	120	12.8	696	13.0	53	5.2	3433	177.5
1954	2392	128.3	146	15.2	1440	16.6	46	4.4	4024	164.5
1955	2433	146.0	146	17.9	1598	18.3	51	5.0	4228	187.2
1956	2609	148.1	190	15.4	1470	18.0	78	4.5	4347	186.0
1957	2828	145.9	263	11.7	1063	20.9	54	4.1	4208	182.6
1958	4611	194.1	352	19.6	1868	21.8	16	2.7	6847	238.2
1959	3355	174.5	439	19.1	1711	17.9	13	2.9	5518	214.4
1960	3697	173.6	390	26.6	2403	22.1	18	2.9	6507	225.0

(x) Including aerodromes and the land route of Wadi Halfa.

Source: Statistical Department, Cairo, Monthly Summary of Foreign Trade.

EGYPT'S EXPORTS BY PORTS: 1950-1960 TABLE 46

Year	Alexandria		Port-Said		Suez		Quseir		Other Outlets*		Total	
	1000 tons	£million	1000 tons	£million	1000 tons	£million	1000 tons	£million	1000 tons	£million	1000 tons	£million
1950	807	164.7	271	4.1	599	3.6	358	0.6	38	5.5	2073	178.5
1951	905	184.6	326	11.2	658	4.5	275	0.5	67	7.0	2231	207.4
1952	538	136.7	99	2.7	492	4.0	324	0.7	48	6.0	1501	150.1
1953	847	128.8	194	3.0	534	4.3	297	0.7	89	5.8	1961	142.4
1954	832	129.1	295	2.7	530	4.8	328	0.8	72	6.5	2057	143.9
1955	902	128.0	247	4.1	548	6.1	335	0.8	41	7.0	2073	146.0
1956	757	121.2	150	5.3	548	6.3	355	0.9	52	8.6	1862	142.3
1957	911	144.1	260	3.8	584	14.2	332	1.0	90	8.6	2177	171.7
1958	1116	142.9	1807	3.9	1515	8.6	306	1.0	90	6.8	4828	126.7
1959	1052	133.5	1726	3.4	1683	8.4	320	0.9	115	6.6	4857	152.8
1960	1257	170.0	1873	4.7	1696	10.0	194	0.6	143	5.2	5163	190.6

* Including aerodromes and the land route via Wadi Halfa.

Source: Statistical Department, Cairo, Monthly Summary of Foreign Trade.

NAVIGATION TRAFFIC AT ALEXANDRIA, PORT-SAID AND SUEZ (x) TABLE 47

Year	Alexandria		Port-Said		Suez	
	Number of Vessels	Net Tonnage 000's	Number of Vessels	Net Tonnage 000's	Number of Vessels	Net Tonnage 000's
1946	1,357	3,082	4,618	19,364	4,619	19,495
1947	1,769	3,721	5,423	24,151	5,440	24,487
1948	1,784	4,387	9,252	42,996	8,670	41,600
1949	1,955	4,956	10,857	51,517	10,730	53,597
1950	2,139	5,383	12,054	61,961	12,424	63,406
1951	2,208	5,546	12,121	60,959	12,195	61,159
1952	2,072	5,368	12,745	72,671	12,601	72,575
1953	2,240	3,581	13,363	71,134	13,246	71,211
1954	2,249	5,826	13,907	77,212	13,572	76,876
1955	2,400	5,911	15,166	86,934	15,012	86,775
1960	3,063	7,891	19,082	137,112	19,287	138,230

(x) Excluding sail vessels

Source: Statistical Department, Cairo, Annual Returns of Shipping, Cargo and Passenger Traffic in the Ports of Egypt and Suez Canal Transits.

TABLE 48

CARGO LOADED FROM THE THREE MAIN PORTS OF EGYPT (1000 tons)

		1946	1947	1948	1949	1950	1951	1954	1955	1956	1957 (1st half)	1958 (1st half)	1959	1960
Alexandria	(From Egypt	1024	1028	1008	896	836	669	793	937	926	544	764	1107	1493
	(Transit	63	14	41	57	9	10	10	16	17	31	20	213	25
	Total	1087	1042	1049	953	845	679	803	953	943	575	784	1320	1518
Port Said	(From Egypt	183	183	203	136	120	242	298	231	143	14	72	340	237
	(Transit	28	102	141	75	40	21	121	122	90	9	74	489	207
	Total	211	285	344	211	160	263	419	353	233	23	146	829	444
Suez	(From Egypt	263	220	214	134	154	177	163	168	228	26	143	248	421
	(Transit	10	1	22	4	26	16	512	171	261	49	344	69	4
	Total	273	221	236	138	180	193	675	339	489	75	487	317	425

Source: Statistical Department, Cairo, Annual Return of Shipping in the Ports of Egypt, 1962.

TABLE 49

CARGO LANDED AT THE THREE MAIN PORTS OF EGYPT (1000 tons)

		1946	1947	1948	1949	1950	1951	1954	1955	1956	(1st half) 1957	1958	1959	1960
Alexandria	(For Egypt	1816	2114	2742	2899	3395	3978	2484	2763	3342	1792	2089	3600	4367
	(Transit	52	62	16	9	8	7	11	31	67	29	23	213	39
	Total	1868	2176	2758	2908	3403	3985	2495	2794	3409	1821	2112	3813	4406
Port Said	(For Egypt	458	456	460	379	393	581	465	210	178	38	61	291	766
	(Transit	631	290	355	99	72	46	278	299	182	4	133	482	169
	Total	1089	746	815	478	465	627	743	509	360	42	194	773	935
Suez	(For Egypt	1905	1066	1238	251	1079	1032	724	1116	1028	562	458	3797	4308
	(Transit	14	1	3	3	3	25	869	181	388	60	435	214	10
	Total	1919	1067	1241	254	1082	1057	1593	1297	1416	622	893	4011	4318

Source: Statistical Department, Cairo, Annual Return of Shipping in the Ports of Egypt, 1962.

canal-passing traffic at Suez, 1,250 to 2,000 tons may indicate that they serve mainly the Red Sea trade.[1]

As regards navigation at Alexandria, Suez and Port-Said, it is obvious from Fig. 42 and Table 47 that the number of vessels excluding sail vessels has increased from 4,619 vessels in 1946 to 19,287 in 1960, at Suez. Net tonnage has increased from 19,495 tons in 1946 to 138,230 in 1960. Port-Said is second after Suez in terms of net tonnage and Alexandria third, although in terms of foreign trade the latter is the chief port of Egypt. However, the remarkable expansion in the net tonnage in Suez and Port-Said is essentially affected by the Suez Canal traffic (see Fig. 42). It is clear that the expansion in the port traffic, whether it is passing through the Canal or not, and regardless of any handling of cargo, naturally involves an expansion in the economic life of the town, especially with regard to activities directly connected with the port traffic, such as supplying ships with fuel, fresh water and provisions.

Goods Traffic

In terms of the volume of cargo handled at the Egyptian ports, Suez accounts for about 28-33% of all goods landed at the three ports of Alexandria, Port-Said and Suez, and for about 20-35% of all goods loaded from them. Port-Said accounts for some 11-15% of goods landed and 21-22% of goods loaded, and Alexandria for the remainder (see Tables 48 and 49), although Suez and Port-Said have a high tonnage, which results from the nature of their cargoes:

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1 Abu-Bakr, A.: Op. cit.

(a) Suez handles more than 70% of the trade in manganese for Egypt and 26% of phosphate exports;

(b) a large proportion of the trade of Suez port is in oil, since Suez is the nearest port to the Eastern suppliers.

From Fig. 43 it can be seen that Suez comes second to Alexandria as regards the volume of unloaded cargo, while in the case of loaded cargo it has attained a similar place only during the last few years. During the Second World War, when there was great risk attached to trading through the Mediterranean ports, Suez competed with Alexandria for the first place as the port for imports (receiving 36.1% of the total imports of Egypt in 1942), while it lagged behind with regard to exports (less than 20% of the total). Most of the imports received at Suez during the war years came from the countries of Western Europe via the Cape of Good Hope.[1] With the collapse of Japan and the enormously growing importance of the U.S.A. in international trade, Egypt's commerce was once more concentrated at Alexandria, and the share held by Suez declined to 8.8% of total imports and 2.8% of total exports.[2]

It is clear from Table 50 that the value of imports at Port-Said was more than at Suez, and the value of exports at each of the two ports was about the same, which was because of the return of commercial activity to Port-Said after the Second World War.

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1 Abu-Bakr, A.: Op. cit.

2 See Tables 48 & 49.

TABLE 50: VALUE OF IMPORTS & EXPORTS IN PORT-SAID & SUEZ, 1950[1]

Port	Value of Imports Egyptian £	% of Total Imports	Value of Exports Egyptian £	% of Total Exports
Suez	18,029,253	8.4	2,924,238	1.6
Port-Said	29,621,554	13.9	3,576,865	2.0

In 1955, imports and exports at Port-Said and Suez were as shown in Table 51.

TABLE 51: VALUE OF IMPORTS & EXPORTS IN PORT-SAID & SUEZ, 1955[2]

Port	Value of Imports Egyptian £	% of Total Imports	Value of Exports Egyptian £	% of Total Exports
Suez	16,203,356	8.8	3,908,461	2.8
Port-Said	17,885,791	9.7	3,769,149	2.6

During the year of 1957 the balance changed entirely between the two ports. The value of both imports and exports increased in Suez very much more than in Port-Said, as shown in the table below.

TABLE 52: VALUE OF IMPORTS & EXPORTS IN PORT-SAID & SUEZ, 1957[3]

Port	Value of Imports Egyptian £	% of Total Imports	Value of Exports Egyptian £	% of Total Exports
Suez	20,915,265	11.5	14,155,681	8.2
Port-Said	11,718,278	6.5	3,404,126	2.0

1 Statistical Department, Cairo, Monthly Summary of Foreign Trade, 1950

2 Statistical Department, Cairo, Monthly Summary of Foreign Trade, 1955

3 Statistical Department, Cairo, Monthly Summary of Foreign Trade, 1957

This increase was because of the Suez War in 1959 which blocked Port-Said for some time (the sudden rise in the value of exports from £6.3 million in 1956 to £14.2 million in 1957 without a corresponding rise in volume was caused by the shipment of 17,000 tons (£8.6 million worth) of cotton from Suez to the Far East during the first quarter of 1957 when the Canal was closed).

From the monthly summary of Foreign Trade for 1960 we can easily observe that the value of imports has increased in Port-Said for it to become the second port in Egypt as regards the value of its imports. Suez occupies the second place after Alexandria in regard to the value of its exports (see Table 53 and Fig. 44).

TABLE 53: VALUE OF IMPORTS & EXPORTS IN PORT-SAID & SUEZ, 1960[1]

Port	Value of Imports Egyptian £	% of Total Imports	Value of Exports Egyptian £	% of Total Exports
Suez	22,167,585	9.8	10,083,654	5.2
Port-Said	26,634,599	11.8	4,744,724	2.5

Coastwise Traffic

It should be recalled that a part, though very small, of the cargo landed or loaded as given by the "Returns of Shipping" represents local coastwise traffic, and in this respect Suez is far ahead of the other two main ports of Egypt. Oil was discovered in Egypt on the western coast

1 Statistical Department, Cairo, Monthly Summary of Foreign Trade, 1950

of the Gulf of Suez, and slightly further south on the coasts of the Red Sea, separated from the Nile Valley and the Delta by wide stretches of desert. Under such circumstances it was natural for Suez to become the centre of collection as well as of supply for the oilfields, since they were easily accessible by sea. The establishment of oil refineries there enabled Suez to maintain its position as the oil centre.

The incoming coastwise traffic at Suez grew with the increase of oil production until the post-war years when well-maintained means of inland communication wuch as roads and railways became adequate for the transport of the crude oil output from the field to the refineries. The volume of goods unloaded at Suez through coastwise traffic increased thus from 223,200 tons in 1938 to 670,000 tons in 1939, and to 1,390,000 tons (out of a total unloading of 1,905,000 tons) in 1946, but decreased thereafter to become only 1,200 tons in 1950.[1] With the discovery of oilfields on the eastern side of the Gulf of Suez (Sudr, Asl and Wadi Feiran), which lack direct land connections with Suez, barges were used once more to carry the crude oil to Suez across the head of the Gulf. Incoming coastwise traffic rose again at Suez to account for 33,300 tons in 1955 and 56,800 tons in 1956. As the output of the eastern side fields has recently increased substantially, this kind of traffic has undoubtedly gained in importance, but detailed figures are not, as yet, available.

A part of the coastwise traffic at Suez, rarely exceeding 10,000 tons in either direction, is handled in transit.[2]

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1 Abu-Bakr, A.: Op. cit.

2 Ibid.

TRANSIT TRADE IN EGYPT (1000 tons) TABLE 54

Year	Imports					Exports				
	Alexandria	Port-Said	Suez	Others	Total	Alexandria	Port-Said	Suez	Others	Total
1950	181.1	820.1	170.1	3.4	1174.7	177.2	811.1	143.7	24.7	1174.7
1951	230.8	969.3	226.0	1.6	1427.7	226.8	954.1	188.3	58.5	1427.7
1952	150.1	558.6	134.5	4.4	847.6	138.3	544.4	109.0	55.9	847.6
1953	95.8	638.7	176.3	5.0	915.8	87.7	610.5	147.4	70.2	915.8
1954	122.9	682.1	168.9	11.2	985.1	118.9	653.7	132.4	80.1	985.1
1955	171.6	693.4	145.9	20.8	1031.7	161.7	668.9	107.0	94.1	1031.7
1956	105.5	557.5	91.7	4.9	759.6	104.6	534.4	66.7	53.9	759.6
1957	29.6	115.8	38.5	4.7	188.6	14.5	102.1	17.2	54.8	188.6
1958	62.8	217.1	45.3	2.2	327.4	51.6	176.3	31.6	67.9	327.4
1959	82.7	253.4	115.5	8.7	460.3	61.2	219.1	107.4	72.6	460.3
1960	82.7	284.4	178.4	11.5	557.0	77.9	251.8	134.5	92.8	557.0

Source: Statistical Department, Cairo, Monthly Summary of Foreign Trade.

Transit Traffic

A good deal of the cargo landed at the Egyptian ports, especially at Suez and Port-Said during recent years, is for the transit trade. In 1954, for example, Suez alone accounted for 859,000 tons or 82% of all the cargo unloaded at the three ports for transit, and for 512,000 tons or 80% of all the cargo shipped from them under the same title. During the first half of 1938 the corresponding percentages were 74 and 79 respectively, while between 1956 and 1958 transit traffic at Suez was insignificant because of the Suez war and the blockade of the Canal by the countries of the Western Bloc (see Table 14 and Fig. 45).

Suez may be recommended as an important centre for transit trade by two main factors, namely, its being the first port on the Red Sea which is accessible from the Mediterranean, and the scarcity of good and developed ports on the Red Sea capable of receiving or serving liners.[1]

The main sources of transit traffic at Suez are usually India, Australia, Britain, Belgium and Italy. The same countries, with the Sudan replacing Australia, often represent the main destinations of the outgoing transit trade.

The Development of External Trade

The relative importance of Suez in Egypt's external trade is necessarily governed by the structure and orientation of this trade (Fig. 46).

From the earliest stages in Egyptian civilisation, trading contacts were established with the Phoenicians - mainly with the object of import-

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1 Abu-Bakr. A.: Op.cit.

ing wood, of which Egypt has always been short.

From about 2,000 B.C., Egypt established trading contacts with southern Arabia and East Africa, and was able to draw on the produce of India through the medium of the southern Arabians, whose chief port, Aden, was a great entrepôt for international trade.

The growing influence of the Greeks and Phoenicians in the Mediterranean resulted in a strong current of trade flowing from the Indian Ocean to the Mediterranean. This trade current has always been of great importance to Egypt for, although the prosperity of the country has been heavily dependent upon agriculture, the tolls levied on the transit of goods and the trading profits built up, formed an important source of revenue; this still applies today. Until the time of the Arab Conquest, it was the constant policy of the Egyptian rulers to attract as large a share as possible of the Indo-European trade to their country.

The rounding of the Cape represented a deadly blow to Egyptian trade - once the Portugese had established their superiority, Indian goods entered Europe by way of Lisbon. By the beginning of the Nineteenth Century, Egypt was a poor, isolated country, ruined by the diversion of trade from the Mediterranean to the Atlantic.

The year 1841, when Mohamed Ali's attempt to create an industrialized, closed state economy was defeated by the Great Powers, marks the initiation of a new process, consummated only after the British Occupation, of integrating Egypt as an agricultural colonial unit into the international politico-economic system.

The general economic expansion and rapid increases in foreign trade during the Occupation can be demonstrated as follows: (values in £E mill.)

		Imports	Exports
1885-89	-	7.9	11.0
1910-14	-	25.2	31.7

The rise in the export figure was due to increases in the volume and value of cotton, the proportion of which to the total value of exports rose from 81% to 93%. Imports were mainly manufactured articles, foods and fuels (see Table 55).

Main Character of Present Trade

Export Trade: the general structure of Egypt's export trade is simple. Cotton accounts for the bulk of exports by value (70% in 1960), rice and onions accounting for a little over 5%. The main manufactured items are textile yarns and cotton fabrics.

Import Trade: cereals form the main item in the imports of Egypt because of the increased consumption of food generally and of cereals in particular (see below, values in £E million):

	1938	1950	1959
Imports of Cereals	0.1	17.91	32.27

This reflects the increase in population.

As a result of the growth of the domestic production of cotton piece goods, imports of this commodity are now insignificant, as shown below:

1938	-	9.0%
1950	-	2.7%
1959	-	negligible

TABLE 55: VALUE OF TRADE SINCE 1930 (£E mill.)

Year	Imports	Exports	Year	Imports	Exports
1930	46.2	31.1	1946	80.0	69.0
1931	30.5	25.9	1947	98.1	88.4
1932	26.5	25.3	1948	160.3	143.1
1933	26.1	28.1	1949	166.6	137.8
1934	28.7	31.0	1950	200.4	175.4
1935	31.2	34.7	1951	236.5	207.3
1936	31.5	33.9	1952	222.9	150.2
1937	38.0	39.5	1953	179.7	142.5
1938	36.8	29.4	1954	164.4	143.9
1939	34.0	33.4	1955	187.2	146.0
1940	31.3	28.3	1956	186.4	142.3
1941	33.1	22.6	1957	190.4	171.6
1942	55.3	19.3	1958	230.4	163.8
1943	39.1	26.6	1959	214.4	154.3
1944	50.6	30.0	1960	225.1	191.6
1945	58.9	54.0			

Source: United Nations International Yearbook of Trade, 1961 (W.I.T.)

TABLE 56: ORIENTATION OF TRADE 1960

(Values in £E mill.)

Country	Imports (from)	% of Total	Exports (to)	% of Total
U.S.S.R.	22.9	10.17	30.9	16.1
U.S.A.	39.9	17.72	9.9	5.2
West Germany	32.9	14.61	9.1	4.3
India	9.9	4.4	13.4	7.0
China	6.8	3.0	15.5	8.1
Czechoslovakia	8.0	3.5	12.9	6.8
East Germany	8.8	4.0	10.0	5.2
Italy	11.2	5.0	7.2	3.8
United Kingdom	13.6	6.0	4.6	2.4

Source: United Nations International Yearbook of Trade, 1961, (W.I.T.).

TABLE 57: PRINCIPAL ITEMS OF TRADE 1959

(Values in £E mill.)

IMPORTS

Cereals	32.27	Fertilizers	5.58
Wheat & Flour	10.59	Explosives and Chemical Materials	5.16
Tea	6.65	Paper and Board	5.85
Tobacco	5.07	Iron & Steel Goods	10.26
Lumber	4.58	Metalworking Machinery	10.78
Textile Fibres	4.00	Textile Machinery	6.50
Crude Petroleum	9.88	Power-Generating Machinery	6.24
Petroleum Products	11.57	Electrical Machinery	11.13
Medicinal and Pharmaceutical Products	6.33	Motor Vehicles	8.58

EXPORTS

Raw Cotton	134.7	Rice	9.8
Textile Yarn and Fabrics	12.8	Vegetables	5.9
		Crude Petroleum	2.9

Source: United Nations International Yearbook of Trade, 1961, (W.I.T.).

Machinery and chemicals are prominent items in Egypt's import trade, reflecting the general development of the economy of the country (see Table 57).

Orientation of Trade

At present, Eastern European countries are Egypt's main markets, (see Table 56). They took 50% of Egypt's exports during the first four months of 1961, and during the same period imports from thence represented 25.5% of the total.

Egypt is outstandingly an exporter of raw materials and an importer of manufactured goods, and the bulk of its external trade is therefore bound to be exchanged with industrial countries. Until a few years ago cotton used to form nearly 80% of the total value of Egypt's exports followed mainly by rice, onions, phosphate and manganese. A great part of the latter two items was, and still is, exported from the two minor ports of Quseir and Abu Zenima respectively, both in the neighbourhood of the mining centres.

With regard to imports, Egypt's requirements consist mainly of manufactured goods which were nearly all supplied by Europe and the United States of America, and were naturally received through Alexandria, or through Port-Said if such goods were shipped on liners not passing by Alexandria. It is only petroleum products, procured from south-eastern Asia, which were sometimes unloaded at Suez and sometimes at Port-Said or Alexandria, where there were (and still are) more handling facilities and where discharge fees and municipality duties were much lower.[1] The diversion of such imports to the northern ports would not be handicapped by the Suez Canal fees as these are collected in the case of loaded vessels passing through the Canal according to their net tonnage, not their actual cargo.

With the rising importance of Egypt's commerce with Eastern and Far Eastern countries, the share of Suez in the import trade of Egypt increased to reach 10% of total imports in 1938,[2] while its exports remained at 3% of total exports, thus bringing the share of Suez in the turnover of Egypt's foreign trade during that year to 7.2%. Port-Said had a slightly better position. During the war years, when the Mediterranean was a risk for trade, Suez competed with Alexandria for the first place as the port of importation, receiving 36.1% of the total imports of Egypt in 1942, while it lagged behind with regard to exports (less than 20% of the total).

Certain developments have caused the share of Suez in Egypt's foreign trade to show some increase during latter years. These developments are the industrial growth of Egypt, the need for fuel oils, for which the natural port is Suez, and for the closer commercial contact with the developing countries of the Red Sea and the East.[3]

The recent industrial growth in Egypt created exportable surpluses of manufactured goods which accounted for about 11% of the total value of

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1 The Report of the Suez Chamber of Commerce submitted in 1954 to the Ministry of Commerce and Industry. A new law was promulgated in November 1954 unifying duties at all Egyptian ports and reducing by 75% the fees charged on ships entering the port of Suez for the purpose of crossing the Canal.

2 Suez Port Authority, Unpublished Report, 1940.

Egypt's exports in 1957, against less than 4% in 1938. The main manufactured, and semi-manufactured, exports of Egypt were formerly almost confined to sugar and cotton seed oil, but now consist of cotton yarn, cotton fabrics, rayon fabrics, heavy oil products, cement, shoes, sugar, cotton-seed oil, clothes, perfumes and soap.

The recent industrial growth in Egypt and the need for oil directed the attention to Suez Port, which is the natural port for oil. Prospection and exploitation of oil in Egypt have been enhanced, while increasing quantities of crude oil and oil products are imported to Suez from the Persian Gulf countries via the Red Sea as well as from European countries through the Suez Canal. On the other hand, some of the newly discovered local crude oil is exported through Suez as it is surplus to local requirements.

The efforts made by the countries of the East towards economic development since the Second World War have created between them a spirit of sympathy and brought them into closer co-operation and good economic relations. The share of Red Sea countries and countries of the East, such as India, Ceylon, China, Indonesia and Japan, in the turnover of Egypt's external trade[1] has increased from 15.5% in 1938 to 17% in 1950 and further to 24.4% in 1957. Suez might have been the natural port for handling the whole of this trade had it not been for certain considerations of shipping economics. If a ship coming from the East, carrying among other cargo some goods destined for Egypt, has in its schedule to

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1 Abu-Bakr, A.: Op. cit., p. 137.

THE SHARE OF EACH PORT IN THE TOTAL AMOUNT OF FOREIGN TRADE, 1960

TABLE 58

Port	IMPORTS									
	Total		Tobacco		Mineral Fuel Oils		Iron, Cast Iron & Steel		Other Merchandise	
	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000
Alexandria & W. Frontier	3,697	173,612	11.0	5,030	980	9,867	195	15,401	2,510	143,314
Port-Said	390	26,635	0.2	36	48	423	16	904	325	25,272
Suez	2,403	22,168	0.1	73	2,312	14,009	18	1,556	73	6,529
Others	18	2,660	-	3	-	-	3	74	15	2,483
Total	6,507	225,075	11.3	5,142	3,340	24,299	232	17,935	2,924	177,698

Port	EXPORTS									
	Total		Rice		Raw Cotton		Cotton Yarn		Other Merchandise	
	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000	M. Tons 1000	£.E. 1000
Alexandria & W. Frontier	1,256	170,036	272	9,487	374	134,728	19	8,820	590	17,002
Port-Said	1,874	4,745	5	260	-	-	-	178	1,868	4,306
Suez	1,696	10,084	-	-	-	12	-	22	1,696	10,050
Others	337	5,738	3	83	-	6	-	98	335	5,550
Total	5,163	190,602	280	9,830	374	134,746	19	9,119	4,489	36,908

stop at Alexandria to load cotton for another country, it will be preferable to have loading and unloading performed at the same port, so as to avoid paying the port entry fees twice, while no extra expenses will be incurred by handling the goods in question at Alexandria instead of unloading at Suez.[1]

During the last few years the importation of frozen meat became significant, and large quantities were brought from Australia and China via Suez. It may be recalled that Suez has a special wharf to receive animals imported alive from Somalia, Ethiopia and the Sudan.

It is necessary to stress the difference between the value and the volume of trade, for, if Alexandria still accounts for some 77-80% of the value of all imports and about 85% of the value of all exports, its share drops to 60-67% and 40-42% respectively as regards volume. On the other hand, Suez accounts for only about 9.1% of imports and even less than 5% of exports by value, while it accounts for 25-27% of imports and 26-30% of exports if we consider the volume. The explanation is simple. The bulk of exports from Alexandria consists of light-weight, high-priced cotton, while expensive and rather heavy machinery make up the greater part of its imports. In the case of Suez, all the main goods handled for both importation and exportation (except cotton and rayon fabrics) are bulky and cheap. A list[2] of the main items imported and the main items exported through Suez in 1960 is given below in Table 58.

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1 Abu-Bakr, A.: Op. cit., p. 137.

2 Statistical Department: Summary of Foreign Trade, 1962.

Passenger Traffic

Passenger traffic at Suez would have been of lesser importance than goods traffic had it not been for pilgrimage and tourist traffic. This latter movement is a new product of the Suez Canal in combination with modern motor communication with Cairo across the desert. Passengers passing through the Canal from south to north often land at Suez, where organised tourist transport including more than one hundred new cars and a number of well-maintained buses await them. They pay a rapid visit to Cairo, cross the Delta, and rejoin their vessels at Port-Said.

Pilgrimage is the age-old traffic which was one of the main reasons for the continuity of existence of Suez when it practically ceased to act as a port of commerce, for here was the natural point of passage for pilgrims from Egypt and the whole of North Africa. The route to Mecca via Suez (or Qulzum) was, however, stopped during the Crusades, when pilgrims turned to the southern Red Sea ports. About the middle of the Thirteenth Century,[1] the Suez route was restored, and since then pilgrimage has remained of paramount importance to the life of Suez. Up to the eighties of the last century, pilgrim caravans either crossed Sinai to 'Aqaba at the head of the twin gulf bearing its name and thence to Mecca,[2] or took vessels at Suez and completed their journey by sea. The development of the Red Sea navigation attracted an increasing preference for the sea route. There are now no more pilgrim land caravans from Egypt to Mecca.

1 Abu-Bakr, A.: Op. cit., p. 139.

2 Ammar, A.: The Eastern Entrance to Egypt: Sinai, Cairo, 1946.

Tell-el-Haggag, (Pilgrims' Hill), one kilometre to the north of Tell-el-Qulzum, is a reminder of the old caravan days. The north-eastern water-front of modern Suez represents the pilgrims' port (Al Ansary), used during the last decades of the last century and the first decade of the present one.

The pilgrimage season which had been for centuries one of the main sources of revenue to Suez has now become of no special significance to the life of the town. Yet, it still presents a vital passenger traffic movement at the port. Around 1860, pilgrims passing by Suez numbered about 7,000-8,000.[1] The number of Egyptian pilgrims now travelling through Suez averages about 10,000 every season.

THE HINTERLAND OF SUEZ

It is difficult to determine the hinterland of Suez, firstly because Egypt is connected with several ports. These ports provide services for the hinterland and maritime organization. Inevitably, each port attempts to attract as much traffic as possible from any direction, in as much as more traffic means more life and prosperity and greater prestige; secondly, Egyptian ports serve commodities rather than regions. Port-Said handles potatoes, onions and ground nuts, Suez deals in oil and minerals and also cotton piece goods. Alexandria is the port for cotton and rice. Cotton is grown all over the country, potatoes mainly in the

1 Clerget, M.: Le Caire, Tome II, p. 199.

Delta of the River Nile, onions in Upper Egypt and rice in the northern parts of the Delta. Thus the whole Nile Valley and Delta in Egypt may be considered as one and the same hinterland for exports through either Alexandria or Port-Said without any distinction. The transport cost differential does not interfere significantly in the preference of one port to another.[1] Cotton grown in the eastern part of the Delta, which is nearer to Port-Said and Suez, may be exported from Alexandria.

In the case of Suez, the situation is different. Some minor exports of about 50,000 tons and £1.5 million in value are channelled through Suez, not on account of their nearness to their places of production but because of their nearness to their destination. A good example is given by cotton piece goods which are produced in different localities inland and exported after satisfying local demand through one of the three ports according to destination. In this respect the hinterland is common for the three ports.

Suez handles more than 70% of the manganese, 26% of the phosphate and nearly all the oil products exported by Egypt. These same items together form about 78% of the total volume but only about 40% of the total value of exports from Suez.

The first two items are produced near the coast of the Gulf of Suez and the Red Sea, while petroleum products are processed at Suez from crude oil mainly extracted from oilfields on both sides of the Gulf.[2]

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1 Abu-Bakr, A.: Op. cit.

2 El-Sakkar, F.: The Mineral Industry of Egypt, Ph.D. Thesis, University of London, 1960, pp. 112-150.

The delineation of a hinterland for Suez with regard to its exports can thus be attempted, after taking into consideration the quantities of manganese exported from Abu Zenima and of phosphates exported from Quseir. The oil-producing areas as well as the mining and quarrying centres served by Suez are now connected with it by modern motor roads extending along the sides of the Gulf (see Fig. 47). Traffic to and from the Sinai Oil-fields is carried on barges mooring at small ports constructed for this purpose opposite the oilfields. Among the most important petroleum and mining settlements are Ghrdada, Ras Gharib, Abu Zenima, Sudr, Safaga and Quseir. Their total population does not exceed 2,900 inhabitants.[1] Their economic importance is based on the fact that they produce more than 3,300,000 tons of crude petroleum, 400,000 tons of phosphate ore, 200,000 tons of manganese ore and many other less valuable minerals such as lead, zinc, gypsum and talc. These settlements[2] depend entirely upon Suez for fresh water, fresh food and transportation.

Turning to the import side, the position is rather determined by two main factors, apart from the diversified nature of Egypt's imports as already mentioned:

(a) The geographical location of Egypt's supplying markets with regard to either of its two seaboards.

(b) The peculiar geographical situation of Egypt with two seaboards, one facing Europe and the other looking towards the East.

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1 Seteha, M.: Op. cit., p. 3.

2 Ibid., p. 2.

Suez being the nearest port to the eastern suppliers, it attracts a good deal of the bulky imports coming from that direction together with crude oil and oil products imported from the north via the Canal, amounting in all to some 1.0-1.5 million tons and £16.21 million per year. Alexandria attracts all the bulk of European imports as a part of the goods procured from countries lying to the south of east of Suez. Port-Said attracts light but valuable goods imported from both the south, such as wool and tea, as well as from the north. Imports through Port-Said are usually less than 200,000 tons but amount in value to about £12-18 million. Although this distribution of imports among the three ports gives quite a useful geographical indication with regard to forelands, it adds further complication to the question of hinterlands, as the goods imported through any one of these ports are transported to all parts of the country without any clear distinction, mainly through Cairo wholesalers.[1]

So, if a hinterland, although in a limited sense, could be defined for the exports of Suez, the hinterland of its imports comprises the whole of Egypt.[2] Oil, oil products, cattle, tea, dry vegetables, and other goods imported through Suez are not meant to serve a certain region; they are received there either because the port is better equipped for them, as in the case of oil and cattle, or because it is nearest to their provenence (dry vegetables, tea and also cattle).

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1 Abu-Bakr, A.: Op. cit.

2 Ibid.

Among the most important obstacles to the development of the local hinterland of Suez is the lack of necessary public services in mining zones, such as roads, means of communications, ports, etc. This is why the 5-Year Plan for public projects foresaw the construction of a network of roads to serve mining as well as other purposes. It was also decided to construct a series of ports on the Red Sea and the Gulf of Suez at Bernis, Abu Ghadoun, El Sharm el Bahary or El Sharm el Kibli, Ras Malaab, etc., to serve the local hinterland of Suez. As for the present ports of Quseir, Safaga and Abu Zenima, projects for their enlargement and conversion to public ports, rather than their existing status of private harbours are ready, so as to serve coastal traffic of the hinterland.

The programme also involves the execution of projects for the supply of drinking water for labourers and miners in the present mining zones, through the erection of condenser installations at Ras Benas, Abu Zenima and Mersa Alam in addition to the enlargement of the Quseir and Safaga condensers. These projects will develop the local hinterland of Suez and will increase the importance of Suez Port.[1]

MARITIME TRAFFIC AND FORELANDS OF SUEZ

Turning lastly to the forelands, it is clear that developments there can be factors of equal importance in port traffic as the hinterlands.

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1 For details see El-Sakkar (Op. cit.) and Seteha (Op. cit).

THE FORELANDS OF SUEZ PORT: 1955 & 1960

TABLE 59

Area	Import				Export				Total			
	1955		1960		1955		1960		1955		1960	
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%
U.K.	22,712	2	992	0	2,617	1.6	68	0	25,329	2	1,060	0
Other Europe	51,176	4.5	5,068	0.1	6,737	4.0	34,728	8.3	57,913	4.5	39,796	0.9
U.S.A.	26,794	2.4	551	0	187	0.1	163	0	26,981	2.1	714	0
U.S.S.R.	-	-	368,208	8.6	-	-	-	-	-	-	368,208	7.8
Africa	114,285	10.1	2,425,765	56.3	105,321	62.7	268,764	63.7	219,606	17.1	2,694,529	57
Asia	770,286	69.2	1,312,325	30.4	42,254	25.1	69,196	16.5	812,540	63.3	1,381,521	29.2
Australia	59	0	185	0	48	0	280	0.1	107	0	465	0
Others	130,680	11.8	195,665	4.6	10,853	6.5	47,873	11.4	141,533	11.0	243,538	5.1
Total	1,115,992	100	4,308,759	100	168,017	100	421,072	100	1,284,009	100	4,729,831	100

The forelands have been suggested to indicate those areas which are connected with a port by means of ocean carriers.[1] This definition does not differentiate between commercial and non-commercial connections, and in the case of Suez these two divisions should be emphatically distinguished from one another. The greater number of vessels arriving at Suez seek only a passage through the Canal without carrying out any commercial transaction between Suez and the places from which they have come or to which they are going.[2] Thus it is essential to restrict the study of the forelands of Suez to those vessels loading or unloading goods at the port.

Comparing the forelands tonnage of 1955 with that of 1960 (Table 59), the changes between 1955 and 1960 find expression in the shifted emphasis among various continents. In the total traffic picture of 1955, Asia has gained most remarkably in both imports and exports. Its share was 63.3%, next to it came Africa with 17.1%, U.S.A. 2.1%. However, a significant change in the forelands of Suez followed the nationalisation of the Suez Canal and the resulting tension with Britain and France. This is illustrated by the same table. In the total traffic picture of 1960, Africa gained the first place, instead of Asia, with 57%, Asia was second with 29.2% and the U.S.S.R. third with 7.8%. This is explained by the fact that the U.S.S.R. became an important market after the Suez crisis: imports were 8.6% in 1960. The U.K. and U.S.A. disappeared from the list

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1 Weigend, G.: Op. cit., p. 3.

2 Abu-Bakr, A.: Op. cit.

in 1960, and the figure for 'Other Europe' had declined from 4.5% in 1955 to 0.9% in 1960 (Table 59, Fig. 48).

Thus many factors have combined to effect the modern rapid growth of Suez as a port, but it may have a still more promising future ahead. The great increase in East-West trade through the Suez Canal indicates the recent economic development of the East, where the progress of Western civilization has caused remarkable expansion and diversification in both production and consumption. Traffic has been increasing through the Suez Canal because of the oil of the Persian Gulf, with more than 50% of world proven oil reserves and more than 25% of the world production of crude oil; the Persian Gulf has thus jumped into importance as one of the world economic centres.

With the recent development of the African and Asiatic countries, Egypt has been strengthening her commercial relations with those countries.

It is clear from this chapter that Suez, as a port, can or even should handle more than double its present share in the value of Egypt's external trade, and a far larger volume of transit traffic than is handled at present. As an urban centre, there will be in the near future, wide opportunities for industrial and business expansion, especially with the promise of the discovery of more minerals, particularly oil, in the neighbouring areas. The town will grow also as a commercial centre, connected with the developing port activities. By its situation at the shores of two oceans, Egypt can draw upon the sources of raw materials and upon the markets of two completely different areas such as Europe and

Africa or the Middle East, and adapt its industrial production to the different markets. Thus the best utilization of the geographical position of Suez could be made by turning Suez into the great industrial "work-shop" of the Red Sea. It is envisaged that a free port should be constructed in Suez, where raw materials of the Red Sea countries would be turned into industrial products and re-exported to countries on the same sea-lanes. The plants which could be planned for immediately for such a free port include a fish plant; a meat packing and preserving plant, combined with leather industries; production of plywood from tropical woods; tyre production; and palm-oil processing.

Chapter VII

PORT SUDAN

The Port and Town

Physical setting - Historical Development - Layout of the Ports -
Growth of the Town - Urban Functions - Population:
Growth and Structure - Public Utility Provision.

External Relations

Transport and Trade Routes - Traffic Pattern at the Port -
Hinterland - Foreland.

THE PORT AND TOWN

Physical Setting

The region, which extends along the Red Sea coast, may conveniently be divided into three zones roughly parallel to the coastline; the zone of coral formations, the main plain of fluviatile sites, sands and gravels, rising westward to the foot of the Red Sea Hills which comprise the third zone.

The shore-line is formed from recent coral reefs which have been raised above the present sea level and extend up to 2 k.m. inland. South of Port Sudan the coral beach is only slightly above the Sea level and rises gently inland forming scattered low mounds. At Port Sudan and to the north the shore line is often marked by a low cliff about 2 m. (6 ft.) in height.

Between the raised coral beach of the coastline and the main plain may be a channel depression only very slightly above sea-level and floored with saline mud.

Port Sudan is an inlet extending north-westward from which, about three-quarters of a mile within the entrance, a short arm extends westward. This inlet is, for the most part, bordered by reefs. Obviously this canal-like inlet is not the mouth of a river, past or present,[1] for present rivers, flowing over a wide plain, through

(1) Crossland, C. Desert and Water Gardens of the Red Sea. 1913, page 146.

loose and heterogeneous materials, could cut out such a channel but would end in a wide shallow estuary or delta, if it formed a definite mouth at all.

The forms of all the harbours of the coast can be reduced to one plan more or less easily, that of a cross with arms parallel and at right-angles to the coast-line, and are in fact formed by two cracks in the earth's surface nearly at right-angles. The former arm is generally the largest, and in the case of Port Sudan it is two miles long. The other arm, which connects this with the sea and forms the shallower branch harbour, is much the shorter. In the case of the narrower harbours, like Sukin, the arm at right-angles to the sea is the longest and the plan of the inlet is more like the conventional cross.(1) Most of the land between the inner arm and the sea, corresponding to the East Town in Port Sudan, has been cut down and converted into reefs, upon which strips of sand have accumulated to form islands in places.

The main plain is covered by a series of silts, sands and gravel of fluviatile origin often presenting a stony surface increasing in coarseness towards the foot of the Red Sea hills.(2) In places the stony surface is buried by blown sand or washed silt. Mobile dunes, of the barchan type, are sterile. This coast line is almost

(1) Ibid Page 143

(2) Geographical Handbook of Western Arabia & the Red Sea. page 112.

featureless except that it is broken north of Port Sudan by small hills of limestone, sometimes with gypsym, among which the most notable is Saghum, some 50 miles south of Mohammed Qol.[1] The coast and land which backs Mersa and Port Sudan is a low flat plain extending about 11 miles inland to the base of the mountains, Jebel Gumaderiba (Lat.20° 4' N.,Long.26° 43 E.). Jebel Baiviti is a range of mountains extending some 16 miles south-south-eastward from Jebel Gumaderiba, about 5,000 to 6,000 feet high. Southward of Jebel Baiviti the ranges decrease in elevation until just westward of Port Sudan, Jebel Asoteriba (Sotriba) rises to an elevation of 4,478 feet. Along the western margin of the plain, hills of Archaean rocks have been reduced to plain level by erosion and are now marked by residual fragments of the underlying rock type. This forms locally a desert surface of the Hamada type.

Several large Khors carry the drainage from the Red Sea hills to the coastal plain. Torrential floods may occasionally reach the Red Sea but the water is usually absorbed by the sediments of the plain.

Khor Arbaat, north of Port Sudan is one of the few permanent streams in the Red Sea hills. The water flows as far as the foot-hills and may reach the sea in torrential floods during exceptionally wet years. Water from a catchment area of about 3,000 sq.km. drains into the khor, that is a supply of 3,000,000 cubic metres for every 1 m.m. run off. A large proportion of this water is stored in the

(1) Grabham, G.W. The Physical setting of the Sudan. <u>The Anglo-Egyptian Sudan from within, 1935,</u> page 273.

valley-fill deposits, thus serving as a natural reservoir from which Port Sudan draws its water supply.

Khor Mog, one of the two khors flowing into the harbour of Port Sudan, is usually dry and it has a wide sand and gravel bed. During the rain season floods are often experienced due to the great catchment area of the creek and the torrential character of the rains. The other khor is to the north of the town, it flows into the main inlet and its floods do not affect large areas. (See Figs.49 & 50)

Geology

The structure of this district is, on the coast at least, two series of folds lying at right-angles to each other.(1) The axes of the dominant series lie N.W. - S.E., while those of the subsiding series at S.W. - N.E.

In order to understand this structure it is necessary to give a short recapitulation of the series of events which led up to the present form. After the close of the Miocene period a series of earth movements began which gave rise to the Red Sea and the Gulf of Suez and Aqaba. The whole of the land became submerged up to the foot of the granite hills. This remained under water until the Pleistocene period was far advanced; limestone and coral reefs were formed, while conglomerates and gravels were deposited along the foot of the hills. Towards the end of the Pleistocene period earth-movements again began; a crust creep set in along a N.E. - S.W. line which caused a series of low folds to be formed; while at the same time feebler movements took place in a direction at right angles to the other. These, along with a trough-fault, created the harbour at Port Sudan.(2) The harbour lies along the line of the dominant fold while the short arm is on the subsiding fold at right-angles to it. A glance at the chart of plan of the harbour will enable one to understand the structure of the coast better. The piece of high ground on the seaward side of the harbour rose from the sea at the

(1) Barron, T. Port Sudan (Geological Survey) 1905. Paper unpublished University of Durham School of Oriental Studies. Page 1.

(2) Ibid. page 1.

same time as that on the land side. These are the anticlines. The harbour and the low ground to the west of the high ground on the landward side of the harbour represent the synclines. The sea occupied those while the anticlines formed tongues of land jutting out into the sea. As the land went on rising the strain on the rocks became so great that they gave way on either side of the present harbour; the crack gradually widened and a wedge-shaped piece slipped down, giving rise to the steep escarpment on either side of the deep water. This double fault passes out to sea and apparently goes along the edge of the present reef, explaining the deep passage into the harbour. Before this fracture took place, however, the sea had cut out and eroded the coral limestone to the extent of the difference in level between the submerged shelf and low plateau on either side of it. The same is seen to the west of the high ground on the landward side of the harbour; the coral limestone has been cut back by the sea which entered by the short arm of the harbour. From its northern end the high ground was almost an island at one time and now a small neck is still seen connecting it to the gravel plateau beyond. That this is the work of the sea is proved by the remains of beaches still see lying against it. Near the head of the harbour the low ground is due to the combination of the two folds; while to the north of the proposed site of the town is another mud flat into which the sea comes during high tide, which also owes its origin to the same causes. Furthermore, on the seaward side of the harbour the coast is a level plain of marine erosion only covered by a few inches of water for more than half-a-mile, which, as the coast is a rising one, will become a mud flat.(1)

It is a remarkable fact that the inlets on either side of Port Sudan are facsimiles of the harbour there.

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(1) Barron, T. op. cit. page 2.

Historical development

Development to 1909

For many centuries before the British occupation of the Sudan, the modest needs of the Red Sea littoral had been served by Suakin, a port which became, year by year, more heavily obstructed by coral reefs. The entrance is now so blockaded by coral reefs that no ship can attempt to enter at night. Farther up the coast to the north is a very good harbour about 30 miles from Suakin, called "Sheikh Barute". The question naturally presented itself as to why this good harbour should be left utterly unused when, with a couple of lighthouses, it could be entered at any time.

When Sir Reginald Wingate became Governor-General of the reconquered Sudan at the end of 1899, he was aware that Suakin was quite unsuitable as the port of entry to so vast a territory,(1) and also undesirable as such for political reasons but as it was understood that the Hydrographer of the Royal Navy had stated that it was the best port available, no immediate steps were taken to find another.

The reconnaissances and surveys executed by Lieutenants W.E.Longfield and S.F.Newcombe, R.E., from 1901 to 1903, confirmed the opinion that a projected Nile - Red Sea railway should start from Suakin, and accordingly elaborate arrangements were made to convert that port into a suitable terminus. Materials were collected,

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(1) Sandes, E.W.C. The Royal Engineers in Egypt & The Sudan. Chatham 1937, page 493.

causeways and jetties built, and sidings laid on the area known as Graham's Point to the south of the narrow entrance to the harbour. It was only natural that Major G.B.Macauley, R.E., the Director of Railways, should be anxious that his plans should not be upset by any sudden change of base, and accordingly the claims of Suakin were allowed to remain unchallenged. They were assailed by Captain M.R.Kennedy, R.E., the Director of Works, on April 23rd,1904, when the preparations for commencing the railway were nearing completion. Kennedy, having been ordered to examine Suakin Harbour and estimate the cost of straightening the entrance channel, reported that the blasting of the coral reefs would cost £48,000 and might occupy his men for two years. "In considering this expenditure", he wrote,(1) "I should like to bring forward the question as to whether Suakin justifies its choice as the port of the Sudan. The harbour is an unsatisfactory one. It can be entered only by day; it can take only a few ships; and it does not lend itself to improvement, except at great expense. As a site for a town, Suakin has little to commend it". Kennedy said in his report that, if a harbour with greater natural advantages and more conveniently situated could be found, we should not be deterred from accepting it because the inferior harbour of Suakin possesses certain traditions, vested interests and a dilapidated town. He added that a glance at the chart naturally causes one to turn to Sheikh Barghut, about 29 miles

(1) Report dated April 23rd, 1904, from Kaimak - M.Ralston Kennedy, Director of Works to the Agent General, Sudan Government, Cairo.

north of Suakin. After collecting all the information about it he visited the harbour and said in his report that there was no comparison between it and Suakin Harbour. It was clear of dangerous reefs and the entrance was wider and the harbour much larger. With a lighthouse on the Sanganeb Reef and a couple of leading lights vessels could enter by night as well as by day. This harbour, too, lent itself to improvement without excessive expenditure. The ground around was an ideal site for a town and there was ample space for extension. Water was obtainable from deep wells or borings at the foot of the hills inland. In his report he mentioned that if Suakin was finally adopted as the port, it would mean an uncontrolled and mastricted, and an inferior and equally restricted harbour. Kennedy said there would be no difficulty in running the railway to Sheikh Barghut. As to the work already done by the Railway Authorities in improving Suakin Harbour, it may be presumed that they looked upon Suakin merely as an existing termination to the railway. Kennedy suggested in his report, that the question of Sheikh Barghut should be gone into by a Committee, of which, say, two of the members should be Naval experts; he suggested that the Committee should visit Suakin first, then Sheikh Barghut.

Sir Reginald Wingate, with his intimate knowledge of the coast, was fully aware of many of the attractions of Sheikh Barghut before Kennedy drew attention to them. He had already put forward to Lord Cromer the idea that the Sudan should have a port entirely its own and better adapted for trade purposes than Suakin. It is probable that Kennedy's estimate of the cost of improving Suakin Habbour weighed the scales in favour of Sheikh Barghut and caused Sir Reginald to visit the harbour. The gangway which was lowered from his steamer must have been almost the first piece of wood to touch those inhospitable and deserted shores. Seeing for himself the wonderful natural harbour and great depth of water at Sheikh Barghut, Sir Reginald came to the conclusion that no better port could be found on the Red Sea coast and, continuing his journey to Cairo, he laid the whole question before Lord Cromer. The British Agent and Consul General then agreed to the appointment of a small Commission to examine Suakin and Sheikh Barghut.

The report of the Commission and some individual reports by the members were received in September, 1904, and settled the fate of Suakin. The Commission(1) as a whole estimated that the improvement of Suakin would cost approximate £E.100,000 and the establishment of a port at Sheikh Barghut about twice that amount, but they recommended most strongly that Sheikh Barghut, rather than Suakin, should be adopted as the port of entry and the terminus of the railway to the Nile.

The recommendations of the Commission having been considered and generally approved, Kennedy was ordered to prepare detailed plans and estimates for all the proposed works at Sheikh Barghut. The

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(1) Sandes, E.W.C. The Royal Engineers in Egypt & the Sudan. Chatham 1937, page 490.

estimates amounted now to £E.940,000 and proved, four years later, to be accurate to within £E.17,000. Instructions were given on December 23rd, 1904, to the leaders of the first party of labourers sent to Sheikh Barghut. These people arrived in Suakin from Berber on January 7th, 1905, and reached Sheikh Barghut by sea on the 11th of the same month.

So the great undertaking was launched. "As time went on", writes Sir Reginald Wingate(2) "a correspondence took place between Lord Cromer and myself on the subject of a suitable name for the new port. It was though that "Sheikh Barghut", meaning "The Sheikh of the Fleas" was quite unsuitable and Lord Cromer suggested that the name should be 'Port Wingate'. I replied that as he had been mainly instrumental in obtaining the necessary funds for the railway extension and for the building of the town and harbour, it would be far more suitable to call the place 'Port Cromer'. He dissented, however, and I then said "why not call it what it is really going to be, that is to say the port of the Sudan; in other words 'Port Sudan'? This was approved and thus Sheikh was renamed Port Sudan.

The scheme prepared by Kennedy provided for four quays to berth five ships, entrance and leading light towers, dockyards workshops and a slipway, customs sheds, an electric power station, electrically-operated cranes and coal transporters, an opening lift bridge to carry the railway over an arm of the harbour, lighting, drainage and water-

(1) Letter from General Wingate to Mr. G.W. Grabham, Khartoum, dated 24th October, 1934

supply systems, and all the usual staff and administrative buildings required for a town which was to be not only the chief port of the Sudan, but the headquarters of the Red Sea Province. The supervising of this programme of construction would have been utterly beyond Kennedy's power had he not been able to secure the appointment of Lieutenant H.H.Kelly as Resident Engineer. Kelly arrived in Port Sudan at the end of 1904; and thereafter, although a general supervision was exercised by Kennedy, the construction was directed by Kelly. In September, 1906, he was joined by Lieutenant E.E.B. Mackintosh. Together they continued the task, with the help of a staff of civilian specialists in harbour, mechanical, electrical, and civil engineering. On January 1st, 1906, Sir Reginald Wingate gave the following description of Port Sudan and its surroundings:-(1)

"The new port is 30 miles north of Suakin, 800 miles from Suez, 497 from Khartoum, 307 from Atbara and 692 from Wadi Halfa. Thus the route from Khartoum to the sea (at Alexandria) is reduced by upwards of 900 miles. The entrance to the harbour lies open to the south-east, while the port itself consists of an outer basin with two arms, the shorter lying south-west and the outer running north-north-west for 2½ miles. Along the coast are fringing reefs, allowing a perfectly clear channel 300 yards wide and 600 yards long into the harbour........The harbour basin is 12 to 15 fathoms deep. There are 237 acres available for large ships up to 5,000 tons, and 70 acres for smaller vessels. The outer reefs break all large waves,

(1) Extracts from a Memorandum by the Governor-General of the Sudan, dated January 1st, 1906, appearing in the Report on the Finance, Administration and Conditions of the Sudan, 1905, pp.52-54.

and access is easy by day or night in all weathers. The east side of the harbour has been entirely appropriated for commercial wharves, shipping offices, etc., while the town proper has been laid out on the high-lying ground on the west side. Here will be constructed all the Government buildings and offices, the post and telegraph office, hospital, barracks, schools and prison. A quarantine station is being built on the ground south of the harbour. The main line of railway runs round the end of the harbour. The residential portion of the town has been divided into building lots, and lots for business premises. The town is being lighted throughout by electricity, as are the harbour and quays. The central electricity station is being made large enough to provide power for the cranes and conveyors, and for the pumps of the water-supply station".

By the end of 1907, the schools, Custom House, four warehouses, two quarters for officials, post and telegraph offices, the quarantine station and the Governor's Palace (Muderia) had been completed, and the prison, barracks, electric power station and the civil hospital were nearly finished. The opening-lift bridge was in position and could be operated by hand. Four electric cranes had been erected and the main dockyard buildings were ready.(1)

Kelly encountered many difficulties in building Port Sudan.(2) The local clay and lime were poor in quality and stone was scarce, so he used coral blocks set in cement. The coral was found to disintegrate unless cut and used soon after being exposed to the

(1) Annual Report, Public Works Dept., Sudan Government, 1907. by Kennedy, M.R.
(2) Sandes, E.W. The Royal Engineers in Egypt and the Sudan, 1937, p.499

air. Ironwork corroded with extraordinary rapidity in the damp and salt-laden atmosphere and even reinforced concrete was unreliable. Nevertheless, good progress was made.

April 1st, 1909, saw the formal opening of Port Sudan by the Khedine, Abbas, and is now the chief seaport of the country, and one of the important harbours of the Red Sea. It has been greatly enlarged during the past fifty years. The external trade of the country is for the most part carried to Port Sudan even when Egypt is its destination, except to Upper Egypt.

Recent growth of the port and town will be explained further on.

Layout of the Port

Approaches

Port Sudan is a natural harbour formed in the coral reef. The approaches to the harbour are clear from an easterly direction. To the north-east of the harbour entrance lie the Wingate and Sanganeb Reefs, to the south-east and east-south-east lie the Towartit reefs, the North Gumna Shoal and Hind Kadam Island.(1) Sanganeb Reef lies about 14 miles from Port Sudan and is equipped with navigational lights. The northern extremity of Towartit Reef, and Hind Kadam Island are also provided with navigational lights. The northern and southern lights of the Port Sudan administration are installed at Shab Baraya and Masamarhu Island, about 70 miles to the north and 92 miles to the south-east respectively from Sanganeb Light House.

Anchorage

The harbour is 1½ cables in width at the entrance. The approaches are well beaconed and illuminated, and no difficulty should be experienced in the making the harbour by day or night. The anchorage is good, with excellent holding ground in a depth of from 10 to 14 fathoms, and is well protected from all winds. The rise and fall of water is found to be practically entirely due to barometric causes,(2) combined with the semi-annual raising and lowering of the

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(1) Sudan Railways - Port Authority - Port Sudan Harbour, Handbook of Regulations 1937 page 7

(2) Ibid

whole body of water in the Red Sea. These result in a variation of the level of about three feet in a year, being highest in the winter and lowest in the summer months. In this variation of level, a change of two feet may occur in any month from a periodical fluctuation of air pressure, while a third variation of two or three inches in a day may follow the daily barometric movement which is of a remarkably regular nature.

A straight channel with deep water gives easy access to the mouth of the coast, so that the reefs outside form a shelter from the heavy seas brought in by the southerly and easterly winds. The entrance is about five hundred yards wide, and this breadth continues for nearly a mile.(1) Then the inlet expands into a basin on the south side, which is some nine hundred yards long by 500 hundred yards in breadth, having a depth of from 6 to 17 fathoms.(2) Beyond this the channel runs up into the land for a distance of about two miles. There is another basin on the north side about one and a half miles up, and a third at the end of the inlet. The narrowest part of the inlet is about seventy yards. The shores of coral rise to a height of from 6 to 14 feet above sea-level.

Port Sudan is run as a branch of Sudan railways, in the charge of a Port Manager who is responsible to the General Manager of the Railways at Athara. There is a Harbour Advisory Board composed of representatives of the provincial administration, the town council, Customs Department, Ministry of Commerce, Railways, and three non-

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(1) Martin, P.F. <u>The Sudan in Evolution.</u> London 1921. page 202.
(2) Port Sudan Authority: <u>Report of the Harbour</u> 1962. page 1.

official members nominated by the Sudan Chamber of Commerce. A division of administration resulted in a marine section and a dock section.[1]

Berths (Fig. 51)

On the eastern side of the harbour lie the main quays, 2,280 ft. in length, divided into five berths and taking four large ships and one small one equipped for handling general cargo. The depth of water alongside the quays is 28 ft. at low summer water-level. An extension of 1600 ft. to the main quays has recently been completed. The depth is 35 ft. at low summer tide.

North of the main quays are berths 9 and 11, the lengths of these being 500 ft. for the first one which can accommodate one ship drawing 34 ft., and 450 ft. for No. 11 which can accommodate a small ship drawing 28 ft., both at low summer water level (outside fender pontoons).

South Quays

These occupy the other side of the arm which lies to the left side of the ship entering the port. That arm is the end of Khor Mog which descends from the inland hills. On this side of the harbour lie four berths normally allocated to special traffic. Two of these berths, Nos.17 and 18, are 908 ft. in length and are allotted to the coal and bunker trade.[2] The facilities for coal

(1) Directory of the Republic of the Sudan, page 114. London 1961-2.

(2) Port Sudan Authority. Report about the Harbour of Port Sudan, 1962. page 2.

cement, clinker and similar bulk cargo are adequate. The wharf for the accommodation of oil tankers is being rebuilt to take vessels of 18,000 tons.

Table 60

The following table gives some characteristic data about the berths.(1)

Berth No.	Location	Length in feet.	Drift in ft.	Year of Construction
1 to 5	East side	2,280	28 to 33	1909
5a to 7	" "	1,600	35	1961
9	" "	500	13	1943
11	" "	450	13	1941
15	South Side	600	13	1927
16	" "	220	35	"
17 to 18	" "	908	13	"

The depth of water is 31 ft. outside pontoon fenders at low summer water level.

Further to the east lies a berth 223 ft. in length at which dangerous cargoes, such as petroleum, are handled. This berth is connected by pipe line with the installations of the petroleum companies. The depth of water is 33 ft. at low summer water level. The last of these four berths, 653 ft. in length, normally handles cargoes of salt or dangerous cargoes, such as petroleum. The depth of water alongside is 35. ft. at low summer waterlevel. Berth No.16 serves the petroleum product distributors of the Sudan, namely the

(1) Port Sudan Authority. Report about the Habbour of Port Sudan, 1962

Shell Company of the Sudan, Mobil Oil Sudan Ltd., and Nitol, the distributing agency for Caltex. This berth is connected to the petrol storage installations by 8-inch and 10-inch pipelines.

At the Shell Company of the Sudan's Port Sudan Installation, storage capacities (in metric tons) are:-

Benzine 11,870, Kerosene 3875, Gasoil 8,219, Diesel Oil 8,713, Fuel Oil 33,318, Aviation Gasoline (all grades) 6,519, Aviation Turbine Fuel 1,622.

Caltex installations comprise tanks containing average stock as follows:-

3,055 tons white oil and 5353 tons black oil; 2,500 tons Benzine, 2,500 tons Kerosene, 1,250 tons Aviation Spirit, 550 tons lubricating oils.

Mobil Oil installations storage capacities are as follows:-

Benzine 3,000 tons, kerosene 2,750 tons, Gas Oil 1,150 tons, Aviation Gasoline 1,250 tons.

Black oils are stored in tanks on the east side of the harbour and white oils at the main installation on the south side.

West Quay

This occupies the western side of the main arm on which Port Sudan lies; depths here are not quite enough to build berths, the average being about 6 ft. except an area which has a length of 150 ft. and a depth of 16 ft., which is used by the harbour's vessels.

The improved operating standard of the last few years have been made possible by better organisation of the shore working, close co-operation with ship's agents and particularly by the provision of better port equipment. The portal quay cranes brought into service about 25 to 30 years ago are being replaced by newuunits more suited to the ships of today.

The greater height of the new cranes and their longer jibs enable cargo to be handled quickly and safely to and from the far side of the hatches of the largest vessels using the port. The movement of goods from the quay front has been accelerated by the use of trailers hauled by small tractors.

The Port facilities:[1]

Mechanical devices.

(1) Berths Nos.1 to 5 have the following electric wharf cranes:-

1 crane -	lifting	capacity	15	tons (No.5 only)
12 cranes-	"	"	5	"
3 cranes-	"	"	3	"
10 cranes-	"	"	5	" for the new extension of 1600 ft. to the main quays.

(2) Berths Nos.9 and 11 are not equipped with cranes.

(3) Berths Nos.17 and 18 are served by four electric transporters.

Tugs:

3 tugs of 1,000 H.P. each
3 tugs smaller size.

Two tugs accompany every ship as she docks since, although the entrance to the harbour is not a difficult one, the necessary manoeuvres to get alongside the quays can present problems during the windy seasons.

Lighters:

There are 15 lighters with a capacity of 250 tons each available

(1) Sudan Railways - Port Authority: Port Sudan Harbour - Report,1962.p.3

and also quite a number of pontoons for the benefit of vessels working at the anchorage or taking coal bunkers.

Oil Fuel:

All berths at the main quays are equipped to supply oil fuel or diesel oil by pipe line direct from the heavy oil installation tanks on the east side.

Water Supply

Fresh water from the Red Sea hills in pipe direct to the quays and water points are provided at all berths. Water is supplied by water barges to vessels at anchorage and to the offside of vessels alongside the quays.

Wireless Station:

Continuous day and night facilities for communicating with ships passing through the Red Sea are provided by a Government Wireless Station with a day range of 250 miles.

Dockyard

To the north of the main quay there is a small dockyard in the open sea. The dockyard workshops are equipped with plant suitable for undertaking repairs to craft and machinery within the scope of the slipways and for maintaining Government craft in an efficient state; also repairs of a minor, temporary nature can usually be carried out to the average sea-going vessel. Electric and oxygen welding and burning plants are available.

There are four slipways with cradles electrically operated with capacities as follows.[1]

	Slipway No.1 for Tugs, etc.	Slipway No.2 for Pontoon Barges Fenders, etc.
Total length of centre cradle track -	516.75 ft.	440 ft.(approx.)
Width between banks -	47.57 ft.	-
Cradle dimensions	150 ft.long by 40 ft.wide	150 ft. long by 30 ft. wide
Capacity D.W.displacement -	500 tons.	200 tons.
Mean draught over cradle keep blocks	10 ft.	6 ft.6 ins.
Slope of slipway	1 in 17½	1 in 23

Slipways Nos.3 and 4 are for small light craft, such as launches etc. A new 600 tons capacity is in hand and will be completed by 1962.

Storage:

The transit sheds and stacking areas which have been greatly extended and improved in recent years have proved adequate for the increased import traffic. The private warehouse area adjoining the port was fully taxed in dealing with the increased flow of exports. Many firms engaged in the export trade are erecting new buildings and the administration is providing adequate sidings to enable traffic to be handled promptly in and out of the warehouses. The local user wagon fleet was brought up to 207 bogey wagons, a sufficient number for current needs.[2]

The total area occupied by the ports is 264 hectares, 210 ha. on the east side (including 4 ha. of dockyard and 63 ha. of warehouses) an d the rest 54 ha. on the south side.

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(1) Sudan Almanac: An official handbook, 1961. Khartoum. p.218
(2) Sudan Railways: Annual Report 1959/1960 page 24.

Development and New Expansion

Plans have been passed to continue the extension from No.7 to No.9 to give an extra berth for deep draft vessels up to 33 ft. Main quays extension of 1600 ft. has recently been completed and is being provided with three modern warehouses for the reception of import cargo. The lengthening of No.15 was completed early in 1961 to 60 ft. Plans to link No.9 to No.11 are unlikely to be implemented in the near future.(1)

To cope with future demands, the Authorities have made the following plans for the extension of the port facilities.

A) Construction of quays on the easterly side of the harbour northwards up to the causeway.

B) Further extension on the west side from the power station down to the marine barracks as a first stage, and from the marine barracks down to the swimming pool as a second stage.

Possibilities for the ports

One of the major problems that the Sudan will have to face is the creation of another port. Although the potentialities of the port harbour have not been fully reported yet, the fast growth of production centres, namely mining in the north and agriculture in the south, brings this question to the fore.(Fig.52).

(1) Ports of the World, 1961. pp. 885/886.

Growth of the Town

Port Sudan is located on the West Coast of the Red Sea, in 19° 37' N. lat. and 37° 13'. long., approximately 700 miles by sea south of Suez and approximately 497 miles by rail north-east of Khartoum and 295 miles east of the Nile valley, which the railways join at Atbara. When the poverty of the Red Sea and the coastal plain are considered, perhaps the most astonishing thing is that they have been able to afford a suitable site and water supply for a town the size of Port Sudan at all.

Port Sudan was naturally the best place adapted to serve the purpose as it was easily accessible from both land and sea, besides affording safe and sure anchorage and good protection against the relatively high waves of the open sea. Today the surrounding land of the inlet has been reclaimed and laid out in the form of a township and the site has developed into an important sea port for all the Sudan.

Port Sudan is an artificial town created for a particular reason in a location selected only for the fulfilment of physical requirements. No other economic considerations or communication requirements influenced the selection of this location. It is too young a town to have influenced, as yet, the shaping of the surrounding settlements. The physical obstacles of the seacoast and the Red Sea hills create centripetal forces which will influence the shape of its future development. The early work in building was carried out in 1905;

a few scattered houses were built along the south-west of the inlet to form the core from which present Port Sudan grew. The original plan of construction seems to have been drawn upon too liberal and too optimistic a scale, space being allowed for great expansion and for theerection of other buildings.

The town stands on coral soil on the west with its commercial and residential areas and, with its tree-lined roadways against the background of the distant Red Sea hills, imparts a general air of prosperity. The principal constructional material for official and other first class buildings is a handsome coral rock obtained in unlimited quantities from the subsoil of the ground upon which the town is built.

The town planning of Port Sudan started by creating several quarters on the western coast of the inlet. It has been possible to develop at Port Sudan a town on modern lines, unhampered by any pre-existing buildings, with adequate space, both for all the needs of a commercial community and for the construction of the railway yard, warehouses and dockyard workshops essential to the requirements of a modern port.(1)

Port Sudan differs noticeably from other Sudanese towns in that the public buildings, shops, and other private houses are better built, and often rise to two and even three storeys, until, in 1956 the Government encouraged people to build huge buildings. The coralline

(1) Martime The Evolution of the Sudan, 1921. page 208

limestone of which the coastal plain is made up can easily be quarried and cut to provide a durable building stone, while local supplies of gypsum make excellent mortar. There are, however, a number of one-storeyed buildings dating from the earliest days of settlement in Port Sudan, and these are mainly built of wood, raised on stilts to prevent dry-rot and termite attack, their slotted roofs and wooden frames and floors of imported timber giving a foreign air to the older streets where they stand.(1) Unconventional building materials are also to be found in certain of the poorer quarters of the town where old wooden sleepers and beaten sheets of tinplate from four-gallon petrol cans are used to make the homes of the poorer labourers. The hot and humid climate which persists throughout a long and tiring summer makes it desirable for living-rooms to be open to the sea breezes! The heavy dew that forms by night makes it unsuitable to sleep under the stars, and so small covered structures are commonly seen on the roofs of houses.

The Growth of the Town

The development of the port was a starting point for the enlargement of the town as a commercial centre.

Whether for trading or residence, the development of the town followed a policy which has been enforced by the Government. It has set a definite policy for the development of Port Sudan as a town. Its policy is to grant no freeholds. This will effectively prevent

(1) Barbour, K.M. The Republic of the Sudan, 1960. page 233

land speculation, which had already proved a calamity in Khartoum.

The longest leasehold does not extend beyond ninety-nine years and stringent regulations are introduced into all leases with regard to the character and the value of the buildings destined to be erected, and the length of time permitted to carry out the work.[1]

By these means the town will keep uniformity in the appearance and value of its structures; in course of time, therefore, Port Sudan should develop into a handsome and homogeneous town.

Recent expansion of the town.(Fig.54)

The expansion of Port Sudan is now influenced by the navigation traffic in the port. The rapid increase of traffic necessitates expansion of the port and its facilities. It also requires expansion of the town in order to meet the migration of the people who are seeking work in the port.

Until 1940 growth continued at a slow rate. The town grew around the port installations and near the Khor Mog, possibly because this is the only place where arable land is available. The port and the railway line attracted some new housing development. The part where the main town is now located did not accommodate more than a few Government buildings. It was between 1940-1951 that extensive building activity contributed to the creation of the main town. This was due to economic reasons dictated by the fact that Port Sudan was needed and used for second world war purposes.[2] In 1951 the new

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(1) El Shami, S. The Maritime Orientation of the Sudan. 1952. Cairo University. p. 164.

(2) Port Sudan. Existics - Abstracts on the Problems & Science of Human Settlements, Vol.9, p.119. 1960.

completed. During the years 1951-1959 the town continued to grow at a fast rate but not in accordance with an overall programme or plan. The directions for expansion were guided rather by land availability than by land suitability.(Fig.53)

The most characteristic feature of Port Sudan as a town is the inlet which divides it into three parts, the west town, east and south towns. This inlet extends north-westward from which, about three-quarters of a mile within the entrance a short arm extends westward into which Khor Mog falls, and separates the west from the south part. The inlet is divided by a causeway constructed to accommodate the railway line and join together the west with the east part of the town.

The Western Town

This part extends to the west of the inlet and represents the most important part of Port Sudan. The eastern part of the western town is the core of the older part which constituted old Port Sudan up to 1924 and now represents a business centre of older type where can be found big storehouses, shipping agencies' offices and those of transport companies. Among the other establishments which have roots going back to this phase of growth are the two schools, the hospital, the post office, the Mudiria, the railway station, the two clubs, the small church, and several private residences belonging to officials.

The extension of this part is to the west of the railway branch which extends to the southern town. This extension represents the expansion of the town after the second world war. It comprises the residence of comparatively middle income classes (merchants, contractors and officials). This quarter of the town is known as Diem Medina (Town's quarter). Most of the houses in this quarter are built of wood.

The middle of the western town is the cleanest part of all Port Sudan. The main street, called Osman Deknh, divides the town into two parts. It is 12 metres wide and runs from the central station in the north to the Airport in the south. Many small ,streets run from the main street, dividing this part into handsome and homogenuus sections. The roads in this part generally average only 6 to 12 metres in width. The principal means of transportation in the city is by local bus, running on several lines to connect all the parts of Port Sudan.

Eastern Town

The eastern town comprises the main quays behind which lie the main offices of the port authority, the customs area and 380,000 square ft. of warehouses,[1] Outside the customs area there are extensive warehouses owned by private firms. Until 1924 there were only 8 stores which covered 104,572[2] square ft.; after 1924 the Gövernment gave lands outside the custom area to the

(1) El Arabi Port Sudan 1962 No.40 page 123 Kuiwt (in Arabic)
(2) El Shami,S. Port Sudan (in Arabic) Cairo. p.48

following companies:-

Mashell Cotts Co.

3 stores	-	covered	1350 m^2
6 "	-	"	6000 m^2
3 "	-	"	900 m^2

Glately Hanby Co.
8 stores, 3 of them covered 13500 m^2.

Many other companies have got small stores. The majority of them lie on the side behind the custom warehouses and the dockyard. The only residential area in this part lies to the east of the dockyard, it is called Diem Ahu Hashish, comprising the residence of officials and labourers who work in the port.

So the Eastern town is divided into three sections, the customs area encircling the port quays, the commercial residential quarter and warehouses of private firms.

The Southern Town

The Southern Town lies to the south of the arm which extends to the western side of the main inlet. The arm is the end of Khor Mog which descends from the inland hills. This town is limited by the coast of the Red Sea. On its eastern side and by the Red Sea desert plain in the west and south and to the north by Khor Mog. This part of Port Sudan was deserted until 1922, then the Carantina occupied it for a long time and recently it has extended to the west along Khor Mog. In this part of Port Sudan there are now quite a lot of quarters inhabited by different types of people from different countries, i.e. Ethiopia, West Africa, and Arabs of the Yemen. The most important quarters are, Dium Shati (the Peach quarter), Dium El-Habrash (Ethiopian Quarter) Dium Takarin (Nigerian quarter) Dium Mosa and Dium Gaper are inhabited by the Arab people of the Eastern Sudan. Most of these quarters are in poor condition, where old wooden sleepers and beaten sheets of galvanised iron or leather are used to make the homes of the poorer labourers who work in the port, the petrol companies and in Salt work. The best quarter in this part of Port Sudan is Dium Shati which is inhabited by officials of the Sudanese Government. To the east of the Southern town lies the coaling quays together with the Petroleum Companies Installation. South of these are the Salt works and the airport of Port Sudan.

The evolution of Port Sudan as a town has always been essentially influenced by the degree of its importance as a port, and the future growth of the port and the town of Port Sudan is clearly dependent on the level of foreign trade of Sudan as a whole.

Urban Functions

The main function of the Port of Sudan is that it serves as the only port for the entire country. The need for such a port was the principal reason for which the port was established and the performance of this function at an increasing rate contributed to the rapid growth of Port Sudan. In particular during the secbnd world war (1941-1945) the tremendous influx of population experienced was due to increased port activities. The establishment of the port and the installation of the railway line connecting the port with the other urban centres of the country attracted the first settlers who worked either in transport, or in the conbtruction of new houses and other buildings. They formed the first nucleus of the town which, little by little, grew and survived.(see Fig.55)

To-day, the town can roughly be divided into five districts: commercial-residential, industrial, wharfs, administrative and residential, though such districts are often intermingled.(Fig.55)

Commercial-Residential Districts

These districts are divided into two setions. The main market is located in the centre of the town; it is intermingled with administrative buildings and residential areas and its expansion is already blocked. In the eastern town there is a small district which has few shops, and in the south there are no shops at all.

The total number of shops in Port Sudan is very high in relation to the population, partly due to the small size of most shops.

Table 61

Area	Population	No.of Shops	Shops per 1,000 persons
1) Eastern town	9,564	102	10.6
2) Main town	6,154	1,140	185.2
3) Deim Medina, " Warsha, " El Arab	15,102	237	15.7
4) Deim Muse, " Gabir, " Felata	14,605	137	9.4
5) Deim Shati, South Town	2,137	-	-
Total of Port Sudan:	47,562	1,616	34

In the main centre lie the most important shops and a bazaar to provide the inhabitants with their food requirements; there are also offices of shipping agencies, banks, etc. Most of the shops in this district are owned by foreigners, such as Italians, Greeks, Egyptians and Syrians.

Industrial Districts:

The only major industry in Port Sudan is a newly-built oil factory, located behind the east port warehouses; there is also the shipbuilding industry in the dockyard. In the western town there are quite a number of industries gathered in the Deim Warsha, also there are four canneries in the western part of the town. The district near the southern town contains a tin factory to supply the petroleum product distributors with tin. The salt industry in the southern town is the main one for the whole country. The production of salt amounts to about 55,000 tons per year.[1] About 30,000 tons are consumed in the Sudan, the remaining quantities being exported. The salt concession area occupies 2,000 acres, of which 330 are actually used for 30 pans; the site is above sea-level, the water being pumped into the pans.

Wharf districts

These are distributed at the eastern and southern flanks of the harbour. The deep water wharves and the newly completed special cargo wharves have a total length of about 3,880 ft. and marginal tracks and paved roads are laid to the apron which allows direct ship-to-rail handling and vice versa.

Administrative districts

Of the administrative centres, the Municipal government of Port Sudan lies in the western town; the Muderia, the Governor's palace, is situated on the stern flank of the inner harbour in the west town. The harbour bureau is situated on the eastern bank of the inner harbour behind the main quay.

Residential districts

They are divided into three sub-districts. The largest stretch of the higher residential district is in the western town, while the smaller one lies near the port and is mainly for the lower income groups who work in the shipping services. The third residential area lies in the southern town and is inhabited by poor people

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(1) El Arabi Port Sudan 1962 No.40. p.130 (In Arabic) Kuwit.

who are divided into several quarters. Most of them come from outside the Sudan and each nationality usually lives in one quarter which is called in Port Sudan 'deim' (see section on 'Population'). This residential area in the south is very remote from the other parts of the town.

Future Master Plan[1] (Fig.56)

This plan aims at serving an eventual population of 125,000 and has the flexibility required for its further expansion if so necessitated (Fig.9). The plan covers the whole area of the present town and provides for completely new residential communities and two industrial zones. The total area of the plan is about 2,200 hectares; 859 hectares for residential; 398 for the central, civic, business etc.; 290 for industrial; 132 major open spaces, and 505 hectares for the port. The plan is based on the following basic ideas:-

a) Control of the floods and creation of a main arterial road leading from the new airport in Asoteriba along the Khor Mog canal. The railway line serving the south port is placed on the other side of the canal.

b) The existing causeway is widened by the construction of a new one on the north-west side of the railway line.

c) A ring road is provided to carry all the passing-through traffic,

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(1) Doxiadis - The future of Port Sudan, Athens, 1959

as well as the traffic from the urban centres of the south to the east port and the industrial area.

d) A heavy industrial zone is provided north of the port. This area is adjacent to the port and well served by the railway. Light industries are kept at the same place as now, but provision is made for expansion.

e) An extensive utilisation of the inner harbour is made by the creation of an open space zone.

f) The residential quarters of a such a size as to allow for creation of integrated communities, having the necessary shopping centres, education buildings, religious buildings, sports grounds, etc.

POPULATION

Population Analysis

As the 1955-56 Census is the only official source of information,[1] no comparison can be made with the past. Assumptions, which referring to future estimates, are based mainly on the experience gained in other countries.

Size of Population

The table below indicates the size and density of the population of the ten major urban centres which were fully and separately enumerated during the population census of the Sudan, 1955-56. Fig.57 explains the distribution of settlement along the Red Sea coast of the Sudan.

Table 62 [2]

Town	Population	Area in Square Km.	Persons per square Km.
Omdurman	113,551	44	2,581
Khartoum	93,103	44	2,116
Elobeid	52,372	65	806
Wad Madam	47,677	18	2,649
Port Sudan	47,562	65	732
Kassala	40,612	44	923
Khartoum North	39,082	18	2,171
Atbara	36,298	21	1,729
Malakal	9,680	10	968
Suakin	4,228	8	528

From the above table it is clear that Port Sudan is an important centre in the Sudan, next in status to Omdurman and Khartoun, and that

(1) Census of the Sudan, 1955-56
(2) Ibid

it has the lowest density after Suakin which is in a handicapped situation because of its decline. It has the largest population along the Red Sea in the Sudan (Fig.57).

The inhabitants of the coast belong to the Beja tribes who take little interest in the sea preferring to live a pastoral life in the hills. It is extraordinary that these people should have made so little use of the sea.

Age Group of the Population (Fig.58)

The age structure of the population "under puberty" is 33%, which is lower than the average percentage of the ten major urban centres.[1] It is clear that the "under 5 years" population is also lower. This is mainly due to the high percentage of infant mortality and also to the influx of adult population during recent years which increased the "over puberty" percentage.

Age and Sex Structure (Fig.59)

Table 63 [2] 1955-56

Town	No. of People	Male	Female
Port Sudan	47,562	28,745	18,740

The number of males, as it seems from this figure, is higher than the number of females; This is due to the migration of men to Port Sudan to work in the port. Men used to come alone at first until they got a job and made money; then they would send for their families to

(1) Ibid

(2) The First Census - Sudan Republic. Report 7, pp.4-5, 1955/56.

join them.

The analysis of the place of residence compared with the place of birth has not yet been officially released. From the information collected it is understood that a high proportion of the people living in Port Sudan were born outside its area. This fact justifies the view that the growth of population is due in a large measure to internal migration. The diagram (Fig.59) shows the age and sex structure of Sudan, Kassala Province, the average of the ten major urban areas and Port Sudan. It is obvious that in the urban areas there is a very high percentage of male population. Although there are no striking differences between persons "under puberty" there is a considerable difference in sex ratio. While the female "over puberty" population makes up 24.8% of the total, the corresponding figure for the male population is as high as 42.3%.

The population of Port Sudan has always included a number of different cultures.

Table 64

Nationality or Tribe	Number	Nationality or Tribe	Number
Arabs		Arabs (Contd.)	
Baggara	358	Gehena	1,184
Dar-Hamid	344	Arabs of Middle Sudan	40
Gawarnha-pederia	2,585	Arabs of North Sudan	233
Shokeria	38	Arabs of East Sudan	1,477
Gaalyoon	10,562	Arabs of West Sudan	85
Total	13,887	Grand Total	16,906

Nationality or Tribe	Number	Nationality or Tribe	Number
Nuba, North-east	14	Nubians	6,678
Nuba, North-west	12	<u>Nilotes</u>	
Nuba, South-west	67	North-east Dinka	2
Nuba, South-east	84	Dinka Ber	2
Nuba from other places	2	South-west Dinka	2
Nuba, Kababish	6	Dinka	237
Nuba, Meseria	12	Fung	318
Nuba	686	Nuer	30
	883	Nilotes	39
<u>Beja</u>			630
Amarar	3,322	<u>The Nilo-Hamites</u>	
Hadendowa	1,446	Anuak (Ethiopia)	14
Beni 'Amer	2,533	Pari	25
Bisharia	907	Luakaya	176
Other Beja	1,906		215
Beja	52	<u>Sudanese</u>	
	10,166	Moru	32
<u>Western Sudanese</u>		Bongo	51
West Darfur	742	Ndogo	14
French Sudan	154	Zande	34
Nigeria	422	South-western	45
Western (unknown)	220	Unknown	18
	1,538		194

Nationality or Tribe	Number	Nationality or Tribe	Number
<u>Sudanese from:</u>		<u>Foreigners</u>	
Greek nationality	32	Western European	10
N.African "	2	Eastern European	12
W.African "	168	English	115
E.& S. African "	2	Italian & Maltese	40
Ethiopian "	18	Greek	27
Egyptian "	165	South American	2
		North American	6
Syrian-Liberian "	24	North African	12
South Asian "	86	West African	3,857
Andian "	20		
	517	East & South African	2
		Ethiopian	375
		Egyptian	92
		Syrian & Lebanese	84
		West Asia	864
		Indian	576
		South Asian	2
		Australian	2
			6,078

According to the 1955/56 Census, the number of the Beja is 10,166, about 27% of the total number of the population of Port Sudan.

The rest of the population of Port Sudan includes a number of different cultures and creeds. The number of Arabs is 17,293, the largest group of whom are in the port; the total number of people from Nuba who came to work in Port Sudan reached 6,678 persons. The Nilotes in Port Sudan number 630, the Nilo-Hamites 215, the Sudanese 194, and those from West Sudan, French Sudan and Nigeria 1,538. Those who are Sudanese by nationality number 517, and foreigners number 6,388.

Most of the inhabitants of Port Sudan make their living from work connected with the harbour and the sea.[1] These includes merchants, many of whom are Indians engaged in importing and exposting. At the moment about 40% of the labour force of the population is occupied directly or indirectly with the port activities. This number is expected to increase in future as the port capacity and activities expand.

Table 65

Town	Population	% of the total	Crude birth rate per 1000 p.	Crude death rte. per 1000 p.	Excess of birth rate over death r.	Infant mortality per 1,000 births.
Sudan	10,262,536	100.00	51.7	18.5	23.2	93.6
Kassala province	941,039	9.17	42.6	17.5	25.1	82.0
Port Sudan	47,562	0.46	38.1	16.2	21.9	130.9

This table shows that Port Sudan has a very high rate of infant

(1) BARBOUR, K.M.: The Republic of the Sudan, 1960. p.232

mortality, which affects the rate of natural increase. From the table it is realised that the rapid increase cannot be justified by the rate of natural increase, which is only 2.2% (excess of the birth over the death rate) lower than the average of other centres in the Sudan , which is 2.4%.

43.7% of the male population of Port Sudan and 80.1% of the female population are illiterate. These are higher than the figures of other major urban areas, but considerably lower than the illiteracy figure of Kassala Province.

The labour force

From the table below[1] it is clear that in Port Sudan 43.8% of the total population are gainfully employed. This is a very high figure compared to the other urban centres of the Sudan.

Table 66

	Males			Females			Total	
	Under 5 Years	5-and over to puberty	over puberty.	Under 5 Yrs.	5-and over to pbty.	over puberty	All ages	per-cent-ages
Population	2,994	5,638	20,113	3,226	3,791	11,800	47,562	100.0%
Gainfully employed	-	579	18,861	-	163	1,220	20,823	43.8%
Percentage of gainfully employed	-	10.3%	93.8%	-	4.3%	10.3%	-	-
Unproductive occupations	2,994	5,059	1,252	3,226	3,628	10,580	26,739	56.2%

The ratio of the male to the female gainfully employed people is 14.1

(1) Population Census of the Sudan, 1955/56.

Employment Structure

The structure of the labour shown in diagram (Fig.60) - primary structure is taken to include agriculture and fishing, secondary production to include manufacturing, extractive industry, building and construction, and tertiary production the port and all other economic activities such as trade, transport services, administration and other activities not producing material output.

It is clear that Port Sudan has a very high proportion of the labour force occupied in tertiary activities, due to the existence of the port and the fact that secondary industry has not yet developed. The rapid growth of Port Sudan has been largely associated with the development of the port. There are indications that the functional distribution of the working population may not change substantially in future. The port will continue to expand, and although the introduction of mechanisation will reduce the number of workers employed, the percentage of the people associated with port activities will remain as high as it is now.(1)

At the moment about 40% of the labour force of the population is occupied directly or indirectly with port activities. The influx of the rural population into the town is expected to continue. Old migrants, who came alone in order to find work, will bring their families and tend to settle permanently, while the importance of the town will attract new settlers from the countryside. Nomads will be attracted by the better living conditions of the town and they will gradually tend to settle permanently. For all these reasons

(1) Doxiadis Associates: Report of the future of Port Sudan. Athens 1959. page 36.

it is assumed that migration will continue to add to the normal rate of increase. The populati on of the town is expected to be 125,000 within a period of twenty to thirty years.[1] Thus the long term Master Programme should take into account all considerations regarding the increase of population.

(1) Ibid page 130

Public Utility Provision

Water supply

The growth of Port Sudan has necessitated extensive work for the provision of an adequate water supply. The supply system as it exists at present was completed by the end of 1930. It consists of five bore holes in the gravels of the lower gorge supplying water by gravity to the two mains. These mains deliver the water to the yard of Port Sudan where, by the manipulation of values, it can be diverted direct to the high level tank immediately above, or to either of the two high level tanks on the east side of the harbour. There is an underground reserve reservoir which holds 5,000 tons of water and this can be filled direct of by the overflow from the west-side high level tank to which the mains are normally connected. Water can be lifted by an electrically driven pump from this reservoir to any of the high level tanks and is delivered by a pipe carried under the harbour. A distribution system was provided in 1929 for the new area on the south of the harbour and this is connected to the main distribution system by a six-inch cast iron pipe, carried across the Khor Mog creek on a timber gantry.(1)

Whereas in 1925 the consumption of water was 850 tons a day,

(1) Hebbert, H. The Port Sudan Water supply. S.N.R. Vol.XVIII 1935, part 1. p.88

by 1930 it had reached nearly 1,500 tons. The supply system, completed by the end of 1930, remained the same from 1930 to 1935 and there was no need for more water, firstly because of the cold war before the second world war, and secondly, because the consumption of water by ships entering Port Sudan decreased (it had reached 63 tons per day in 1931) due to the decrease in the number of commercial ships entering that port.(1) The decrease continued until it dropped to 49 tons per day in 1933. In 1934 the consumption by ships increased, reaching tons per day, and by 1935 it had reached 99.5 tons per day. The increase or decrease being governed by the number of ships entering the port.(2)

It was decided to change the 6-inch pipe to an 8-inch one because of the increase in consumption during the years 1936-38. The consumption by 560 ships entering Port Sudan in 1936 was so high (the number of ships entering the port in 1933 was 250) that the level of water table fell so rapidly and threatened the value of the port andthe town. The arrival of the flood early during that year returned everything to normal and the water table rose again. In 1939 the Sudan Government railway authorities build a tower for storing water, with a capacity of 15,000 tons, on the eastern side (near the warehouses); the British built another one for military purposes near the railway station.

(1) Reports by the Governor General, 1930-1940. Khartoum.

(1) Ibid.

In 1940-41 the problem of the water supply returned and the price per ton increased from 125 millions to 500 millions for ships. This was because of the high cost of improving the water resources in Port Sudan.

After the two towers were completed the water supply was much improved and consumption reached 886,000 tons per year (above 2,400 tons per day). In 1948 the water supply decreased, necessitating several wells being dug during 1949.(1) Since that time Port Sudan has had an adequate supply of water throughout. Thus the water supply in Port Sudan is the result of the great efforts made during the last fifty years.

The water now comes from Khor Abhaat, a creek north-west of Port Sudan. It is collected in underground wells, driven in the bed of the Khor and is conveyed to the town by gravity. There are no records with regard to the capacity of the wells. The great (6,000 sq. Km.) catchment area of the Khor Arbaat, combine with the annual precipitation (106 m.m.) indicates that the total quantity of water falling in this area is tremendous. The stormy character of the rainfall, however, suggests that a great part of the average annual discharge is lost, flowing into the sea as a torrent. The competent authorities assume that the discharge of the wells, supplemented by new ones, properly driven, would average 15,000 Cu.m.

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(1) Reports by the Governor General, 1939-1949. pp.102 & 220.

per diem.[1] The water is conveyed to the town and distributed without any purification. The distribution system consists of a reservoir and several elevated tanks and a pipe network covering the whole area of the port.

Electricity

The town is supplied with A.C. current generated by five diesel engines of a total installed capacity of 3,180 kw. Transmission is effected through 16 substations. The H.T. current is stepped down to 240 v. for domestic use and 415 v. for industries. The L.T. distribution system is overhead all the way and the poles are mostly of reinforced concrete, some of steel and a few of wood. The peak demand varies considerably around the year owing to special seasonal loads, e.g. the operations of the ginning factory. The maximum demand recorded in 1958 was 1440 k.w. The present number of consumers is about 3,300, i.e. 38.8% of the houses are supplied with electricity. The demand for new connections hasbeen such during the past three years that their number increased by 45% and is anticipated to reach 5,000 in five years' time. The additional number of consumers who may be served by the existing power station is estimated at about 1,800. The annual consumption has increased accordingly: from about 4 million K.W.H. in 1956 the consumption increased by approximately 25% to reach 5 million K.W.H. in 1958.

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(1) Doxiadis. op. cit. page 100.

It is anticipated by the local authorities that it will amount to 10 million K.W.H. in five years' time.

To cope with such demand a new power station is planned in the south town. It is designed for an ultimate capacity of 4 x 1230 = 4920 kw., but only two sets of half this capacity will be installed initially, the rest being installed according to demand requirements.(1)

Sewerage

There is no main sewerage system yet in Port Sudan. The disposal of sewage is effected by means of septic tanks, privies, pit latrines, bucket system and public latrines. The existing programme of the competent authorities for improvement of sanitary conditions involves mainly the gradual eradication of the bucket system. The long-term target, however, will be to replace all existing sanitary systems by an adequate main sewerage system covering the whole area of the town.(2)

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(1) Doxiadis: op. cit. page 100

(2) Ibid

EXTERNAL RELATIONS

Transport and Trade Routes

Transportation services are of crucial importance to the country's economy, and are a true indication of the importance and influence, not only for trade centres, but also of the volume and nature of the trade itself. Insofar as a port plays a major role in the trading pattern of a country and certainly of its hinterland, thus also will the influence of the port be reflected in its trade routes and transport services.

Efficient and cheap transport services of adequate capacity are important in any country but in the Sudan with its vast distances they are vital if progress is to be made in raising the standard of output and living. Firstly they ensure the mobility of the working population. Secondly, they are necessary if advantage is to be taken of regional specialisation in production within the country. Thirdly, the Sudan in its progress towards a higher standard of living depends greatly on the exchange of goods with other countries; the transport services play and indispensable part in moving goods from the producing areas and in carrying the varied imports of capital and consumer goods.

Before dealing with the port trade of Port Sudan some description must be given of the transport facilities available for the moving of the products of the country to the port from its hinterland, and vice versa.

Sudan Railways

In 1962 the Sudan railways were operating 4,232 route km. of 3'6" gauge track.

The true dawn of railway communication in the Sudan commenced with the reconquest of the country in 1896. The first spade of sand of the desert railway wasturned on the first day of 1897, the rail-head reached Abu Hamad on November 1st, Atabara on July 3rd, 1898, and Halfaya by the end of 1899.(1)

On January 1st, 1900, the beginning of the second stage in the growth of railway communications: the railway system of the Sudan was made up of two line of 1,245 kilometres, which converged at Wadi-Halfa, the most important outlet of the country in those days, although it was 1,440 kilometres from the nearest sea port by the Nile Valley route. To face the new economic development it was necessary in the first place to find some shorter and better route to the sea. Study of this question was made and thoughts went back to the Berber-Suakin project of 1885. The preliminary surveys ascertained that a route between Marsa Sheikh Barghout (Port Sudan) and Atbara was, and still is, easier and better graded than that following the old caravan route between Suakin and Berber.(2)

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(1) Morrice, H.A. The Development of Sudan Communication. S.N.R. Vol.XXX, 1949. page 1.

(2) See detailed discussion in Longfield (1955) F.W. pp.326-328

The work of laying the rails commenced from both ends on September, 1904, and by the end of the year 1905 the new harbour of the Sudan was connected by a direct railway with the Nile Valley.

During construction of the Nile - Red Sea railways, the northern Sudan saw a great change in the railway system. The Kerma line wasremoved and a new line between Abu Hamad and Kreima was laid down to serve Dongala Province.

The third stage of the Sudan railway development had begun in 1907, when attention was directed to the Central Sudan, the region which produces the bulk of the country's output, either for local consumption or for export. The Western Sudan, with its gum arabic and cattle trade, the Gazira with its vast cultivable land, and the Kassala district with the fertile delta of Khur al Gash, were in great need of a modern means of transport. A bridge was built across the Blue Nile at Khartoum, and a line was laid to Wadi Medani on the Blue Nile in 1909, and was continued to Sennar, 267 kilometres south of Khartoum. This line was a fundamental basis in the Gezira project. From Sennar the line was directed to the west and a bridge over the White Nile was built in 1911 at Hillet-Abhas. By the end of the year the rails were laid into Elobeid, the chief gum market of the Sudan; and, therefore, the gum forests of Kordofan were brought within reach of Port Sudan.

The outbreak of the first world war in 1914 made it impossible for the Sudan to take immediate advantage of its excellent railway communications. In 1923 conditions permitted the resumption of work and the extension of the railway from Haifa on the Nile - Red Sea line, to Kassala commenced in October and it reached Kassala on the 21st April 1924. This line serves an important part of the Sudan where the climatic conditions are, on the whole, favourable to a regular production.

In 1927 work upon the extension of Kassala line to Gedaref and Sennar began in order to tap the rich grain-producing areas around Gedaref[1] and it was opened for traffic in the middle of February,1929.

At the end of 1929 the route mileage of railway track was 1,995 miles, or 3,213 kilometres. Since 1930 there has been no major extension of either rail or steamer facilities, but the building of Jebel Aulia dam and the military demands of the last war necessitated track-laying of temporary duration.

In 1954 work upon the extension of Er Roseires on the Blue Nile began from Sennar and it reached Er Roseires in 1955 to serve the southern part of the Gazera and to encourage further cultivation of grain and other crops. The line of 220 kilometres from Sennar to Roseires hasbeen built (a) to replace the seasonal river service, (b) to speed the development of the area and (c) to have ready for Roseires dam construction a transport route of adequate capacity.[2]

In addition to the expansion and modernisation of the established

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(1) MacMichael (1930) p.78

(2) See Fig.4

pattern of services, far-reaching new railway extension to the west had reached Nyala in Darfur, 2055 kilometres from Port Sudan (Fig.61). This line brings Darfur more closely into economic relations with the Red Sea port, while the southern Qoz, through which the line passes has great possibilities for grain, sesame, and ground nuts. The whole Qoz region, which is outstandingly difficult for lorry transport, has the advantage of easy railway construction across it.[1]

In March 1959 work was begun on the southern extension from Babanousa to Wan, a distance of 445 kilometres; in April 1960 it reached Wan, 2165 kilometres from Port Sudan. These new lines are not likely to prove remunerative to Sudan Railways for a good while but they are of profound importance to the remote communities of two or three million people whose standard of living they will quickly help to improve because of the contact with the outerworld through Port Sudan .

Further extensions of the railway system for which considerable additional capital will be required are under review in various parts of the country in connuction with the Government's £s.210 million seven-year development plans in other directions.[2]

The present average freight rate of 2d per ton mile is universally low for the type of traffic carried by Sudan railways. Every effort is being made to keep it so in the interests of maximum development of the country's resources.

(1) Barbour, K.M. op. cit. page 273. 1960.

(2) Directory of the Republic of the Sudan. 1961-62. p. 118. London

Some general indication of the rapidly rising scale of Sudan's agricultural and industrial development for the movement of which the railway administration is planning ahead can be seen from the table b elow of goods tonnages carried on the railway.

Table 81 (000) tons

	1956/7	1957/8	1958/9	1959/60
Exports	614	513	651	706
Imports	593	738	688	768
Internal	515	529	610	546
Total	1,722	1,880	1,949	2,020

Considerable attention was also paid in 1961 to increase the capacity of the railways, e.g. by the acquisition of more heavy diesel electric locomotives. Other measures are also being considered so as to cope with the difficulty of the concentration of Sudan's exports in a short season.(1)

Roads

Road communications in the Sudan, as elsewhere, had their origin in the tracks made by primitive man in the course of his journeyings from place to place, and with elementary tracks of this kind the Sudan is well provided. The road system of the Sudan reflects the varied and often extremely difficult conditions of terrain which the country presents. (See Fig.62).

Excepting the Upper Nile province in which swamps and the lack of road metal make it practically impossible to do more than maintain

(1) Sudan Railways - Annual Report 1960

dry weather roads by the repeated use of graders, the great part of the remainder of the Southern zone lends itself to road-making more easily than any other part of the country and, in fact, contains the best roads. Juba, the terminus of the river navigation, is now an important model point for road traffic. There is a road to Torit and Nimule on the Uganda border. Another road links Juba with Aba in the Congo, but there is a network of all-season roads, both in Mongalla and in Wahr el Ghazal provinces. These all carry motor transport.

In the Central zone, which roughly extends between the 15th and 10th parallels, communication is handicapped in many parts of Kordofan and Darfur by soft sand dunes which defy any economic method of road construction; in other places by the presence of thick abd thorny bush. Animals are still the main means of transport in such a zone.

There are no all-weather roads in this district except in towns, but efforts have been made to clear tracks and to make roads suffice for motor traffic during the dry season.

In the northern zone, which lies north of the latitude of Khartoum, communication is limited by questions of wells and water supply. Except in the neighbourhood of the river there are no cleared roads in the northern desert belt of the Sudan. In the west area away from the Nile there are caravan tracks of which Darb Al Arabin, between El Fashir (Darfur) and Asyout was once of great importance. Since the railways were built in the eastern part of this zone the importance of those tracks as trade routes has decreased.[1]

Compared with a road a railway is expensive to build; therefore it needs a fairly heavy freight traffic in order to realise its potential economies. The advent of the cheap motor lorry has placed many up-country areas on the map as regards economic production. For a commodity to be worth producing for export the essential feature must be high cash value per unit of weight.[2]

Table 67

Route and Track Kilometrege

1958/9

Route........................	4179.3031 kilom.
Track........................	547.6764 "
Total of Track & Route....	4726.9795 "
Tesseni Line	
Route,,......................	52.5156 "
Track........................	2.5633 "
Total of track & route...	55.0789

The Sudan urgently needs a network of modern roads; they cannot, however, economically replace the railway except where traffic is light. Their true function is to provide access to those parts of the country not directly served by the railway, thus acting as feeders and facilitating administration.

The following is a summary account of the main through routes:-[3]

(i) Shellal (Egypt) - Khartoum

(a) Shellal - Wadi Halfa: uninhabited desert track
(b) Wadi Halfa - Abu Hamad: Along railway line, through desert.
(c) Abu Hamad ⊖ Atbara - Khartoum: along railway line.
(d) Karina/Dongala: road service recently established.

(1) For full detailed description of tracks throughout this zone, see Gleicher (ed.) "The Anglo-Egyptian Sudan,1905.Vol.II (Routes.
(2) March,C. Transport in the Sudan. (Agriculture in Sudan) p.176
(3) Sudan Almanac. Transport - Khartoum 1961 p.213

(ii) Khartoum - Uganda and Congo. Country mostly inhabited at at intervals but the going in places is rough with sand or steep watercourses.

(a) Khartoum - Malakal, via Kosti- Renk - Paloe, or Kosti - Er Rahad - Tonga (West bank), or Wad Medani - Senga - Er Roseires - Kurmu - Being - Palaich. Open normally November - May. Also Kosti - Elobeid - Muglad - Wau - Juba: Mid November to end of May.
(b) Malakal - Juba: via Bor - Mongalla. Open normally mid-December to mid-April; otherwise cars must be shipped by river steamer.
(c) Juba - Nimuli - Uganda or Yia - Aba (Congo): all weather roads.

(iii) Khartoum - the West (French Equatorial Africa). Khartoum - Kosti - Elobeid - En Nahud - El Fasher - Geneina. Very sandy in places.

(iv) Khartoum - the East (Eritrea).

(a) Khartoum - Sufeiya el Derishab - Kassala. Direct route through country inhabited only by nomads and mostly waterless. Closed July - November.
(b) (alternative) Khartoum - Atbara - Goz Rageb - Mitateb - Aroma - Kassala. Unfrequented but open throughout the year except after rain.
(c) Kassala - Tessenir (Eritrea). Open except when R.Gash flowing (about 15th June - 1st October).

River Communications

Its most obvious advantage is that the waterway is provided free of charge, so that capital costs are low despite the expense of terminal facilities.

The Nile is navigable at almost all seasons, and without transhipment from Alexandria to Wadi Halfa, and again from Khartoum as far as Juba. Between Wadi Halfa and Khartoum cataracts hinder navigation, except for short stretches, and again south of Juba, where motor roads connect with Nimule on the Uganda frontier.

Government services are maintained on the Nile from Wadi Halfa to Shellel; between Karima - Dongala - Kerma; from Khartoum to Juba. Servives Kosti - Gambela, Kosti - Wau (or alternatively as far as Moshra' or Reg only) are operated in the flood season only.

The tributaries of the Nile, the Atbera, Rahad and Dinder have been navigated by vessels in the flood season, but are not considered normally navigable.

During the past few years the fleet have been gradually modernised and the bulk ofthe work is now done by diesel-engined units.(1)

Steamer services on the White Nile connect Juba, in the far south, with Khartoum, 1,650 km., all the year round, while steamers ply seasonally on the Blue Nile. The Sahet is usually navigable to Gambala by the end of May. The Juba steamers carry hides, skins, and rain-grown cotton from the south to Khartoum.

Navigation is simple enough during the flood season in Bahr El Ghazal, and there is a subsidiary steamer service connecting Wau on the River Zur with the White Nile. The Zur is open to navigation from July to the beginning of November as far as Wau, the headquarters of Bahr El Ghazal district. All the trade goods of the district as well as the supplies for the district administration are carried to Wau, which finds its only means of communication during the rest of the year in a road of 160 kilometres.(2) The Zur service brings down the timber to the north. Hides and skins and rain-grown cotton come by river from the south to Khartoum, and from it by railway to port Sudan.

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(1) Transport & communication in Sudan - Report by Philosophical Society of the Sudan, Khartoum, 1957. p. 26.

(2) The railway reached Wau in April 1960, which is 2,165 kilometres from Port Sudan.

At the end of the year 1960 the mileage of the river services operated was 3,744 kilometres (2,325 miles).

Sambuk (Native sailing-craft)

These are in common used for coastal traffic on the Red Sea. They ply between Port Sudan, Suakin, Trinkitat and Aqiq. The entire Tokar cotton has often been transported by them from Trinkitat to Port Sudan. It is used also during the pilgrimage season for the transfer of pilgrims between Port Sudan and Jidda.

Trade Routes in the Sudan.

Before the 20th century, most of the Sudan trade was carried by caravan routes. There are many main cross-country routes which are now of little more than historical interest.(1) The most important route leading outside the Sudan was Darb-Alarbim (40 days journey), between El Fasher, the capital of Darfur, and Assyut, the largest town in Upper Egypt. The Nile played little part as a carrier of trade to Egypt because of the six cataracts which render it useless as a means of transport.

The Sudan is bounded by countries which, except for Egypt in the north, are, like the Sudan, exclusively producers of raw products. There is, therefore, little possibility of trade with them. There are, moreover, no feasible trade routes across the eastern, southern and western frontiers.(2)

In the matter of external trade, therefore, the orientation of

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(1) Al-Sayyad, M.M., The Anglo-Egyptian Sudan, 1948, p.136. Ph.D. Thesis, King's College in the University of Durham.
(2) Davies, R. The Anglo-Egyptian Sudan from Within, 1935. p. 295

the Sudan is towards Egypt and the Red Sea. Hence the first railway line in the Sudan wasto connect the latter with Egypt. The northern gateway secured the larger share of the Sudan trade for many years. In 1904 more than 80% of the import trade and 70% of the export trade was via Egypt,(1) but as soon as the new harbour of Port Sudan was opened in 1909 trade along this route began to decline and now forms less than half of the Sudanese trade.

Table 68

Route	1919		1920		1921	
	£	%	£	%	£	%
Red Sea Route (Port Sudan)	3,984,152	51.1	6,707,076	61.5	5,176,474	65.7
Nile Route	3,550,506	45.7	4,705,674	35.6	2,460,058	31.2
Others	235,540	3.2	310,767	2.9	226,768	3.1
Totals	1,770,198	100.0	11,723,517	100.0	7,863,300	100.0

From Table 1, it is clear that the trade of the Red Sea Route (Port Sudan) flourished after the First World War, at the expense of the Northern (Nile) route. The percentage of trade through the Northern Route decreased from 45% in 1919 to 31% in 1921, whereas through the Red Sea Route trade increased from 51% in 1919 to 65.7% in 1921.

(1) Al-Sayyad, M.M , op. cit., p.137

Table 69

Year	Import Trade		Export Trade	
	Red Sea Route %	Egyptian Route %	Red Sea Route %	Egyptian Route %
1925	72.0	24.5	89.9	8.7
1930	78.9	17.3	95.3	3.9
1935	85.5	12.1	89.9	5.1(1)
1936	92.6	13.3	93.5	3.1
1937	83.5	13.7	95.9	2.8
1938	84.5	13.6	92.8	5.6
1939	84.8	13.9	93.4	4.6 (2)
1940	70.9	26.7	87.1	11.6
1941	57.9	35.3	85.4	13.7
1942	51.5	36.3	75.0	22.8
1943	47.8	40.1	71.8	26.1
1944	63.6	23.4	74.4	24.1
1945	68.8	17.5	79.3	20.0

In the above table, the figures for export trade through the Egyptian route indicate that there has been a gradual decrease since 1935. The slight increase of 1938 and 1939 was due to the rasing of freight rates by the navigation companies but this was abolished after two years.(3) The import trade seems to be maintaining its level since 1934. Goods carried to the Sudan by this route include tobacco, cigarettes, cigars and fruit. The principal items exported via the Northern routes are dates from the Northern Province and cattle.

During the second World War the Egyptian route regained some of its historical importance, but as soon as the war came to an end, its share of the Sudan trade began to decrease gradually. More than 23% of the total exports of the Sudan used the Northern route in 1942, and

(1) Economic and Trade Reports by the Governor General, 1934-8. Khartoum.

(2) Report by the Economic and Trade Department. Khartoum, 1945

(3) Al-Sayyad, M.M., op. cit., p. 137

THE VALUE OF TRADE IN THE SUDAN BY ALL ROUTES

TABLE 70

Route		1940 £	1941 £	1942 £	1943 £	1944 £	1945 £	1946 £
Port Sudan Route	Imports	3,933,655	4,669,394	3,951,572	5,007,396	6,360,144	6,360,144	8,041,984
	Exports	4,372,356	7,299,926	5,362,944	4,405,817	6,451,171	8,362,647	7,482,210
	Re-exports	164,174	94,442	112,913	295,361	134,105	166,670	288,902
	Total	8,470,185	12,063,762	9,427,429	9,708,574	12,945,420	15,434,747	15,813,096
Wadi-Halfa Route	Imports	1,507,594	2,842,640	2,935,345	3,216,811	2,284,712	1,732,308	2,213,922
	Exports	584,118	1,174,038	1,628,866	1,489,204	2,057,129	2,117,642	1,688,000
	Re-exports	171,431	91,360	88,100	101,328	245,656	178,781	226,461
	Total	2,263,143	4,108,038	4,652,311	4,807,343	4,587,497	4,028,731	4,128,383
Other Routes	Imports	132,640	548,815	992,778	977,005	1,303,076	1,380,875	1,173,657
	Exports	66,504	73,363	158,969	121,674	130,395	75,589	96,934
	Re-exports	86,214	162,028	150,310	194,254	250,520	193,251	275,904
	Total	285,358	784,206	1,302,057	1,292,933	1,683,991	1,649,715	1,546,475
Grand Total		11,018,686	16,956,006	15,381,797	15,808,850	19,216,908	21,113,193	21,487,954

THE VALUE OF TRADE IN THE SUDAN BY ALL ROUTES

TABLE 70 (Contd.)

Route		1947 £	1948 £	1949 £	1950 £	1951 £	1952 £	1953 £
Port Sudan Route	Imports	11,182,178	16,874,454	19,851,968	22,885,203	35,123,461	53,251,932	43,151,766
	Exports	13,473,364	21,800,044	24,780,330	30,235,242	59,535,073	39,733,597	41,706,217
	Re-exports	172,629	190,210	403,699	222,566	897,111	508,029	300,518
	Total	24,828,171	38,864,708	45,035,997	53,343,011	95,555,645	93,493,558	85,158,501
Wadi-Halfa Route	Imports	1,941,677	3,731,831	2,422,416	1,368,344	2,678,287	3,033,560	2,724,183
	Exports	1,278,939	1,355,718	1,569,416	1,706,916	1,367,005	1,315,517	1,209,523
	Re-exports	126,779	76,570	88,133	100,085	61,979	47,821	74,986
	Total	3,347,395	5,164,119	4,079,965	3,175,345	4,107,271	4,396,898	4,008,692
Other Routes	Imports	3,083,274	1,546,972	1,595,185	3,013,318	4,164,343	5,410,224	4,899,921
	Exports	113,545	94,277	85,650	139,383	135,629	115,758	122,405
	Re-exports	230,425	361,722	509,249	708,661	780,732	1,050,380	1,005,465
	Total	3,427,244	2,002,971	2,190,084	3,861,362	5,080,704	6,576,362	6,027,791
Grand Total		31,602,810	46,031,798	51,306,046	60,379,718	104,743,620	104,466,818	95,194,984

THE VALUE OF TRADE IN THE SUDAN BY ALL ROUTES

TABLE 70 (Contd.)

Route		1954 £	1955 £	1956 £	1957 £	1958 £	1959 £
Port Sudan Route	Imports	41,252,880	42,590,533	38,161,160	57,717,312	52,516,776	47,159,345
	Exports	37,017,248	47,080,628	63,175,958	46,128,362	38,720,672	62,654,056
	Re-exports	488,392	599,539	457,088	1,066,365	1,106,759	306,384
	Total	78,758,520	90,270,700	101,794,206	104,912,039	92,344,207	110,119,785
Wadi-Halfa Route	Imports	2,464,189	2,505,882	3,303,289	4,664,654	2,215,161	3,204,169
	Exports	1,740,926	1,528,853	1,945,915	2,481,595	823,437	345,320
	Re-exports	104,459	124,803	102,991	83,768	895,482	94,217
	Total	4,309,574	4,159,538	5,352,195	7,230,017	3,934,080	3,643,706
Other Routes	Imports	4,772,491	3,706,219	3,783,998	5,174,785	4,759,310	6,691,085
	Exports	143,569	226,602	219,528	261,726	243,833	476,170
	Re-exports	900,566	948,607	887,999	1,400,761	1,638,725	2,894,413
	Total	5,816,626	4,881,428	4,891,525	6,837,272	6,641,868	10,061,668
Grand Total		88,884,720	99,311,666	112,037,926	118,979,328	102,920,155	123,825,159

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959. TABLE 71

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 1. FOOD PRODUCTS, BEVERAGES, TOBACCO							
Live Animals	-	3	-	722	223	460	1,408
Meat & Meat Preparations	18,400	-	1,397	-	20,615	-	40,412
Dairy Products, Eggs & Honey	158,828	17	1,705	-	12,666	16,367	189,579
Fishery Products	28,020	1	-	-	-	-	28,021
Cereals	229,146	193	135	3	15	6	229,498
Manufactured Cereal Products	2,075,196	18,020	136	6	236	-	2,093,594
Fruit & Nuts, except Oilnuts	205,126	23,544	3	13,799	4,608	2,330	249,410
Vegetables, Roots & Tubers	381,515	2,837	1,562	16,511	3,522	406	406,353
Sugar & Sugar Confectionery	3,723,086	108,400	-	-	714	-	3,832,300
Coffee, Tea, Cocoa & Spices	4,191,905	-	138,427	429,921	23,558	1,306,834	6,090,645
Beverages & Vinegars	227,630	11	-	-	474	-	228,115
Animal Feeding Stuffs	-	-	-	-	-	-	-
Tobacco Products	136,081	212	-	-	644,162	39	780,494
Total Section 1.	11,374,929	153,238	143,365	460,962	710,793	1,326,442	14,169,729

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 2. <u>FATS & WAXES, ANIMAL AND VEGETABLE</u>							
Oilseeds, Nuts and Kernels	7,591	-	-	772	-	3	8,366
Oils, Fats, Greases and Waxes	360,943	29	131,427	2,829	221	5	495,454
Total Section 2.	368,534	29	131,427	3,601	221	8	503,820
SECTION 3. <u>CHEMICALS</u>							
Chemicals & Pharmaceutical Products	1,272,510	2,179	1,122	176	216,180	204	1,492,371
Dyestuffs, Tanstuffs & Colours	363,826	2,846	156	585	2,464	1	369,878
Essential Oils, Perfumery, Cosmetics, Soaps	381,370	46,336	1,093	-	30,384	142	459,325
Fertilizers	979,073	-	-	-	-	-	979,073
Total Section 3.	2,996,779	51,361	2,371	761	249,028	347	3,300,647

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 4.							
Rubber and Manufactures	1,111,004	245	7,623	-	3,801	100	1,122,773
SECTION 5.							
Wood, Cork and Manufactures	1,035,865	4,181	18	10,034	2,063	47	1,052,208
SECTION 6.							
Pulp, Paper, Cardboard and Manufactures	711,337	72,315	18	184	11,592	22	795,468
SECTION 7. <u>HIDES, SKINS, LEATHER</u>							
Hides, Skins, Leather	52,689	22,101	3,943	-	844	10	79,587
Leather Manufactures	12,532	2,998	2	4	1,316	567	17,419
Furs	-	1,943	-	-	-	-	1,943
Total Section 7.	65,221	27,042	3,945	4	2,160	577	98,949

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 8. TEXTILES							
Textile Materials, Raw	9,307	11,979	-	-	15	-	21,301
Yarns and Threads	553,457	18,611	-	-	5,876	600	578,544
Textile Fabrics & Small Wares	7,000,834	2,119,602	11,963	72	205,812	3,322	9,341,605
Special & Technical Textiles	193,597	3,243	3	44	12,664	10	209,561
Total Section 8.	7,757,195	2,153,435	11,966	116	224,367	3,932	10,151,011
SECTION 9. CLOTHING & MADE-UP TEXTILES							
Clothing, Underwear, Hats	83,974	101,635	13	32	119,333	290	305,277
Leather & Fur Clothing	2,379	-	-	-	468	-	2,847
Footwear	743,870	387,447	2	24	68,143	92	1,199,578
Textile Articles, other than Clothing	1,283,993	24,412	21	21	13,586	16	1,322,049
Total Section 9.	2,114,216	513,494	36	77	201,530	398	2,829,751

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 10. NON-METALLIC MINERALS							
Non-Metallic Minerals, Crude	256,809	3,139	-	-	88	4	260,040
Pottery & Clay Products	68,560	1,929	-	-	962	-	71,451
Glass & Glassware	444,716	38,037	-	19	24,210	63	507,045
Other Manufactures	126,243	1,454	-	810	1,036	-	129,543
Total Section 10.	896,328	44,559	-	829	26,296	67	968,079
SECTION 11.							
Products for Heating, Lighting & Power & Lubricants	5,004,241	25	-	-	21,978	-	5,026,244
SECTION 12.							
Precious Metals & Stones	1,694	-	-	-	1,100	10	2,804
SECTION 13.							
Gold Metal & Specie	-	-	-	-	17,299	19,589	36,888

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 14. BASE METALS AND MANUFACTURES							
Ores and Slags	-	-	-	-	41	95	136
Iron and Steel	2,583,608	34	2,304	450	1,216	108	2,587,720
Non-Ferrous Base Metals	158,723	1,242	34	286	693	6	160,984
Base Metal Manufactures	1,968,079	9,730	1,262	16	50,140	101	2,029,328
Total Section 14.	4,710,410	11,006	3,600	752	52,090	310	4,778,168
SECTION 15. MACHINERY, APPARATUS, VEHICLES							
Machinery & Appliances, Non-Electrical	2,436,095	18,995	2,947	3,249	99,001	68	2,560,355
Machinery & Appliances, Electrical	1,020,156	2,415	2,082	2	35,300	2,404	1,062,359
Vehicles & Transport Equipment	4,095,648	28,411	56,643	18,350	2,301,447	3,370	6,503,869
Total Section 15.	7,551,899	49,821	61,672	21,601	2,435,748	5,842	10,126,583

SUMMARY OF IMPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 16. <u>MISCELLANEOUS</u>							
Miscellaneous Items	133,112	3,975	24	747	4,364	386	142,608
Miscellaneous Manufactured Items	1,252,062	111,272	703	6,991	435,249	679	1,806,956
Total Section 16.	1,385,174	115,247	727	7,738	439,613	1,065	1,949,564
SECTION 17.							
Returned Goods & Special Transactions	73,155	8,168	3,058	237	22,324	41	106,983
SECTION 18.							
Postal Parcels (excluding Tobacco)	1,364	3	97	-	33,466	-	34,930
GRAND TOTAL	47,159,345	3,204,169	369,923	506,896	4,455,469	1,358,797	57,054,599

SUMMARY OF EXPORTS BY SECTION AND ROUTE FOR 1959

TABLE 72

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 1. FOOD PRODUCTS, BEVERAGES, TOBACCO							
Live Animals	1,044,718	54,162	-	-	119	-	1,098,999
Meat & Meat Preparations	25,326	-	-	-	5	-	25,331
Dairy Products, Eggs and Honey	15,514	66	-	-	23	19	15,622
Fishery Products	636	36,778	23,463	-	40	-	60,917
Cereals	1,583,120	2,036	-	300,068	1	-	1,885,225
Manufactured Cereal Products	-	-	-	-	10	-	10
Fruit & Nuts, except Oilnuts	2,333	15,337	22	8,634	112	628	27,066
Vegetables, Roots & Tubers	374,915	39,850	251	561	1	389	415,967
Sugar & Sugar Confectionery	-	-	8	-	3	882	893
Coffee, Tea, Cocoa & Spices	114,501	5,880	12	-	-	-	120,393
Beverages & Vinegars	-	-	-	-	-	37	37
Animal Feeding Stuffs	1,701,603	-	-	-	-	-	1,701,603
Tobacco Products	20	-	-	-	-	-	20
Total Section 1.	4,862,686	154,109	23,756	309,263	314	1,955	5,352,083

SUMMARY OF EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 2. FATS & WAXES, ANIMAL AND VEGETABLE							
Oilseeds, Nuts and Kernels	10,834,227	19,852	-	-	4	47	10,854,130
Oils, Fats, Greases and Waxes	591,229	-	-	-	2	14	591,245
Total Section 2.	11,425,456	19,852	-	-	6	61	11,445,375
SECTION 3. CHEMICALS							
Chemical & Pharmaceutical Products	53	3,738	-	-	-	-	3,791
Essential Oils, Perfumery, Cosmetics, Soaps	-	-	-	-	-	763	763
Total Section 3.	53	3,738	-	-	-	763	4,554
SECTION 5.							
Wood, Cork and Manufactures	65	37	-	-	53	-	155

SUMMARY OF EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 7. HIDES, SKINS AND LEATHER							
Hides, Skins, Leather	919,482	131,600	-	-	18,909	301	1,070,292
Leather Manufactures	46	-	-	-	292	39	377
Total Section 7.	919,528	131,600	-	-	19,201	340	1,070,669
SECTION 8. TEXTILES							
Textile Materials, Raw	40,095,203	-	57,135	-	-	37	40,152,375
Textile Fabrics & Small Wares	-	-	-	-	31	701	732
Total Section 8.	40,095,203	-	57,135	-	31	738	40,153,107
SECTION 9. CLOTHING & MADE-UP TEXTILES							
Clothing, Underwear, Hats	-	-	-	-	27	-	27
Footwear	-	-	3	-	38	31	72
Total Section 9.	-	-	3	-	65	31	99

SUMMARY OF EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 10. <u>NON-METALLIC MINERALS</u>							
Non-Metallic Minerals	34,115	2,099	17,638	-	2,423	16,262	72,537
Other Manufactures	-	-	-	-	-	60	60
Total Section 10.	34,115	2,099	17,638	-	2,423	16,322	72,597
SECTION 12.							
Precious Metals and Stones	-	-	-	-	12	-	12
SECTION 13.							
Gold Metal & Specie	-	-	-	-	16,326	-	16,326
SECTION 14. <u>BASE METALS AND MANUFACTURES</u>							
Base Metal Manufactures	-	5	-	63	7	3	78

SUMMARY OF EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 16. MISCELLANEOUS							
Miscellaneous Items	5,291,172	33,752	1,308	-	749	649	5,327,630
Miscellaneous Manufactured Items	1,273	109	-	-	4,563	-	5,945
Total Section 16.	5,292,445	33,861	1,308	-	5,312	649	5,333,575
SECTION 17.							
Returned Goods and Special Transactions	24,505	24	1	-	2,281	-	26,811
SECTION 18.							
Parcel Post (excluding Tobacco)	-	-	-	-	105	-	105
GRAND TOTAL	62,654,056	345,325	99,841	309,326	46,136	20,862	63,475,546

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 TABLE 73

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 1. FOOD PRODUCTS, BEVERAGES, TOBACCO							
Dairy Products, Eggs and Honey	12	-	-	-	-	-	12
Fruit and Nuts, except Oilnuts	20	-	-	-	5	-	25
Vegetables, Roots & Tubers	461	-	-	-	-	11	472
Sugar and Sugar Confectionery	3,102	-	-	-	1	-	3,103
Coffee, Tea, Cocoa and Spices	-	-	-	-	26	-	26
Animal Feeding Stuffs	3,000	-	-	-	-	-	3,000
Tobacco Products	265	-	-	-	886	-	1,151
Total Section 1.	6,860	-	-	-	918	11	7,789

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 3. CHEMICALS							
Chemicals and Pharmaceutical Products	2,516	449	-	-	1,207	-	4,172
Dyestuffs, Tanstuffs and Colours	13	52	-	-	4	-	69
Essential Oils, Perfumery, Cosmetics and Soaps	-	-	-	-	2	43	45
Total Section 3.	2,529	501	-	-	1,213	43	4,286
SECTION 4.							
Rubber and Manufactures	298	5	-	-	1	-	304
SECTION 5.							
Wood, Cork & Manufactures	89	567	-	-	114	-	770
SECTION 6.							
Pulp, Paper, Cardboard & Manufactures	-	156	-	-	83	-	239

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 7. HIDES, SKINS AND LEATHER							
Hides, Skins, Leather	-	36	-	-	-	-	36
Leather Manufactures	-	-	-	-	12	-	12
Total Section 7.	-	36	-	-	12	-	48
SECTION 8. TEXTILES							
Yarns and Threads	449	858	-	-	-	37,028	38,335
Textile Fabrics & Small Wares	151	30	-	-	76	27,372	27,629
Special & Technical Textiles	-	146	-	-	54	-	200
Total Section 8.	600	1,034	-	-	130	64,400	66,164
SECTION 9. CLOTHING & MADE-UP TEXTILES							
Clothing, Underwear, Hats	540	135	-	-	20,929	29	21,633
Footwear	-	-	-	-	49	2,807	2,856
Textile Articles other than Clothing	400	-	-	-	2	701	1,103
Total Section 9.	940	135	-	-	20,980	3,537	25,592

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 10. <u>NON-METALLIC MINERALS</u>							
Pottery & Clay Products	-	-	-	-	11	45	56
Glass & Glassware	-	212	-	-	33	-	245
Manufacture of Non-Metallic Minerals	11	-	-	-	-	-	11
Total Section 10.	11	212	-	-	44	45	312
SECTION 11.							
Products for Heating, Lighting and Power, and Lubricants	15,379	20,154	2,199	-	546,833	12,806	597,371
SECTION 13.							
Gold Metal & Specie	-	-	-	-	32,000	-	32,000
SECTION 14. <u>BASE METALS AND MANUFACTURES</u>							
Iron and Steel	15,753	782	-	-	-	-	16,535
Non-Ferrous Base Metals	10,838	28,523	-	-	-	-	39,361
Base Metal Manufactures	66,191	1,325	2	-	2,188	100	69,806
Total Section 14.	92,782	30,630	2	-	2,188	100	125,702

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 15. <u>MACHINERY, APPARATUS, VEHICLES</u>							
Machinery and Appliances, Non-Electrical	61,557	4,361	-	-	4,056	-	69,974
Machinery & Appliances, Electrical	5,451	3,014	50	-	631	37	9,183
Vehicles & Transport Equipment	46,872	28,126	9,251	6,500	2,045,188	1,698	2,137,635
Total Section 15.	113,880	35,501	9,301	6,500	2,049,875	1,735	2,216,792
SECTION 16. <u>MISCELLANEOUS</u>							
Miscellaneous Items	-	-	-	-	27	2,113	2,140
Miscellaneous Manufactured Items	3,253	1,503	30	147	115,142	1,439	121,514
Total Section 16.	3,253	1,503	30	147	115,169	3,552	123,654

SUMMARY OF RE-EXPORTS BY SECTION AND ROUTE FOR 1959 (Contd.)

	Port Sudan £s.	Wadi Halfa £s.	Juba £s.	Kassala £s.	Khartoum £s.	Other Stations £s.	Total £s.
SECTION 17. Returned Goods and Special Transactions	69,698	3,783	815	134	18,786	25	93,241
SECTION 18. Postal Parcels (excluding Tobacco)	65	-	-	-	685	-	750
GRAND TOTAL	306,384	94,217	12,347	6,781	2,789,031	86,254	3,295,014
GRAND TOTAL OF ALL TRAFFIC	110,119,785	3,643,711	482,111	823,003	7,290,636	1,465,913	123,825,159

this amount increased to 26% in 1943. In 1942 the value of trade via Wadi-Halfa was £3.5 millions, and in 1943 £5 millions, gradually decreasing after this to £3.2 millions in 1950. In 1957 there was a sudden decrease in the value of trade through Wadi-Halfa, due to the blockage of the Suez Canal, the total value of trade in that year being £7.2 millions.[1] After the re-opening of the Suez Canal, the value of trade through Wadi-Halfa returned to its previous level, being £3.9 millions in 1958 and £3.6 millions in 1959. (see Fig.62)

The primary disadvantage of the Northern route via Wadi-Halfa, as an outlet for Sudanese trade, is its remoteness from the nearest port on the Egyptian route. It is some 800 miles from the Egyptian port of Alexandria. The othermain disadvantage is that there is no direct communication between Wadi-Halfa and the sea. Goods from different parts of the country must be carried to Wadi-Halfa by train and then taken by steamer to Challal where they are again transferred to trains. This greatly increases the cost of transport to the exporter. These two main disadvantages, together with the political factor which makes the Sudan economically independent of Egypt, direct most of the trade through Port Sudan, the only gateway to the Sudan on the Red Sea,[2] and through it passes more than 99% of the cotton exported yearly. In 1959 goods to the value of £S.40,095,203 were exported through it and only £S.57,135 exported in Juba. The total cotton exported that year

(1) Annual Foreign Trade Report, Khartoum, 1959. p.4.

(2) See "Summary of imports and exports and re-exports by section and routes for the year 1959" Tables 71,72 and 73.

was £S.40,152,375. No cotton has been exported down the Nile via Wadi Halfa since Egypt has its own cotton.

However, the study of imports, exports and re-exports by section and route in 1959 (Tables 71, 72, & 73) proved that Port Sudan is serving the whole region of the Sudan, and all commodities, unless the transport cost differential interferes, is to the advantage of another route.

PORT SUDAN

The Annual Growth of the Port Traffic

Table 74

Year	No. of Vessels	Tons 1,000	Year	No. of Vessels	Tons 1,000
1909	-	384	1935	1,181	4,052
1910	-	432	1936	1,148	4,020
1911	-	701	1937	1,174	3,896
1912	-	700	1938	1,153	4,004
1913	315	722	1939	922	3,235
1914	298	797	1940	-	-
1915	202	583	1941	-	-
1916	317	692	1942	-	-
1917	288	429	1943	-	-
1918	178	316	1944	493	1,028
1919	287	510	1945	457	844
1920	208	737	1946	516	1,009
1921	451	1,106	1947	738	1,946
1922	452	1,193	1948	789	2,184
1923	609	1,765	1949	906	2,937
1924	699	1,993	1950	938	3,075
1925	786	2,539	1951	929	2,936
1926	825	2,870	1952	1,057	3,404
1927	853	2,986	1953	1,136	3,824
1928	922	3,176	1954	1,174	3,673
1929	886	3,222	1955	1,097	3,422
1930	945	3,482	1956	1,165	2,936
1931	888	3,222	1957	1,033	2,446
1932	808	3,098	1958	1,106	3,315
1933	778	2,921	1959	1,309	4,034
1934	886	3,921	1960	1,330	3,976

Navigation Traffic

Situated approximately 700 miles South of Suez, Port Sudan is essentially affected by navigation through the Suez Canal and the Red Sea. As the canal has become the second most frequented highway in the world, Port Sudan also has become one of the most frequented ports. Exports are shipped by tramp steamers at attractive rates owing to the good location of Port Sudan near the Suez Canal; ships stop at the port to pick up extra cargo before entering the canal.(1)

Arrivals at Port Sudan rose from 315 vessels in 1913 to 1,330 in 1960; the average tonnage through the port increased from 384,000 tons in 1909 to 3,976,000 tons in 1960.

Table 74 gives the navigation traffic and tonnage since the opening of Port Sudan in 1909. The table tells a true story of slow but steady progress until 1919 when a notable mutation happened and the port began a new stage of its development.

Table 75

Year	Number of vessels			Tonnage of British Vessels	Tonnage of other Vessels	Total Tonnage
	British	Others	Total			
1909	-	-	-	293,507	90,185	383,692
1910	-	-	-	350,455	81,109	431,564
1911	-	-	-	589,499	211,611	801,110
1912	-	-	-	527,198	173,115	700,313
1913	256	59	315	527,485	194,025	721,510
1914	232	57	289	642,419	154,859	797,278
1915	185	27	202	546,266	36,659	582,925
1916	286	31	317	632,280	59,619	691,899
1917	230	58	288	370,847	58,291	429,138
1918	141	37	178	261,395	56,362	315,757
1919	240	27	167	472,212	37,287	509,499

(1) World Trade Information Service: Economic development in Sudan 1958 Part 1, No. 59. 23

The eloquent figures of the preceding table give a clear account of the importance of Port Sudan. The external trade of the country is for the most part carried to Port Sudan, even when Egypt is its destination (apart from Upper Egypt). It gives the numbers of steamers which called at Port Sudan and the international tonnage of vessels which have used the harbour since its opening in 1909. This table is a true indication of slow but steady progress. Because of the First World War, the number of vessels decreased until it reached 178 vessels in 1918, which was half the numberof vessels visiting the port in 1913. After the end of the war the port began a new stage in its development. The increase of the deep-draught ships from one year to another was a serious problem for the port. The number of these vessels reach 30%[1] of the total number of vessels which visited the port. (Table 76) This made the Port Authority consider the future expansion of the port to suit all types of vessels. New wharves and landing stages have been built, and modern mobile cranes installed.

Table 76

Year	Number of Vessels	Commercial Vessels	No. of Vessels of Greater Length than the berths.
1918	178	124	6
1919	267	144	17
1920	308	265	49
1921	451	426	108
1922	452	433	127
1923	609	581	238

(1) El Shmi, S. The Maritime Orientation of the Sudan. p.289 Cairo University, 1956 (unpublished).

Table 77 shows the development of port traffic after the end of the First World War, from 1920 to 1930.

Table 77

Year	No. of British Vessels	No. of Other Vessels	Total	Tonnage of British Vessels	Tonnage of Other Vessels	Total
1920	258	50	308	137,214	99,988	737,202
1921	349	102	451	1,172,934	230,653	1,403,587
1922	342	110	452	1,138,601	361,334	1,499,935
1923	456	153	609	1,768,603	496,772	2,265,375
1924	513	186	699	1,940,266	582,962	2,523,229
1925	563	223	786	2,470,493	703,007	3,174,500
1926	591	234	825	2,763,902	814,565	3,578,367
1927	605	248	853	2,879,872	886,086	3,695,958
1928	639	283	922	2,872,495	1,097,501	3,969,997
1929	585	301	886	2,870,334	1,193,859	4,046,143
1930	609	335	945	2,979,723	1,448,084	4,428,007

From table 77 we can observe the increased tonnage of the British vessels and also of the other vessels. It can be seen that Imports and Exports, during the five years after the end of the First World War, reached two and a half million tons, where in 1918, before the end of the war, they were less than half a million tons.

After 1924 the number of vessels increased very rapidly, which made the Government look ahead to further expansion of the port in order to meet the increase. They therefore devised a plan to construct new quays in the south for coal and petroleum. The years after 1924 saw the development of port construction to meet the increase.

From the above table we can observe the high increase in tonnage and in the number of vessels between 1925 and 1930. Tonnage increased from 2.5 million tons in 1924 to 4.5 million tons in 1930.

After the harbour of Port Sudan had been reconstructed and improved, its annual total of incoming and outgoing vessels increased to 945 in 1930, totalling 4.5 million tons. In 1920, the number was 308 vessels totalling 737,202 tons, i.e. an increase of three times in the number of vessels over ten years and an increase of six times the tonnage in the same period. The port was ready to face the economic development in all fields in Sudan, in order to serve the internal and external trade, especially the increased production of cotton. The development of internal communications in Sudan connected the hinterland with the only maritime orientation towards Port Sudan and made it easier for imports and exports to move towards their markets.

Table 78

Year	No. of British Vessels	No. of Other Vessels	Total	Tonnage of British Vessels	Tonnage of Other Vessels	Total
1931	548	340	880	2,655,881	1,485,702	4,141,583
1932	539	269	808	2,177,796	920,511	3,098,307
1933	510	268	788	2,009,834	911,021	2,920,755
1934	574	312	886	2,225,106	1,095,516	3,320,622
1935	693	488	1,181	2,575,072	1,476,732	4,051,804
1936	653	495	1,148	2,474,579	1,545,555	4,020,134
1937	610	564	1,174	2,278,074	1,618,142	3,896,216
1938	-	-	1,153	-	-	4,004,000
1939	-	-	922	-	-	3,235,000

From table 78 a decrease can be observed in the number of vessels and in tonnage between 1930 and 1933. The total tonnage decreased from 4.5 million tons in 1930 to 2.9 million tons in 1933,[1] and this was due to the fall in prices everywhere. Trade wasstagnant throughout the world. The world-wide wave of economic depression did not

(1) Reports by the Governor General of the Sudan, 1928-1930-1933, pp. 55, 49, 43.

leave the Sudan untouched. The value of the Sudan cotton fell heavily, cotton having been the most important factor in the rapid rise of the country's foreign trade during the previous few years.

In 1934 the Sudan began to recover and imports and exports showed a marked increased through Port Sudan. In 1934 outgoing and incoming ships at Port Sudan numbered as many as 886, totalling 3.3 million tons. The steady increase of pre-war trade traffic through Port Sudan reached its peak in 1937, incoming and outgoing vessels increasing in this year to 1,174 vessels, totalling about 4 million tons.

The outbreak of war in 1939 and the consequent disorganisation of shipping decreased the number of vessels to a great extent during the period of the war, and in fact almost stopped port traffic. In 1939 outgoing and incoming ships decreased in number to 922, totalling 3.2 million tons. In 1940 there were only 477 vessels, totalling 1.2 million tons. The remarkable increase in 1941 was due mainly to the war situation in East Africa with Italy. Accordingly the port traffic increased, the tonnage of vessels visiting the port in 1941 being 2.3 million tons. However, this number decreased to less than a million tons after 1941

Table 79

	Year	No. of British Vessels	No. of Other Vessels	Total	Tonnage of British Vessels	Tonnage of Other Vessels	Total
(1)	1944	213	280	493	454,018	574,437	028,475
	1945	226	151	457	500,269	344,210	844,479
	1946	223	293	516	632,673	376,506	1,009,179
	1947	232	406	738	1,280,870	665,235	1,946,105
	1948	360	429	789	1,353,063	831,084	2,184,336
	1949	454	452	906	1,958,635	978,444	2,937,079
	1950	-	-	938	1,906,334	1,168,559	3,074,892

(1) Reports of the War Years, by the Governor General. 1950.

In 1945 the trade of Port Sudan had fallen to only 844,479 tons, the lowest tonnage recorded during the previous twenty years. Table 79.

This general decrease during the period of the Second World War shows that Port Sudan is closely attached to navigation through the Red Sea, and also to world problems.

The end of the Second World War meant the rejuvenation of Port Sudan. Commercial activity returned once again to the Red Sea area, and navigation traffic was secured. After the war, the port began a new stage of its development, as is shown in the previous table. In 1950 outgoing and incoming ships increased to 938, totalling 3,074,892 tons. This, however, was still less than the numbers of the pre-war period, which reached more than 4 millions tons.

Table 80

Period	Ships Calling		% Tonnage by Nationality				Tonnage	
	Number	Tonnage	British	Egyptian	Other	Total	Imports	Exports
(1) 1951	925	2,971,726	60.83	3.61	35.56	100	614,462	467,441
1952	1,056	3,303,488	54.56	1.58	43.86	100	733,838	403,808
1953	1,136	3,363,847	59.92	1.62	38.46	100	666,491	480,188
1954	1,165	3,672,885	54.30	1.90	43.80	100	745,907	347,685
1955	1,097	3,422,713	46.56	3.50	49.94	100	699,570	466,054
1956	1,165	2,936,488	41.06	2.38	56.54	100	728,889	597,817
1957	1,033	2,445,767	25.01	3.31	71.68	100	1,096,609	618,720
1958	1,016	3,315,455	36.69	1.28	62.03	100	898,406	417,810
1959:								
1st Qr.	303	937,274	38.04	1.13	60.78	100	192,292	176,688
2nd "	357	1,147,536	36.64	1.33	62.03	100	255,412	183,588
3rd "	332	1,016,189	35.39	1.21	63.20	100	249,165	218,360
4th "	317	932,550	33.09	1.22	65.69	100	268,770	121,482
(2) 1960								
1st Qr.	304	884,790	33.10	1.03	65.87	100	245,795	150,609
2nd "	359	1,041,142	29.77	0.38	69.85	100	217,359	200,302
3rd "	340	1,052,976	29.07	0.14	70.79	100	255,180	190,506
4th "	327	996,671	28.23	1.33	70.44	100	255,624	137,461

(1) Annual Foreign Trade Report, Khartoum, 1959. p.337
(2) Foreign Trade and Internal Statistics, December, 1960.

From table 80 it is clear that the British tonnage reached its peak at 1951, with 60.8% of the total tonnage. After 1951 it can be seen that the British tonnage decreased to 46.6% of the total tonnage, and that was due to the increase of the foreign trade with other countries, i.e. Soviet Block, Far East, & U.S.A.

In 1957 there was a severe drop in the British Tonnage, 25.01% of the total, which was because of the Suez war and the blockage of the Suez Canal. (see Fig.63).

External trade

The relative importance of Port Sudan in Sudan's external trade is necessarily governed by the structure and orientation of this trade.

Sudan is chiefly an exporter of raw materials and an importer of manufactured goods, and the bulk of its external trade is therefore bound to be exchanged with industrial countries.

Exports

Sudanese exports consist in the main of cotton and cottonseed which form nearly 65% of the total value. These two items earned for the Sudan during 1959 over £S.44 million. Cotton is grown entirely for export, and as the most lucrative crop it plays a dual part in the economy of the country. It is a source of wealth to the native as well as a source of revenue to the Government which takes, in addition to the direct income, an indirect one through duties on increased imports and railway receipts. Hence the financial position of the Sudan is apt to change with the rise and fall of cotton prices.(1)

(1) Al-Sayyad, M.M.: The Anglo-Egyptian Sudan, 1948. p. 222

The first economic problem facing the development of cotton export is that of transport. Cotton from Kordofan has to be carried some 1,200 miles to Port Sudan for export. The journey of Equatoria's cotton islonger. The fact that much cotton acreage is far from the river and railway centres makes the transportation problem more difficult. The most promising districts in Equatoria, Torit, Gei, and Amadi are some 90 miles from the river. Distances are greater in the Nuba Mountains area. The two principal centres, Taladi and Kadugli are 100 miles and 160 miles respectively from the river.

The development of road transport has overcome the problem to a certain extent, but it will take the Sudan, under its present financial conditions, a very long time to provide these districts with sufficient roads and railways. In most other regions of the Southern Sudan motor lorries belonging to the Sudan Government or privately owned are at present a problem which in itself is almost prohibitive. A ton of Nuba Mountains cotton costs about £E.6 to transport to Port Sudan, that of Equatoria £E.9, while the Gezira cotton costs nearly £E.3 per ton. Cotton-seed, not used for planting, is burnt at the gins as it is not considered worth the cost of transportation to the Sea board.(1)

Labour is another major problem, especially because cotton is one of the crops which need many hands at every stage of its cultivation, from sowing to picking. The three provinces of the Southern Sudan which cover a combined area of 395,395 square miles have a total

(1) The above figure is taken from the first population Census of Sudan, as on 17.1.1956.

population of 2,783,136[1] inhabitants. Although the density of population is greater than that of the Sudan as a whole, it is too low a density to allow development on a large scale. In this effort to stimulate economic development, the Government found itself faced with many problems of which some have been solved in part or entirely while others still await solution. Provision of seed, control of insect pests, handling and financing the crop, and erection of ginneries have all been faced successfully. The remoteness of the region from the sea-port has almost been solved by the development of the communications of the Sudan during the last five years. The sparsity of population, the present degree of civilisation, and the disinclination of many tribes for the labour of cultivation render rapid development a matter of some difficulty. However the Government encouraged natives to settle down to grow cash crops and make extra money. The results, though not very rapid, many be considered fair progress and mark some economic advance in cotton export.

The value of textile materials , now exported via Port Sudan, in 1959 were £S.40,095,203, the main countries of destination were - The United Kingdom 30%, European countries 35%, Soviet Block 9%, Far East 2.2%, Japan 2.6%, North America 1%.

Next to cotton in descending order of importance is gum arabic, the Sudan exercises a virtual monopoly producing over 85% of the world output. Main production is centred in the Kordofan Province with

(1) Taken from the first Population Census of Sudan - 17.1.56.

its market at Elobeid, production in Kordofan in 1958/9 was 484,059 kantars, about 65% of the grand total production of Gum Hashab. Smaller production occurs in the provinces of the Blue Nile, Kassala and Darfur whose markets are at Singa, El Fasher and Gedaref. The export value was £S.5.1 millions in 1959. The yield varies greatly according to weather conditions and its collection entails considerable hardship in desolate and generally waterless country. But an improvement in transport facilities and the provision of wells will be of great use. A wider area will be tapped and exports will increase.(1)

Gum is exported direct from Port Sudan to its overseas markets. It goes to nearly every country of the world, but its chief purchasers are the United Kingdom, the U.S.A., India, Canada, Australia, Egypt, Norway, France, Netherlands, Belgium, Spain, Germany, Japan, Italy, Argentine and Brazil.

The value of gum exports in 1961, viz. £S.6,141,000 remained 12% below the 1960 value. This drop was mostly due to lower prices for the quantity exported fell only from 51,881 tons to 51,234 tons. The average value per ton exported, however, decreased from £S.134.3 per ton to £S.119.8 per ton.

Sudan's production of gum is still very dominant in world production.

Table 81: The total value of exported gum in past decade via Port Sudan:

Type	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Gum Hashab	3313	2372	2852	3574	4435	5056	4446	4881	4751	4551
Gum Tahl	126	72	117	17	202	265	213	278	301	377
Gum Bleached	22	21	11	16	14	23	12	16	15	19
Gum Dust	11	7	10	27	29	25	20	32	-	-

Table 82: The Main Importers of Gum Hashab (£S.000's)

Country	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
(1) Australia	144	58	84	112	139	156	147	119	99	224
Belgium	161	128	145	155	209	219	164	234	168	223
France	390	196	227	368	290	345	260	261	143	300
India	139	118	153	46	139	138	98	69	65	127
Italy	232	289	280	346	402	422	418	497	419	599
Japan	57	23	101	91	150	171	169	222	219	325
Netherlands	155	105	127	194	296	203	253	207	361	476
Sweden	86	107	61	83	104	154	81	86	-	-
U.K.	982	539	724	906	1022	1358	997	1081	1106	1034
U.S.A.	549	523	562	681	898	1053	985	1064	1130	1584
W.Germany	56	34	70	138	164	201	191	184	186	317

Food products, beverages and tobacco are another item of revenue for the Sudan. The export value via Port Sudan in 1959 was £S.4,862,686,(2) the chief purchasers of these items were the European countries, the Soviet Block, Egypt, and other countries.

The exported value of fats and waxes, animals and vegetables via Port Sudan were £S.11,425,456(3), the main countries of destination for these items in 1959 were the United Kingdom, with 25.7% of the total value, followed by Egypt 8%, Japan 5.9%, the Soviet Block 1.9%, European countries 42% and other countries.

The value of hides, skins and leather exported via Port Sudan in 1959 were £S.919,528 and main countries of destination were Egypt,

(1) Annual Report, 1959. p. 315
(2) Annual Foreign Trade Report, 1959. p. 36
(3) " " " " " p.36

U.S.A., U.K. and other European countries.

The value of all the exports via Port Sudan in 1959 were £S.62,654,056, the grand total of all exports via all routes in 1959 were £S.63,475,546 and from this fact it is clear that Port Sudan is the main gateway for the majority of the Sudan foreign trade.

Imports.

The Sudan, asa raw material producer, imports mostly manufactured goods. Generally speaking the chief imports were in 1959[(1)] food products, beverages and tobacco valued at £S.14,169,729, i.e. 24.8% of the grand total of imports. Chemicals were £S.3,300,647 - 5.7%; products for heating, lighting, power and lubricants, valued at £S.5,026,244 - 8.9%; textiles valued in the same year £S.10,151,011 - 17.8%; Metals and manufactures £S.4,778,168 - 8.3%, machinery, apparatus, vehicles £S.10,126,583 - 17.7%, rubber and manufactures - £S.1,122,773 - 2.8%; and clothing and made-up textiles £S.2,829,751 - 5%.

The following table shows the percentage of the total value of imports by section and county of origin in 1959. From it, it is clear that most of the Sudan's imports are manufactured goods, coming mainly from the United Kingdom. From the latter the Sudan imported in 1959 £S.14,188,181 (24.9%) of the grand total of imports, European countries £S.12,200,511 (21.4%), Soviet Block £S.4,330,532 (7.6%), Far Eastern Countries £S.1,944,363 (3.4%), Japan £S.608,058 (1.1%)

(1) Annual Foreign Trade Report, 1959 p.16

North America £S.1,093,283 (1.9%), Egypt £S.455,719 (8%), other countries £S.6,456,005 (11.3%) and other sterling areas £S.11,601,943 (20.4%).

From this it is clear that the three principal sources of imports were Great Britain, Egypt and the Soviet Block. Their share is nearly 40% of the total value in 1959.

The Sudan's imports in 1940 were £S.5,633,889, in 1950 there has been a continuous increase to £S.27,266,865, in 1959 the increase reached its top level - £S.57,054,599.

The increase in the imports of consumer goods resulted from the consequent increase in the purchasing power, while the increase in the import of capital goods is due to the expansion in the development schemes, industrial as well as agricultural.(1)

The total value of imports via Port Sudan in 1959 were £S.47,159,345, and the total value of imports by all routes were £S.57,054,599. So it is clear that more than 80% of the value of imported trade was via Port Sudan, the main gateway to all the country.

Table 71 classifies the principal imports and their value via Port Sudan in 1959. A glance at the table shows that the most important of these textiles, which the Sudan imported via Port Sudan was to the value of £S.757,195. The sources of supply for these cotton piece goods were - United Kingdom, Egypt, U.S.S.R., Japan, India and other countries.

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(1) Sudan Almanac, 1961. p.151

The role of the U.S.A. and of Japan, however, became much more important. In 1960, 2.9% of the total value of imported goods came from thw U.S.A. and 2.5% from Japan; in 1961 these percentages had risen to 6.1% and 5.8% respectively. The increase in the relative share of the U.S.A. is partly explained by the regulations requiring the utilisation of almost all aid funds in purchase of American products.(1) In the case of Japan it should be mentioned that there has been simultaneous increase of imports from Sudan which rose from £S.1.8 million in 1960 to £S.2.6 million in 1961.(2)

Sugar is the second item, the value of imports via Port Sudan in 1959 being £S.723,086. The sources of supply were - Taiwan, Brazil, Belgium, German Democratic Republic, Egypt, U.S.S.R., Poland and China.

Machinery, Apparatus, Vehicles: Imports, both Government and public of these items via Port Sudan were valued at £S.7,551,899. Great Britain was easily the largest supplier of goods classified under this category. Its share of the total value was 80% before the second world war, and £S.7,505, 274 (74.1%) The European countries' share totalled 13.8%, and the Soviet Block 1.3%.

Rubber and manufactures imported via Port Sudan were valued £S.1,111,224 in 1959; the sources of supply were mainly the U.K., (37.3%), European countries (33.5%), Soviet Block (6.0%), Japan (4.9%), Far East(3.6%), and other countries.

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(1) <u>The Republic of the Sudan: Economic Survey</u>, 1961

(2) Ibid.

There are other items imported by the Sudan, like chemicals, imported mainly from the United Kingdom and other European countries. Coffee and tea, cocoa and spices: coffee imported from Eritrea, Ethiopia, Uganda, Kenya and other countries. Tea is imported mainly from India, which is the chief country for supplying Sudan with tea. Cocoa is mainly from the United Kingdom. Spices are imported from India, Ethiopia and Ceylon.

The Hinterland

Cargo classfffcation brings attention to the great variety of the Port Sudan hinterland. Cotton is grown all over the country, gums mainly in Western Sudan, the central zone produces the bulk of grain, other crops include coarse tobacco, grown chiefly in Darfur. Port Sudan is the only port for all the Sudan, it serves 80% of the whole trade of the country.

A "hinterland" can be described as organised and developed land space which is connected with a port by means of transport lines, and which receives or ships goods through the port.(1) In Sudan there is a good network of railways connecting Port Sudan with all regions. The railhead is Elobeid and recently it was extended to Nyala for serving the gum region of eastern Kardofan and the cattle trade there. At Sennar the railway bifurcates, the main line following the Blue Nile to Khartoum and to Athera, where it forks again to Wadi Halfa and Port Sudan. The main line carries the Gezira crops of cotton, cotton-seed and grain, while the branch takes the gum, oil-seeds and grain from the Gederef region, the cotton crop of the Gash delta, and much of the dominant trade.

Thus most of the Sudan may be considered a hinterland for exports and imports through Port.Sudan. External trade of the Sudan with the neighbouring countries is negligible because these

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(1) Weigend,Guido: Some Elements in the Study of Port Geography. Geographical Review, Apr.1958. p.192

countries do not achieve a good market because of the lower standard of living, and all these countries, except Egypt, are exclusively producers of raw products of much the same kinds as those produced in the Sudan.

Import hinterlands are the areas of destination for goods imported through the port, and export hinterlands are the areas where outbound shipments of the port originate. The terms "import" and "export" in this sense do not refer in any way to the foreign trade of the country. They refer simply to commodities arriving at the port, or moving out of it.

Cotton production, which was value at £S.40,153,107 im 1959 was mainly exported from Port Sudan to International markets. The value of cotton exported via Port Sudan in 1959 was £S.40,095,203 (99%) of the total value of cotton exported via all routes.

Nearly all cotton and gum production, which valued 70% of the total export, is exported by Port Sudan. Cotton is grown all over the country and exported,after satisfying local demand, through Port Sudan. In this respect the hinterland will be the whole country, but for gum the hinterland will be limited according to the limited area which produced gum in Western Sudan. Thus the hinterland of the port varies, not only in special distribution, but also for special location according to the product.

Turning to the import side, the position is rather determined by two main factors apart from the diversified nature of Sudan's imports of manufactured articles.

The geographical location of Port Sudan, being the nearest port south of Suez Canal, attracts a good deal of the bulky imports coming from both directions.

Goods imported through Port Sudan are transported to all parts of the Sudan without any clear distinction, mainly through Khartoum wholesalers; this adds further complication to the question of hinterlands.

Port Sudan is not like other ports. A port usually belongs to the hinterlands it serves; but a port such as Port Sudan serves (the distant hinterland) the people of the Nile valley in the Sudan who are separated from the sea by a belt of desert 200 miles and more in breadth. The immediate hinterland of the port is just a desert which is inhabited only by nomads who make no contributions to the economy of the port.

The Foreland

Turning next to the forelands, it is clear that developments there can be equally as important factors in port traffic as those in the hinterlands.

The define the foreland of Port Sudan, an attempt has to be made for studying the port traffic at the port within the available, though inadequate, data. We have, therefore, to restrict our study of the foreland of Port Sudan to those vessels loading or unloading goods at that port, as basis for defining the foreland. Fortunately the Sudan's shortcoast line lies alongside the Red Sea which is normally the busiest waterway of the world. Vessels from and to all parts of the eastern and western worlds pass along this route.

As stated earlier, the United Kingdom was the Sudan's best customer before the war, taking more than 40% of its total exports. It was the heaviest buyer of cotton and gum arabic and almost the sole purchaser of cotton-seed. Exports to the United Kingdom totalled £E.2,551,563 in value in 1939 (47.5%) of the total value of the Sudan exports. The percentage fell in 1959 to 26.4% of the total value of exports. This was due to the increase of exports to other countries, i.e. Soviet Block, Far East, Japan and the U.S.A. (see Tables 83 & 84).

It is important to observe that the European Common Market was the largest buyer of Sudan's export products in 1961, surpassing the

IMPORTS IN 1959 - BY SECTION AND COUNTRY OF ORIGIN

Section	Total Section % of Section to Grand Total	Sterling Area U.K.	Sterling Area Other Sterling Area	European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
I. Food Products, Beverages and Tobacco	14,169,729 (24.8)	1,121,814 (7.9)	4,310,799 (30.5)	3,319,952 (23.4)	1,054,016 (7.4)	1,355,799 (9.6)	854 (0.0)	21,066 (0.1)	381,990 (2.7)	2,603,439 (18.4)
II. Fat and Waxes, Animal and Vegetable	503,820 (0.8)	1,115 (0.2)	96,867 (19.2)	249,859 (49.5)	- -	5,395 (1.0)	- -	10,342 (2.0)	4,897 (1.0)	135,345 (27.1)
III. Chemicals	3,300,647 (5.7)	1,049,936 (31.8)	162,779 (4.9)	1,795,157 (54.4)	26,348 (0.8)	8,362 (0.3)	29,804 (0.9)	15,374 (0.5)	206,324 (6.2)	6,563 (0.2)
IV. Rubber and Manufactures	1,122,773 (2.0)	418,897 (37.3)	132,853 (11.8)	375,735 (33.5)	67,303 (6.0)	39,678 (3.6)	55,281 (4.9)	1,381 (0.1)	29,970 (2.7)	1,675 (0.1)
V. Wood, Cork and Manufactures	1,052,208 (2.0)	32,849 (3.1)	134,211 (12.8)	282,819 (26.9)	580,037 (55.1)	- -	968 (0.1)	5,646 (0.5)	5,547 (0.5)	10,131 (1.0)
VI. Pulp, Paper, Cardboard and Manufactures	795,468 (1.3)	191,037 (24.0)	7,367 (0.9)	429,203 (54.0)	50,387 (6.3)	944 (0.1)	9,327 (1.2)	403 (0.1)	94,863 (11.9)	11,937 (1.5)
VII. Hides, Skins and Leather	98,949 (0.2)	54,610 (55.2)	5,877 (5.9)	3,622 (3.7)	3,765 (3.8)	- -	- -	61 (0.1)	30,393 (30.7)	621 (0.6)
VIII. Textiles	10,151,011 (17.8)	582,862 (5.8)	4,147,606 (40.9)	620,110 (6.2)	1,362,420 (13.5)	356,954 (3.5)	277,450 (2.8)	1,050 (0.0)	2,773,172 (27.3)	29,387 (0.0)

IMPORTS IN 1959 - BY SECTION AND COUNTRY OF ORIGIN (Contd.)

Section	Total Section	Sterling Area		European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
	% of Section to Grand Total	U.K.	Other Sterling Area							
IX. Clothing and Made-up Textiles	2,829,751 (5.0)	127,771 (4.6)	1,185,405 (41.9)	213,112 (7.5)	521,321 (18.4)	63,439 (2.2)	54,720 (1.9)	13,272 (0.5)	637,274 (22.5)	13,437 (0.5)
X. Non-Metallic Minerals	968,079 (1.7)	117,061 (12.1)	21,776 (2.2)	358,335 (37.0)	256,853 (26.6)	192 (0.0)	22,539 (2.4)	311 (0.0)	101,163 (10.4)	89,849 (9.3)
XI. Products for Heating, Lighting, Power and Lubricants	5,026,244 (8.9)	382,208 (7.6)	776,561 (15.5)	326,190 (6.4)	- -	149 (0.0)	- -	105,674 (2.1)	20,158 (0.4)	3,415,304 (68.0)
XII. Precious Metals and Stones	2,804 (0.0)	1,004 (35.8)	60 (2.1)	997 (35.6)	3 (0.1)	5 (0.2)	5 (0.2)	3 (0.1)	228 (8.1)	499 (17.8)
XIII. Gold Metal and Specie	36,888 (0.1)	17,299 (46.9)	- -	- -	- -	- -	- -	- -	- -	19,589 (53.1)
XIV. Base Metals and Manufactures	4,778,168 (8.3)	1,676,118 (35.1)	395,793 (8.3)	2,360,333 (49.4)	140,266 (2.9)	106,826 (2.3)	9,045 (0.2)	69,466 (1.5)	14,948 (0.3)	5,373 (0.0)
XV. Machinery, Apparatus, Vehicles	10,126,583 (17.7)	7,505,274 (74.1)	151,797 (1.5)	1,401,131 (13.8)	126,378 (1.3)	2,817 (0.0)	117,841 (1.2)	729,656 (7.2)	51,251 (0.5)	40,438 (0.4)

IMPORTS IN 1959 - BY SECTION AND COUNTRY OF ORIGIN (Contd.)

Section	Total Section	Sterling Area		European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
	% of Section to Grand Total	U.K.	Other Sterling Area							
XVI. Miscellaneous	1,949,564 (3.4)	844,586 (43.3)	141,868 (7.3)	435,758 (22.4)	139,793 (7.2)	3,397 (0.2)	29,999 (1.5)	98,438 (5.0)	188,022 (9.6)	67,703 (3.5)
XVII. Returned Goods and Special Transactions	106,983 (0.2)	41,811 (39.1)	9,384 (8.8)	23,130 (21.6)	1,447 (1.4)	390 (0.4)	187 (0.2)	14,463 (13.5)	11,467 (10.7)	4,704 (4.3)
XVIII. Postal Parcels	34,930 (0.1)	21,929 (62.8)	940 (2.7)	5,068 (14.5)	195 (0.6)	16 (0.0)	38 (0.1)	6,681 (19.2)	52 (0.1)	11 (0.0)
GRAND TOTAL	57,054,599 (100.0)	14,188,181 (24.9)	11,681,943 (20.4)	12,200,511 (21.4)	4,330,532 (7.6)	1,944,363 (3.4)	608,058 (1.1)	1,093,283 (1.9)	4,551,723 (8.0)	6,456,005 (11.3)

EXPORTS IN 1959 - BY SECTION AND COUNTRY OF DESTINATION

Section	Total Section	Sterling Area		European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
	% of Section to Grand Total	U.K.	Other Sterling Area							
I. Food Products, Beverages and Tobacco	5,348,333 (8.5)	154,817 (2.9)	893,807 (16.7)	1,721,379 (32.2)	27,903 (0.5)	- -	- -	45 (0.0)	459,753 (8.6)	2,094,379 (39.1)
II. Fats and Waxes, Animal and Vegetable	11,445,375 (18.0)	2,956,765 (25.8)	999,434 (8.8)	4,841,458 (42.3)	215,802 (1.9)	- -	677,483 (5.9)	- -	971,712 (8.5)	782,721 (6.8)
III. Chemicals	4,554 (0.0)	- -	- -	- -	- -	- -	- -	- -	3,738 (82.1)	816 (17.9)
IV. Rubber and Manufactures	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
V. Wood, Cork and Manufactures	155 (0.0)	- -	- -	- -	- -	- -	- -	- -	90 (58.1)	65 (41.9)
VI. Pulp, Paper, Cardboard and Manufactures	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VII. Hides, Skins and Leather	1,070,669 (1.7)	62,307 (5.8)	1,893 (0.2)	307,307 (28.7)	1 (0.0)	- -	- -	217,360 (20.3)	381,796 (35.7)	100,005 (9.3)
VIII. Textiles	40,153,107 (63.3)	12,426,656 (30.9)	7,165,261 (17.9)	14,218,574 (35.4)	3,665,119 (9.1)	867,760 (2.2)	1,062,181 (2.6)	381,869 (1.0)	- -	365,687 (0.9)

EXPORTS IN 1959 - BY SECTION AND COUNTRY OF DESTINATION (Contd.)

Section	Total Section % of Section to Grand Total	Sterling Area U.K.	Other Sterling Area	European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
IX. Clothing and Made-up Textiles	99 (0.0)	16 (16.2)	21 (21.2)	6 (6.1)	11 (11.1)	- -	- -	4 (4.0)	- -	41 (41.4)
X. Non-Metallic Minerals	72,597 (0.1)	1,329 (1.8)	59 (0.1)	60 (0.1)	- -	- -	32,130 (44.3)	330 (0.5)	2,099 (2.8)	36,590 (50.4)
XI. Products for Heating, Lighting, Power and Lubricants	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
XII. Precious Metals and Stones	12 (0.0)	12 (100.0)	- -	- -	- -	- -	- -	- -	- -	- -
XIII. Gold Metal and Specie	16,326 (0.0)	16,326 (100.0)	- -	- -	- -	- -	- -	- -	- -	- -
XIV. Base Metals and Manufactures	78 (0.0)	- -	- -	- -	- -	- -	- -	- -	5 (6.4)	73 (93.6)
XV. Machinery, Apparatus, Vehicles	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

EXPORTS IN 1959 - BY SECTION AND COUNTRY OF DESTINATION (Contd.)

Section	Total Section % of Section to Grand Total	Sterling Area U.K.	Sterling Area Other Sterling Area	European Accounts Area	Soviet Block	Far East	Japan	North America	Egypt	Other Countries
XVI. Miscellaneous (including Gum)	5,333,575 (8.4)	1,152,912 (21.6)	488,823 (9.2)	1,797,056 (33.7)	89,486 (1.7)	177,518 (3.3)	219,179 (4.1)	1,206,187 (22.6)	106,413 (2.0)	96,001 (1.8)
XVII. Returned Goods and Special	26,811 (0.0)	2,699 (10.0)	422 (1.6)	1,056 (3.9)	91 (0.4)	11 (0.0)	76 (0.3)	337 (1.3)	81 (0.3)	22,038 (82.2)
XVIII. Postal Parcels	105 (0.0)	40 (38.1)	- -	32 (30.4)	2 (1.9)	- -	2 (1.9)	26 (24.8)	- -	3 (2.9)
GRAND TOTAL	63,475,546 (100.0)	16,773,879 (26.4)	9,549,720 (15.1)	22,323,599 (36.1)	3,998,415 (6.3)	1,045,289 (1.6)	1,991,051 (3.2)	1,806,158 (2.8)	1,925,687 (3.0)	3,498,419 (5.5)

importance of the United Kingdom in this respect. In this connection it is pertinent to observe again that if the European Common Market develops into a closed economic society it will have an adverse effect on the progress of developing countries,[1] for the need of raw m aterials.

The United Kingdom remained, however, the largest supplier. The total value of exports to the Common Market increased from £S.14.0 million to £S.18.2 million and for cotton separately from £S.5.9 million to £S.9.9 million. The relative importance of India as a buyer of Sudan's products did not change matterially in 1961, compared with 1962, but the share of the U.S.S.R. rose from 3.2% to 5.5% of total exports.(Table 83).

Contrary to these changes in the direction of exports, the relative significance of the United Kingdom, the European Common Market and the U.S.S.R. in Sudan's imports did not change. The role of the U.S.A. and Japan, However, became much more important. In 1960, 2.9% of the total value of imported goods came from the U.S.A. and 2.5% from Japan, in 1961 these percentages had risen to 6.1% and 5.8% respectively. The increase in the relative share of the U.S.A. is partly explained by the regulations requiring the utilisation of about

purchase of American products.[2] In the case of Japan, it should be mentioned that there has been simultaneous increase in imports from Sudan which rose from £S.1.8 million in 1960 to £S.2.6 million in 1961

(1) Ministry of Finance & Economics (Sudan). Economic Survey, 1961
(2) Ibid.

1 Table.85 Foreland Traffic of the Sudan. Value in Millions £S

To/From	Import				Export				Total (Import & Export)			
	1960		1961		1960		1961		1960		1961	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
European Common Mkt	13.0	20.3	16.1	19.8	14.0	22.0	18.7	29.3	27.0	21.2	34.8	24.2
United Kingdom	17.4	27.2	21.7	26.6	17.1	26.0	10.9	19.1	34.5	27.2	32.6	22.7
India	7.6	12.0	7.7	9.5	6.4	10.3	6.1	9.8	14.0	11.1	13.8	9.6
U.S.S.R	2.3	3.6	3.0	3.7	1.8	3.2	3.4	5.5	4.1	3.2	6.4	4.5
U.A.R.	5.4	8.4	5.5	6.6	3.0	4.8	2.9	4.6	8.4	6.6	8.4	5.8
U.S.A.	1.8	2.9	5.0	6.1	1.9	3.2	1.7	2.8	3.7	2.9	6.7	4.7
Others	16.2	25.6	22.5	27.7	19.2	30.5	18.5	28.9	35.4	27.8	41.0	28.5
Total	63.7	100	81.5	100	63.4	100	62.2	100	127.1	100	143.7	100

Examining the import and export tonnages by forelands (Table 85) the changes between 1960 and 1961 find expression in the shifted emphasis on various countries.(Fig.64)(1) In the total foreign trade, picture of European Common Market has gained most remarkably in both imports and exports, whereas the United Kingdom has lost its position and its trade with the Sudan as a leading country, its share having decreased from 27.2% in 1960, to 22.7% in 1961. The U.S.A. trade increased from 2.9% in 1960 to 4.7%

(1) It applies to the whole trade of the Sudan by all routes but it gives an idea about the forelands of the Sudan since more than 80% of the total value of foreign trade passes through Port Sudan.

in 1961.

Since the forelands constitute an integral part of the port and no comprehensive analysis can be carried out without adequate and reliable statistics concerning the port under consideration, no such analysis can be made for the time being due to the lack of statistics on the forelands of Port Sudan.

CHAPTER VIII

THE ERITREAN PORTS.

MASSAWA AND ASSAB

THE PORTS AND TOWNS

The physical setting of the Eritrean Ports - The development of Massawa Port - Massawa harbour - Massawa town - The urban functions of Massawa town - Population of Massawa - Public utility provisions.

The development of Assab port - Assab harbour - Assab town - The urban functions of Assab - population of Assab - Public utility provision.

EXTERNAL RELATIONS

Transportation and trade routes in Eritrea and Ethiopia - The traffic pattern of the ports of Massawa and Assab - The hinterlands of Massawa and Assab - The forelands of Massawa and Assab.

The Physical Setting of Eritrea Ports

Eritrea has a coastline of over 550 miles, discounting irregularities, from latitude 18° N. to latitude 12° 43' N. To the north it has a common boundary with the Sudan, and with French Somaliland in the extreme south-east. The triangular port is occupied largely by the Ethiopian plateau and its northern continuation, known as the Sudan plains, and falls steeply from its high eastern rim to the coastal plain north of Massawa and in the south to the Danakil desert.

The coast of Eritrea falls naturally into three subdivisions controlled by geological structure. These are (a) between Ras Kasar and Annesley Bay, (b) between Annesley Bay and Amfile Bay, and (c) between Amfile Bay and Ras Dumeira on the frontier with French Somaliland.(1)

(a) Ras Kasar - Annesley Bay. In the first subdivision the coast trends south-south-east for 200 miles, reef bordered and with few inlets or promontories. South-east of Ras-Kasar, Brassy Light, is a small bay where dhows anchor off the coastal reef. The coast is low and sandy, with swamps and salt flats neab Hasmet, for 40 miles to Mersa Taclai. Beyond Mersa Taclai the coast continues low and sandy to Massawa, and between the coastal reef and Dahlak bank the north Massawa channel extends for 160 miles south-south-east. There is anchorage almost anywhere on the west side of the channel. The best anchorage is the outer port of Khor Dakligat, a small bay between

(1) Western Arabia & the Red Sea. op. cit. pp.115-118

Ras Dagon and the 'Abd al Qadir" peninsula which overlooks Massawa harbour. The coastal plain in this section, called Sakel in the north, samar in the south, is formed by terraces of marine sedimentary rocks with, near Massawa, intercalated volcanic beds and occasionally an outcrop of ancient crysalline rocks. The land opposite Massawa and the island itself consist of coral rock of which so many of the islands in this part of the Red Sea are composed. It is formed by agglutination of broken corals, shells, and coral sand.(1) All these islands are perfectly flat and stand about 20 or 30 ft. above high-water mark being surrounded by a low cliff of that height.(2) A reef extends for a varying distance outwards from them and terminates abruptly. Doubtless the island was formerly co-extensive with the reef, but much of the coarse rock has been swept away by the sea.(3) The reef is naturally broadest in the direction from which the heaviest breakers come, the open sea.(4)

Behind the plain, the scarp of the Ethiopian highlands rises like a broken wall, about 25 miles inland in the north, 15 miles inland nearer Massawa.

Massawa lies on a flat sandy plain on the south side of the Abd al Qadir peninsula, at the northern entrance of Arkika Bay.

(b) Annesley Bay - Amfile Bay.

In this second subdivision of the Eritrean coast the coast extends to about 100 miles and there are three large bays: Annesley Bay or the Gulf of Zula, near which are the ruins of Adulis, an ancient city

(1) Blandford, W.T. Geology of Abyssinia. London 1870. p.105
(2) On the island of Massawa, the eastern of seaward side is much higher than the other.
(3) Blandford W.T. op. cit.
(4) Western Arabia & the Red Sea. op. cit.

and port; the second bay is Hawakil Bay and the third is Amfile Bay. The whole stretch of coast between Annesley and Amfile Bays, with its associated islands, forms the south-west side of the south Massawa Channel. On the north-east side lies Dahlak archipelago which, with its reefs and banks, extends for nearly 200 miles parallel to the coast. Along this stretch of coast there are no important ports. The country behind this section consists of volcanic hills of varying heights, some of conical form, others developed on lava flows, in the form of ridges, with small sandy plains between them, unfit for cultivation except where river floods can be utilised,[1]

(c) Amfile Bay - Ras Dumeira.

The third subdivision of the Eritrean coast, about 210 miles long, trends south-eastwards. The coastal plain in this section is covered with gypsym and sand-dunes, with a few walls of brackish water near the mouths of the wadis. The desert plain behind is about 15 miles wide, a desolate expanse of dunes and salt flats with a few settlements clustered round brackish wells. Assab port is the only important settlement along this section of the coast; it lies on the north-west shore near the entrance to Assab bay. From the sandy, mangrove-fringed coast the land rises slightly behind Assab, with sand-dunes and low hills partly scrub covered. This gives place inland to barren volcanic hills. The whole of this third subdivision of the Eritrean coast is backed by the Danakil highlands.

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(1) Western Arabia and the Red Sea op. cit pp.123-125.

The Development of Massawa Port

Historical Interpretation

In ancient times, when Ethiopia enjoyed the unencumbered rights of her extensive coastline, such a name as Adulis, the thriving port on the Red Sea, was a recognised gateway for a flourishing maritime commerce. Adulis seems to have been built by Syrian Greeks.(1) The author of the Periplus, who gives this indication, was apparently a merchant engaged in the trade between Egypt and India. He tells us that Adulis was one of the colonies of Ptolemy Philadelphus (B.C. 285-246) and became the centre of the elephant trade. Alexander the Great had encountered squadrons of elephants in India. The Ptolemies proposed to arm themselves in a similar manner with African elephants, for which purpose they established colonies on the African coast of the Red Sea. Adulis was the most important, because it was the natural port for Ethiopia and the Sudan.(2) Subsequently the African elephant was found to be useless for war and the trade collapsed.

The next phase wasthe Roman, their attitude was entirely different from that of the Ptolemies. The African coast of the Red Sea had no great commercial importance in their eyes and they established no stations for the elephant trade. Adulis still existed and there was trade between it and Egypt and India, with a regular demand for Egyptian textiles, glass, copper and iron; from India, Adulis

(1) Schoff, W.H. The Periplus of the Erythaen Sea. London,1912. page 60.
(2) Ibid

imported also iron, blades, cotton, girdles and fur cloaks.(1) Other exports consisted of ivory, tortoiseshell and rhinocerous horn; but to these Pliny adds hippotamus hides, monkeys and slaves.(2)

The third phase began with the rise of the Kingdom of Axum and continued until the arrival of the Arabs: the rulers of Axum claimed dominion over both shores of the Red Sea.

Following the rise of Islam in Arabia, the Arabs invaded the old coastal settlements, travelling south along the Red Sea coast, settling down and intermarrying with the local inhabitants. The new religion replaced the old one, and the Arabs, knowing something about the sea, were more likely to appreciate and to take advantage of the trading facilities that the old coastal settlements offered.

The relations of Abyssinia to the early caliphs were not always friendly. Their fleets ravaged the commerce of the Red Sea. They even sacked Jidda (in 702), and there was an alarming prophecy current that one day they would capture Mecca itself and destroy the Kataba.(3) The Caliphs retorted by occupying the ports of Abyssinia. It was not until the early eighth century that the Arabic occupation of the Abyssinian coast became effective. With the loss of its ports the Abyssinian kingdom was completely cut off from access to the civilised world.

Towards the end of the ninth century the Abyssinian kings seem to have succeeded in reconquering the ancient coastal dominions.(4)

(1) Schoff, W.H. op. cit.
(2) Crowfoot, J.W. Some Red Sea Ports. The Geographical Journal,1911,May. p.527.
(3) Jones,A.H.M. A History of Ethiopia,1901. p.46
(4) Ibid.

At the beginning of the tenth century Abyssinia was a maritime and commercial power, in friendly relations with the Kingdom of Yemen. It owned Massawa and Dahlak, whose Moslem inhabitants paid tribute to the Abyssinian king.(1)

An Arab writer, Al Masudi, writing in 935, confirmed that the Ethiopians were still in control of the coast and observed that Dahlak and the coastal plains were tributary to Ethiopia. Ibn Hawqel, writing in 977-8, gave a similar picture observing that the Red Sea coast opposite Yemen was in the possession of Ethiopia, which enjoyed a good trading relation with the Yemen. The Ethiopians used Messawa as their port. Subsequently some of the population of the small Arab realm which had grown up on Dahlak Island removed to Massawa. Massawa was still an Ethiopian possession when the Portuguese Mission landed there in 1520, but its population was wholly Muslim.(1) The Portuguese ambitions, other than missionary, were confined to the occupation and fortification of seaports, yet they had no monopoly of local sea power. The Turks had begun at the same moment a great movement of expansion when their fleets advanced into the Red Sea. Suakin and Massawa were occupied in 1916;(2) the Turkish occupation was, it would appear, occasional and confined to the island, the garrison feeble or corrupt. It did not prevent the landing of the Alvanez mission in 1520, it did not even hinder the landing of the Portuguese soldiers in 1541 and other missions.(3)

(1) Jones, A.H.M. op. cit. p. 46.
(2) Longridge, S.H. A Short History of Eritrea, 1945. p. 44
(3) Ibid p. 45

In the sixteenth century the Turks, who were at that time engaged in a contest with the Portuguese for the control of the eastern trade through the Red Sea, occupied the Dahlak archipelago.(1) In the year 1557 they seized the port of Massawa itself as a base where from they might control the Red Sea. Despite that, they lost all hope of controlling the eastern trade through the Red Sea on account of the discovery of the all-sea route round the Cape of Good Hope. Therefore they somewhat relaxed their hold on the Ethiopian coast; they ceased to maintain a strong garrison at Massawa and left its management to the local Naib.

Bruce, writing over two centuries later, emphasised the detrimental affects of the Turkish occupation. Massawa, he recalled, had once been a place of 'much resort' and one of the principal places of residence.(2) He also provides us with a detailed description of Massawa town, which suggests that it had developed somewhat since the time of Almeida, almost a century and a half earl ier. The houses were still mainly composed of poles and grass, though there were also about twenty stone buildings, six or eight of which were of two storeys. The stones came from the sea or the rocky islands in the vicinity, as was evident from their sea-shell incrustations.(3)

Situated on a small island 'immediately off the Abyssinian shore' Massawa, he confirmed, had 'an excellent harbour and water deep enough

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(1) A group of islands facing the port of Massawa.
(2) Bruce: The discovery of the source of the Nile. Vol.1, p.483.
(3) Ibid, Vol. III, p.52.

for ships of any size to approach the very edge of the island'; they might ride in the utmost security from whatever point or with whatever degree of strength the wind might blow. This 'great convenience of commodious riding for vessels' joined to the 'valuable articles of trade' available there, had 'overcome the inconvenience of want of water.' (1)

Massawa, he continues, was a place of great commerce; it possessed a share of the Indian trade and served as the export centre for a considerable quantity of goods from the great tract of mountainous country behind it.(2) Trade, however, was conducted in a 'slovenly manner' and imports were limited to articles which required only a small amount of capital, conditions being considered too precarious to risk a venture in valuable commodities as 'the hand of power' entered into every transaction.(3)

The main exports bought at Massawa, Bruce states, were gold and ivory, elephant and buffalo hides and, above all, slaves, of much greater value as being more sought after for their personal qualities than any other sort. Most of these commodities were shipped to Mecca.(4)

The main imports, he says, were textiles of various kinds, fine cloth from different parts of India, coarse white cotton cloth and unspun cotton in balls from the Yemen.(5)

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(1) Bruce. op. cit.
(2) Ibid, Vol.III, p.1.
(3) Ibid, Vol.III, pp.54-5.
(4) Ibid, Vol.I, p.275
(5) Bruce, op. cit. Vol.III,

Trade, it appeared, was no longer in the hands of the Indian merchants or Banians, as formerly. 'The Banians', Bruce says 'were once the principal merchants of Masuah, but the number is now reduced to six'.(1)

At the close of the 18th century Massawa was held by the Sharif of Mecca, and it afterwards passed to Mohammed Ali of Egypt. The Turks were reinstated about 1850, but in 1865 they handed the island back to Egypt in return for an annual tribute. Between 1869 and 1880 an Italian priest Sapetz, had already directed his attention towards obtaining Ethiopian land for Italy. He purchased a portion of land in the Bay of Assab, ostensibly to serve as a coaling station for an Italian firm.(2) This station was not taken possession of until November 18th, 1869, when Italian gunboats assisted the company. In 1882 the small territory was declared an Italian colony.(3) In February 1885 Italian troops were landed at Massawa, Egyptians there being withdrawn in the following November. Massawa was the capital of Eritrea until 1900 when the rest of the administration was removed to Asmara.

Wylde observed that the Italians "had fixed too low a price for everything in the colony.(4) The export trade which existed at the Italian conquest was reduced by the exorbitant duties imposed by the Italian authorities. Berkeley gives the following figures:-

(1) Ibid. Vol.III. p. 55
(2) Robinson,Rowan. England, Italy, Abyssinia London 1935, p.69
(3) Pankhurst, E. Sylvia.: Eritrea on the Eve. London, 1952, p.67
(4) Wylde, A.B. Modern Abyssinia. p.113

The export of pearls fell from 612,500 Italian lire in 1898 to 180,000 lire in 1879; that of mother-of-pearl from 906,000 lire in 1898 to 508,000 in 1879; that of coffee from 310,000 lire to 28,000 in the same years.(1)

An Italian Royal Commission visited the territory in 1901. The Commission complained that goods from Italy were imported duty free into Eritrea, whereas Eritrean goods had to bear duty on entering Italy. The duties imposed on the export of skins from Massawa were so high that the valu e of this export had fallen from 123,046.93 lire in 1888-1889 to 29,748.37 in the first nine months of 1890-91. The Commission explained that the Italian Customs Authorities estimated too high a value for the goods. They imposed a further duty for disinfection, although no disinfection was attempted.(2) When the cost of transport was added, the value of the skin was reduced to zero; it did not pay to export skins which had to be carried more than 100 kilometres, except on the backs of n atives.

The following table indicates the excess of imports over exports in Eritrea under Italian administration.(3)

Table 86

Year	Import Lire	Export Lire	Deficit Lire
1903	7,760,666	2,800,712	4,959,956
1907	10,605,877	2,188,205	8,417,672
1911	13,296,900	6,574,112	6,722,788
1915	23,623,460	14,005,201	9,618,289
1919	55,536,978	37,663,337	17,873,641
1923	106,294,311	40,394,759	65,899,552
1927	201,536,478	81,566,179	119,970,299
1931	186,825,100	89,063,359	117,761,741
1933	176,565,985	62,490,114	114,075,811

(1) Berkeley. The Campaign of Adowa. 1935. p.387
(2) Italian Royal Commission Report. 1901. p.86-88
(3) This page is taken from the Four Power Inquiry Commission Report.

The unfavourable balance continued underthe British Administration. The total value of imports from April 1941 up to 30th September, 1947, was Shgs. EA. 370 million £E.A.18½ millions) compared with Shgs.EA. 210 million (£E.A.10½ million) for exports and re-exports. Over that period exports and re-exports amounted to 57 per cent of the imports by value.

The Italians made improvements at Massawa Port; the port facilities were being greatly enlarged. "Wharves on a grand scale" were constructed. A network of roads and bridges was established during the years of their occupation, in preparation for the Ethiopian war, but their main effort was directed to the creation of a new port in the Peninsula of Abd-el-Rader.

New quays and jetties were created, new warehouses and stores and many new roads were constructed.(1)

When Italy had succeeded in establishing her forces in Addis Ababa and the conquest of the Italian Empire had been proclaimed in Rome on May 9th, 1936, the work of replacing the temporary structures in and around the port of Massawa was undertaken. Fine buildings in eastern style were erected to meet all the needs of the port.

An arsenal was erected on the peninsula of Abd el Cader, and a cement factory, useful for the large-scale building operations around and port, and further afield, was erected nearby. A railway traversed the length of the peninsula and served both the arsenal and the

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(1) Pankhurst, S. <u>Eritrea on the Eve</u>, 1952. p.9

Italian East African Fishery which operated here. The offices of the Italian Naval Command and a hospital of 500 beds were situated on the Peninsula.(1)

Vessels calling to refuel with coal or oil at Adaga Berai anchored in the roadstead between the peninsula of Gharar and the islands of Taylud and Massawa. On the peninsula of Gharar was an ice factory capable of producing twenty tons daily. There was also one repairing station for small boats, and two for repairing larger vessels. A salt works and the central electrical works of the port were also established on Gharar.

New aqueducts brought increased supplies of water. New banks, new factories, new hotels were erected in the port area. New roads were cut through the old town of Massawa. The port, when Mussolini's regime crashed, was grandiose indeed by comparison with the old Massawa.

Early in 1941 the British Military Administrative destroyed the port and drove the Italians out. The British retained the port and town on Massawa and made use of it until the time of their withdrawal in 1952. The greater part of the installations in and around the port of Massawa have either been sold to other territories or totally destroyed, by order of the British Administration before their withdrawal. The port was in the process of being demolished, all its installations were being systematically destroyed or removed.

Sylvia Pankhurst, who visited the port early in 1952, mentioned that 'all the equipment of the arsenal had been removed. The building was

(1) Pankhurst, S. op. cit. Page 10.

empty, the doors and wooden shutters of the windows had been taken out, some 75 buildings - customs offices, warehouses, dwellings of naval and civil officials and personnel, the quarters of passengers held for quarantine - had been demolished.(1) The cement factory on the peninsula of Abd-el-Cader, capable of producing 1,000 tons of cement daily, had been sold to the Sudan.(2) The aerodrome and the aviation barracks had been sold to Egyptians for demolition; the hospital likewise had been sold for demolition. Probably the finest of all the costly installations in the port was the floating dock, with its great cranes and other mechanism for the raising and repair of ships. This was sold to Pakistan. Two great cranes, each capable of raising a ship, were sold, one to Egy pt, the other to Malta. The equipment of the commercial portof Massawa cannot compare with the magnificent installations which have been destroyed or sold abroad from Abd el Cader.(3) As a result of the demolitions in the port its capacity has been reduced by 75%.

In December 1950, the United Nations General Assembly agreed to restore to Ethiopia the long-lost Red Sea ports of Eritrea and to federate Eritrea to Ethiopia under the Ethiopian Crown. This Resolution was to take effect on September 15th, 1952, when the power and responsibilities of the British administration were transferred to the two successor authorities, i.e. the federal Government and the Government of Eritrea.(4)

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(1) Pankhurst, S. op. cit. p.15.
(2) Ibid
(3) As (1).
(4) Pankhurst, R. Ethiopia and Eritrea 1953. pp.253-256.

With the return of Ethiopia's sea coasts in 1952, it was found necessary by the Government to form a separate administrative body for the supervision of all naval and marine affairs. Thus, in 1953, the Department of Marine, a division of the Ministry of National Defence, was established. Its many functions and responsibilities include the Ethiopian Navy, and cover the organisation, development and control of harbours, merchant shipping, fisheries and marine industries, lighthouses and navigational aids.

The Department has been active in improving the Port of Massawa and in transforming the beginnings of the port at Assab into an extensive modern harbour.

(1) The significance of Massawa port internationally is defined as:

(a) A pass-through point for the pilgrims to Mecca. Pilgrims mainly coming from Eritrea and Ethiopia shipped to Jidda, Saudi Arabia, through Massawa.

(b) A minor air communication key-point for East African routes.

(2) Conversely, Massawa port is of much greater significance nationally because it was until recently the only port of Eritrea and in particular the only communication terminal through which the whole import and export trade of the country is carried on. (It is now serving the northern part of Eritrea and Ethiopia for the construction of Assab port 1960).

(3) Massawa port is linked to the other urban centres of the country

mainly by rail and road and with these transportation possibilities from and to Massawa port peak traffic can easily be coped with.

(4) From the administrative point of view Massawa belongs to the province of the Red Sea and it is the capital of the province.

Massawa Harbour

Position (Layout of the modern Port)

The exact position of Massawa Port is 15° 38' N., 39° 28' E. It is entered between the southern extremeity of Abd el Kader peninsula, on the northern side, and Ras Mudur, the north-eastern extremity of the island of Massawa on the southern side. Gherar peninsula, the eastern extremity of which is situated about 4 cables westward of Ras Mudur, forms the northern side of the inner part of the harbour and the island of Taulud its south-eastern side. These peninsulas and islands are connected with each other and with the mainland by reefs, which dry, and on which are causeways.(1) Fig. 65.

Gherar Bay, close within the northern entrance point of the harbour, has a width of from 300 to 400 ft. ($91^{m}4$ to 127^{mg}) in the fairway. At the head of the outer harbour a narrow channel leads into Taulud Bay, the inner harbour.

The approaches to the country from the Red Sea are particularly difficult owing to the waterless nature of the littoral and the steep ascent to the plateau. Massawa has always been the main point of entry and is the largest town on that portion of the coast.

Approaches to the Port:

Massawa Port is a natural harbour formed in the coral reef, fringing and barrier reefs give protection from heavy seas to harbours lying behind them.(Fig.1)

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(1) The Red Sea & Gulf of Aden Pilot. 1957. p. 246

Anchorage: North Anchorage

Khor Dakliyat: Khor Dakliyat, which is known locally as Khor Gurgusum, is entered between Ras Doyan and a point about 7½ cables southwards; the entrance channel is about 2½ cables wide. A mole extends from the southern entrance point to a rock named Dakliyat,and then ce 1¾ cables north-westward of the head of the mole in depths of from 37 to 38 ft. (11^m3 to 11^m6) mud. There is a good anchorage, about 1¼ cables west-north-westward of the head of the mole in depths of from 37 to 38 ft. (11^m3 to 11^m6) mud. There is another anchorage for light draught vessels in the north-western arm of the bay, in depths of from 22 to 26 ft. (6^m7 to 7^m9).

Jetties: At New jetty, the head of which lies about 2 cables west-south-westward of the head of the mole, there are two 350 ft.(106^m7) berths with a depth of 23 ft. (7 mo) alongside. The jetty is connected with the railway and the berths are served by a 50-ton travelling gantry. A pier, with a depth of 9 ft. (2^m7) at its head extends north-north-westward from the shore about one cable southward of the root of New Jetty. A pier extends from the northern side of the harbour about 7 cables to the west-north of Ras Dagon; and Dagon pier, with a depth of 4 ft. (1^m 2) at its head, is situated about 3¼ cables to the west of Ras Dagon.

Massawa South anchorage:

This anchorage (Lat.15°36' N., Long.39°27' E.) is in the bay south-west of the island of Taulud and is entered between the southern end of that island and a point about 1¼ miles south-westward, the navigable channel being about 4 cables wide between the reefs on either side, which extend in places to as much as 4 cables offshore.(1)

Sheikh Said, a sandy island covered with mangroves, has a jetty extending from its western side (Fig.65). Between this latter island and the reef extending eastward and southward of the island of Taulud is an inlet with depths of from 18 to 56 ft. (5^m5 to 17^m1); a conical buoy is moored on the western side of this inlet at its southern end; a shoal, with a depth of 8 ft.(2^m4) over it lies about 2½ cables westward of the northern extremity of Sheikh Said.

There is anchorage, in depths of 39 ft.(11^m9) about 3¼ cables west-south-westward of the southern extremity of the island of Taulud, and a conical buoy is moored about 3½ cables west-north-westward of this point. Two piers extend from the head of the bay, Anchico, and another pier extends from its south-western side. A floating pipeline lies off the head of the latter pier, it is attached to a pillar which stands about 1¼ cables east-north-eastwards of Anchico pier.(2) There is an oil installation for tanker discharge.

Massawa Harbour: The main anchorage is in the outer harbour (Lat.15°ss' N.,Long.39° 29° E.) in depths of from 6 to 9 fathoms (11^m0 to 16^m5) mud, and good holding ground. The harbour is an irregular deep-waterinlet enclosed on the north by the 'Abd al Qadir peninsular and on the south by Massawa and Taulud islands which are joined to each

(1) The Red Sea Pilot, 1955. p. 248.

(2) Supplement No.2, 1959, relating to the Red Sea Pilot. p.24

other and to the mainland by causeways. The outer harbour is 1,500 yds. long and 350 yds. wide, extending south-west. At the head of this a narrow channel continues into the western arm, Taulud bay. The northern arm of the harbour, Gharar Bay, is separated from the western by the Gharar peninsula. In many places the shores of the harbour are fringed by coral reefs and there are no beaching positions. Extensive salt-pans border the north-west side of Taulud Bay and stretch across the head of Gharar Bay.

There are several moording buoys in the outer harbour. The main quay has a total length of about 2900 ft. (910^m) and provides six berths for all classes of vessels.

Along the quay wall the present depths vary from berth to berth(1)

Table 87

	Length	Depth
No.1 Berth	578 ft.	9 - 16 ft.
No.2 "	492 ft.	22 - 27 ft.
No.3 "	444 ft.	26 - 28 ft.
No.4 "	421 ft.	26 - 28 ft.
No.5 "	495 ft.	26 - 28 ft.
No.6 "	525 ft.	26 - 28 ft.

Berth No.1 is normally reserved for coasters and shallow draft vessels. Berth No.6 is used by vessels carrying dangerous cargo, i.e. explosives.

Salt Berth: Situated in the outer harbour on the Gharar peninsula. The depth of the wateris 31 ft. and the length of the berth is 91.5 metres This berth is also used for the loading of goods by heavy draft vessels, and for ship repairs.

For petrol there are two jettys with nine tanks, on Abd al Qadir

(1) Report by Massawa Port Authority, 1961

peninsula and in the South Anchorage where vessels discharge from mooring in water depth of 29 ft. (8^m8) Fig.65.

To-day all the warehouses at Massawa port, along the quays covering altogether a total floor-space of 17,500 metres, have been purchased from their former ownerd and either reconstructed or completely renovated. Panels perforated in geometrical patterns have been inserted high in the walls to admit more air. Exterior colonnades, roofed with glass and other devices have been introduced to keep the warehouses cool. These warehouses are adminstered by the Customs Authorities.(1)

<u>Mechanical Devices</u>

There are six electric wharf cranes operating between berths Nosl 3 and 5, maximum lifting capacity 7 tons, and 2 floating cranes with lifting capacity of 50 and 25 tons respectively.

<u>Tugs:</u>

There are two tugs for pulling ships into position, of 500 and 350 horsepower.

A dredger and a floating dock(2) were both part of Massawa's port equipment during the Italian occupation, but were sold by the British Administration on the eve of the handing of the port to Ethiopia by United Nations' decision.

There are two privately owned slipways for the building and repair of small vessels, and running repairs can be carried out on large vessels at the commercial port berths. Ship repairing facilities include a slipway of 300 tons lifting capacity and smaller slipways.

(1) <u>Report by the Authority of Massawa Port, 1961</u>
(2) Ellsberg, E.: <u>Under the Red Sea Sun</u>. The floating dock for repairing ships and many other vessels was holed and sunk by the Italians before they surrendered Massawa in 1941. The floating dock and other scuttled vessels were brought to the surface & repaired by American technicians & Eritrean labourers in 1942.

The Town of Massawa

Massawa Town

The land around Massawa is sandy and barren. The wide expanse of Arkiko Bay lies to the south, the bay of Gurgussum to the north. In between is the peninsula of Abd al Qadir, sheltering the town harbour to the north. The flat coral islands of Taulud and Massawa, joined to the mainland at Edaya Barin and to each other by causeways, serve as a sheltering arm to the south. Between these northern and southern bulwarks extends the peninsula of Gharar which divides the harbour into two secure basins for shipping. The town lies on Massawa and Taulud islands, the Gharar and Abd al Qadir peninsula, and has a suburb at Adago Barir on the mainland, about a mile north-west of Taulud island (Fig.66).

Massawa Island

The old city, which covers the whole of Massawa Island, retains many of the characteristics of a Turko-Arab town. In its narrow streets the buildings are relatively lofty; the built-out wodden balconies are enclosed by lattices. Many of the larger dwellings and businesses were built by prosperous Arab merchants. These preserved the ancient Oriental style in the old city. After the Italian occupation of Massawa, they made improvements to the port and to the old city, including residential buildings. In fact the Italians were interested in Massawa particularly in preparation for the Ethiopian war, but their main effort was directed in the creation of a new town and a modern port for military purposes.

At the present time Massawa Island is the main commercial centre of the whole city. It is divided into three sections, apart from the customs area(1) encircling the port quays; the wharf section - this is on the eastern part of the island. The deep-water wharves are all here, marginal tracks and paved roads are laid to the apron which makes the direct ship-to-rail handling and vice versa possible. To the south of this section there is a hospital and a play ground. The second section is essentially the business zone which serves the port traffic. It extends along the western side of the customs area where there are private warehouses, the State Bank(1) of Ethiopia, Roma bank, hotels, offices of the shipping agencies and transport companies. The third section lies to the west, including stores and shops meeting the direct needs, in goods and services, of the people of Massawa. In this commercial-residential section shops are small and consist of one storey. This section is the most densely populated area and the population density is in direct proportion to the length of history of each part of the city. A new market has been built by the Municipality in this section, providing the inhabitants with their food requirements.

Taulud Island

Taulud, in former times, was the official and residential quarter of the seaport and it still retains that character; the main railway

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(1) The Ethiopian Government purchased from an Italian Company a large building which has been transformed to a single long hall for travellers, where the Customs Officials examine baggage.

(2) A former Italian bank has been purchased and renovated to house a Branch of the State Bank of Ethiopia.

Station is here. The principal hotel is on the southern side of the island, facing the sea. There is a church on the island of St.Mary, of Neo-Byzantine style.

The Municipality offices are opposite to the railway station. Twenty new buildings had been erected by 1960. Fluorescent lighting of the streets has been introduced. The Municipal Government, is situated on the eastern side of Taulud, north of it there is the Fish Dock, to the west there is a small residential district containing a number of government offices on the ground floor and residential flats above. The southern district of Taulud is a tourist quarter, where there are few modern buildings for foreigners, a modern hotel and a swimming pool and gardens.

Gharar Peninsula.

Gharar peninsula forms the northern side of the inner port and harbour. It is devoted to the salt works and industrial purposes. South of Gharar there is one wharf for rapid loading of salt by conveyor belt; behind lies the salt factory with its laboratory. To the west there is an ice factory for supplying the city; next to it is the power station providing electricity for the town. Along the southern shore there are two privately owned slipways for the building and repairing of small vessels.

Peninsula of Abd-el-Qatir.[1]

The Peninsula of Abd-el-Qatir is the bulwark which renders the Massawa harbour secure on the northern side.

(1) see Fig. 66.

The Italians, during their occupation, created a new port on the peninsula, but it was subsequently destroyed by the British Military Administration of Eritrea during the second world war.

To-day much of thepeninsula of Abd-el-Qatir still has a bare and desolate appearance after the destruction and disposal of port installations and offices which had left the peninsula totally vacant. Four buildings only had been saved from the destruction, to these have since been added some few dwellings.

Some of the buildings saved from destruction on Abd-el-Qatir were meanwhile being put in order for the Naval School and new ones were erected as quarters for the instructors.

To the east of the peninsula there is a huge Signal Tower. To the south of it there is a jetty with tanks for petrol. The French company, Caltex, and the Italian company, Agip, import petroleum through Massawa. East of the Abd-el-Qatir peninsula there is a modern hospital, with 100 beds in it, there is a special wing for the Navy, and there are separate pavilions, erected nearer the sea, for malaria, venereal and infectious diseases.

The Urban Functions of the Town.

The main function of Massawa port is that is serves as the only port for northern Ethiopia (including Eritrea). The performance of this function at an increasing rate has contributed to the rapid growth of Massawa port. In particular before and during the second world war (1941-1945) the tremendous influx of population experienced was due to increased port activities. The Massawa port was vastly enlarged, improved and equipped. The output rose from 100 to 1,500 tons per day.(1) Thus the Italians, and later the British, changed the sleepy port to an active one.

The establishment of the port and the installation of the railway line connecting the port with the other urban centres of the country during the Italian regime attracted more settlers, who were working in the transport field, construstion, dock-work and in the salt industry. They formed the first nucleus of the town, which little by little survived and grew. More functions were then created and an additional number of people moved into the town.

To-day Massawa has become a commercial and business centre, mainly in connection with the port trade. It is the administrative centre of its district, but its significance is by reason of the port. It is also a small industrial centre, the most important industry being based on the salt concession.

These functions will continue to develop in the near future, as the country develops, especially after the federation of the two countries of Eritrea and Ethiopia.

(1) Longrigg, S.W. A Short History of Eritrea, 1945. p. 140

To-day Massawa town can roughly be divided into five districts: commercial-residential, industrial, wharves, residential and administrative[1];

Commercial-Residential District

This district is situated at the western side of Massawa Island and the main market town is located in the centre, intermingled with the residential areas. In this district there are also offices of shipping agencies, banks, hotels, the post office, etc.

Industrial District

The main centre of industry in the town is Gharar peninsula, where nearly all the industrial activities take place. The most important industries are the salt concession, the shipbuilding industry (on a small scale), the ice industry. The salt concession, to the west of the town, is the largest one in all the Red Sea basin. Since mechanisation of the process production has been increased to about 100,000 tons per year. Massawa town is also a large centre for the Shell industry on the Red Sea. An important export industry which contributes to the activity of the port of Massawa and affords a growing source of employment is the incade industry.

Table 88 Production of Fisheries

	Massawa				
Products	1953	1954	1955	1956	1957
(1) Dried Fish	2,277,200	1,540,250	2,350,400	2,352,011	2,914,400
(2) Sea Shells	-	866,125	158,100	190,060	285,800
(3) Fresh Fish	-	-	94,945	32,400	127,345
(4) Miscellaneous	100	150	250	380	1,000
Total Kgs.	2,277,300	2,406,525	3,637,266	3,232,900	13,062,091
1,000 M.Tons	2.28	2.51	2.64	3.23	13.06

(1) See Fig.67

There are three fish-meal factories in Massawa but they were short of raw material. This would be remedied by increasing the fishing industry; thereby more work would be provided for people on the coast and a cheap food would be made available for the population. Dried fish are exported mainly to the U.S.A. as a good fertiliser.

Wharf District

This lies on the north-east part of Massawa Island, at the north-east of Taulud island, round the shores of Gharer peninsula and to the north and south-east of Abd-el-Qatir peninsula. The deep-water wharves are to the north-east of Massawa Island.

Administrative district (Official Residential Districts)

The Municipal Government lies in the eastern part of Taulud Island. The Imperial Palace, and the Municipality are also in Taulud. The harbour bureau is situated on the port area in Massawa Island. There is a residential district, which is intermingled with the official district, in Taulud island. There are few official residential districts scattered on Abd-el-Qatir peninsula.

Residential District

There is a district solely for residential purposes, situated at Edge de Bari, a small village at the beginning of the road from Massawa to Asmara, inhabited by poor people. The majority of them are working as labourers in the salt factory and some are working in the port.

The Population of Massawa

Within the division of the eastern plain, with Massawa as its headquarters, there are grouped, firstly, the Dahlak Islands; of these the inhabited islands include Dahlak itself. The island population, supported by fishing and a few goats and camels, are of mixed Danakali, Somali, Arab and Samhar blood, numbering some 3,000 and speaking, Tigri and some Danakali. The Danakils also are grouped in the district of Massawa itself, including the Bari peninsula in the district of Thio; and in that of Assab, where the bulk of its inhabitants and of little Assab, its suburb, are themselves Danakil. They supply workers for the salt pans of Massawa and Assab. For the rest, the Danakali are nomadic. The tribes, which can be distinguished among the Eritrean Danakil to-day, are the Damohrita, some 4,000, the Dahimela, the Hadarin, who claim Hadramaut origin, as the Belesuwa and the Dunna claim Yemeni. Smaller tribes, including some predominantly Somali, are numerous - the Assaburka, Nassal, Afara, Ankala, Hawakil, Gadimto. There is no unity among them.(Fig.68) This figure shows the density of the population.

The Massawa division includes the Samhar tribes; there are a few Sudanis, who live in the port areas of Massawa and Assab, all as simple labourers; their total numbers in Eritrea may be 8,000. With them, but far above them in society, are the smaller communities of Yemenis, and men from the Hadramant and rarely of Hijiz origin, who provide the specialised stevedore labour at Massawa docks, and to whom belong some of the most considerable Massawa merchants.

(1) Longrigg, S. A short history of Eritrea. pp.154-163

Table 89. Table of Population, Language and Religious Statistics (1943)

Population	Asmara	Massawa
Sedentary people	200,000	45,000
Nomadic "	9,000	30,000
Total	209,000	74,000
Language		
Tigrinya	190,000	5,000
Tigre	6,000	32,000
Beja	-	-
Bilein	1,000	-
Saho	1,000	-
Dankali	-	20,000
Arabic	8,000	10,000
Nilotic and others	3,000	2,000
Religion		
Copts	172,000	2,000
Muslims	32,000	73,000
Catholics	34,000	-

From the above table it is clear that 45% of the people of Massawa are nomads, the rest being sedementary people. As in Suez and Port Sudan, the author observed the high percentage of male population over female. This striking phenomenon is mainly due to the economic conditions prevailing in Massawa Port, which continues to attract large numbers of males towards the town in search of employment. Those males used to come along leaving their families, and after a short time working in Massawa, the majority of them would leave their jobs after accumulating some money, and return to their homes until their money was exhausted, then they were obliged to return to Massawa. These people do not like to settle in Massawa simply because of the hot climate and also because of the high cost of living in the town.

As a result of political and historical changes in Massawa, the town has phases of emigration and immigration of population,(1) four in number:

a) Phase of emigration by force (exporting slaves), starting during the ancient Egyptian era, and lasting until the arrival of the Italians.

b) Phase of immigration during the Italian occupation, and the arrival of labourers to work in the new colony. In 1835 the number of Italians was 6,098, the total population of the town during that time being 17,169; thus the percentage of Italians was 35.5 %. The majority of these were engaged in road and building construction for the war with Abyssinia.

c) Phase of emigration after the second world war and the federation of Eritrea with Ethiopia (1952). It was difficult for the Italians to stay under Ethiopian rule, and the majority of them left, excepting some doctors and experts still working for the Ethiopian Government; their number in 1958 being about 3,000.(2) (The author was in Massawa in 1961 and remarked that many Italians continue to leave the town because of the Ethiopian policy towards them and because of the decline of the port activities after the development of Assab port). By 1962 their number had decreased to less than a thousand.

d) The last phase is one of immigration. During the Italian occupation

(1) Vasonic, Milord: Massawa, luka Ethiopia. Bulletin de la Soc. Serbe Géog. Tome 40, No.2,1960. pp.103-121.

(2) Ibid.

the number of Copts was not more than 50 persons in Massawa, working as servants to the Eritrean merchants. By 1943 their number had increased to 2,000 of a total population of Massawa town of about 45,000 persons. In 1952, after the federation, the immigration of Ethiopians increased to a great extent. They occupied the most important administrative functions. (The policy of the Ethiopian Government is that the administrative jobs should be reserved for the copts of Ethiopia, and the Eritreans could work only as labourers at the port of Massawa and in the Salt works).

It is very difficult to estimate the true numbers of the population of Massawa, their functions, age or sex structure, since there is no census for Ethiopia. However, an estimate may be made of the structure of the labour force from the viewpoint of function: primary production is taken to include industry, building and construction and tertiary production the port and all other economic activities such as trade, transport services, administrative and other activities not producing material output.

Massawa port has a very high proportion of the labour force in tertiary activities, but to the existence of the port and the fact that a significant secondary industry has not yet developed. There are indications that the functional distribution of the working population may not change substantially in future. The port will continue to expand, and the introduction of mechanisation will reduce the number of working hands employed, just as it has in the case of the salt workings.

Public Utility Provision

Water Supply

The source of water supply is wadi Tamarisco in the district of Dogali, which is 12 miles to the west of Massawa. The water is collected in an underground lake beneath the bed of the wadi and is conveyed to the town by gravity. The waterworks were constructed in 1935 during the Italian regime and developed recently.

There are no records with regard to the capacity of the wells. The stormy character of the rainfall, however, suggests that a great part of the average annual discharge is lost, or escapes into the sea. The water is conveyed from Dogali to the purification station near Massawa through a pipe-line, and from the latter to the town. The distribution system consists of reservoirs and several elevated tanks and a pipe network covering satisfactorily the whole area of the town. The consumption in 1960 reached 437.070 mc.(1)

Sewerage

There is no main sewerage system yet in Massawa. The disposal of sewage is effected by means of septic tanks, privies, pit latrines, and public latrines.

Electricity

Electricity is sufficient for the present town and for the few industries.

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(1) Statistics and information supplied by the Municipality of Massawa, 1961.

Assab Port

Evolution of the Port

The name Assab is supposed to be derived from[1] Saba, an ancient town the ruins of which may exist nearby. It is suggested that the Ethiopian town Saba was named after Saba in Arabia, perhaps by emigrants from that country.

The Italians long neglected Assab, though it wastheir first foothold in Ethiopia.[2] The Italian priest, Guiseppe Sapeto, had purchased land near there, ostensibly as a coaling station for a private shipping company. This piece of land had been extended by subsequent annexations and in 1882 it had been formally taken over by the Italian Government. For the Italians, Assab at that time led nowhere except to a bare, poor hinterland; Massawa was the inevitable port of the colony they subsequently acquired by devious means. The trade of Northern Ethiopia had converged at Massawa for centuries before and during the more or less nominal rule of the Turks. Under the Egyptians it had been improved. There was always some sort of road from Massawa which was destined to be the capital of the colony the Italians named Eritrea.

Assab was now regard as a point of departure for the invasion of the Ethiopian capital. To this end a proposal was made to the Ethiopian Government for a highway from Assab to Dessie, which would taken an invading army far into the highlands and well on the way to Addis Ababa. When eventually the Italians succeeded in occupying Ethiopia, it was obvious to them that Assab could bemade the most suit-

(1) Ethiopia Observer. Zulu & Assab. Volume III,No.8, pp.240-260
(2) Pankhurst, E.S.: Eritrea on the Eve. 1952, p.35

able port for Addis Ababa.

In their tourist guide for 1938(1) they declared Assab was destined to be the principal port for their new empire. An Italian engineer, Guido Ferrazza, was instructed to prepare a plan for the seaport, but from this elaborate composition little was actually built (Fig.69). The Italians were defeated in 1941 and the port passed out of their hands, by which time they had constructed only sufficient berthing space for one large and one small vessels. Port equipment was correspondingly meagre.

Renascent Ethiopia was dependent on the export of her produce to pay for the import of machinery required for her development and for her expanding social services. The inefficiency of the seaport most accesible to her capital and largest exporting centre could not be permitted to continue. The cost of transport is, of course, a major item when exporting goods to world markets where competition is extremely keen. Moreover, the time spent in loading is also important to the merchant and the shipowner. A port unable to provide at least average facilities for allowing ships to discharge, reload and depart rapidly, is a handicap to all concerned. The cost of transport is increased by delay and inefficiency at any stage.

Exports through Assab were increasing despite all hindrances, but the shortage of berthing space and all other necessities was a serious limiting factor. The extension and modernisation of the port had become an imperative necessity.

(1) Guido do Italia della Consociazione Turistica Italiano, Africa Orientale Italiana, 1938.

Following several surveys and investigations, a contract was signed on October 15th, 1957, between the Ethiopian Government and the Pomarsko Graderno Poduzecej Company (P.O.M.G.R.A.D.) of Split in Jugoslavia.(1)

The contract for the work at Assab was accompanied by a loan from the contractor to the Ethiopian Government on easy terms, to facilitate the important project which cost 27,000,000 Ethiopian dollars, approximately £3,857,143 sterling.

The Norwegian firm of consulting engineers, Norconsultants, were engaged as advisers and supervisors. (1)Pomgrad arrived at Assab in January, 1958, (Fig.70) and the work was completed in October 1961. Whereas formerly, only one large ship and one small one could be berthed at Assab, now it is possible to berth five large ships and some small ones concurrently.

(1) Ethiopia Observer: Zula and Assab. Volume III, No.8, pp.240-269

(2) Report of the Port of Assab for the year ending 7th July,1961.pp.1-15.

Assab Harbour

The Coast: The general aspect of the land from Ras Darma to Ras Dumeira, about 46 miles south-eastward, is high, rugged and mountainous towards the interior, barren towards the coast, and descending in several ranges, successively lower. From Ras Darma the coast trends about 14 miles south-eastward to Ras Dugai and thence about two miles east-south-eastward to Ras Luma, the western entrance point of Baia di Assab. The coast is low and is fringed by a reef which, in places, extends to as much as one mile offshore.(1)

A small rangeof hills, from 50 to 80 ft. ($15^{m}2$ to $24^{m}4$) high, about 7 miles south-south-eatward of Ras Darma, lie from one to 1½ miles inland. Jebel Aduli, or Assab hill, 3,211 ft. ($970^{m}7$) high, situated about 18 miles south-south-westward of Ras Darma, is the highest peak in this locality. A range of well-defined and prominent peaks extends from it towards the town of Assab, about 18 miles eastward, and is also connected with the high land southward of Baia di Bailul, the bay on the western side of Ras Darma.(see Fig.71).

Monte Tughi is a conical hill, 984 ft.($299^{m}9$) high, situated about 3¾ miles westward of Ras Dugai; Monte Sella, rising to 1,853 ft,, ($260^{m}0$) lies about 3 miles south-south-westward of the same cape; Monte Marcale, about 11 miles westward of Monte Sella, being 2,275 ft. ($693^{m}4$) high, and part of the higher inland range which, from Monte Sella,

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(1) The Red Sea Pilot. op. cit.

increases in elevation westward until it culminates in Jebel Aduli.

Baia di Assab

The coast between Ras Luma and Ras Dahannaba, about 17 miles east-south-eastward, is low, sandy and swampy, and forms Baia di Assab, which affords good sheltered anchorage; the town of Assab stands on the north western shore of the bay and the village Morgabelah lies about 1½ miles inland and 6¼ miles southward of Assab. The shores of this bay are mostly fringed by reefs, and the land round the inner part of the bay is inundated at high tides.(1)

Channels leading into the Bay.-

Canale di Margabelah (5^m5), between Ummal Baher, westward, and Umm al Sciara and Gurna, eastward, is the best channel leading into the southern part of the bay and has depths of from 33 to 57 ft. (10^m1 to 17^m4) in the fairway.

The channel ,westward of Aureikiya, has a least depth of 32 ft. (9^m7) in it; the channel between Aureikiya, westward, and Huiheb and Haleb, eastward, has a least depth of 35 ft.(10^m7) in the fairway. Canale Pubattino, between Huiheb (Lat.12°59'N.Long.42° 53'E.) and Haleb, south-westward, and Fatma and Dercos, north-eastward, have a least depth of 19 ft.(5^m3) in the fairway, but patches, with depths of from 7 to 15 ft. (2^m1 to 4^m6) over them, render this channel intricate.(1) The south-eastern entrance to this channel is between Ras Macana and the reef extending south-eastward of Dercas, and the southern side of this part of the

(1) Ibid

(2) The Red Sea Pilot. p.122

channel is marked by a can buoys.

A vessel entering the bay passes between Ras Macana (Lat.12^{o} 57' N. Long.,42^{o} 59' E.) and Dertos and then through Canale Rubatino.

Anchorages: There is good anchorage in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$).

The Harbour:(1) (Fig.72).

The harbour consists of five structures. These are:-

1) The North half Jetty
2) The South half Jetty
3) The Piers for small vessels
4) The Breakwater and the small boat harbour.

1) North Half Jetty:

The North 'Half' Jetty, with a length of 480 metres and a depth of water of 11 metres throughout the whole length can accommodate three large vessels. Only the western part of the jetty is suitable for berthing ships, the eastern part being constructed with stone slopes to protect the harbour and the ships from waves, particularly during the north-east monsoon.

2) South Half Jetty:

The South 'Half' Jetty has a length of 530 metres and four vessels can be berthed: two medium sized, where the depth of the water is 9 metres and 10 metres; and two small vessels where the depth of water is 6 and 9 metres. The western part of the jetty is made up of stone spending slopes which, if the need arises in the future, may be converted into berthing places.

3) Piers for small vessels:

Between the two half jettys there are two small piers, each having a length of 80 metres. The depth of the water is 6 metres. These two small piers provide berthing space for four small vessels.

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(1) Report by the Ethiopian Department of Marine, 1962. pp.8-20.

4) Small Boat Harbour

A small boat harbour has been constructed west of the main harbour for fishing boats, small dhows and craft.
A breakwater of 711 metres lengths has been constructed to give protection against the south-east monsoon. It extends south-westerly.

The Port Facilities:

Port Crane: There is a derrick crane of 30 tons capacity, a mobile crane of 15 tons, and a fork-lift truck of 7 tons capacity. There is a small slipway for repairing small vessels, and two tugs of 600 h.p. each.

Port Warehouses:

There are three large modern and ventilated port warehouses, 5,000 sq. metres each, with cold storage of 1,3000 cu.metres capacity. Each one has six entrances in front and six at the rear. There are also private warehouses in the port area, for coffee and special types of cargo. There is space for freezing 20 tons of fish and 10 tons of butter, milk, cheese, eggs, canned goods, vegetables, fruit, etc.

Oil Harbour:

The oil harbour is outside of the commercial harbour and can accommodate tankers of 36 ft. draft.

Assab Town

Assab, as it was left by the Italians, comprised the beginning of the port town. By the time the Italians were defeated in 1941 little was actually built of the town. During the British Military Administration, the British had worked destruction at the port end of the town of Assab. Since the colony of Eritrea was restored to Ethiopia the importance of Assab to the Ethiopian economy has been continually growing. This was inevitable Assab being 300 kilometres nearer to the capital, Addis Ababa, the major export and import centre, than is Massawa. Moreover, apart from the actual distance, Assab is easier of access from Addis Ababa. By the good highway between the port and the capital there is only one long climb instead of the undulating series of steep ascents which render the Massawa journey difficult.

The future expansion of Assab town will be influenced by two factors, each working independently: they are port traffic and the salt industry. In 1960 the town of Assab bore little relation to the plan of Assab which appears in the Italian tourist guide of 1938; admittedly, however, that plan was only a design to be carried out in future, as is made clear in the text of the guide. How little had actually been constructed is indicated by the very few buildings named and coloured, by far the greater part being left in mere outline.(1) Few even of those named buildings seem to correspond with anything existing to-day. (see Fig.69).

Except for the new constructions erected recently after the developing of the port under the Ethiopian Government and local population

(1) See the Plan of Assab 1938 (tourist guide) Rome 1938.

Assab presents a decayed and desolate appearance. (Fig.73).

<u>The urban functions of the town:</u>

The significance of Assab town is that it serves its port. The need for such a function was the mainreason for which the town was established. The town is linked to the other urban centres by a good highway. From the administrative point of view Assab is the capital of the Eritrean Province. To-day Assab town hasbecome a commercial and business centre, mainly in connection with the port trade. It is also a small industrial centre, the most important industry being the salt concession.

The town of Assab can roughly be divided into these districts: commercial-residential, industrial, wharves, administrative and residential, though as such districts are often intermingled, this is but a general method of classification.

<u>Commercial-Residential district</u>

This district, sprawling to the west and south-south-east of the harbour, is the most populated area in Assab town. Most of the shops lie in this district, the main market centre being located there, intermingled with the administrative buildings and residential areas. Commerce and the import and export trade are developed in the same area, in many cases intermingled with houses. The majority of those establishments are connected with the port activities. The future expansion of this district will be on both sides of the road to Addis Ababa, within the town.

Population of Assab

The population of Assab has always been a mystery. The complete absence of factual data so far has made the population of Ethiopia anybody's wild guess.(1) Almost none has sufficient basis to be raised to the status of an estimate. The various guesses range from 8,000 to 10,000, the majority of them are Danakil and there are few Europeans, Yemeni and Somalies.

The Dankali are nomadic, but recently some of them began to work as labourers in Assab port and in industry. As a result of political changes in Assab the town has seen some emigration and immigration. These could be considered in three phases:

a) The first phase was immigration, the arrival of the Italians.

b) The second phase was the departure (emigration) of the Italians after the second world war.

c) The last phase has been the arrival of the Copts after the federation between Ethiopia and Eritrea.

Labour force structure.

Assab has a high proportion of labour force occupied with tertiary activities due to the existence of the portand the less important secondary and service industries in the town. As at all the ports of the Red Sea, the males are more numerous than the females because of the recent growth of port activities and the immigration of many males from poorer areas in search of employment. As Assab will be in the near future the gateway for Ethiopian trade it is assumed that the present

(1) Information supplied by the Municipality of Assab Port. 1962

number of nomads leaving the town for a part of the year will tend to diminish. Nomads will be attracted by the better living conditions of the town and they will slowly tend to settle permanently, even though living costs in the town are higher.

Public Utilility Provision

Water Supply

Assab's present water supply was installed by the Italians. It is pumped from two wells in the Asile valley, 7½ miles (12 k.ms.) from the town, to a reservoir holding 300 cubic metres at a distance of ⅝ mile (1 k.m.) north of Assab. The daily consumption is 300 cubic metres. The water is salty and corrodes the iron pipes laid on the surface of the ground; they break frequently and take anything from two to ten days to repair.(1)

Early in 1958 a contract was signed between the Ethiopian Government and Norconsultants for theinvestigation of water sites for the supply to Assab.(2) The investigations were carried out at places called Ghibdo and Isseita. The results of the investigation showed that the water at Isseita was of good quality and of sufficient quantity. Based on the results of the investigation the Department of Marine prepared the Assab water supply project. The project comprises the construction of an infiltration plant and a pumping station at Isseita (which is about 8⅛ miles from Assab and about 1⅞ miles upstream from the present pumping station at Arsile) and the laying of about 7,000 metres of 8" pipeline from Isseita to the Salt Works where the new pipeline will be connected to the present pipeline. The construction of the water supply project is being carried out by Pomgrad under the supervision of Norconsultants.

The port office of Assab has recently constructed an Intermediate

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(1) Ethiopia Observer. July 1939, Vol.III, No.8

(2) Report by the Ethiopian Government - Department of Marine, 1962. p.17

Pumping Station at the entrance to the town. The Intermediate Pumping Station, which has been constructed to improve upon the old system, will also be used for many years to come, not only for the supply of the port but also for the supply of those parts of the town of Assab which are on higher ground. The harbour pipeline system is directly connected to the Intermediate Pumping Station. All requirements of the port (even in exceptional cases of emergency) can be met by disconnected the town line at the Intermediate Pumping Station.(1)

Sewerage.

There is no main sewerage system as yet in Assab.

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(1) Report by the Ethiopian Government - Department of Marine, 1962. p. 17.

EXTERNAL RELATIONS

Transport

Under Italian rule Massawa developed much more rapidly than Ethiopia and it to-day occupies a special place in the structure of the Ethiopian Empire because it serves Eritrea and Northern Ethiopia.

The Italians[(1)] constructed a fairly complete road system for Eritrea as well as a railway and roadway from the port of Massawa to the capital of Asmara. The railway continues on beyond Asmara to Bisha, a distance of 224 miles in all.(see Fig.74).

The railway connecting the port with the capital at Asmara was commenced in 1888, reaching Asmara only in 1911. The progress through the mountains was very difficult, but there appears to have been other reasons for the delay.[(2)] The Italian Royal Commission, which sited Eritrea in 1891, observed that work on the railway had been stopped. The line then extended from Massawa only as far as Sahati, a distance of 17 miles, and the Commission complained it was not possible to use it owing to defects in the track. It appears from their remarks that it was then regarded solely as a military railway for the use of the troops. The Commission had been sent out from Italy to ascertain how the Colony could be run at lower cost. They emphatically declared that Italy could not afford to build railways in Eritrea. They very much doubted whether

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(1) Luther, Ernest W.: Ethiopia To-day, London, 1958. pp.142-3.

(2) Relazione Generale della R. Commissione della Colonia Eritrea, Roma, 1891. pp.142-345.

the time would ever come when it would be worthwhile to build "a single metre of railway in Italian Africa." Nevertheless, as this railway had been built, they considered it should be operated and the local traders and peasantry should be encouraged to make use of it in order to recover as much as possible of the money spent on it.

Already there was talk in Italy of extending the Eritrean railway towards the Sudan where, it was believed, the colony could profitably trade. The Royal Commission opposed such expenditure, but later expansionist views prevailed in Italy.(1) The railway was accordingly extended westward and reached Agordat in 1928. It was subsequently extended to Biscia, 19.25 miles further. The line is a single track of narrow gauge, 95 centimetres wide (3 ft. $\frac{3}{8}$ inches). This was the gauge already employed in Italy and was selected for Eritrea in order to make use of Italian rolling stock in the colony.

From Taulud, one of the islands which form the port of Massawa, the railway traverses 73 miles (117.52 kilometres) to reach Asmara. In this distance it climbs from 10 ft. (3 metres) above sea-level at Taulud to 7,694 ft. (2,345 metres) at Asmara railway station, the highest point on the line being 2,394 metres. From Massawa the gradient is fairly easy for the first 18.6 miles (29.9 kilometres), but from Mai Atal to Ghinda it increqses in severity, and from there onward to its highest point, still more so. The line turns westward at Asmara railway station

(1) <u>Commissione della Colonia Eritrea,</u> Roma, 1891. pp.142-345

and proceeds on a downward gradient past Keren for 118.7 miles (190.78 kilometres) to Agordat. Here the line now terminates at an altitude of only 606 metres above sea-level. Along the whole railway from Massawa to Agordat there are 39 tunnels and 65 bridges.

The railway and its equipment, far from first-class, when installed in the old colonial days, was destined to suffer greatly under the heavy traffic of wartime, the careless handling of soldiers, and the impatience of hasty Empire builders. Little short of a decade was covered by the period from the commencement of preparations for the Ethiopian war to the Italian surrender in 1941, and the entire railway was in a truly deplorable condition when the British came into possession. According to the report of an expert, prepared early in 1943 for the use of the British Military Administration[1] "At the commencement of the British occupation in 1941, the track throughout was in a very bad condition, outer rails on curves were so badly worn as to be less than 70 per cent of their original weight. Over long stretches sleepers were rusted to paper thinness and fastenings were corroded with rust."

The British had been obliged to make immediate repairs. in 1942, near Massawa, says this report, "the section of the line called 'Campo di Morte' (22½ miles) was re-sleepered by British personnel; throughout the section called Ghinda (71.25 miles) the inner and outer rails were changed over, joints were fully staggered and the worst sleepers replaced. In spite of this, the entire track had to be renewed

(1) Pankhurst, S. The British Military Administration in Eritrea. London.

before it could be expected to stand up safely to continuous traffic.[1]

The report continued "The track is ballasted throughout, but in general the gauge of the ballast is far too large. Culverts are far too small, especially in the Ghinda-Asmara section. Here the track winds continually round spurs and re-entrants, resulting in heavy landslides in the rainy season between June and September." During the British occupation rough improvements were made to catch-water drains, retaining walls and concrete flow drains.[1]

Water supplies for the railway, as well as for the people, were gravely inadequate. The writer of the report considered it "quite astonishing that the Italians had for years transported water for locomotive purposes to Asmara from outlying stations,where improvement of the existing installations would provide adequate supplies." Under Italian management a reservoir, dry for eight months of the year, with four wells together producing 7,735 gallons daily in the dry season and 12,155 gallons in the rainy period, had to suffice for the needs of Asmara town and railway, although on a very meagre estimate 22,000 gallons daily were required.

The British opened two more wells with which the supply was increased to the essential 22,000 gallons required daily. The report was prepared before the construction of the more important Ida Rose dam.

Owing to the steep gradients, accentuated by sharp curvature of the line, train loads were necessarily low.[2] The Four Power Commission of 1947 stated that between Mai Atal and Damas there was "a considerable

(1) Ibid

(2) Four Power Commission of Investigation Report, 1947. Vol.I, Appendix 73.

hump" which necessitated loads being reduced at Mai Atal, a great inconvenience. The most powerful of the locomotives used by the Italians, as reported by the Four Power Commission, were able only to haul a gross load of 300 tons up the mountain section from Ghinda to Asmara. The writer of the above mentioned report to the British Administration, an expert with experience of the performance of the locomotives, waslessfavourable. He stated that the locomotives were all "Mallet Compounds" and explained "These engines carry one ton of coal and 600 gallons of water, their boiler pressure is 180 lbs. per square inch and weight in working order 34 tons with a tractive effort of 10 tons; they can haul a 60-ton train up a 3.5° grade. It is remarkable that the Italians have never introduced locomotives more powerful than these toy engines." The writer added that seven hours were required to accomplish the seventy-three miles from Asmara to Massawa by steam train. There was also the "Littorine" service for passengers, comprising diesel rail-cars seating 30 passengers with Fiat 120 h.p. engines; these made the journey between Massawa and Asmara in three-and-a-half hours.

In the western section of the railway toward Argordat the track runs through extremely sultry country. The writer of the British report notes that at Umfutat, a hundred miles from Asmara to the west, the line crossed the Carobel River by a bridge constructed by the Italian military engineers in 1937; just over six miles further on the Barka River is crossed by a bridge of the same type.

It will be recalled that in 1940, the Italians having declared war on Britain, attacked them on the Sudan frontier. The British Government thereupon prepared to defeat the Italians in all Africa. To facilitate their advance into Eritrea the British built an extension of the Sudan railways from Abu Kemal, on the Sudan border, to Tessenei in Eritrea. They stopped the railway at this point because the Italian retreat was rapid and the final collapse of Italian resistance came so soon that the railway, for the transport of munitions, was no longer necessary to their offensive. The section of railway the Italians had built from Agordat to Biscia, being of the same gauge as some Italian railways in Libya, could be made use of there; the British, therefore, removed it and shipped it to Middle East Command for the desert war. Recently the Ethiopian Government has re-opened the railway link from Tessenei to Kassala in the Sudan. It is used for durra import and for coffee export from Ethiopia to the Sudan.(1)

Railway Labour

(2)Railwaymen are employed either on a daily or on a monthly basis. Daily workers are paid according to their skill from two to nine Ethiopian(3) dollars a day. Monthly paid workers receive from 200 to 600 Ethiopian(4) dollars.

Most important to the Ethiopian worker is the improvement in his status since the railway passed under Ethiopian control. Under Italian rule Eritreans were strictly relegated to unskilled work. It was an offence under Fascist law to employ them as artisans, the work of artisans

(1) Owen Africa and the Middle East, 1962. p.41
(2) Report by the Eritrean Railway - Railway Office, Asmara, 1961.
(3) That is to say from 6/- to £1.7.0 a day in English currency.
(4) In English currency - from £28 to £85 a month.

being limited to Italians. When the British took control they gradually relaxed the strict control without, however, making any drastic change and in their time the large majority of skilled workers were still Italians. The great majority of the manual employees in the railway workshops are now in consequence Eritreans,(1) ten percent of whom are apprentices. There are 500 workers in the locomotive repair shops; 600 workers are employed on the line and 400 in stations. There are only 37 Italians left in the entire railway service.

Since the Ethiopian Government took charge of the railway much has been spent on improving it. Sleepers have been renewed, bridges and sustaining walls rebuilt or repaired; some new diesel engines have been purchased, other engines have been renovated, and carriages renewed.

Since the Eritrean railway was transferred to Ethiopian management, four new diesel locomotives have been imported to replace some of the old steam engines. The result has been a great saving in the cost of operating the trains. The steam engines are old, heavy and inefficient; some of them have been in use for 30 to 35 years. They burn much coal, which has to be imported and is therefore costly. They need constant repair and they have to make frequent halts to take up water and coal, and have to come back to the workshop for routine checking and cleaning after running a mere 1,500 kilometres (approx.93$\frac{3}{8}$ miles). The new diesels do not come back to the workshops before they have travelled 5,000 or even 10,000 kilometres (3,000 to 6,000 miles). They burn less fuel, pull heavier loads, employ less labour and run at less than a third of the

(1) Report by the Manager of the Eritrean Railway, Asmara, 1961.

cost of the old steam engines.

Despite heavy competition, the port of Assab, which on account of its shorter, less mountainous road to the capital, is drawing much export and import trade away from Massawa, and also despite the competition of motor bus transport, the Massawa-Asmara railway is holding its own fairly well, as will be noted from the following table:-

Table 90 Railway Transport Statistics, 1952-1960

Agordat - Massawa Railway

(a) Freight Traffic

Annual data:	Total	Inland	Export	Import
1952	-	-	-	-
1953	96.6	-	-	-
1954	88.2	-	-	-
1955	130.9	38.1	46.0	46.8
1956	129.4	39.0	48.1	32.0
1957	119.1	39.0	48.1	32.0
1958	114.3	24.4	46.8	33.3
1959	126.7	24.1	34.7	67.9
1960	153.9	43.2	64.2	46.5
Monthly data:				
1960: January	17.0	3.2	9.2	4.6
February	18.6	3.8	12.5	2.3
March	16.0	4.2	7.4	4.4
April	12.6	4.8	4.8	3.0
May	10.6	4.4	3.1	3.1
June	10.1	4.4	2.6	3.1
July	11.2	3.1	3.4	4.7
August	9.6	3.7	2.0	3.9
September	10.2	2.5	3.8	3.9
October	8.8	1.1	2.5	5.2
November	12.0	4.1	4.5	3.4
December	13.1	6.3	3.9	2.9

Table 90 (contd.) Agordat - Massawa Railway

(b) Passenger Traffic

Annual data	Passengers Carried	Passengers Kms. carried
	(in thousands)	
1952	-	-
1953	244	12.518
1954	183	10.791
1955	201	11.480
1956	208	11.718
1957	215	11.678
1958	222	12.513
1959	196	11.245
1960	218	11.845
Monthly data		
1960 January	22	1.315
February	19	1.134
March	17	973
April	21	1.199
May	19	1.055
June	16	867
July	15	861
August	21	991
September	23	841
October	23	828
November	27	930
December	26	913

Rail Service to the Hinterland of Massawa and Assab

The number of passengers has grown during the last few years because it is now cheaper and faster to move by the railway. There is the "Littorine" service for passengers from Asmara to Massawa, making the journey in three-and-a-half hours . [1] The journey costs about three Ethiopian dollars; the same journey by bus costs four dollars, and people prefer to travel by the railway also because it is safer than by the difficult road route.

In Table 90 it is shown that the number of passengers carried by railway in 1960 was 218,000; in the monthly data for the same year it can be seen that the number of passengers increased in the winter as compared with summer. From October to April the number rose to 134,000, because the people prefer to leave the high lands and winter in Massawa which has milder weather than the cold of the high lands.

Freight carried by the railway has grown and during 1960 reached 153.900 tons. The year 1956-57 showed a decrease in freight carried by the railway, but this was abnormal and related to the Suez crisis, when shipments to and from Europe in the Red Sea area fell on account of the closing of the canal. In each of the two previous years the freight had rising(Table 90). The year 1959 showed a fall in exports by 25 per cent owing to the terrible havoc caused by the locusts which came in immense swarms and consumed every leaf in the areas where they settled. Export freight carried by the railway includes oilseeds, hides, skins, fruit, vegetables and coffee.(see Fig.75).

(1) Statistics supplied by the management of the Railway. Asmara, 1961

Teleferica

The cableway or the ropeway, named by the Italians the Teleferica,(1) was constructed to assist in transporting to Asmara during the Ethiopian war the vast quantities of supplies they were importing through Massawa. (2) The British Administration, when they took over Eritrea, did not find much use for this cableway. It consisted of two parallel cables supported on steel pylons. On these cables were hung a number of skips: on one cable the skips were descending; on the other ascending. The British found the cableway to be extremely vulnerable. Thieves climbed up the pylons to rob the skips. They therefore ceased to use the cableway and eventually removed it.

The Franco - Ethiopian Railways.

The railway was constructed in three sections, the first extending from the port of Jibuti in French Somaliland to Harar, the second from Harar to Entoto, the third from Entoto to the province of Kaffa. The railway, generally known as the Franco - Ethiopian railway, was started in 1897, but was not completed into Addas Ababa until July 1917. The foreign and internal trade of Ethiopia is its only 'raison d'etre" for there is substantially no traffic handled for French Somaliland or elsewhere, other than Ethiopia. Its metre-gauge is 784 kilometres long, with single-track line on steel crosslines. As from the 10th June,1960, the company was recognised as being of Ethiopian nationality.

The tonnage of commercial exports and imports by the railway are shown in Table 91.

(1) This ropeway was the longest in the world, it was serviced by a dozen power stations and
(2) Longrigg, S.H.: A Short History of Eritrea, 1945. p.140.

Railway Transport Statistics, 1952-1960[1]

Table 91

Addis Ababa - Djibouti Railway

(a) Freight Traffic	Total	Inland	Export	Import
	(in thousand tons)			
1952	280.5	58.2	127.9	94.5
1953	304.5	55.5	140.2	108.3
1954	233.0	65.1	68.3	100.2
1955	255.2	92.5	75.3	87.4
1956	234.3	86.4	59.1	88.8
1957	254.0	74.6	76.4	103.0
1958	253.9	79.4	47.2	127.3
1959	286.0	92.6	62.4	131.0
1960	295.7	88.8	89.7	117.2

(b) Passenger Traffic	Passengers Carried	Kms. carried
	(in thousands)	
1952	543	48.620
1953	486	48.200
1954	371	38.930
1955	357	41.300
1956	342	43.300
1957	385	45.620
1958	406	46.800
1959	485	53.397
1960	-	-

(1) Imperial Ethiopian Government, Ministry of Commerce & Industry, 1961.

It will be observed that there was a decline during the 1950's in both imports and exports carried by the railway. It is useful to compare these railway statistics with the total of exports and imports for Ethiopia as a whole through Massawa Port and Assab Port.(Table 92)

Table 92 (in thousand tons)

(1) Exports	1952	1953	1954	1955	1956	1957	1958	1959
via Djibouti	127.9	140.2	68.3	75.3	59.1	76.2	47.2	62.4
via Massawa	144.8	100.7	142.4	116.3	142.1	150.5	153.6	142.5
via Assab	57.8	49.2	106.3	89.3	82.6	98.6	90.1	94.3

(2) Imports	1952	1953	1954	1955	1956	1957	1958	1959	1960
via Djibouti	94.5	108.3	100.2	87.4	88.8	103.0	12.7	13.1	117.2
via Massawa	96.5	81.7	69.8	103.1	105.9	123.9	112.3	17.4	148.0
via Assab	17.2	21.9	46.0	49.7	53.5	70.4	59.2	76.8	91.0

From these figures it is clear that a great volume of the Ethiopian trade has been attracted to the port of Assab, especially in recent years. There has also been a decline in the volume of trade carried by the railway via Djibouti.

It is advantageous to use Assab and Massawa ports for several reasons. Goods entering the country by those routes pay import duty based on the C.I.F. price assessed at the port, whereas goods entering by Djibouti pay duty on the price assessed at Addis Ababa; handling charges at Djibouti must be paid in French francs, so that extra bank charges are incurred; and except during the busy months of the coffee season, lorry rates are often much cheaper than the rail freight.[1]

(1) Board of Trade: Report of the U.K.Trade Mission to Egypt, the Sudan & Ethiopia, 1955. p.113.

(2) Ethiopian Highway Authority - Report, 1961 Addis Ababa.

Table 93 Average Tariff by Lorry between Addis Ababa & Assab Port (1)

From	To		1953	1954	1955	1956	1957	1958	1959	1960
(Eth.$) Addis Ababa -	Assab	per metric ton	87.50	52.50	46.0	44.00	49.00	42.50	40.0	37.50
		Met.ton per K.m.	0.101	.067	.063	.47	.57	.052	.047	.044

With the improvement of the highway between Assab and Addis Ababa the transportation tarrif by lorry has generally decreased to compete with the railway.

(I) Report by the Ethiopian Highway Authority, 1961. Addis Ababa.

Highways Serving the Hinterland of Massawa and Assab

Road building with surfaces suitable for the use of motor vehicles in Ethiopia began approximately in the mid-1920's. The relatively small mileage of road built then was greatly extended during the conflict with the Italians. It is estimated that approximately 3,300 kilometres (about 2,062 miles) of all-weather road was completed during this time. The most important of all is the road between Massawa and Asmara built in 1935 with a labour force of about 100,000 workers. The task of rebuilding and extending the road system has since been undertaken by the Ministry of Public Works.

In order to meet the needs for rehabilitation and to maintain modern all-weather roads, a new agency of government,[1] called the Imperial Highway Authority, was created in 1951. This agency is governed by a Board of Commissioners with the Minister of Public Works as Chairman and is currently managed by a small number of U.S. Bureau & Roads personnel working under an agreement with the Government of Etniopia.

The primary purpose of these specialists in the Imperial Highway Authority is to train and teach, through day-to-day operations, Ethiopian personnel in the science of roadbuilding and maintenance of the complete roads.

On February 28th, 1951, the International Bank for Reconstruction and Development, the U.S. Bureau of Public Roads and the Imperial

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(1) Ethiopia Observer. Vol.V, No.2, 1961. pp.101-102

Ethiopian Government entered into an agreement to proceed with the reconstruction of three principal highway routes, totalling approximately 1,000 miles.(1) In addition to this programme over 1,800 miles of additional roads have been reconstructed or improved through maintenance.

The First Highway Programme of projects undertaken in agreement with the International Bank for Reconstruction and Development, and the U.S.Bureau of Public Roads provided for the rehabilitation of the following roads:-

1)	Addis Ababa to Assab Port - -	538 miles	(861 kilometres)
2)	Addis Ababa to Jimma - - -	220 "	(335 ")
3)	Addis Ababa to Lekempte - - -	218 "	(331 ")

The cost of this First Highway Programme was in conformity with the task to be performed and kept to a minimum. Considering that it costs between Eth.$ 55,000 to Eth.$ 210,000 to build one kilometre of new road, the rehabilitation costs of the First Programme resulted as follows: Addis Ababa to Assab completed in 1954, cost Eth.$10,000,000 the total length of the highway being 538 miles (860 kms.); Addis Ababa to Lekempti, 218 miles (331 kms.) was also a matter of Eth.$10,000,000; Addis Ababa to Jimma, 220 miles (335 kms.) cost Eth.$7,200,000.

With highway improvement the traffic movement increased sharply. On the Addis Ababa to Assab road an average of(2) 170 vehicles was counted per day in 1953. The same route showed an increase to 374 vehicles per day by 1957. In terms of annual traffic volume on this road, 1956 showed approximately 50,000 for the Abbis Ababa - Combolcia section,

(1) See Fig. 76.
(2) Ethiopia Observer: The Imperial Highway Authority. Vol.V, No.2,1961. p.112

25,000 for the Bati section and 13,00 for the Bati - Assab section.

In the course of the following years the average tariff for transportation by lorry between Addis Ababa and Assab Port had decreased from Eth.$87.50 per metric ton in 1953 to Eth.$49.00 in 1957.

Trade Routes in Ethiopia

Material Source

This research is based on the material sources gathered from the principal exporters and importers in Ethiopia. Questionnaires were sent to the different main importers and exporters which were filled in by the merchants themselves and then collected by officials of the Ministry of Commerce and Industry. Additional data was also obtained from the Marine Department.

Object of the Research.

The main object of this research is to find out the size of business carried on by the different ports. As is already known, the Ethiopian Government has invested a substantial sum of money for the development of Assab Port. If the amount of merchandise goods coming into and going out of the country through this port does not increase, and if the commercialisation of the country as a whole and especially of the places nearer to the port is not stimulated by such an investment, it can safely be stated that the investment was not as productive as it was expected to be.(1) The main aim of this report is to suggest some corrective measures based on the findings.

Table 94. Distribution of External Trade in Value by Trade Routes. (Fig.13)

(in Eth.$ thousands)

Routes	Exports 1956/57	Exports 1957/58	Exports 1958/59	Imports 1956/57	Imports 1957/58	Imports 1958/59
Djibouti	105,142	84,311	82,941	78,728	90,509	95,027
Assab	35,606	53,572	40,537	35,244	37,359	44,004
Massawa	30,067	25,940	27,288	41,759	50,999	52,584
Others	5,993	6,193	18,933	9,766	15,316	15,650
Total	176,808	170,016	169,699	165,497	194,183	207,265

(1) Report by the Imperial Ethiopian Government Ministry of Commerce, Industry & Planning, 1962.

Findings of Questionnaires sent out to Merchants

According to the replies obtained from the principal exporters and importers in Addis Ababa, the bulk of foreign trade of the country is carried out through Djibouti as compared to the share of trade passing through the other two ports. Some importers and exporters do a hundred per cent of their importing and exporting activities through Djibouti. Others export and import a smaller percentage of their merchandise goods through Massawa or Assab. Some merchants having branches in Dessie and some other towns in the North import their supplies for these places via Assab or Massawa. Export items, such as hides and skins and oil seeds collected in Dessie and in some other places in the north are either exported through Assab or through Massawa. But coffee, which mainly passes through Addis Ababa, is usually exported through Djibouti. The supply of foreign consumer goods for Addis Ababa is also, to a large extent, imported through Djibouti. The reasons for the prevailing situation are many but the main reasons, as gathered from the principal exporters and importers in Addis Ababa are as follows:

Reasons for smaller shipping activities through Assab.(1)

a) Railway transportation from Addis Ababa to Djibouti and vice versa offers greater guarantee of safety than road transport from Assab or vice versa.

b) The fluctuation of transport rates on the Addis-Assab road is one of the main factors which contributed to smaller shipping activities via Assab. Some of the merchants stated that the transportation rate from Addis to Assab is generally greater than the railway transportation rate via

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(1) Report by the Imperial Ethiopian Government, Ministry of Commerce, Industry and Planning, 1962.

Djibouti but there are also times when the road transport rate from Addis Ababa to Assab is smaller than the railway transport rate. The undesirable element cited was its changeability.

d) An inefficient organisation and administration of the port of Assab has contributed to the decrease of trade carried on through that Port. Lack of ship chandlers, lack of separate stores for inflammable materials, and the scarcity of fresh water are some of the obstacles to the development of Assab.

Recommendations

1. All possible and acceptable steps should be taken to attract ship masters to call at Assab or Massawa.

a) Bunkering facilities and water supplies should be provided as quickly as possible to the vessels at competitive prices so that ships may be induced to call at Assab or Massawa.

b) However, the most important inducement is the availability of enough merchandise goods to be picked from Assab or Massawa.

c) The truck transportation problem should be solved by organising an efficient and reliable transportation system.

.The traffic pattern of the Ports of Massawa and Assab.

Navigation Traffic

The importance of the location of Massawa and Assab ports is further reinforced by the fact that they lie in the south of the Red Sea nearest to India and the Far East which have been major centres of trade from ancient times to the present day. Secondly, there is the fact that they lie along an important international trade route, the Suez Canal and the Red Sea now being the second most-frequented highway in the world. Ships stop at the ports to pick up extra cargo before entering the Canal.

Arrivals at the port of Massawa rose from 311 vessels in 1873[1] to 769 vessels in 1960; the average tonnage through the port increased from 40,442 tons in 1873 to 1,543,480 N.R. tons in 1960.

The latest trade statistics available are as follows.(Fig.78).

Table 95

Table (1) Navigation traffic through Massawa Port[1]

Year	No. of Ships	N.R.T.
1948	499	726,168
1949	459	992,761
1950	420	773,828
1951	371	659,742
1952	470	795,390
1953	436	766,093
1954	389	750,733
1955	434	854,520
1956	473	863,958
1957	561	1,090,273
1958	612	1,207,757
1959	740	1,572,089
1960	769	1,543,480
1961	756	1,634,788

This Table gives the navigation traffic and the N.R.T. since

(1) Report of the Port of Massawa. Massawa 1961. Department of Marine.

1948. It shows the slow but steady progress of navigation through the port since the second World War; after the return of Massawa to Ethiopia in 1952 the port began a new stage of its development. The total number of merchant ships which called during the year 1961 was 756, totalling 1,634,788 net registered tons. On this number 646 were foreign-going vessels and 110 were home-trade vessels (under the Ethiopian flag). The ships which called comprised 105 Italian, 79 British, 66 American, 58 Norwegian, 52 Dutch, 53 German, 42 Yugo-Slavian, 22 Greek, 16 Japanese, 15 Israeli, 10 Swedish, 8 French, 26 other nationalities, and the balance of 189 ships were Ethiopian.(1)

The naval ships totalled in the same year 34, comprising 22 American, 7 French, 3 British, 1 Norwegian and 1 Dutch.

The Dhow returns are shown below.(2)

Table 96

Year	Total Dhows	Year	Total Dhows
1952	610	1957	893
1953	652	1958	736
1954	668	1959	750
1955	706	1960(10 months)	482
1956	774	1961	662

The number of dhows which called in 1961 was 662 totalling 31,004 net registered tons. This was an increase over the number of dhows which called during the 1960 period for 10 months, but a decrease of 88 dhows on the year 1959, which returned a total of 750 dhows.

(1) Report by the Port of Massawa Authority, 1961. Department of Marine, Ethiopia - Massawa. p.18

(2) Ibid.

Table 97

Navigation traffic through Assab Port.[1] (Fig.79)

Year	No. of Ships	N.R.T.
1952	205	173,259
1953	286	327,382
1954	412	426,972
1955	396	493,419
1956	405	505,562
1957	504	576,647
1958	605	973,944
1959	552	956,079
1960	487	871,690

From the above figures it is clear that the port of Assab has developed and has attracted a good many vessels since 1952. The N.R.T. of ships increased from 173,259 tons in 1952 to 871,690 tons in 1960, an increase partly because Assab port increased in competition to Jibuti port which was the only gateway of Ethiopia towards the sea before the federation. Assab port serves the central and south Ethiopian hinterland, and after the recent development of the port which finished in 1961, Assab will be the main port and the major outlet of the great producing areas of the centre and south Ethiopia.

(1) Ministry of Commerce & Industry: Ethiopian Economic Review, Vol.1,No.4, 1961

Goods Traffic. (Fig.98)

Table 98 Goods traffic through Port Massawa.[1]

Year	Goods unloaded (tons)	Goods loaded (tons)
1952	96,578	144,819
1953	81,790	100,707
1954	69,865	142,440
1955	103,196	116,323
1956	105,959	142,100
1957	123,912	150,593
1958	112,336	153,681
1959	174,987	142,595
1960	148,000	155,000
1961	153,114	147,946

Massawa port serves mainly Eritrea and northern Ethiopia.

Accurate data on the foreign trade of Eritrea is difficult to obtain for the period prior to federation, partly because some Ehtiopian exports to Eritrea were always reprocessed and listed in the Eritrean trade statistics as native Eritrean produce. Such was the case with a great many hides and skins smuggled across the Ethiopian border into Eritrea. From the above table it may be seen that imports and exports increased after the federation and commercial activity returned once again to the port. Imports increased from 96,578 tons in 1952 to 153,114 tons in 1961. The import and export commodity tonnages for 1961 are very interesting inasmuch as they are absolute trading returns and provide a true state of the development and trade progress which is being made. In particular, the import tonnages are not affected by parcels of U.S. gift grain as no grain was received during the year under

(1) Ethiopian Economic Review, Vol.1,No.4,1961,Ministry of Commerce & Industry.

review, as did occur in 1959 and 1960 in substantial amounts. The tonnage returns for 1961 could, therefore, become the true comparison basis for future years for port trade statistical purposes and to measure acutal regional development and trade progress. Basing a comparative assessment on the year 1952, the export commodities in 1961 increased by 3,127 tons, which marked increased in fruits and vegetables, fresh fish, manganese, ground nuts, and various seeds. There was a decrease in salt and general merchandise.

The imports increased in 1961 by 64,563 tons over the 1952 figures. In 1952 exports exceeded imports by 56,241 tons, but after the recent development in Ethiopia which includes all fields, the balance of trade changed and in 1961 imports exceeded exports by 5,168 tons.

Table 99 Goods traffic through Port Assab.[1] (Tons)

Year	Goods unloaded	Goods loaded
1952	17,241	57,842
1953	21,952	49,256
1954	46,059	106,372
1955	49,333	89,331
1956	53,510	82,680
1957	70,461	98,327
1958	69,237	90,106
1959	76,857	94,301
1960	91,000	84,000

The table 99 shows that Assab port is getting a good deal of the total foreign trade of the country. Imports increased from 17,241 tons in 1952 to 91,000 in 1960, or five times the 1952 figures. Exports

(1) See Fig.79.

Table 100 Port Traffic - 1952 - 1961 - Gregorian Calendar

	Entry of Ships		Passenger Traffic (Numbers)		Goods Turnover (tons)	
	No.	N.R.T	Disembarked	Boarded	Goods loaded Export	Goods unloaded. Import
(a) PortMassawa Annual Volume of transport						
1952	470	795,390	2,111	3,917	144,819	96,578
1953	436	766,193	1,190	2,649	100,707	81,790
1954	389	750,610	1,185	2,237	142,440	69,865
1955	434	854,520	1,304	1,825	116,323	103,196
1956	473	863,958	1,069	1,848	142,100	105,959
1957	561	1,090,273	1,085	1,754	150,593	123,912
1958	611	1,423,783	1,158	1,899	153,681	112,336
1959	740	1,572,689	1,603	2,257	142,595	174,987
1960	769	1,543,480	1,487	1,699	155,000	148,000
(b) Port of Assab Annual volume of Transport						
1952	205	173,259	443	428	57,482	17,241
1953	286	327,382	380	242	49,265	21,952
1954	412	426,972	498	361	106372	46,059
1955	396	493,419	378	250	89,331	49,333
1956	405	505,562	388	334	82,680	53,510
1957	504	576,647	390	501	98,327	70,461
1958	605	973,944	409	327	90,106	69,237
1959	552	956,079	532	453	94,301	76,857
1960	487	871,690	635	534	84,000	91,000

Source: Department of Marine, Ministry of Defence increased from 57,842 tons in 1952 to 84,000 tons in 1960, or 1.5 times the figure of 1952. In the case of Massawa the increase is not the same as Assab. Imports through Massawa port were 96,578 tons in 1952 which increased to 153,114 tons in 1960, or more than 1.5 times the figure of 1952, showing that Assab in the new few years will compete with Massawa port as a significant outlet to Ethiopia's foreign trade.

<u>The position of the ports in the Ethiopian external trade</u>

The relative importance of Massawa Port and Assab Port in Ethiopia's external trade is necessarily governed by the structure and orientation of this trade.

Ethiopia is a rich yet under-developed country which has not yet been fully opened up to trade. The great variety in soil and climate between the deep valleys and the high plateau, with a considerable range of intermediate altitudes, gives rise to a corresponding variety of products. At the lowest levels wild rubber and vines flourish in the tropical forest; rather higher, coffee grows wild in enormous quantities; the central levels are well suited to the vine, oil palm and cereals; and on the high plateau grazing and arable land is extensive.

Although the Ethiopian economy is virtually self-contained and provides largely for its own needs, agricultural exports are important in providing a means whereby the minimum of imports (largely textiles) that the country requires can be obtained.

Coffee is the most important export item for Ethiopia. The tropical forest in which coffee grows naturally is found in the provinces of Keffa, Wellega, Illubador and Ghema Gofa at altitudes between 1,500 and 1,800 metres where rainfall is adequate. Similar rainfall and temperature conditions are to be found on the south-facing slopes of the South-East Highlands from Harar to Sidamo. In addition there is small-scale cultivation between Harar and Diredawa and in the region of Asha Teferi. Most of Ethiopia's coffee output comes from the south-west provinces and is 'wild coffee' gathered from the forest. Coffee coming from southern and eastern Ethiopia is produced from cultivated bushes om small plots or from larger plantations.(see Fig.80).

Addis Ababa is the major coffee market; Lekemt, Demibidallo, Gore and Jimma are important regional 'coffee capitals' in the south-west; Harar, Diredawa, Asha Teferi, Irgalam, Dilla and Wondo perform the same function in the east and south. The coffee harvest begins in October inall these areas, reaches the peak in December, and from the end of December onwards cleaned coffee in large quantities from the regional centres begins to find its way to Addis Ababa for export. There are four main varieties of coffee, Harar, Sidamo, Jimma and Lekemt. The different types are recognised on the world market by coffee dealers.(1)

Before the war with Italy, Ethiopian foreign trade was very small both absolutely and in relation to that of neighbouring African states. Total trade has been estimated, during this period, at Eth.$.20-25 million per year(2) (exports plus imports). Export at that time consisted almost entirely of coffee, cereals, hides, skins and beeswax, and on the import side of cheap cotton textiles. Ethiopia has never been a trading

(1) Ethiopia Observer. Vol.VI, No.2,1962. p.112

(2) Luther, W.E. Ethiopia to-day London,1958. p.90

nation,[1] landlocked and isolated as she was for much of her history.

During the Italian occupation there was a spectacular rise in imports, owing to the heavy programme of construction and roadbuilding which the conquerors had undertaken in the country and the consumption requirements of the sizeable new Italian settlement in Ethiopia.

It is not until 1945 that we get the first reliable figures concerning Ethiopia's foreign trade. The data for that year (ending December 9th since this is the closed approach that can be made to a Gregorian basis by adding the appropriate quarters of two Ethiopian years) show that total exports reached Eth.$.38.1 millions, and imports Eth.$.36.2 million. It is also apparent that foreign trade as a whole is already much greater - three or four times greater than in the period before the Italian occupation.[2] Since 1941 trade has continued to grow and a decade after the end of the war the value of exports and imports wasin the neighbourhood of Eth.$.160 million each, more than quadruple the 1945 figures and sixteen times the pre-1935 level.

The reasonsfor this large expansion of Ethiopia's foreign trade are manifold. One is that the Italian motor road system of over 4,000 miles opened up the country for the first time. It permitted the produce of remote provinces to be brought to market for export, and it equally facilitated the distribution of imports. Another reason is related to the crumbling of the ancient semi-feudal system in operation before the war and its gradual replacement by a semi-modern administrative and legal structure. The cost of government was much increased and

(1) Ibid.

(2) Luther, W.E. op. cit. p.92

hence import requirements were greater, if only to maintain, on a skeleton basis, the expensive Italian economic structure of roads and public services.(1) In addition there were many more thousands of foreigners in the country after the war than before, people whose consumption requirements had to be met and whose presence contributed greatly to raise the level of exports and commercial activity. Ethiopian's wants had themselves increased as a result of their wider contact with the foreigners.

Exports

In recent years the greatest benefits to the Ethiopian economy have come from the successive jumps in the world price of coffee, Ethiopia's main export. In 1957, when the Coffee Board of Ethiopia was founded, the export of Ethiopian coffee was high. It reached a total of 50,220 tons in that year, as compared with 30,945 tons in 1956 and 41,752 tons in 1955. In 1959 the figure reached 45,000 tons, of which 905 tons were exported through Massawa. In 1960 the total export of coffee 53,000 tons, of which 972(2) tons were exported through Massawa port and 6899 tons through Assab port. In 1961 coffee export increased through Port Massawa to 1217 tons and 9283 tons through Assab port, which is nearer to the production areas as well as to the main central market (Addis Ababa).

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(1) Luther, W.E. Op. cit. p.93

(2) The above figures are for 10 months period.

The following table show the relative share of each export item in percentages:

Table 101 Percentages of total exports.[1]

	1953	1954	1955	1956	1957	1958	1959	1960	1961
Coffee	59.2	62.1	55.6	53.2	64.1	58.6	47.4	51.5	50.1
Hides & Skins	10.8	10.1	9.9	10.6	8.0	10.8	15.7	10.5	13.4
Cereals & Pulses	10.4	6.9	6.0	5.4	5.6	4.8	9.9	12.4	9.6
Oilseeds	9.8	7.6	11.8	12.4	9.7	8.8	7.7	9.9	8.0
Beeswax	.4	.8	.4	.7	.7	.7	.7	.8	.7
Civet	.2	.4	.3	.4	.2	.4	.4	.3	.4
Animals & Chickens	.2	.2	2.4	1.5	.2	11	.1	.2	.3
Food Products	2.5	4.7	5.6	6.6	4.5	6.6	8.2	6.7	10.1
Fish & Fish Meal	.6	.7	.5	.7	.5	.6	.8	.3	.5
Meat,canned & Frozen	.8	1.3	2.1	1.9	1.1	1.5	2.2	2.6	1.8
Other Products	3.5	3.6	3.5	3.9	3.4	4.3	4.7	3.0	3.1
Re-exports	1.6	1.6	1.8	2.7	2.0	2.8	2.2	1.8	2.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

According to figures obtained from the Ethiopian Customs Statistics, total exports have increased from Eth.$.169.4 millions in 1953, to 188.6 million in 1961. Though the composition of exports has changed to someextent, they are still confined mainly to raw agricultural products. But, compared to 1953, the exports of 1961 show a considerable increase in items that were insignificant in 1953. Such items as fruits and vegetables and some meat products have increased. On the other hand, coffee is gradually taking a lower share in the total exports and such traditional export items as pulses are recovering slightly. From the above table it is obvious that the most important export products are coffee, pulses, skins and oilseeds.

(1) Report on Economic Conditions & Market Trends - State Bank of Ethiopia, October, 1962, No.54. pp.5-6

Thus the structure of exports is similar to that of most under-developed countries, being almost entirely based on two or three main export commodities - coffee, hides and skins and oil seeds comprised more than 85% in value of total exports. Owing to this export structure the economy is heavily dependent on the price fluctuation of these articles.

Composition of Imports and Exports

Of export commodities, those of agricultural origin still accounted for about 90% of the total in 1961, with those of industrial (mainly processing) origin constituting only a rather meagre portion. In spite of the falling prices of coffee obtained, it still accounted for over a half of the total exports, followed by hides and skins, pulses oilseeds, and chat, in order of importance. The share of meats, frozen and canned, declined somewhat in 1961.

Table 102 Ethiopia's major export commodities, 1958-61

(Years ending Dec.10)

	Quantity (1000 tons.				Value (in Eth.$ Million)				Percent (%)	
	1958	1959	1960	1961	1958	1959	1960	1961	1960	1961
Coffee	39.1	45.1	51.0	55.8	89.9	81.1	91.7	93.6	51.2	50.9
Hides	4.4	10.1	9.1	8.1	3.5	8.8	7.7	8.3	4.3	4.5
Skins	4.3	5.3	3.8	6.6	12.0	16.0	11.7	15.3	6.5	8.3
Oilseeds & Nuts	40.0	28.3	47.1	45.7	11.5	9.9	16.7	14.7	9.3	8.0
Pulses	33.3	46.4	66.6	79.5	6.4	15.3	22.1	18.3	12.3	10.0
Cereals	2.3	0.5	1.5	1.0	0.5	0.2	0.4	0.2	0.2	0.1
Chat	1.9	2.6	2.5	3.2	5.1	7.6	7.0	10.8	3.9	5.9
Vegetables & Fresh Fruits	10.8	11.5	10.1	12.9	3.3	3.5	3.2	4.3	1.8	2.3
Beeswax	0.5	0.4	0.5	0.5	1.0	1.2	1.5	1.2	0.8	0.7
Meat Frozen & Canned	...	...	...	...	2.0	3.2	4.4	3.1	2.4	1.7
Other	...	...	...	...	14.4	15.6	13.0	14.1	7.3	7.7
Exports & Re-exports Total	adjusted				149.6	162.4	179.5	183.9	100.0%	100.0%

* Adjusted for over-valuation of coffee exports in 1958-60.

Of imports in 1961, textile goods remained firm accounting for 27% of the total. In spite of increased local production of cotton fabrics which rose from 6 million sq. metres in 1959 to 13 million in 1960, and again to 21 million sq. m. in 1961, the import of cotton piece goods and manufactures (excluding raw cotton) were well maintained and even increased, amounting to the value of Eth.$ 35.0 million and Eth.$ 38.6 million respectively for 1960 and 1961 and accounting for 17% of the total import bill. This was due almost as much to the shifting of imports from the lower grades (e.g. grey sheetings) of fabrics to higher grades (e.g.khaki drills, artificial silk goods,etc.) as to the increased level of consumption. Woollen and silk and artificial silk goods accounted for another 7% of the total.

All round increases in the import of metal and engineering products were recorded in 1961, together constituting some 35% of the total import bill. As a natural corollary of the raised tempo of industrial development imports of machinery recorded a higher-than-average rate of increase, accounting for 12% of the total import bill in 1961.

Ethiopia's External Trade - Report by Ministry of Commerce, Industry and Planning, 1962

Table 103 — <u>Ethiopia's Major Import Commodities</u>

	Value (in Eth.$. millions)					Percentage distribution(%)	
	1957	1958	1959	1960	1961	1960	1961
Cereals	1.1	3.3	7.6	8.7	1.0	4.2	0.4
Flour	-	1.1	1.9	1.2	0.7	0.6	0.3
Raw Cotton	6.5	3.9	3.8	9.4	5.2	4.5	2.3
Cotton Piece goods	20.9	18.4	18.5	19.4	21.7	9.4	9.6
Cotton Yarn	3.2	3.2	3.1	2.9	3.3	1.4	1.6
Other cotton manufactures	15.0	11.9	10.9	12.7	13.2	6.1	5.9
Woollen goods	4.0	3.3	3.1	3.6	3.8/e	1.7	1.7
Silk & art.silk goods	8.1	6.7	7.5	10.9	12.8/e	5.2	5.7
Other textile goods	2.3	2.7	1.6	1.3	1.5/e	0.7	0.7
Total, All textile goods	59.8	49.9	48.5	60.2	61.7	29.0	27. 4
Aircraft & parts	4.6	9.3	2.2	1.9	1.0	0.9	0.4
Motor vehicles & parts	15.0	18.3	18.6	20.3	21.2	9.8	9.4
Machinery & tools	11.2	13.6	22.7	20.7	27.5	10.0	12.2
Electrical Goods	5.0	6.1	9.7	6.6	8.7	3.2	3.9
Iron sheets & plates	4.7	4.5	300	3.8	7.2	1.8	3.2
Other metal mfrs.	9.2	12.1	18.5	16.0	13.0/e	7.7	5.8
Total, Metal & Engineering products	49.7	63.9	74.7	69.3	78.6	33.4	34.9
Petroleum products	9.9+	12.5+	12.2+	12.0+	14.7+	5.6	6.5
Rubber tyres & tubes etc.	6.3	6.2	6.2	7.1	8.2	3.4	3.6
Miscellaneous	41.8	46.9	46.4	49.2	60.0	23.9	26.7
Total imports	168.6+	183.8+	197.5+	207.7+	224.9+	100.0%	100.0%

+ = Adjusted value
/e = For some commodity groups, figures for the 4th quarter of 1961 involved estimates.

The level of imports is being determined by the extent of export earnings and the effective demand exerted by the home market. While exports were mainly composed of raw materials and agricultural products, about 75% of the value of importswas composed of finished goods. The largest single import commodity was textile goods, which accounted for more than 40% of the total value of imports. The import of raw materials was in fact limited to raw cotton, coal, oil, caustic soda and a few other products.

However economic development will have certain effects on foreign trade. Not only will imports increase in volume but their structure will change. Capital goods, semi-finished goods and raw materials will occupy a much greater share in import, though, in absolute terms, consumption goods will increase slightly and have a different composition. Exports will grow at about the same rate as imports, but no great change in their composition is expected in the near future. Agricultural commodities will still comprise 95 per cent by value and coffee, hides and skins, and oilseeds will still form more than 85 per cent of the total. In the absence of detailed statistics concerning other branches of the economy, data about the export-import trade may be taken as an indicator of overall development.

Table 104 Exports and Imports (In millions of Eth.$)(1)

	1957	1958	1959	1960
Total Exports & Re-exports	193	155	181	184
Total Imports	180	193	209	219

This table shows the steady increase in the foreign trade of the country. A similar tendency may be discerned in the growth of traffic passing through the ports handling the country's foreign trade. Traffic through the ports of Assab and Massawa increased from 314,000 tons in 1952 to 468,000 tons in 1960, i.e. 33 per cent in eight years.

(1) Ethiopian Economic Review, No.4, Vol.1, 1961.

Table 105 Percentage Distribution of External Trade by Ports (value)(1)
1956/57 - 1958/59

Ports	Exports 1956/57	Exports 1957/58	Exports 1958/59	Imports 1956/57	Imports 1957/58	Imports 1958/59
		per cent			per cent	
Djibouti	59.5	49.6	48.9	47.6	46.6	45.8
Assab	20.1	31.5	23.9	21.3	19.2	21.2
Massawa	17.0	15.3	16.1	25.2	26.3	25.4
Others	3.4	3.6	10.1	5.9	7.9	7.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

As shown by the following table, the ports of Massawa and Assab are becoming a serious competitor with Djibouti port through which about half of the value of Ethiopia's foreign trade passes.(2) In terms of tonnage, however, the share of trade passing through Assab and Massawa is much bigger in terms of value, as is evident from the following comparison.

Comparison of total export tonnage with its distribution by Ports, 1952/59, (Fig.81

Table 106 (in thousand tons)(2)

Gregorian Calendar	Cargo landed at Massawa	Cargo landed at Assab	Export through Djibouli	Total 3 Ports	Ethiopian total Export tonnage	Difference
1952	141.2	57.2	127.9	326.4	169.4	157.0
1953	98.5	49.9	140.2	288.6	219.8	68.6
1954	142.4	106.4	68.3	317.1	249.1	67.9
1955	116.3	89.3	75.3	281.0	206.7	74.3
1956	142.6	81.9	59.1	283.7	207.8	75.9
1957	118.4	98.3	76.4	291.2	295.4	-2.3
1958	153.7	90.1	47.2	291.0	238.4	52.6
1959	142.6	94.3	62.4	299.3	245.2	54.1

(1) Ethiopian Government - Ministry of Commerce, Industry & Planning, Economic Review, No.2, June 1960. pp.46-7.
(2) Board of Trade: Report of U.K. Trade Mission to Egypt, Sudan & Ethiopia, 1955. p. 113.

Table 107 (Fig.81 Comparison of total import tonnage with its distribution by ports, 1952/59 (1)
(in thousand tons)

Year	Cargo Unloaded at Massawa	Cargo unloaded at Assab	Imports through Djibouti	Total 3 Ports	Ethiopian(+) Total Imports Tonnage	Difference
1952	96.0	17.2	94.5	207.8	126.8	81.0
1953	82.2	22.0	1 08.3	212.5	174.0	36.5
1954	70.0	46.1	100.2	216.3	179.1	37.2
1955	103.2	49.3	87.4	239.9	153.3	86.6
1956	106.0	53.6	88.8	248.4	191.8	76.6
1957	84.9	70.5	103.0	258.3	170.8	87.6
1958	132.3	69.2	127.3	308.9	234.8	74.1
1959	175.0	76.9	131.0	382.8	298.7	84.1

(+) The total import and export tonnage refers to Ethiopian Calendar years ending September 10th, while other figures refer to Gregorian Calendar years.

The difference between the total tonnage of imports and exports and those handled at the various ports amounted to over 50,000 tons a year for exports and more than 70,000 tons for imports. Such differences were partly due to a difference to calendar years in keeping the records, and partly due to the inclusion of coastal traffic in the figures for Massawa and Assab, for which the figures strictly refer to cargoes loaded and unloaded. The difference between cargoes loaded and actual exports is some 35,000 tons a year for Port Assab and amounted to 45,451 tons for Port Massawa.

However during the period 1939 - 1960, 14% of Ethiopia's imports and 97% of its exports were carried by sea. In the same year 21% of the total

(1) Ethiopian Government - Economic Review No.2, June 1962, p.47

exports and 20% of the total imports passed through the port of Massawa.[1] This figure is before the construction of the new port, but in future Foreign trade will increase through the new port which will attract a good deal of foreign trade passing through Djibouti, which remains a foreign port.

Comparison of Export Tonnage with Cargo Loaded at
Assab - Massawa.

Table 108

Years	Assab 1956 - 1959 (in metric tons) Cargo loaded	Exports	Difference	Massawa 1957 - 1959 (in metric tons) Cargo loaded	Exports	Difference
1956 -	81,884	58,9777	27,907	('57)118,434	118,227	207
1957 -	98,327	62,547	35,780	(58) 153,681	101,230	52,451
1958 -	90,106	54,171	35,935	(1959)142 595	-	-
1959 -	94,301	59,060	35,241			

(1) Ministry of Commerce & Industry: Ethiopian Economic Review, Vol.1, No.4 1961.

Table 109 Assab Port Commodities Statistics for the Year 1960 and 1961

Import Commodity

Commodity	1960		1961	
Cement	14052	Tons	8719	Tons
Cotton	2010	"	1715	"
Fuel, gas oil, Desiel & kersonie	30176	"	36036	"
Gal. & corr. metal sheets & others	1796	"	5015	"
Merchandise general	9081	"	5791	"
Soap	1089	"	1426	"
Timber (all kinds)	659	"	759	"

Table 110 Export Commodity

Commodity	1960		1961	
Castorseeds	2773	Tons	1603	Tons
Coffee	6899	"	9283	"
Horsebeans	12312	"	17256	"
Hides	4055	"	3048	"
Lentils	23642	"	21339	"
Linseeds	1360	"	2060	"
Peas	4108	"	2062	"
Salt	15734	"	10397	"
Sheep and goat skins	1587	"	861	"

Source: Assab Port Authority

Table 111 Massawa Port Commodity Statistics for the Year 1959, 1960 and 1961 (1)

Imports-Commodities

Commodity	1959		1960		1961	
Cement	14032	Tons	14776	Tons	1 7909	Tons
Dates	1128	"	1145	"	1190	"
Fruits & Vegetables	1592	"	935	"	1603	"
Lubricating Oil	16530	"	1356	"	-	
Sugar	1361	"	1109	"	1142	"
Wheat Flour	3691	"	3208	"	2219	"
Yellow-milo & Wheat	31869	"	23272	"	2219	"

(1) (Compiled from statements, published by the Customs Administration)

Source: MassawaPort Authority 1962.

Tabl e 112 Export Commodities

Commodity	1959		1960		1961	
Fruits and Vegetables	11038	Tons	9568	Ton s	12862	Tons
Fish meal	2238	"	830	"	-	
Gum olibanum	2037	"	3213	"	1152	"
Hides	2178	"	2741	"	1756	"
Lentils	2728	"	3971	"	5645	"
Merchandise (General)	20846	"	7337	"	5934	"
Meat (frozen & tinned)	3016	"	4752	"	4580	"
Nigerseeds	4766	"	11299	"	9508	"
Salt	77158	"	55788	"	52156	"
Sesamseeds	1329	"	4580	"	6547	"

Table 113 **Ethiopia's External Trade Valuation at Customs Stations 1958/59** (1)

(For years ending September 10th of years stated).

(Eth.$.1,000)

Customs Stations	Value of Exports & Re-exports 1958	Value of Exports & Re-exports 1959	Value of Imports 1958	Value of Imports 1959	Percentage Distribution 1959 Export per cent	Percentage Distribution 1959 Import per cent
Addis Ababa Railway Station	41,958	47,879	64,283	65,224	28.21	31.47
Diredawa Rly.Stn.	36,379	26,787	17,960	21,322	15.79	10.29
Massawa Port	23,975	25,946	49,084	50,218	15.89	24.23
Assab Port	53,572	40,537	37,359	44,004	29.88	21.23
Others	13,324	28,550	25,497	26,497	10.22	12.88
Total	169,208	169,699	194,183	207,265	100.0	100.0

From the above table it is clear that the Port of Assba is becoming a serious competitor with the railway-fed Port of Djibouri. The trading hinterland of Massawa in some respects covers the whole of Ethiopia and there is considerable transport of goods by road between Addis Ababa and Massawa. Wheh Assab has been fully developed there will be a natural division of territory between the two ports, Massawa taking the northern trade and Assab developing the northern part of Ethiopia as its trading hinterland.(Fig.82) This figure should be studied carefully with the map of transport because the transport cost differential interferes significantly in the preference of one port to another.

Thus it is advantageous for Ethiopia to change the orientation of its external trade towards Assab and Massawa instead of Djibouti in French

(1) Source: Imperial Customs Administration. 1960

Somiland. Goods entering by Djibouti pay duty on the price assessed at Addis Ababa; handling charges at Djibouti must be paid in French francs so that extra bank charges are incurred and, except during the busy months of the coffee season, lorry rates are often much cheaper than the rail freight.

From Fig. 82 it is clear that the potential hinterland of Assab will be greater than that of Massawa because the distance between Addis Ababa and Assab is 861 kms. and between Addis Ababa and Massawa via Asmara is 1,196 kms. Thus from the economic point of view it is useful to use the Assab port to supply these areas which are near the capital and to the south of it. Massawa port could serve the northern part of Ethiopia and Eritrea. Asmara, the capital of Eritrea and the main centre market for trade, is nearer to Massawa than Addis Ababa (Addis Ababa - Asmara is 673 miles; Asmara - Massawa is 75 miles)

Thus in the near future it is likely to be economic for the trade of the northern provinces, i.e. Eritrea, Tigre and Begherndir to use Massawa. To the other provinces it is more advantageous to use Assab port for external trade. (see Fig. 83).

However, the Ethiopian Government is intent on developing Assab port in fear of the separation of Eritrea since relations between the Ethiopians and Eritreans is very poor. To avoid that possibility, they seem to be prepared to develop Massawa as a Naval port in order to keep it under control,(1) but Assab seems destined to become the major commercial port.

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(1) See Versonic, Milord. Massawah, Port de L'Ethiopia. <u>Bulletin de la Soc. Serbe de Geographie</u>. Belgrade 1960

The Hinterland

Cargo classification focusses attention on the great variety of the Ethiopian hinterland. It has an area (including Eritrea) of roughly 450,000 square miles, including the following percentage land use:
(1)
Desert, 31 per cent; Coffee forests 0.6%; Grazing 28%; Lakes & rivers 13%; land under other crops 8.1%, wood and bush 13%

Ethiopia is fortunate in possessing a rich hinterland, which depends on agriculture in the first place. However, out of a total cultivable surface of some 55 million hectares only 7.5 million are cultivated.

The country's mineral resources have not so far been sufficiently explored. There are, however, indications based upon reconnaissances that the development of the mining industry might be profitable for meeting internal requirements and, above all, for export. As far as metals are concerned the iron deposits of Eritrea may be of particular importance. The extent of the explored reserves and the qualtity of the ore open up favourable prospects for the future.

The annual bulk earnings from each type of export crop is as follows:

Coffee - 108 million Ethiopian dollars; oilseeds, 17 million dollars; Hides, 14 million dollars; Cereals, 9.7 million dollars; other products, 28.8 million dollars.

Weigend has defined the hinterland as 'organised and developed

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(1) These figures are estimates of the Ministry of Commerce, Industry and Planning, 1961.

land space which is connected to the port by means of transport lines and which receives or ships goods through that port.[1] If transport links alone are considered a map can be constructed delimiting on a physical base of effective distance the hinterland of Massawa. The map of transport shows the areas that are closest to each of the major ports of Ethiopia by road or rail connections. The rail regions correspond generally with those areas having the lowest freight rates on major commodities to or from the ports indicated. On this basis, the hinterland of Massawa extends to include most of Eritrea and the northern region of Ethiopia; (Tigre province and Beghemder). Much of the export from the Harar regions (mainly coffee) is exported directly through Diredawa and Djibouti. Exports from the Addis Ababa pass through Djibouti, Assab and Massawa.

The hinterland of Assab port extends to include most of the centre and southern Ethiopia. This hinterland used to belong exclusively to Djibouti; before the federation with Eritrea. Now it is often advantageous to Ethiopia to use Assab instead of Djibouti. On the previous basis the hinterland of Djibouti includes Harar province, from which all commodities can move to Diredawa railway station and from there to Djibouti which will be nearer than Assab.

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(1) Weigend, "<u>Some elements</u>......." op. cit. pp.192-3

The Foreland of Ethiopia

Turning next to the forelands, it is difficult to define the foreland of the Ethiopian ports since there is no reliable data available. The only data concerns Ethiopia's external trade by country of origin or destination. This data can be used to give a general idea about the foreland of Ethiopia's ports, since more than 99% of trade moves through these ports.

The pattern of geographical distribution of trade changed but little in 1960. Europe still had the largest share in Ethiopia's foreign trade, supplying over half of the latter's total imports and taking less than a third of its exports, to be followed by the Americas, Asia and the Middle East. Trade with countries in Africa still accounted for only a relatively small share of the total in 1960 - 2.7% of the total value of external trade. In the same year U.S.A. took about a third of Ethiopia's total exports. The direction of the export trade is more difficult to establish precisely since many exports are made through Djibouti and Aden and these two ports are recorded as the destination of the goods. It must be remembered, however, that Djibouti and Aden, particularly Aden, are entrepots engaged in the direction of goods to other countries. For this reason, although figured show almost as much trade with Aden as with the U.S.A., this is no clear indication of the final destination of Ethiopia's exports.(1)

Next only to the U.S.A. in 1960, if we take into account as estimated volume of entrepot trade through Aden and French Somaliland,

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(1) Economic Review: Issued by the Ministry of Commerce, Industry and Planning, No.2, June 1960.

Table 114

Ethiopia's External Trade by Country of Origin & Destination, 1957-1960

(for years ending December 10th) (in Eth.$. Millions)

	Exports & Re-exports				Imports				Percentage distribution 1960 (January - December)	
	1957	1958	1959	1960	1957	1958	1959	1960	Exports (%)	Imports (%)
Americas	52.7	41.2	46.9	74.0	19.9	30.1	21.4	33.0	38.17	15.08
Europe	63.7	43.7	59.0	57.6	82.4	94.4	109.5	109.7	29.73	50.07
Middle East	55.6	51.1	50.2	37.8	26.2	23.7	28.9	24.3	19.54	11.11
Asia	3.1	3.5	8.9	14.8	48.2	41.7	46.3	49.8	7.64	22.7
Africa	17.2	14.9	15.7	9.2	2.3	2.8	2.4	2.0	4.77	0.92
Oceania	.1	[illegible]	.2	.2	.2	.2	.1	.2	0.15	0.10
Total	192.7	154.9	181.1	183.3	179.5	193.2	208.8	219.2	100.00	100.00

Table 115 The Forelands of Ethiopia Value in thousands

	Import				Export				Total (import & export)			
	1957		1960		1957		1960		1957		1960	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Americas	19,961	11	33,060	15.10	52,774	27.25	74,010	38.4	72,735	19.5	107,070	26.00
Europe	82,434	46	109,793	50.2	63,745	33.22	57,640	29.7	146,179	39.3	167,433	40.53
Middle East	26,276	14.6	24,356	11.2	55.696	28.8	37,874	19.5	81,972	22.0	62,230	15.15
Asia	48,266	27.	49,182	22.5	3,149	1.69	14,808	7.65	51,415	13.8	63,990	15.5
Africa	2,360	1.28	2,018	0.9	17,240	8.95	9,254	4.8	19,600	5.3	11,272	2.7
Oceania	230	0.12	222	0.10	615	0.19	285	.15	395	0.1	507	0.12
Total	179,527	100	218,631	100	192,769	100	193,871	100	372,296	100	412,502	100

Italy was the best customer of Ethiopian exports (15.8%). The Sudan, Saudi Arabia and Norway were foremost in taking Ethiopian coffee. Considerable increases in imports and exports were noticed in 1960 (see table 114) to and from these countries.

If we examine from a general point of view the import and export values by forelands (table 115), the changes between 1957 and 1960 find expression in the shifts in emphasis among various countries. In the total external trade Europe has gained most remarkably in both imports and exports. Whereas Africa has lost heavily, as is clear in Fig.84. However trade with countries in Africa still accounts for only a relatively small share of the total. With more African countries gaining independence and better communication and transport facilities in the near future, such trade is bound to grow at a faster rate than hitherto. The Middle East has lost heavily since 1957. Its share in the total trade was 22.0% and in 1960 it was down to 15% due to the development of Assab port which attracted a lot of trade going to Aden (entrepot) as mentioned before. Fig.85 gives a clear picture of the distribution of the external trade of Ethiopia by geographical areas and from that figure it is obvious that the of Europe has been increased from 82.9 Eth.$ millions in 1960 to 93.4 Eth.$ millions for the same period in 1961.

However, economic development will have certain effects on the emphasis on various countries. Imports in the near future will increase in volume and their structure will change. Capital goods, semi-finished goods and raw materials will occupy a much greater share in imports though,

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Ethiopia's First Five-year plan, 1957-1961. See <u>Ethiopia Observer, 1959</u> Vol.III, No.4, p.132

in absolute terms, consumption goods will increase slightly and have a different composition. Exports will grow at about the same rate as imports but no gheat change in their composition is expected in the near future. The value of agricultural commodities will still comprise 95% and coffee, hides and skins, and oil seeds will still form 83% of the total.

Though accelerated industrial development will reduce the demand for some imported goods, there will be an overall increase in the demand for imports and foreign services. Repayment of foreign loans and interest payments must also be taken into account. In order to meet these needs it is essential to expand exports and this can mainly be achieved by drawing on the agricultural potential. The need to secure safe export markets and price stability is intensified, as the country will still be relying , to an overwhelming extent, on such agricultural products as coffee, hides and skins, oil seeds and live cattle. A favourable demand on the world market could, however, without any great effort in domestic production, lead to an expansion in the export of pulses and cereals. The foreseen expansion of industrial production, particularly in consumption goods, will reduce the demand for imported consumption goods and thus enable the increased import and capital and other goods required for economic development.

Though it is impossible to be statistically precise within the limits of data concerning the ports of Ethiopia and their forelands, enough evidence has been presented to demonstrate the utility, and indeed the necessity, of understanding a port's foreland problems.

Chapter IX

EILATH PORT

EILATH PORT

Geographical aspects of the Port and Town

Physical Setting

The Gulf of Aqaba resembles that of Suez in filling the end of a rift and in being bounded by coastal faults, but it differs from the shallow Gulf of Suez in being deep and almost without reefs. Eilath port (Lat. 29^{o} 33' N., Long. 34^{o} 57' E.) is situated at the north-western end of the head of the Gulf[(1)]. Towards the north the Rift Valley is continued in the depression of the Aravah which also is bounded by high mountain walls trenched by wadis that come down from the mountain flanks through steep canyons and cliffs and are not suitable as lanes of movement. Moreover, in spite of its relatively easy topography it could never develop into a major historical traffic lane at its northern end it reaches the Dead Sea, which is not easily navigable and has such steep shores that not even a path exists which would allow traffic to be moved along its shores.[(2)] Eilath is hemmed in on all sides by rugged mountains of granite and gneiss which are difficult for

(1) Western Arabia and the Red Sea. op. cit.

(2) Karmon, Y. Eilath, Israel's Red Sea Port. Tijdschrift voor Economische en Sociale Geografia, May 1963. pp.117-126

reefs that leave only two shipping lanes between them, not wider than about 800 metres each. The passage through these gaps is dangerous owing to swift currents between the reefs, tides and sudden gusts. Passage between Tiran and the Arabian shore is almost impossible. Thus it is clear that the entrance to the Gulf of Aqaba is not safe and not attractive to shipping and only special reasons can allow its use as a shipping lane.(1)

(1) Karmon, Y. op. cit.

<u>The historical and political geography of Eilath</u>

In March 1949 Israel's troops reached the shore line of the former Mandate of Palestine in the Gulf of Aqaba. Subsequent armistice agreements confirmed Israel's occupation and gave the state about nine miles of coast line(1). Near Umm Rashrah, a former Palestine police station and near the ruins of Ezion-Geber, the port town of Eilath was established and was occupied mainly by construction workers. The first task was the preparation of a desert route which ran along the valley of Arawah. After that, Israel tried to utilise the sea-approaches to Eilath by developing Eilath port.

In 1950 Egypt blocked the entrance of the Strait of Tirán for the Israeli vessels. This restriction was enforced by an armed Customs post on Sinai peninsula at the entrance to the Gulf (Ras Nusrani) near Sharm el Sheikh, as well as from the islands of Tirán and Sanafir. These islands are within the Egyptian territory and have been under Egyptian sovereignty since 1907. All passage into the Gulf, especially through the important Enterprise Channel, would thus be within Egyptian territory. With these rights and the continuance of a legal state of war with Israel, Egypt had a right to this blockade since it is not an international sea-lane. From the Egyptian point of view the passage should be closed for Israeli

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(1) Melamid, A. Political Geography of the Gulf of Aqaba. <u>Annals of the Association of American Geographers,</u> 1959. page 236

transport.[1] The natural approach to Eilath is along the Rift valley, but this route has no continuation towards settled areas because of the steep shores of the Dead Sea. In order to connect with the settled areas of Palestine and the Mediterranean shore, the route has to climb up an almost sheer wall from the Rift Valley to the basin of Beersheba, known as the "Scorpion's Ascent".[2] An exit from the Rift Valley near Eilath towards the east is found along the narrow valley of Wadi Yatin, which forms a connection with the sandstone plateau of Hisma, 800 metres above Eilath. To the west of Eilath the level plateau of northern Sinai, which facilitates traffic routes, approaches Eilath to within about 10 k.m., and here too already in early times a connection through the granite mountains was constructed, known in Arab times as Naqb-el-Aqaba. The combination of the western and eastern approaches created the only land connection between Egypt and Arabia. For most of history the east-west link through Eilath was more important than the north-south link because this was the pilgrim route from Egypt to Mecca via the head of the Gulf of Aqaba.

The Strait of Tirán

The Strait of Tirán lies between Ras Nuzrani and Tirán island, 4 miles wide at its narrowest point.[3] Although the passage between the Island of Tirán and Sinai is so narrow, it is studded with coral

(1) Karmon, Y. Eilath - Israel's Red Sea Port.
(2) See Figures 86 & 87.
(3) Western Arabia & the Red Sea. op. cit.

ships and also for goods carried to and from Israel, just as in the case of the Suez Canal. Israel regards the entrance to the Gulf as an international waterway where free and unrestricted movements of ships must be permitted.

During the 1956 Sinai Campaign, Israel occupied the area of Sharm el Sheikh, as well as Tirán and Sanafir islands to assure unrestricted access to Eilath. United Nation troops took over the positions as a safeguard for free international shipping(1). However, the problem of the political position of navigation through the Strait of Tirán has not been fully clarified until now.

From the imposition of the blockade in the early 1950's until the elimination of the threat by Israeli troops in early November, 1956, virtually no shipping bound for Eilath (except one Greek vessel) passed through the narrow Strait of Tirán at the entrance to the Gulf of Aqaba(2).

The potentialities of Eilath as a major trading centre and as an important outlet for trade with East Africa, Southern Asia and the Far East have, since Israel's inception, been considered favourable assuming that free passage of the Red Sea and the Gulf of Aqaba were attainable. However, the blockade of shipping bound for Eilath that existed until 1957 thwarted almost completely

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(1) Ibid

(2) Boxer, B. Israeli Shipping and Foreign Trade. The University of Chicago Research Paper No.48, pp.139-147.

the successful exploitation of these potentialities. For the most part, the port of Eilath served, during that period, as a fishing port[1].

In mid-December, 1956, the Ministry of the Interior of the Israeli Government announced that Eilath port would become a regular civil frontier post, thus permitting entrance and exit with all normal passport and customs regulations[1]. Since 1956 several events have occurred which are indicative of Eilath's present and future significance as an outlet to Israel.

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(1) Ibid

Port Development

Eilath was opened in 1956 and has a T-headed quay, 1656 feet long, for small vessels and a lighter harbour[1]. There are two steel lighters, each of 50 tons capacity, and there are two mobile cranes of 2 and 3½ tons capacity respectively, on the quay. The oil installations are situated in a separate oil-port. Plans for further port development now envisage the construction of enlarged facilities to enable vessels of 10,000 deadweight tons to load and discharge cargo directly at the quay[1]. A plan which was compiled several years ago under the supervision of the manager of the port of Le Havre, France, for the building of a deep-water port at Eilath is being used as the basis for prospective development. This plan was concerned chiefly with the extension of the existing cargo jetty. It did not consider the need for breakwaters important because of Eilath's sheltered location. Storage and cargo-handling facilities were deemed to be the most pressing requirements for the port. Eilath's potential as a deep-water port was further encouraged by additional reports that noted the interest of a French shipping company in forming a joint line with the Zim Israel Navigation Company, for service to African ports from Eilath[2].

These announcements raise the question of the need for major improvements on the land route between Eilath and Beersheba, as well

(1) The Red Sea Pilot.

(2) Boxer, B. op. cit. page 141.

as expansion in port facilities. Whether such improvements would be economically possible in the long run is dependent upon the eventual solution of the political problems of the Gulf of Aqaba.

Harbour construction in Eilath poses no great problems. The depth of the water near the shores and the steady northern winds necessitate only inexpensive port installations. The present deep-water port is soon to be superseded by a larger one further south in the near future which will be able to handle about 500,000 tons of goods annually.

Site and recent growth of the town.

Of all historical settlements at the northern end of the Gulf of Aqaba, the town of Eilath is the first to occupy the north-western shore, as the more suitable north-eastern shore belongs to Jordan. The only level ground lies within the Aravah and is part of a salt flat, difficult to build upon and prone to floods every few years. Towards the north-west the ground slopes irregularly towards the granite mountains(Fig.88). The slopes consist of unconsolidated desert-pediment and rise to about 150 m. The town was built on these slopes, being founded 15 years ago. Though not a boom town, it has great economic possibilities. For the geographer it is in the main a case-study of settlement in the study in an environment that, except for its geographical situation, has nothing to offer to facilitate human settlement, not even a favoured site. The main reasons for the existence and development of Eilath are not its immediate surroundings but its position on possible lanes of world communications[1]. Its natural position falls short of the more favourable conditions of Aqaba port. It is on the narrow strip of shore that forms Israel's connection with the Red Sea, meeting the need for a southern gateway and it is therefore its port function that determines the existence of the town[2].

(1) Karmon, Y. op. cit.

(2) Ibid.

Future development

Plans for the development of the town and the port will be the enlarging of the harbour to the south of the present port and the creation of an industrial zone by clearing the thick unconsolidated pediment along the coast; the creation of a second zone for smaller industries and crafts along the road to the north; the spread of the town on the slope toward the granite mountains and the construction of a town centre near the north-west corner of the Gulf, and finally the creation of a large tourist and recreation area within the salt flat.

The functions of the town.

The main function of Eilath is that it serves as an outlet for Israel towards the Gulf of Aqaba and the Red Sea, the port being the main reason for which the town was established. The performance of this function at an increasing rate contributed to the rapid growth of the port-town, in particular after the Suez war, 1956-57. The tremendous influx of population experienced was due to increased port activities. The construction of a metalled road was completed to Beersheba in 1958, cutting down the travelling time for a bus to four hours to Beersheba and six hours to Tel-Aviv. This road connecting the port with the other urban centres of the country attracted many settlers, who were working either in the port or in the construction of new houses and other buildings. The town itself grew within a year to about 3,000 inhabitants, and the population started moving into permanent houses. These first settlers formed the first nucleus of the town; today the population amounts to about 7500 and is all settled in permanent houses; the functions of the town have grown and become diversified.

With the opening of the seaway to the Red Sea and the Indian Ocean, Eilath has become Israel's main harbour for the import of crude oil, pumped by pipe-line from Eilath to the refineries at Haifa, a distance of 450 km. The original pipe-line of 8-inch diameter was replaced in July 1960 by a 16-inch line capable of carrying 1,700,000 tons, and increased to 2,8000,000 tons in 1961 - sufficient to cover all of Israel's oil needs[1].

The original plan for the town, first considered seriously in 1956, envisaged the construction of a trans-Israel oil pipeline which would serve as an alternative to the Suez Canal. This plan, endorsed from the outset by the French Government and originally proposed by a French company which was also going to finance the project in conjunction with a consortium of other Western European companies, would have provided for the construction of a thirty-inch pipeline designed to transport approximately 25 million tons of crude oil from Eilath to a port on the Mediterranean Sea (either Haifa or a projected new deep water port). It was originally assumed that this plan would be easily justifiable from a commercial viewpoint, especially if the crude oil could be refined in the refineries at

(1) Karmon, Y. op. cit.

Haifa, then operating only at 25 per cent of capacity.[1]

Regardless of its present or future economic feasibility, this plan for the immediate construction of a large-bore pipeline to the Mediterranean Sea from Eilath has been shelved chiefly for political reasons, and is not likely to be reconsidered until many of the fundamental political problems that plague the Middle East are solved. Faced with the deferment of the more ambitious pipeline scheme, the Israeli Government began considering alternative proposals which would not preclude the larger scheme. In December 1956 it was announced that the Government was considering a more modest plan to lay an eight-inch pipeline from Eilath to Beersheba, the largest city in southern Israel and the terminus of one branch of the Israel railway.[2] The plan, as originally conceived, would have provided for the transport of the major part of Israel's domestic petroleum needs by pipeline from Eilath to Beersheba and then by rail to the Haifa refineries.

In mid-December, 1956, work began on the survey for this eight-inch pipeline and was completed by the end of 1957. This pipeline delivered imported petroleum products to southern Israel and also was used to transport imported crude oil to Beersheba; from there rail tank cars transported the crude oil to a refinery at Haifa. Crude oil delivery with three breaks in the transportation pattern

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(1) Boxer, B. op. cit.

(2) Ibid.

(pipeline to tanker, tanker to pipeline, and pipeline to tank car) is not economical, and presumably shipments of this nature would only take place in emergencies.[1]

Experience has shown that pipelines from the Gulf of Aqaba to the Mediterranean are likely to decline in importance for very large tankers in relation to the route around the Cape of Good Hope.

Relative unit cost of shipping oil
from the Persian Gulf to Europe.

(Cost of transporting one ton of oil in 19,500 ton tanker through the Suez Canal 100)[2].

Table 116

Tanker deadweight in tons.	via Suez Canal.	via Cape of Good Hope
19,500	100	139
32,000	88	118
38,000	82	103
45,000	85	91
65,000	Loaded passage impossible	85
100,000	impossible	75

(1) Melamid, A. op. cit. page 238

(2) Ibid

Industry

Industry in Eilath is very limited, the most important being granite cutting and polishing. In 1956 a granite factory was constructed in the town using local rock as raw material; it is equipped with the most modern machinery for the cutting and polishing of granite. It is expected that the United States, a major importer of granite, will be the chief customer for the Israeli product. The profitable shipment of granite is particularly dependent upon the availability of cheap and efficient transportation. At present the price paid by American importers for one cubic metre of rough-polished granite is approximately twice the cost of production in Israel. The actual ocean shipping costs are relatively low, but the cost of transporting one ton of granite from Eilath to Haifa by truck and rail is two or three times as much as the cost of the shipment from Haifa to the United States.[1] If the granite could be shipped directly from Eilath through the Suez Canal to the United States, the profit realised would be considerably greater.[1]

In 1956 a Committee was set up to consider the construction of a cement plant in Eilath. Assuming that shipping would be free to move through the Gulf of Aqaba, it was felt that the presence of ready markets in East Africa and south and east Asia would more than justify this construction. The advantages were: (1) the availability of

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(1) Boxer, B. op. cit. page 142

adequate local raw materials for the production of cement: (2) the fact that the price of cement should be reasonably low: and (3) the transport costs of shipments to East Africa and Asia would be much lower from Eilath than similar shipments from Haifa, the chief existing centre of cement export.(1)

The main source of employment for Eilath's population is in the copper mines at Timna, thirteen miles from Eilath.(2) It was originally envisaged to create a separate settlement at the site of the mines, but it was found more convenient to house all the mine-workers in Eilath. Work at Timna provides employment for 500 people, about 25 per cent of Eilath's labour force.(3) The mines exploit ores of 1-1.5 per cent copper content which are turned into copper cement by a specially adapted water-saving process. The annual production of about 7,000 tons of copper cement is exported to Japan for refining, as the installation of refinery plants on the spot is economically doubtful, owing to the high costs of electricity.(3) Other industries in Eilath are few because of the lack of raw materials that would be attractive to industry. In addition to the shortage of and the high price of water, wages in Eilath are above average as they include a special "desert allowance". Also transport costs are so high that they would not justify production for a market outside Eilath proper. Thus only small consumer-bound industries have been set up in Eilath such as ice-cream factories, pre-cast building parts, furniture factories and others. These industries provide work for

(1) Ibid
(2) Karmon, Y. op. cit.
(3) Ibid.

less than 20 per cent of the labour force of the town. There is a fish canning factory in Eilath utilising the local catch in the Gulf of Aqaba. The Israeli fishing fleet works along the African shores of the southern Red Sea and refrigerating boats haul the catch to Eilath for consumption on the Israeli market. Eilath's fisheries will probably remain local in importance. They appear to be limited to the serving of the few thousand agricultural, mining and military personnel of the southern Negeb. The inhabitants of Beersheba and its environs in the northern Negeb are not yet within practical reach.(1)

Thus it is clear that all these new functions are nevertheless of secondary importance and would not have been developed if the first basic one did not exist. The port activities provide work for approximately 20 per cent of Eliath's manpower (about 400 out of a total of just over 2,000).(2)

The main problem facing the development of Eliath's functions is its isolation. There is only one agricultural settlement in the Aravah, Yotnata, at a distance of 25 miles from Eilath, and the next settlement is the town of Mitzpah Ramon, about 100 miles distant on the road to Beersheba. The distance for potential suppliers of export goods is even greater, about 150 miles to Beersheba or Oron,

(1) Cohen, S. Israel's Fishing Industry. The Geographical Review, Vol. XLVII 1957

(2) Ibid

and about 160 miles to Sodom (Fig. 4). The construction of roads over these wide distances, without any economic value along the road itself, has been a costly and difficult enterprise. In addition to the generally difficult conditions of road construction in the desert, the roads have to overcome the difficult topography of the steep walls that define the Rift valley. Thus the long distance from the centres of settlement and production, in addition to road difficulties, hot climate and lack of water put the burden of high inland transportation costs on all exports and imports through Eilath. The transport of vital consumption goods, such as vegetables, dairy produce and grains, though these are available in Eilath, are reflected in higher prices. All other goods are more expensive, especially those transported in expensive refrigerator vans, and also because of transportation costs, because most of the vehicles have no return freight.(1)

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(1) Karmon, Y. op. cit.

Population

The population of Eilath is now 7,500. The attraction of settlers to Eilath poses a great problem owing to the psychological and physical difficulties of acclimatisation in the town, especially for immigrants coming mainly from Europe. Consequently settlers in Eilath are offered especially favourable conditions to encourage them to settle for as long as possible. First of all housing precedes the population and every potential settler finds his house ready before he moves to the town. Remuneration in Eilath is higher than elsewhere because it includes the air-travel allowance and a special "desert allowance", which raises wages by about 10 per cent. Income tax is collected at greatly reduced rates and there is no purchase tax on such items as refrigerators and desert coolers.(1)

Despite these benefits the attracting power of Eilath is low. There is a certain number of young couples who are attracted by the availability of cheap housing and of savings; the bulk of these settlers are new immigrants who are sent straight from the boat to ready furnished houses in Eilath. Mostly younger people are selected, but about a third of these people "go north" during the first year. Those who do get acclimatised adopt something of the pioneer spirit, and the population of Eilath is somehow different from other towns in Israel, being younger they give the impression of being more vital and active than in other towns.

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(1) Karmon, Y. op. cit.

Public Utility Provision

Water Supply

The recent growth of Eilath as a town increased the demand for water supply. In desert climates water supply is the first necessity of life; but Eilath has no water resources of its own. Intensive research and experimental drilling in the vicinity of the town have shown no results, and shallow holes near the shore have produced only brackish water. Fresh water in shallow holes is found only on the eastern shore, near to Aqaba village, the very reason why all historical settlements were situated in the vicinity of Aqaba village. From its beginning, therefore, Eilath had to be supplied from distant water resources, but these too are scarce and inadequate. Today Eilath is provided with water from springs and drillings along the valley of the Aravah up to a distance of about 80 k.m. But even along the Aravah there are no copious springs and most of the water is rich in minerals.(1)

The water-needs of the town, which amount to 75,000 c.b.m. per month in winter and rise to 175,000 c.b.m. in a summer month, are met with difficulty. The water, presently available, is not fit for drinking in its natural state and necessitates special chemical treatment. As this treatment is very expensive, two types of water supply are organized, The water piped to the houses is suitable only for cleaning and washing. Drinking water is supplied

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(1) Karmon, Y. op. cit.

(2) Ibid.

to special tanks which were erected in each neighbourhood and has thence to be carried to the houses: it forms only a small percentage of the total water supply.(1) In order to keep up with the rising demand for water a combined project has been envisaged and soon its construction will start. Its centre will be a large power station fuelled by heavy oil produced from imported oil. The power plant will use steam produced from sea-water and will deliver the condensed distilled water to the town's water supply where it will be mixed with slightly brackish water.

Electricity

There is a small power plant for electric power, likely soon to be insufficient. In order to keep up with the rising demand, a project for a larger power station has been envisaged and soon its construction will start. This large power station will be fuelled by heavy oil produced from imported crude oil in a small local oil refinery. The product of the oil refinery will also be used for ships and for heavy trucks.

(1) Ibid.

EXTERNAL RELATIONS

Transport and Trade Routes

Railway: The Israeli network operates 420 k.m. of main railway line and 237 k.m. of branch lines.(1) The service extends to Nahariya, north of Haifa, to Jerusalen and Beersheba, the centre of the southern part of the country (Negev). The line to Beersheba is being extended southwards to the phosphate mines at Oron. Thus it is clear that the main functionsof the railway is to serve the Mediterranean ports, and the Red Sea port of Eilath is distant and remote.

Road Transport uses an inter-urban network of 3,738 k.m. of fairly modern roads of which 3,468 k.m. have a metalled surface. In 1960 73,000 motor vehicles were in service, 23,000 motor lorries and 24,000 other vehicles.(2) This network of roads is mainly concentrated in the northern part of the country, where urban centres are founded, but there is only one road serving the southern part of the country, which is very poor from the economic point of view. The trade routes in Israeli are two, the Mediterranean route and the Red Sea route, the former outstandingly the more important.

Israel's foreign trade is mainly conducted with Europe and North America: 88 per cent of total imports come from Europe and North America, while 84 per cent of all exports were consigned to those two continents, which means that the natural gateways for

(1) ?
(2) Ibid.

this trade are along the Mediterranean route, which is nearer to Europe than the Red Sea route. Cargo handled at Eilath port (Red Sea route) destined for the settled portions of Israel has to travel overland a distance exceeding 160 miles, and effective costs of inland transportation are high. As the contiguously inhabited parts of Israel can be reached more cheaply through the Mediterranean ports, almost all Israel's maritime traffic can be handled more economically through these ports. This includes Red Sea and Indian Ocean traffic. Even if this traffic moves via Capetown and Gibraltar it is more advantageous than using the Red Sea route.[1] For this reason it seems that only bulk cargo destined for Eilath and adjoining parts of southern Israel, such as crude oil, petroleum products, and building materials or exports of minerals can be handled economically through Eilath port.[1]

Trade forecasts by routes (in 1,000 tons)

Table 117	Mediterranean route	Red Sea route
1959	2,825	150
1963	3,225	450
1965	3,625	700

From the above table it is obvious that the Mediterranean route is the natural trade route for the country. The growth of trade via the Red Sea route depends on the markets south of the Red Sea. For all these reasons it is not surprising that the Red Sea route (Eilath) has not developed like Aqaba. Substantial growth in the future cannot be expected. For the time being road

(1) Melamid, A. op. cit. page 237.

communications to the settled parts of Israel are poor, and most traffic moves by air. The plan to build a railroad from Beersheba has been shelved. Thus the use of Eilath route for other than local traffic is economic only if the Mediterranean ports of Israel are closed.

The Traffic pattern of Eilath Port.

With the possession of a stretch of shore, connected with the Red Sea, Israel is a "land on two oceans". At the time of the British mandate almost all of Palestine's trade-connections were with Europe using the Mediterranean ports. Crude oil for export and refinery was supplied by the pipeline from the oilfields of Iraq to Haifa. What little existed of trade connections with lands of the Indian Ocean was shipped through the Suez Canal to Port Said and transferred there to coastal vessels or to the railway, Kantara-Haifa. With the outbreak of war between Israel and the Arab countries the oil-flow from Iraq ceased and the Suez Canal was closed for Israeli ships. On the other hand Israel tried to create strong political and trade connections with emerging countries in East Africa and South-Eastern Asia, although at the time trade with these countries amounted to less than 5 per cent of the total bulk shipped overseas.

Navigation traffic

Table 118 Number of ships calling at the port of Eilath and volume of cargoes[1] (in tons)

Year	No.of ships calling at the port	Total volume of goods handled[2]
1958	35	56,136
1959	42	128,127
1960	55	159,200
1961	76	176,800

From the above it is obvious that navigation traffic has increased

(1) Israel Government Year Book 1962-63 page 140

(2) Excluding fuel imports.

to more than treble the figure for 1958 in 1961. Arrivals at Eilath rose from 35 vessels in 1958 to 76 in 1961. Cargoes handled at the port rose from 56,136 tons in 1958 to 176,800 tons in 1961.

To-day there are regular sailings between Eilath port and the countries sited to the south; four flying the Israel flag work it regularly; one, a refrigerated ship, sails three times a month for Ethiopian ports with agricultural produce and materials, and on the home run takes on the Red Sea catch of fish. Other ships visiting the port fly the flags of Burma, Denmark, Germany, Holland and Ethiopia. The Burmese ship (mixed cargo and passengers) plies every month between Eilath and East Africa.

Goods Traffic.

In terms of volume of cargo handled at Eilath, imports have increased from 28,124 tons in 1958 to 58,200 in 1961; exports have also increased, from 28,012 tons in 1958 to 118,600 in 1961. Goods traffic through the port represents only 5% of the total bulk shipped overseas. In contrast to Haifa, goods handled show a surplus of exports over imports, as shown below:-

Table 119 Imports & Exports through Eilath port(1)
(excluding fuel imports)

Year	Imports	Exports	Total
1958	28,124	28,012	56,136
1959	41,866	86,261	128,127
1960	43,500	115,700	159,200
1961	58,200	118,600	176,800

(1) Israel Government Year book 1962-3 page 140.

Main export items are the minerals of the Dead Sea and the Negev, such as potash, phosphates, copper-cement and industrial products, including cement, tyres, fertilisers, refrigerators, bicycles. The imports consist mainly of agricultural products, such as coffee, guinea-corn, soya, rubber, hides, tropical woods and crude oil.(1)

Table 120 Imports & Exports forecasts for principal commodities by routes in 1,000 tons weight. (1963 & 1965)(2) projected.

Mediterranean ports	Total	Citrus	Bulk	Grains	General Cargo
1963	3,223	600	450	675	1,500
1965	3,625	700	650	750	1,525
Eilath Port					
1963	450	-	225	75	150
1965	700	-	400	125	175

It is obvious that the development of trade via Eilath depends on trade relations with countries bordering the Red Sea and the Indian Ocean. The fact that there are trade relations with Ceylon and Japan emphasises the potential importance of Far Eastern countries in markets for Israel's products. Japan, in particular, is an example of a country which presents opportunities for the profitable development of trade relations.(3) Recent negotiations have been taking place for the sale of Israel's phosphates and good quality industrial products in increased quantities to Japan. Israel could conceivably import from Japan various types of machinery, industrial commodities and transportation equipment through Eilath. At present Japanese prices are favourable and the existing Japanese shipping

(1) Karmon, Y. op. cit. page 123

(2) Israel Government Year book

(3) Boxer, B. op. cit. page 23

services to the Red Sea are such that supply of imported goods could be rapid and efficient.

. Runs have accordingly been organised, with Government assistance, to the Far East (Ceylon, Malaya, Singapore, Hong Kong and Japan) East Africa, Eritrea, Ethiopia, and Somalia from Eilath, and also from Eilath to Iran, which is the main source of crude oil to Israel.[1]

In 1960 the principal export cargoes were cement 43%, minerals 38%, general cargo 11% exported through Eilath to those countries.[2]

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(1) Israel Government Year Book - 1962/1963

(2) -do- -do- -do- - 1961/1962

Israel's foreign trade

Israel's foreign trade is mainly conducted with Europe and North America and the trend towards regional economic integration in Western Europe, therefore, poses serious problems for the future development of her foreign trade. The European Economic Community (E.E.C.) is its most important export market (27.9 per cent of total exports), while the European Free Trade Association (E.F.T.A.) ranks second (25.9 per cent). The E.E.C. is also Israel's principal supplier (30.3 per cent of total imports) and the E.F.T.A.(22.3 p.c.) ranks thid, immediately after the United States (29.3 per cent). Contacts have been established with the E.E.C. in order to find some solution which will prevent damage to Israel's exports. The heavy imports surplus has made Israel a desirable trading partner.(1)

(1) The Middle East 9th Edition 1962 pp. 155-196

External Trade

Table 121 (1960) Countries	(I£ millions) Import	Export
Belgium	13.4	13.1
Canada	6.9	2.6
Denmark	3.2	2.4
Finland	8.8	3.0
France	24.9	4.1
German F.R.	70.9	25.7
Italy	7.6	4.6
Netherlands	21.9	11.4
Norway	2.2	1.6
South Africa	6.0	1.9
Sweden	7.5	4.7
Switzerland	20.9	10.3
Turkey	10.9	9.1
United Kingdom	59.1	35.4
U.S.A.	154.1	28.8
Yugoslavia	5.1	4.7
Total	423.2	163.4
Grand total, with others	495.8	210.0

It is clear from the above table that the external trade of the country is directed primarily at the countries of Northern and Western Europe; no doubt this trend will continue for many years to come. However, if Israel is to close the gaps in her balance of trade, now markets for herexports must be found in Asian countries and African countries, which she failed to develop until now because the majority of these countries have not recognised Israel as a natibn ; the political factor hinders Israel's attempts to find new markets in Asia and Africa.

The Hinterland of Eilath Port

The hinterland of Eilath port is very poor. All natural conditions in the area are most unfavourable for human settlement, the town is neither an oasis nor a gathering-point for surrounding settlements, which are virtually non-existent. The hinterland is a dry steppe and desertland known asthe Negeb, rolling to rugged in topography, with elevations around 1,000 feet and in places with ridges to three times that height. In the latitude of Beersheba, Israel reaches its maximum width of seventy miles. The annual rainfall is less than five inches and evaporation is excessive so that dependable cultivation requires constant irrigation. A number of experimental farms have been established in an attempt to recreate ancient agriculture[1] but the bulk of the Negeb is marginal even for the pastoralist (Fig.90).

The hinterland of Eilath is rich in mineral resources which represent the main item in the external trade through the port. The chemicals of the Dead Sea were the only minerals to be exploited commercially in Palestine prior to the establishment of Israel. The plant at the southern end of the sea at Sodom has never been fully utilised. It came back into operation in 1952 and it has an annual capacity of 135,000 tons of potash and 2,000 tons of bromine, with plans for magnesium salts and other products. Mineral products

(1) In the midst of what is now a desolate land are traces of what was once an area of considerable agriculture dating back to the Nabataean period during the first seven centuries A.D. and as early as the ninth century B.C. The climate was then also dry, but hundreds of low dams diverted flood water from the wadis and spread it over adjoining fields.

(1) (2) See figure 89.

from the Dead Sea will help in future in developing export trade through Eilath port, after the construction of the road between Sodom and Eilath this road along the Rift valley will shorten the distance and avoid the difficult territory of the Negeb plateau.

Phosphate rocks underlie an area of 1,000 acres in the Negeb, south-west of the Dead Sea, where reserves are estimated at 100 million tons. Production amounted to 250,000 tons in 1939 and phosphate rock appears to be one of Israel's most important minerals. Since the P 0 content is only 24 to 26 per cent as compared with a minimum of 30 per cent for the international market, enrichment is necessary before shipment and much of the product is thus converted into superphosphate at a fertiliser plant in Haifa. The surplus is for export. The major countries of destination are Ceylon, South Africa and Japan.[1]

Copper ores are found north of Eilath at Timna.(Fig.89) The ore is of low grade, averaging 1- 1.5 per cent and less of copper but the proved reserves may contain 180,000 tons of copper. The annual production of about 7,000 tons of copper cement is exported through Eilath to Japan.[2]

With all these means and efforts for the development of the hinterland of Eilath port, trade will increase through the port.

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(1) Cressey, G. Crossroads 1961 page 493

(2) Ibid.

The Forelands of Eilath Port

Statistics concerning import and export tonnages by forelands are not available for Eilath port but evidence shows that Asia has gained most remarkably in both imports and exports. Burma, Ceylon, Malaya, Japan, Hong-Kong and Iran and Iran are the most important countries trading with Eilath port. East Africa is now an important market for Israel trade through Eilath port. This market provides Israel with raw materials and it is also a good market for Israel's manufactures. The importance of the Asian and African countries should not be ignored, especially since Israel is closer to these countries than any supplier on the continent of Europe.

Thus there is no doubt that the utilisation of the port opens for the economy of Israel's new resources and outlets. However, it must be re-emphasised that the fulfilment of this potential is contingent upon the equitable solution of many extremely complex political problems.

Chapter X

THE PORT OF 'AQABA

The Port and Town

Physical setting - site and evolution of the port - development of the port facilities - 'Aqaba village - the town of the future and its functions - population - public utility provisions.

External Relations

Transport and trade routes - traffic pattern of the port - hinterland - foreland.

THE PORT OF AQABA (JORDAN)

Physical Setting

The Gulf of Aqaba, extending about 98 miles north-eastward, on the eastern side of Sinai peninsula, is the southerly continuation of Wadi al'Ariba, the valley through which flows the River Jordan and in which lies the Dead Sea. The shores of the Gulf are mostly steep to mountainous ridges, mostly granite and closely approach the shores of the Gulf of Aqaba; in many places they rise from the plain like a wall.(1) The gulf has many reefs and islands, particularly at its mouth, and navigation is hazardous. From the head of the Gulf the ground rises very gradually towards the divide with the Wadi Ariba at 700 ft. that drains to the Dead Sea.(2)

Aqaba Bay, (Fig.91).

The head of the Gulf is a semi-circular bay about 3 miles wide. Its northern side is low and flat, being the end of the Wadi Arabà, a wide, sandy valley which is part of the depression occupied further north by the Dead Sea and Jordan River.(3) The Jordan side of the trough is bounded by the almost vertical wall of the highlands which here rise generally to over 5,000 ft, above sea-level and are not pierced by river valleys as in sections further north.

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(1) Red Sea Pilot. Gulf of Aden. p.269
(2) Short, J.P. Jordan. M.A. Thesis, London University
(3) Naval Intelligence Division - Palestine & Transjordan 1934. p.522

On the Israel side the wall is much lower and less precipitous except in the South near the head of the Gulf of Aqaba. From the divide, some 70 miles south of the Dead Sea, the depression slopes Northwards to the Dead Sea and Southwards to the Gulf of Aqaba. The Eastward and Western sides of the Gulf are backed by mountains which continue Northward to form the walls of Wadi Ariba and over which passes are few and difficult. Aqaba is on the east side of the Bay, and the beach for about 3 miles nort-west of the village is sandy, clear of reefs and suitable for landing, with low sandhills and scrub immediately inshore. From about half a mile inland, up the Wadi Ariba, the land is flat and devoid of cover apart from occasional scrub. Aqaba Bay is very deep, in excess of 100 fathoms at a distance of one mile from the shore. In front of Aqaba Village a sand and corall shelf extends for about 200 metres from the shore, with a depth of water of 2 to 3 fathoms. On the Western part of the Bay there is a sandy beach with a gentle slope, in direct continuation of the desert like Wadi Ariba. East of the village, deep water is very near to the shore and the sea bottom has a steep slope.(1)

Site and evolution of the Port.

It is recorded in the book of Kings that King Solomon made a navy of ships in Ezion-Geber which means 'Giant Backbone' so called probably from the huge range of mountains on each side of the trough.(2)

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(1) Red Sea Pilot page 270

(2) Lindsay W.S. Merchant Shipping Volume 1. pages 29 - 31

Beneath the line of palm trees which now shelters Aqaba Village Solomon chose the site of his port for trade with Africa and Arabia. Though the Jewish trade under Solomon had reached unusually large proportions, these soon fell away and dwindled almost to nothing under his successors.(1) With his death the port declined because of wars and divisions.

The Romans occupied the region about one thousand years later. Although they built a road to the Gulf, there is no record of any trade. This appears reasonable, as the Romans had use of the Nile for transportation of imports from the East. During the first centuries A.D. the region was probably a part of the Nabatian kingdom, the wealth of which was built upon cereal cultivations in Wadis draining towards the Red Sea and possibly there was a trade through aqaba to Arabia.(2)

The Crusaders.

The King of Jerusalem, occupied the site of the present town of Aqaba. Crusaders established themselves simultaneously on the waterless islet of Gezira Firain, which they called Isle de Graye, about twelve miles southwest of Aqaba. During their long occupancy of both Aqaba abd Isle de Graye, the Crusaders never succeeded in developing trade through Aqaba. The port was of lesser importance than other ports, especially those of the Persian Gulf, and Arab

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(1) Ibid

(2) Melamid A. Gulf of Aqaba. Annals of the Association of American Geograph.. page 232

writers of the 9th and 10th Century describe it as a village.(1)

With the general decline of the transit-trade of the Middle East, that began after the Crusaders and especially with the discovery of the sea-route around Africa, shipping in the Red Sea declined and in Aqaba ceased altogether.

While the maritime trade functions of Aqaba were confined to e certain historical periods, its functions as a station on the caravan routesfrom Arabia and Palestine and Egypt were carried out all the time; it even gained in importance when the Middle East became Muslim and the yearly pilgrimage to Medina and Mecca was organised. The pilgrims' route from North Africa and Egypt passed from Suez to Aqaba and was joined near Aqaba by the route of Palestine pilgrims from Gaza in a Kuntil. (See figure) From Aqaba the route went up the Hisma plateau, where it met the pilgrim route from Damascus.(2)

After the withdrawal of the Crusaders the regions remained untouched by World affairs for seven centuries until 1840, when Ibrahim Pasha of Egypt occupied the port of Aqabaand built a road across the Sinai Peninsula to the town to facilitate pilgrim traffic from the Nile to Mecca as well as for stbategic reasons. By the end of the First World War the Turkish portion of the Gulf up to

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(1) Melamid A. op cit. page 233

(2) Karmon. Y. op cit

the Egytian boundary had became part of the Kingdom of Hejaz, then closely allied to Great Britain, who established a mill and primitive war-built facilities for unloading military supplies.[1] The site of the settlement of Aqaba was limited to the Eastern part of the shore, where fresh water is found in abundance. The exact site changed many times, probably owing to flooding by the Wadis, especially the Wadi Yatm. The latest settlement, today the town of Aqaba, is the southernmost of all the Eastern sites. The name which indicates a narrow mountain passage, was adopted first in the 10th century A.D. in the form of 'Aqabath Eilith'and was later on shortened to Aqaba.[2]

As a result of the Arab-Israel war, Jordan (name changed from Transjordan in 1918)no longer uses Haifa as an outlet for its trade. Since alternative transportation through Beyrouth is very expensive, Jordan began to utilize Aqaba in 1952.

Through systematic efforts of the Jordan Government, it has been possible, from 1952, to re-route gradually the bulk of Jordanian imports to Aqaba from other ports, to attract several foreign steamship lines, to develope exports of phosphates, to form a nucleus of an efficient port administration and to complete an ambitious but quite realistic major part construction scheme. In this difficult task, the Government has been assisted by several factors:

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(1) Melamid. A. o.p. cit. page 233

(2) Karmon. Y. o.p. cit

First, facilities built in Aqaba during the last war made it possible to start port operations on a small scale without waiting for the construction of a new port. Secondly, financial aid permitted necessary improvements to the war-time installations, and at a later date, a major port extension scheme. Thirdly, the United Nations Technical Assistance supplied to the Government an international port expert whose advice has been available to the Aqaba Authority.(1)

But the main factor was the consistent will and the necessity for Jordan to obtain an efficient accesd to the sea on her own territory, in order to make the country economically independent, to save foreign currency on imports and to have an inexpensive and reliable outlet for the export of her mineral products. Costs of Transportation from Aqaba to Amman and Northern and Western Jordan, where nearly the whole population of the kingdom is concentrated, average about 30 dollars per ton compared with about 39 dollars from Beyrouth, and a theoretical cost of less than 9 dollars from Haifa.(2)

The development of Aqaba is not only of interest from a purely technical point of view. Although Aqaba has been used for maritime traffic since Solomon's time, the present phase of her development is an example of a port where everything had to be created; port installation, port administration, tarriffs, regulation, staff and

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(1) I.B.R.D. The Economic development of Jordan 1957 page 280

(2) I.B.R.D. OP. CIT. page.

an adequate labour force; these have been built up.

Development of the Port facilities.

Port facilities left by the British Army after the last war consisted of a lighter basin known as the Military Basin, built up on the Western side of the Aqaba village. The basin is enclosed by a wide outer wharg offering about 420 feet of waterfront on the seaward side with a depth of water of 11 feet. Inside the basin there is a total length of quay of about 900 feet with a depth of 6 to 9 feet. There are two simple sheds of 1800 square metres each on land.[1] It would have been possible to use the Military Basin for both military and commercial cargo and to extend gradually and improve its storage and cargo handling facilities. However, neither the location nor the design of the basin are particularly favourable. During the southerly storms the entire impact of the wind and waves is directed towards the northern end of the bay where the basin is located; even inside the basin under shelter of the outer wharf, water becomes more agitated than on some better protected parts of the open shore on the opposite end of the village. The entrance to the basin from the sea is not easy for lighters in tow, as it is almost facing the shore and would probably have been better from the navigation point of view if it had been turned more to the west and south west. The sheds were quite primitive and too far away from the best parts of the wharves. The only advantaage of the basin was ample space for open storage.[2]

(1) The Dock and Harbour Authority. No 477 Vol. XLI July 1960 page 90

(2) Ibid

In view of the above shortcomings it was decided in 1952 to leave the basin in the hands of the Army for the imports of military supplies and develope a commercial port in a more favourable location. The During the war the British army started the construction of a small lighter wharf south of the village near a cold storage plant of the Aqaba Fisheries. Only 47 metres of the wharf had been completed, and a very narrow strip of land, 7 metres wide, had been provided behind the piling. At this particular place there is a small bay so that the shore line curves and the face of the wharf is almost facing North. There is a limited area of water in the bay with a depth of 2 to 5 fathoms, which is fully protected from the Southerly storms.(1)

On the recommendation of the UN. expert, the site of the above lighter wharf has been improved and developed for the handling of general cargo. The low ground to the rear has been filled, levelled and paved, and a small transit shed 45 metres long and 30 metres wide has been built. Construction of the shed was started in January and completed in July 1953. Three mobile cranes of 3 tons capacity (Jones K L 44) were purchasediin order gradually to replace manual handling of cargo by more economic methods. A connecting asphalted road, 3½ Kilometres long was built from the wharf area through the village to the main highway from Ma.an and Ammon.

As cargo traffic increased rapidly, further improvements had to be made. The missions organized by International Bank for reconstruction and development at the request of the Government of Jordan in 1956-7

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(1) The Docks and Harbour Authority August 1960

recommended the following pfogramme for the development of Aqaba port.[1]

(a) Immediate lengthening of the existing wharf and miscellaneous improvements.

(b) An immediate start on construction of a deep water mineral loading berth for exports of potash and phosphate, 150 metres long, with a capacity of approximately 500 tons per hour and storage areas to accommodate phosphate from Roseifa and al Hasa, and potash.

(c) A lighter wharf 120 to 150 metres long with large storage areas.

(d) Handling equipment for general cargo (motor cranes, port-lift trucks, trailers etc)

(e) A line of five deep water moving buoys with lighting equipment.

(f) Offices, workshops, open storage area and road access.

(g) Living quarters for port staff.

Construction of facilities at the port should be integrated with a complete town planning scheme.[2]

General Cargo Berth. (Figure 92)

For the General Cargo Berth a 160 metres long marginal wharf has been built having a depth of water of 10 metres at low water level. Difference between highest and lowest water is only about 1 metre in Aqaba. A large transit shed 108 metres long and 60 metres wide has been built behind the wharf. The shed is divided into three open spans of 20 metres each.[3] However, experience of previous years

(1) Hopkins J The Economic Development of Jordan 1957 Page 280

(2) Hopkins J. The Economic Development of Jordan Page 280

(3) The Dock and Harbour Authority 1960

had shewn thatt imported cargoes must stay in Aqaba for a longer period that would be the case in an average port located near the centres of consumption. Because of long distance to Amman, the limited number of available trucks and the various formalities connect ed with customs clearance, import permits and bank credits, sugar, grain and general cargo often remain in the port area for a month or more. Shortage of covered space resulted several times in serious damage by rain to cargo stored in the open, expecially to sugar. Under impact of the greatly increased traffic the port authority approved in 1958 an increase in the width of the new transit shed to 60 metres (originally the shed was planned with two ~~open~~ spans of 20 metres, giving a total width of 40 metres) by adding a third span in order to avoid similar losses in future. In order to facilitate cargo handling on the quay apron, the port authority erected on the wharf electric gantry cranes. Tow open storage areas have been arranged in the rear, one asphalted, another gravelled. A special enclosure for animals,an inflammable goods store, a shelter for mobile cranes, canteens for port employees and workmen, well paved roads and a wire mesh fence complete the installations of the general cargo berth.

Phosphate Berth

At the new deep water berth, phosphates were to be loaded on ships by belt conveyors. It was not necessary therefore to provide a continuous quay; strong dolphins with a lodding tower in the centre have been built instead. The dolphins are placed in straight continuation of the general cargo wharf, in order to provide one uninterrupted water front. The distance of the berthing face to shore is about 40 to 50 metres.(1)

<u>The Phosphate loading plant</u>.

Phosphates arrive in Aqaba by trucks, either direct from the mines in Roseifa near Amman, or from the railhead at Ras-en-Nagb. Obviously a substantial stock must be held in Aqaba in order to assure prompt loading of vessels. Two adjoining stores, 75 metres long and 37 metres wide have been provided in the plant, each with a capacity of over 20,000 tons of phosphates. The stores are parallel to the shore and are located just north of the centre line of the berth. On the other side of this line, two concrete intake hoppers for 70 tons each have been provided at a distance of 45 metres from the stores. Trucks are dumped into the hoppers with help of hydraulic dumping platforms and phosphate is nrought by rising intake conveyors to an upper gallery on the centre line of each store at a rate of 250 tons per hour.(2) Loading of phosphates from the stores to a ship is made with help of four reclaiming conveyors and one shipping conveyor. Reclaiming conveyors are located in four tunnels under the stores. Through openings in the floors, provided with feed-on shoes phosphate flows by gravity on the conveyors and is brought to a single ascending shipping conveyor to the loading tower in the centre of the berth. A retractable boom extends over the ship's hold

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(1) The Dock and Harbour Authority 1960

(2) Ibid.

and the phosphate drops into the hold through a swivelling telescopic trunk at a rate of 500 tons an hour. A liberty ship will be able to take a full cargo of 10,000 tons in 2 or 3 days, instead of 2 weeks as had hitherto been the case with lighters. Costs of complete loading operations, including storage dropped from about 14 shillings to an average ot 4 to 5 shillings a ton.(1)

Oil Terminal

in 1953, imports of petroleum products from refineries in Syria and Lebanon werд stopped because of the Iraq revolution. The Jordan Goverhment had no alternative but to go ahead with the long postponed idea of buioding a small oil terminal in Aqaba; thus a tank farm was erected in November 1958 - April 1959. The oil terminal is used for imports of refined petroleum products, petrol, kerosene and diesel fuel oil. The Tank Farm consists of 12 tanks of a total capacity of about 16,000 tons. Tanks are located at a distance of about 300 metres from the sea and at an elevation of 17 to 33 metres above sea level. They are connected by three steel pipes of 6 and 8 inches diameter to one of the large central dolphins of the phosphate berth, where simple facilities have been provided for handling. Tankers up to about 20,000 tons deadweight can be safely moored alongside and petroleum products are pumped through the various pipelines to the tank farm.(2)

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(1) Dock and Harbours Authority 1960

(2) Ibid.

Port Authority

Aqaba port authority was established in 1952 for the administration, maintenance and extension of the port. Operating staff was gradually formed, partly from Palestinian refugees who previously worked in Jaffa or Haifa ports.

The physical handling of cargo and lighterage have been very efficiently organised by private contractors who had considerable experience of such work in Haifa and Jaffa ports. More than 20 privately owned lighters from 50 to 200 tons capacity, 2 loading craft of 600 tons, and several tugs from 50 to 250 h.p. are available for the lighterage service.

AQABA VILLAGE.

Aqaba is a small village on the East side of the head of the Gulf, surrounded by groves of date palms, which conceal it from the sea. North of it lies the broad valley of Wadi Ariba; East of it and bending south-west to the coast at El Bury, steep barren mountains form a strong defensive position in the rear, broken by the Wadi Itm which takes the road to Ma-an, and immediately east of the village by the wadi Shallele.

Today the village of Aqaba is merely a collection of roughly built huts of granite masonry, extending for 800 yards along the shore among palm groves owned from the time immemorial by the Howeitat bedouin. It still shows the effect of occupation during the first war 1914 -1918 and the ruined buildings have been partly replaced by mud huts, chiefly occupied by labourers and fishermen.

Construction of facilities at the port should be integrated with a complete town-planning scheme, calling for general facilitiesssah such as water supply, power plant, post and telephone services, hotels etc. However the U.N. experts are studying a new site for the modern town of Aqaba, and in the next few years the town will grow, due to the growth of Foreign trade through the port.

<u>The Town of the Future</u> (its functions)

The main function of Aqaba port is that it serves as the only port in the whole country. The establishment of the port and the construction of roads connecting the port with the other urban centres of the country attracted many settlers who were working in the construction of the new port and now the town is growing slowly. More functions in future will be created and an additional number of people will move into the town. However Aqaba port became a commercial and business centre mainly in connection with the port trade. Aqaba port is also the largest centre for fishing; it is also the administrative centre of its district. All these funtions are nevertheless of secondary importance and would not have been developed if the first basic one did not exist.

The main and secondary functions described will continue in the near future, unless other unforeseen factors intervene to govern the future development of the town. There are good reasons to believe that the port activities will grow as the country developes. The programme of expansion of shipping facilities provides for the increase of traffic volume to more than double the present level to face the increase of mining industry in the hinterland of the port.

Population

An analysis of the future functions of the town implies that Aqaba port will grow as an urban centre. It is now passing through a period of development which will result in the improvement of the social and economic structure. On the other hand, the influx of the rural population into the town is expected to continue. Old migrants who came alonge in order to find work will bring their families and tend to settle permanently, while the importance of the port will attract new settlers from the countryside. In 1948, the population of Aqaba was about 400 Arabs; in 1952 the number had increased to 2,835.[1] In 1954 there was another increase in the figure which reached 4,972 persons,[2] and that was due to the orientation of the Jordan foreign trade through Aqaba instead of Syria and Lebanon.

According to the statistical yearbook of Jordan the number of population in Aqaba port increased to 9273 persons in 1961 as shewn below (3)

Table 122

Town	Males	Females	Total
Amman	126, 069	119,862	245,931
Ma'an	3,807	3,130	6,937
Zarqa	45,864	45,997	91,861
Aqaba	6,350	2,923	9,273

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(1) Pakai R. The Kingdom of Jordan 1958 page 215

(2) Harris. C. Jordan 1958 page 222

(3) Statistical Year Book Kingdom of Jordan 1961 Page 14

From the last table it is clear that in the urban areas the number of females is nearly the same as that of males, except in the case of Aqaba port where the number of males in more than twice that of the females. This striking phenomenon is mainly due to the economic conditions prevailing in Aqaba, which continue to attract large numbers of male rural population, and refugees who were working in the Palestine ports before 1948 towards the town in search of employment. Thus it is assumed that in future in Aqaba port a number of females will be added to the population tending to equal the number of males. But as no more male population will continue moving into the town, it will be a long time before male and female population will be equal.

Table 123 Registered births and deaths in same towns,1961 (1)

	Births			Deaths		
Town	Males	Females	Total	Males	Females	Total
Amman	6367	5847	12,214	695	690	1385
Ma'an	388	306	694	79	70	149
Zerka	2636	2398	5,034	200	184	384
Aqaba	193	179	372	45	24	69

The above table shows that Aqaba port has a normal annual rate of natural increase which was about 40 per 1000 population and a normal death of about 8 per 1000 population. Thus the growth of the population of Aqaba port and the high percentage of males is due mainly to the movement of males from the rural areas. It is assumed that this growth will continue in future, adding up to a 4.0% total average rate of annual increase. It is assumed also that the present number of the nomads

(1) Statistical Year Book Jordan 1961, table 23 and 26.

leaving the town for a part of the year will tend to diminish. Nomads will be attracted by the better living conditions of the town and they will slowly tend to settle permanently. The population of the town in 1961 was 9273. In accordance with the said rate of increase it is anticipated that the population if the town will be doubled in 18 years. This prediction however may be treated as only approximate because many and various factors will influence the growth of the town. The long-term master programme should take into account all these considerations regarding the increase of populatiön. To have this programme safely based, planning should be done for 20,000 people and in a flexible way so as to allow for possible revisions and expansions,

Public Utility Provisions.

Public Utilities.

Water Supply:- The source of water supply is in Wadi Arabi which lies to the north of the port. In the bed of the wadi the water is collected in underground wells and water is raised to a reservoir with a capacity of 500 tons. Although the water is a little hard it is suitable for all domestic uses in its natural conditions.

Sewerage:- In the new town planning for Aqaba, there will be an adequate main sewerage system covering the whole of the settlement.

Electricity

Recently an electric power station has been built and equipped by Brush electric with three diesel electric generating sets of 360 K.V.A. each and one unit of 225 K.V.A. with one set as standby. A part of the power is now available to the village of Aqaba to supplement several small minicipal generators.[1]

Report by Ministry of Communications - Aqaba port 1959 Aqaba (in Arabic)

EXTERNAL RELATIONS

Transport and Trade routes.

The country's geography makes transport facilities somewhat expensive to construct. The Jordan valley and the Dead sea constitute one of the most marked "breaks" in the earth's surface(1) and the wadis running east and west add to the difficulties of North-South transport(1). Recently a good road has been built connecting the capital Amman with the only port on the Gulf of Aqaba. See Figure 93. However there is a further question of whether transport between Amman and Aqaba should be supplemented by rail. Whether it will be worthwh ile to extend the railway from Nagb Ashtar to Aqaba will depend on the volume of phosphate which Jordan will be able to produce and sell abroad. If Jordan should be able to achieve its recently revised expert target of one million tons a year, and as much as 800,000 tons would have to be shipped in Aqaba, it may well prove economic to extend the railway beyond Nagb Ashtar. The distance from Al Hasa to Aqaba is210 Km, of which only 120 Km can be covered by the existing railway. To burden the existing railway with the phosphate centres at Al Hasa and Roseifa would require a complete renewal of track from Al Hasa to Nagb Ashtar, as well as additional equipment for trans-shipment at Nagb Ashtar. At present there is no direct rail connection from Aqaba to the capital,Amman. The first 86 Km of the

(1) For example, the Jerdaalem-Amman road begins 750 meters above sea level. At Jericho (37 Km away) it is down to 200 meters below sea level. It crosses the Jordan lines at 300 meters below sea level and climbs to more than 1000 metres above sea level before reaching Amman (900 metres above sea level) only 105 Km from Jerusalem (I.B.R.D.) Page 252

journey from Aqaba is by a good asphalted road to the railhead at Ras-el Nagb, 5000 feet above sea level and on the top of an escarpment. At Ma'an a further 42 Km away, the railway joins the Hadjiz railway which was built in the early part of this century to carry pilgrims to Medina (Saudi Arabia) The railway track to the south of Ma'an towards Medina was abandoned after extensive damage during the First World War. In effect therefore the railway now runs from Ras el Nagb to Amman, a distance of 236 Km. The railway is 104 cms gauge; its capacity is about is about 300 - 350 tons per day from Ras-el Nagb to Amman. Today however, the network is not sufficient to serve the economy of the country.

Trade Routes.

A large portion of the population and production of the country is concentrated in a relatively small rectangular are bounded by Madaba, Jerusalem and Isbid. Distances to sea ports at Beirut and Aqaba are long: for instance, these ports are respectively 440Km and 460 Km distant from Jerusalem. Traffic over both routes encounters serious difficulties and the major problem in the field of transport is to improve the means of access to other countries, both to reduce the delivered cost of imports and to enable the country to develope export markets.

Before 1948 transport was oriented in an east-west direction. However, since then, imports other than those from neighbouring countries have come mostly via Beirut, necessitating a very longer rail or road journey and passage through two foreign countries(Syria and Lebanon). The transportation policies of these countries,

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I.B.R.D. op cit page 252

together with currency and customs regulations, add to the difficulties of this route, and in any case the distance from Aqaba to Amman is about the same as from Beirut to Amman. The decision whether the bulk of Jordan's international trade should flow through Beirut or Aqaba must take account of the improvements that can be made in the transport links to each port, the facilities that can be provided at the ports and the shipping costs from each port to the sources of supply of imports and potential markets for exports.

There are both rail and road links to Beirut. The Jordan railway connects with the Syrian Hadjiz railway to Damascus, and from there by the D.H.P.line (Chemin de fer Dames, Hama et Prolongements) to Beirut. Traffic agreements with Syria and Lebanon require that all imports unloaded at Beirut in transit to Jordan be carried by rail, with the exception of a few designated commodities, such as petroleum products. The capacity of this rail link to Beirut is limited to about 120,000 tons per year each way. Multiple customs controls and the necessity to pay transport charges in the currencies of each of the countries through which the line passes create administrative and technical difficulties. The result is that the Beirut-Amman rail journey takes from six to seven days. Despite these difficulties, trafficwith Beirut has reached the following levels (in '000 tons).(1)

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(1) I.B.R.D. op.cit. page 253

Table 124.

Year (1)	Imports	Exports
1948	69	-
1949	76	-
1950	55	20 (cereals)
1951	85	5
1952	98	20
1953	96	28
1954	68	37

The reduction in imports since 1952 is due to the development of Aqaba. Port facilities at Beirut are superior to those at Aqaba. Beirut can now handle more than 120,000 tons of phosphate a year, and this capacity will be increased according to need when the port expands. Moreover, port charges and other shipping costs are always likely to be lower at Beirut than at Aqaba, because of the large volume of traffic (over two million tons annually), the fact that port facilities have already been amortized, and because Beirut is an important commercial centre. The competition Beirut is experiencing from other Mediterranean ports recently constructed or improved (Latakia in northern Syria, Iskedderum in northern Turkey and Tripoli in Northern Lebanon)makes it likely that it will try to retain the Jordan traffic by reducing port charges.(2)

(1) No statistics are available after 1954

(2) I.D.R.B. op.cit. page 253

Table 125 Gross Weight and Value of Imports by Means of Transport and Clearing Posts During 1961

Classification	Value: % of Total	Value: 000 J.Ds.	Gross Weight: % of Total	Gross Weight: 000 Tons
Grand Total	100.00	41832*	100.00	799.8
By Means of Transport				
Trains	6.77	2832	4.20	33.6
Trucks	19.47	8143	21.11	168.8
Ships	65.40	27356	48.40	387.1
Planes	1.88	788	0.09	0.7
Own power	1.79	750	0.23	1.9
Parcel Post	2.05	858	0.04	0.3
Other	2.64	1105	25.93	207.4
By Posts and Means of Transport				
Amman - Total	24.57	10276	42.21	337.6
Trains	5.54	2317	3.65	29.2
Trucks	8.73	3653	6.93	55.4
Ships	5.01	2095	5.51	** 44.1
Planes	1.46	612	0.08	0.6
Own p ower	1.24	517	0.15	1.2
Other	2.59	1082	25.89	207.1
Ramtha - Total	9.94	4158	11.92	95.3
Trucks	9.86	4127	11.89	95.1
Other	0.08	31	0.03	0.2

Contd.

* Excluding imports the individual declared values of which are under (10 J.Ds.)

** Goods imported through Aqaba, but cleared in Amman.

Table 1 25 Gross Weight and Value of Imports by Means of Transport and Clearing Posts During 1961 (Contd.)

Classification	Particulars			
	Value		Gross Weight	
	% of Total	000 J.Ds.	% of Total	000 Tons
Aqaba - Total***	60.42	25275	42.92	343.3
Ships	60.37	25256	42.87	342.9
Other	0.05	19	0.05	0.4
H - 4 - Total	0.95	399	2.10	16.8
Trucks	0.49	205	2.03	16.2
Other	0.46	194	0.07	0.6
Mafraq - Total	1.62	678	0.81	6.5
Trains	1.23	515	0.55	4.4
Trucks	0.36	153	0.25	2.0
Other	0.03	10	0.01	0.1
Other posts - Total	0.45	187	-	-
Parcel Post - Total	2.05	859	0.04	0.3

Source: Ministry of Finance - Customs

*** Excluding goods imported through Aqaba but cleared in other posts.

Finally, goods to or from Europe incur lower charges for sea freight when shipped via Beirut than when shipped via Aqaba. (1) A greater volume of shipping calls at Beirut, and vessels going to Aqaba must pay Suez Canal tolls and detour up the Gulf of Aqaba. However, Asia is likely to be the most important market for Jordan phosphate and potash, and Aqaba has the advantage over Beirut of shorter distance and the avoiding of Suez Canal dues on such exports. However it is important for the country to possess its own port instead of depending on another country entirely for Foreign trade. For instance the great test for the Aqaba port came in summer 1958 when in the confusion following the revolution in Iraq, all the land borders were closed. Cargo accumulated in Beirut and had to be re-shipped from Beirut to Aqaba by sea, including U N R R A supplies for the Palestinian refugees. Petrol and Kerosene, previously supplied from Lebanon or Syrian refineries by road had to be sent to Aqaba in small tankers. As a result, port traffic reached 78,850 tons of cargo in August 1958 compared with the previous monthly average of less than 20,000 tons.

A steady traffic of about 45 to 50,000 tons per month has been handled ever since without difficulties and delays. The events of 1958 gave a striking confirmation to the fact that a well organised port at Aqaba is an essential condition for Jordan's economic and even political independence. Without Aqaba it would have been extremely difficult to master the serious economic crisis resulting from sudden interruption of all overland imports.(2)

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(1) Ibid 254

(2) Melamid A. op cit page 236

TRAFFIC PATTERN of the PORT

Port Traffic

The rapid growth of traffic at Aqaba port has been caused by several factors.

(a) The phenomonal expansion in Jordan Phosphate production and the need of that phosphate in the Indian sub-continent and the far Eastern countries. e.g. Japan.

(b) It was also due to the several regular steamship lines which had been gradually encouraged to include Aqaba port in their schedule of calls from Western Europe and from the U.S.A. to the Red Sea or Eastern Mediterranean ports. i.e. British and Belgian ports, sailing about twice a month. A monthly German serviceconnects Aqaba with ports of the Hamburg - Le Havre range, also calling at Marseilles and Naples. Since 1955 an American line called at Aqaba monthly on journeys to and from U.S., Gulf and Atlantic ports. The same shipping lines connect Aqaba with Eastern Ports, except for phosphates (shipped mainly by charter vessels) to India and Japan.

(c) Intermediate trade and commerce of Jordan having been oriented to the Western coastal ports, transport facilities north to Beirut in Lebanon or South to Jordan's only outlet to the sea at Aqaba played a relatively small part in the past. Now Jordan almost exclusively relies on Aqaba as the main outlet for international trade.

The Growth of port Traffic

Commercial traffic her been flowing through Aqaba only since 1950; the table below shows the yearly progress of the port traffic from 1952 to 1961, The increase of traffic not only kept step with the temporary technical and operating improvements, but was ahead of most optimistic expectations, with the exception only of the period from August 1956 to June 1957 when traffic through the Suez Canal was interrupted. Arrivals at Aqaba rose from 122 vessels in 1953 to 443 in 1961. During the Suez war the drop was from 222 vessels in 1955 to 104 vessels in 1957 as shown in the table.

Table 126

The yearly progress of the port of Aqaba 1953 - 1961[1]

Year	No. of Vessels	Imports (tons)	Exports (tons)	Total Cargo.
1952	-	50.850	-	50.850
1953	122	67.665	4.029	71.694
1954	173	80.012	12.339	92.351
1955	222	134.626	66.250	200.876
(1) 1956	155	76.796	77.267	144.062
(2) 1957	104	47.603	99.770	147.376
1958	305	272.405	137.812	410.217
1959	369	453.659	130.658	584.331
1960	409	461.303	223.343	686.646
1961	443	420.674	312.748	733.422

(1) Statiscal Yearbook Jordan 1961

(2) I.D.R.B. op cit page 255

Goods traffic (Figure 94)

In terms of volume of cargo imported through Aqaba in 1961, it accounts for about 51% of all goods imported by all means of transport by weight and 62% of the total value of imports through all routes. The advantages of Beirut compared to Aqaba can be expected to lead to somewhat less than half of Jordan's total imports entering via Aqaba. However almost 70% of exports are expected to be shipped through Aqaba by 1965.

Table 127

Forecast of International Traffic in 1965

	Total	Damascus -Beirut	via Aqaba	Iraq ('000 tons)
Imports				
Food stuffs	30	5	20	5
Fertilizers	20	-	20	-
Building materials.	150	90	60	-
Petroleum products	5	5	-	-
Others	30	20	10	-
Total	235	120	110	5
Exports				
Phosphate	770	200	840	-
Foodstuffs	65	45	-	20
Total	835	245	870	20

This estimate of the expected traffic in o965 was put by a Mission organised by the International Bank for teconstruction and development in 1957.

According to this estimate the total imports will reach the level of 235.000 tons by 1965 but according to the statistics of 1961, imports accounted for 799,800 tons, which is far higher than the estimates. The Mission estimate indicated that imports through Aqaba in 1965 will reach the level of 110,000 tons, but in 1961 imports through Aqaba had already reached the level of 420,674 tons. According to the exports, they put the figure of 870,000 tons for exports through Aqaba, suggested that it will be possible that some superphosphate and some barite and paper clay may be expected before the end of the decade, Exports through Aqaba were 312,748 tons in 1961.

I.D.R.B. op.cit page 255

External trade

The relative importance of Aqaba port in Jordan's external trade is necessarily governed by the structure and orientation of this trade. Bearing in mind the nature of the economic upheaval which overtook the country in 1948 and the absence of any local industrial raw materials, it is hardly surprising that Jordan's economy should require heavy financial assistance from abroad to make ends meet. The country's foreign trade, in particular, follows an exceedingly unusual pattern. During the six years from 1951 to 1956, the average annual value of exports and re-exports amounted to J.D. 2.6 millions. Imports amounted to no less that J.D. 21 millions, so that only an eigth of the value of Jordan's imports was paid for by the country's exports. (1)

Great efforts have been made to expand exports, and in 1961 they were valued at J.D. 5·3 million compared with J.D. 1·5 million in 1951. Nevertheless the progress of the country's deve,opment in that period has inevitably been followed by a heavy increase in imports, which were valued in 1951 at J.D. 41·9 million compared with only J.D. 15·7 million in 1951 (2).

Exports.

The most striking features of the commodity composition of exports are the predominance of agricultural products. In 1958, for instance, just over 43 per cent of the total value was accounted

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(1) Statistical Year Book 1961

(2) Ibid.

for by vegetables, principally tomatoes, fruit mainly water melons, and olive oil. A substantial amount of phosphates is now exported, about 30 % of the total value of export trade in 1961.(1)

Imports.

The import trade is naturally more varied, since1950 the total value of imports has risen, though the rate of increase has been less rapid in recent years than it was in 1950 -51. By far the largest item consists of grain and flour, imports of which in 1958 amounted to J.D. 4.3 million or about 12.7% of the total, compared with a total figure of domestic exports of all kinds that year of J.D. 3.5 million. Imports of fuel oil, motor vehicles, and machinery each accounted for about J.D. 2 million, or about 6% of the total. In 1961 fuel oil amounted to J.D. 2.5 million, motor vehicles and machinery amounted in 1961 to J.D. 2.7 million. The remaining imports consisted of a wide variety of manufactured goods not produced in Jordan, notable sugar amounted to J.D. 1.3 million in 1961, coffee, tea, mate, and spices amounted to J.D. 2.9 million, cotton to J.D. 1.9 million, Iron and steel and articles thereof amounted to J.D. 2.6 million.(2)

In brief, Jordan's foreign trade is largely dependent upon import activities that supply the country's needs for agricultural and industrial products. The bulk of exports, mainly agricultural foods-stuffs is absorbed by neighbouring Arab countries.

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(1) I b i d

(2) Statistical Year Books - Jordan

Table 128 Trade with Arab Countries

	1961 Imports	1961 Exports	1960 Imports	1960 Exports	1959 Imports	1959 Exports	1958 Imports	1958 Exports	1957 Imports	1957 Exports	1956 Imports	1956 Exports
Syrian Arab Republic	2084361	814488	2835575	657476	2958103	717699	2815932	970738	1939613	1197091	1670072	1144113
Lebanon	1829533	548787	2219375	521171	1714472	385799	1203961	326685	1590462	999418	1190547	1764645
Saudi Arabia	1246139	388316	2241586	320950	531344	346835	738572	255474	1641410	295212	1195014	166377
Un.Arab Repub.	911247	1042	801755	505	735056	968	1049821	4583	1175190	931	909790	5337
Iraq	442389	353012	48627	147737	211661	178872	1274423	305318	658642	465209	869315	443179
Sudan	271485	1450	262817	327	321691	325	105302	262	6692	320	3191	6
Aden	197782	2113	115786	486	406934	471	18544	208	56267	960	298389	268
Kuwait	150421	500902	2965	461008	6608	397920	-	263477	270	208791	950	118263
Morocco	27980	4	27223	106	11760	-	-	-	3119	-	10	6
Algeria	1516	-	660	-	67	-	970	-	19079	-	37656	-
Libya	72	520	-	765	217	1089	20	849	-	1407	-	482
Bahrein	30	1774	33995	3281	60	857	-	229	-	941	19792	94
Yemen	26	91	-	-	-	-	15	-	124	-	-	-
Qatar	-	9276	845	3769	-	2009	-	295	-	1172	-	248
Tunisia	-	20	-	58	20100	275	-	-	-	-	-	5
Hadramout	-	12	-	-	-	-	129	-	-	-	-	-
Oman	-	-	-	-	-	59	-	-	-	-	-	-
Muscat	-	-	-	-	-	-	-	-	-	-	-	-
Total	7162981	2621807	8591209	2117639	6918073	2033162	7207689	2128118	7090867	3171452	6214726	3543023
Percentage of total value of trade	17	62	20	61	17	66	21	68	23	74	22	83

Source: Ministry of Finance - Customs.

Table 129 External Trade by Countries During 1959 - 1961

Countries	1961 Imports	1961 Exports	1960 Imports	1960 Exports	1959 Imports	1959 Exports
Total	41909.8	4251.8	42934.7	3480.9	40328.4	3097.5
U.S.A.	7003.8	10.7	5072.5	18.1	3761.2	17.1
United Kingdom	6611.0	4.3	6036.6	2.5	4794.0	1.2
Germany-Federal Republic	3783.4	6.2	4328.0	5.6	4894.7	5.2
Syrian Arab Republic	2084.4	814.5	2835.6	657.5	2958.1	717.7
Lebanon	1829.6	548.8	2219.4	521.2	1714.5	385.8
Japan	1710.8	68.2	1535.9	-	1747.3	-
Netherlands	1257.2	1.2	1450.1	0.2	1302.9	-
Italy	1249.7	0.1	3103.9	6.5	3307.9	2.6
Saudi Arabia	1246.1	388.3	2241.6	320.9	531.3	346.8
Turkey	1220.4	-	618.3	-	761.4	-
Belgium	1108.1	2.9	932.5	2.6	824.1	2.7
United Arab Republic	911.2	1.0	801.8	0.5	735.1	1.0
France	737.9	1.4	885.5	2.7	762.9	1.2
Lebanon - Foreign	674.5	-	2786.3	-	3116.0	-
B ulgary	560.2	-	498.2	-	254.3	-
India	547.6	388.3	105.1	288.1	103.6	59.7
Austria	534.2	-	490.5	0.2	479.1	0.1
Sweden	517.2	0.7	506.0	0.2	481.8	0.3
Czechoslovakia	451.5	276.1	342.6	208.4	402.2	199.2
Iraq	442.4	353.0	48.6	147.7	211.7	178.9
East Germany	416.9	-	446.4	-	783.8	-
Iran	402.7	1.6	286.4	5.5	780.8	5.2
Spain	392.7	37.6	162.1	29.1	116.5	0.4
Switzerland	370.6	0.2	259.6	6.3	249.8	0.1
Romania	360.3	-	372.2	-	249.9	-

Contd.

Table 129 External Trade by Countries During 1959-1961 (Contd.)

Countries	1961		1960		1959	
	Imports	Exports	Imports	Exports	Imports	Exports
Ceylon	330.0	-	467.2	0.1	530.2	0.1
China	324.1	-	398.8	-	415.8	-
Yugo slavia	300.1	777.9	257.1	597.5	315.1	630.0
Sudan	271.5	1.4	262.8	0.2	321.7	0.3
Argentina	268.7	-	160.9	-	24.5	-
Denmark	257.1	0.5	232.5	0.7	199.6	-
Poland	237.0	43.5	271.7	168.2	448.7	133.3
Malaya	229.4	-	105.5	-	10.7	-
Canada	222.0	0.6	280.9	1.0	19.0	0.6
Ethiopia	221.0	-	49.2	-	44.1	-
Finland	209.7	-	116.9	-	241.4	-
Aden	197.8	2.1	115.8	0.5	406.9	0.5
Hungary	197.3	-	182.3	-	254.3	-
Portugal	169.9	0.1	190.5	-	88.3	-
Luxembourg	160.1	-	105.1	-	72.5	-
Hong Kong	159.3	-	76.6	-	90.1	-
Kuwait	150.4	500.9	3.0	461.0	6.6	397.9
Australia	141.3	0.2	301.9	0.1	164.2	-
Brazil	132.6	-	145.1	0.1	251.6	-
New Zealand	128.3	-	0.7	-	-	-
Uganda	125.9	-	39.7	-	16.5	-
Other Countries	1051.9	19.5	804.8	27.7	1081.7	9.6

Source:- Ministry of Finance - Customs

In 1956 external trade with Arab countries account for 83% of the total exports and 22% of the total imports, but recently this level decreased to 62% of the total exports and 17% of the total imports of 1961, (Table 128). This decrease was due to the political crisis with some of the Arab countries.

The relatively wide discrepancy between the value of Jordinian imports and exports is indicated in Table 129. An average import-export ratio of roughly 8.1 for the three years under consideration is considered exceedingly high. The deficit is largely met from the British grants, UNRWA assistance, and United States technical assistance (point 4 aid).[1]

In view of the above situation, Jordan has attempted to accomplish two main objectives; first the development of the country's agricultural and industrial fields to support the increase in population, to learn its dependence on foreign aid and to narrow the gap between imports and exports; second, to find markets for its exports.

THE HINTERLAND

The nature of the Hinterland

Jordan is predominantly an agricultural and pastoral country, with few other economic assets. Crops already occupy every acre of lahd which it is now feasible to cultivate. Any considerable expansion of crop area must wait for expensive irrigation projects who overall potentials are quite limited, or on further penetration into the desert.[2]

(I) Patai. op. cit. p.107
(2) Cressey, O. Crossroads p.462

The total crop area, as shown in the accompanying table amounts to about 2 million acres, or 3,100 square miles. This represents only 8% of the entire national area of 37,500 square miles. Since the refugees are fed in part by imported food supplies, it may not be fair to include them on a per capita basis, but the crop area averages little more than an acre per person.

Wheat is by far the chief crop, but only a third of the wheat-growing area is assured of a good harvest each year; other crops are millet, barley, corn, sesame, beans, tobacco, figs, grapes, olives and vegetables. There is a considerable export of tomatoes from the Jordan valley. Cereal imports are generally required, along with sugar coffee and cotton piece goods; this value considerably exceeds that of the exports; lastly, agricultural produce accounts for around 90% of Jordinian exports.(1)

In addition to agricultural resources, Jordan has access to the dissolved minerals of the Dead Sea, three-quarters of whose shore line lie within the country. The pre-partition evaporating plant near the mouth of the Jordan River, destroyed during the fighting in 1948, has been rebuilt and now produces potash and bromine in the form of potassiom chloride and magnesium bromide. The dissolved potash in the sea amounts to 2 billion tons, while magnesium bromide totals 900 million tons, so that the reserves are almost inexhaustible. The average total salinity of the Dead Sea amounts to 24%, while normal

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Patai.
(1) <u>The kingdom of Jordan</u> page 119.

sea water has a salinity of about 3.5%. Since the concentration of salts in the Dead Sea increases with depth, brine for evaporation is pumped from the lower levels. Due to the low humidity and high temperatures, solar evaporation in the Dead Sea area is rapid, amounting to nearly half an inch a day in summer, and as a result, production costs are low. (1)

Dead Sea Salt.

	Surface composition	175 ft depth
Sodium Chloride	7.0%	9.3%
Potassium Chloride	1.0%	1.5%
Magnesium bromide	0.5%	0.7%
Magnesium Chloride	11.0%	17.0%

Potash is a major fertilizer, while bromine has a wide array of uses in industry. The largest markets for potash are in Southern and South-eastern Asia and in South Africa via Aqaba port.

Rich phosphate deposits, another source of fertilizer, are mined at Roseifa and a Al Hara near Amman and exported through Aqaba.(2) The deposits occur in limestone beds of Eocene age, four - six foot thick and are mined underground. Proven and inferred reserves at Roseifa amounted to 32, 742, 000 tons and at Al Hasa to 9.345.000 tons. As exports overseas from the port of Aqaba consist almost exclusively of raw phosphates, it is essential to deal with their resources more fully.

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(1) Cressey G.B. Crossroads 1960 pages 463-464

(2) See the map of Mineral Locations Jordan Figure 95

Phosphate

Phosphate deposits have been located in an area stretching from North of Amman to the Aqaba region. The main concentrations so far discovered are at Roseifa, 14 kilometres notth of Amman; at Al Hasa 160 kilometres south of Amman and 200 kilometres north of Aqaba; at Ma'an and at Nagb Ashtar.(1)

Jordan's phosphates deposits are of very good quality, on a par with Moroccan phosphate; almost all exports go to India and Japan. Jordan is favourably situated with respect to markets in the East Mediterranean area, where the grade of the Jordan products gives it an advantage over Egyptian phosphate. India is a natural and growing market; the use of nitrogenous fertilizers is increasing rapidly and an increased need for phosphate is probable consequence. Freight rates to India from Aqaba are approximately J.D. 2.7 per ton lower than from Florida and J.D. 1.0 per ton lower from Morocco. Japan is one of the largest purchasers of Jordan phosphate. Jordan rock has a lower iron and alumina content and is easier to grind, qualities which are advantageous in the manufacture of high-grade superphosphate. Moroccon phosphate has a freight advantage in the European market but Jordan can probably sell in the Eastern fringe. However, demand has been growing for Jordan phosphate in the last few years. Originally plans called for an increase in Jordinian phosphate production to 700,000 tons by 1965.

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(1) Patai R. The Kingdom of Jordan 1958 page 114

(2) International Bank for Reconstruction and development. The economic Development of Jordan. Baltimore 1957 page 188

Marketing, however will be a difficult problem, as the entire output with the exception of an insignificant quantity will need to be sold abroad. World consumption of phosphate is expected to rise about 30 - 40% in the next decade and competition for this market is likely to be intensive. Jordan must therefore overcome substantial marketing difficulties to sell as large a quantity as 1 million tons.

The Production of Phosphate.[1] (000 tons)

	1958	1959	1960	1961
Production.	294	338	362	423

Roseifa deposit.

There appears to be four beds of high grade phosphate, 1½ to 2 metres thick, separated by deposits of limestone and other sedimentary rock ranging in thickness from 1 to 6 metres. The Roseifa mine is operated by the Jordan phosphate Mines Co., in which the government owns about 50% of the share. The expansion programme aimed at increasing production to 1 million tons in the next few years, proposed physical improvements (building and equipment) designed to reduce handling losses and costs by eliminating much of the hand labour and transporting stages. The Roseifa deposits are estimated at 32 million tons of calcium phosphate with the high content of 72 - 74%[2]

(1) Statistical Yearbook - Dept of statistics. Ministry of National Economy - Jordan 1961 page 159.

(2) Patai R op cit page 114

Al Hasa Deposit.

The geology of the Al Hasa deposit, also under lease to the Jordan Phosphate Co differs in several respects from that of the Roseifa area. The phosphate occurs in some places just above, and in others, just below, a bed of oyster shells as much as six meters thick.(1)

Al Hasa itself is a station on the Hedjaz railroad, and the "Desert Road" to Aqaba runs through the property. Al Hasa deposits are estimated at 14 million tons with a content varying between 62% and 72% (2) Between 1932, when the deposits were discovered, and 1951, output totaled only 57,000 tons but since then production has risen sharply to 80,000 tons in 1954. There was a further large increase in 1961. The Al Hasa deposit has the advantage of being only 210 kilometres from Aqaba. Transport by road to Aqaba costs as much as transport from Roseifa to Aqaba by rail and road.

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(1) I.B.R.D. op cit page 187

(2) Patai R. op cit page 114.

Table 130 The Forelands of Jordan (oooJ. Os.)

	Import				Export				Total (import & export)			
	1959		1961		1959		1961		1959		1961	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Americas	4056.3	10.0	7627.1	18.22	17.7	0.54	11.7	0.23	4074.0	9.40	7638.4	16.56
Europe	21285.2	52.83	21102.5	50.25	976.3	31.5	1152.7	27.1	22261.5	51.2	22255.2	48.2
Middle East	10782.7	26.7	8210.6	19.66	2034.1	65.73	2611.6	61.5	12816.8	29.56	10822.2	23.5
Asia	2897.7	7.2	3301.2	7.88	59.8	1.92	456.5	10.72	2957.5	6.82	3757.5	8.12
Africa	60.6	0.15	346.9	0.83	-	-	-	-	60.6	0.14	346.9	0.72
Oceania	164.2	0.41	269.6	0.64	-	-	0.2	-	164.2	0.38	269.8	0.58
Other Countries	1081.7	2.71	1051.9	2.52	9.6	0.31	19.5	0.45	1091.3	2.5	1071.4	2.32
Total	40328.4	100	41909.8	100	3097.5	100	4251.8	100	43425.9	100	46161.4	100

Source: Statistical Yearbook of Jordan, 1961

THE FORELAND

Turning next to the Forelands of Aqaba, it is clear that developments there can be equally as important factors in port traffic as those in the Hinterlands. Statistics concerning the foreland of Aqaba port are not available, but the external trade of Jordan might be used to give an idea about the foreland of Aqaba because more than 85% of the total trade of Jordan is shipped through its only port on the Red Sea.

From table 130 it is obvious that Europe was the major supplier of imports in 1961; its share was 50% of the total import, followed by the Middle East 19.5%, Americas 18%, and Asia 8%. Trade with Africa was negligible. Exports were mainly to the Middle East countries whose share in 1961 was 51.5% of the total exports; Europe came second 27%, Asia 11%. Total imports and exports by the forelands (table 130) shows the changes between 1959 and 1961 with shifted emphasis on various continents. Europe has gained 48% of the total trade, followed by the Middle East countries 23.5%, and the Americas 17% and Asia 8%.(1) Trade has been increased with the Americas from 9% in 1939 to 17% in 1951, and decreased in the case of the Middle East from 30% to 23.5%; this decrease is due to the political situation in the Arab countries surrounding Jordan.

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(1) See Figure 96.

CHAPTER XI

JIDDA PORT

GEOGRAPHICAL ASPECTS OF THE PORT AND TOWN

Physical setting - Historical development - Layout of the moder n port - Recent growth of Jidda Town - The function of the town - Industry - Growth of population - Public utility provision.

EXTERNAL RELATIONS

Transport and trade routes - Traffic patern of the port - hinterland - foreland.

Jidda Port

Physical setting.

Jidda is the main harbour town of Al-Hijaz on the Red Sea (Latitude 21° 30', Longitude 39° 10'). It forms a triangle with the two holy cities of Islam, Mecca (76 kms.) and Medina (425 kms.), providing a 'gateway' to central Arabia, not merely by reason of its general middle latitude, but also, to a minor degree, because it lies in the "waist" of Arabia, giving the shortest distance between the Persian Gulf and the Red Sea Coast.

The coastal area is bounded on the east by the Red Sea, on the west by al-Hijaz mountains ('barrier'), in the south by Aśir ("difficult area"); to the north the coastal area extends to the head of the Gulf of Agaba.

The area is naturally divided into three zones approximately parallel to the coast: the shore, the coastal and sub-coastal plains and the hills massif.

The shore consists largely of raised quaternary coral reefs. The reefs fronting the coast between Ras al Farma and Jidda, about 470 miles south-south-eastwards, either extend in ridges and are almost steep-to, or lie on extensive bens; these reefs vary from 2 to 3 miles in length.(1) The shore in the vicinity of Jidda consists of sandbanks with coral bases, with off-lying reefs almost parallel and in many places connected with it.

(1) The Red Sea Pilot, p.268

The inlets on this coast, the entrances to which are very difficult to distinguish, afford convenient harbours such as Jidda and Yenbo.

The Coastal Plain

The coastal plain averages 10 - 40 miles in width behind Jidda, and is known as Tihana and it consists of alluvium, reefs and scanty flows of lava, resting sometimes on old alluvium derived from the ancient basement massif which lies to the east.(1) The coastal plains are crossed by many valleys (wadis), most of which do not flow as far as the sea but are largely lost in the plain. There are great wadis, reaching far to the east, the largest of which is Wadi Hamdh, south of Weigh. Other important valleys are the Wadi Yenbo, Wadi Rabigh, Wadi Ghoran and Wadi Fatimah. At times they carry large amounts of water and also vast quantities of silt. The deposit of silt forms many fertile arable lands in places where the river bends, and at the emergence of streams from the mountain walls and the confluence of the rivers with the sea.(2) The water courses which flow into the Red Sea have a marked seasonal regime, short and torrential in spate, with the exception of the long Wadi Hamdh which comes out at Medina.(3) This large wadi shows some anomalies, related perhaps to river capture, and the streams of lava which may have led to important modifications of drainage pattern.

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(1) Karpoff, R. op. cit. 1959. p.666.
(2) Twitchell, K.S. Saudi Arabia, 1958. p.13
(3) Karpoff, R. Esquisse Geologioue de L'Arabic seoudite. Bulletin societe Geologique la France de serie, 1957. p.656

The Hills

The third zone is the hill mass, formed by uptilting and buckling of the plateau-edge, and composed of pre-Cambrian crystalline rocks (granite, schist, porphyry) with numerous lava flows(barra).(1) This upland, which reaches 9,000 ft. in places, is known as the Madian in the Hedjaz, and further south (in Asir) as the Serah.(2). This zone of old rocks thrown up by more recent lavas stretches from north-north-west to the south-south-east, parallel to the Red Sea, from which it is separated by a generally narrow coastal plain.

The plain behind Jidda extends to a massive, rugged mountain wall of igneous and metamorphic rocks, rising to over 8,000 ft. behind Mecca, 4,000 ft. west of Mahad Dhahab, 3,000 ft., near Medina.(3) The mountains which lie eastward of the plain extending inland from the town are: Jabal Umm Arar, 580 ft. high, situated in the range northward of Jidda; Jabal Gamanjy, 920 ft. high, about 11 miles south-eastward of Jabal Umm Arar; Jabal al Moya, 440 ft. high, about 7 miles south-westward of Jabal Yamaniya; Jabal Sanam, 960 ft. high, about 4½ miles to the east of Jabal al Moya, and Jabal Hadda, about 10 miles eastward of Jabal Yamaniya, 2,650 ft. This latter is the highest and most prominent of the nearer mountains.

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(1) Lemare. Structure Geologique de l'Arabia. 1936
(2) Fisher, W.B. The Middle East, 1961. p.452
(3) The Red Sea Pilot. p.299

Historical development

The importance of Jidda dates from the foundation of the Arab Moslem power, when the town became the sea exit of the capital of a world empire. Though the seat of empire was soon transferred from Mecca elsewhere, Jidda retained a large share in the profitable spice trade of the Red Sea which had passed increasingly under Arab control after the rise of Islam. It was only gradually after the Portuguese circumnavigation of Africa that Jidda ceased to be a commercial entrepot of importance and was reduced to the status of a pilgrim port. Direct attempts by the Portuguese in the sixteenth century to seize Jidda or to blockade its trade, failed. As a part of the domain of the Sharif of Mecca, Jidda fell under Turkish sovereignty in 1517.(1) In 1761 the town was in a more ruinous condition than before because the Turks were interested in collecting customs tariffs only. The products of the customs tariff were shared between the Sharif and the Ottoman Sultan; the rate was 10 per cent for all comers except the English who then monopolised the European trade of Jidda and enjoyed a remission of 2 per cent.(2) Between 1806 and 1811 the Turks were driven out by the Wahhábis who were expelled in turn by Muhammed Ali of Egypt. After 1840 Turkish authority was restored and lasted until a joint Arab and British assault drove the Turks out in 1916. In 1925, after the Saudi-Hejaz war, Jidda was incorporated in the Saudi kingdom.(3) By that time the town was surrounded by a wall of corraline rock faced with mud brick, 10 - 12 ft. high, with a broad, roughly-surfaced road inside. (Fig.97)

(1) Western Arabia & the Red Sea. op. cit.
(2) Ibid
(3) Ibid

There were a water-gate, three main landward gates named after Mecca, Al Madina, and the Sharif, and several posterns. The houses were mostly built of coralline rock. The town was small by that time (see Fig. and the port also was in bad condition. After the discovery of oil in Saudi Arabia, the condition of the port and town of Jidda changed to a great extent as will be seen further in the study of the port and town.

Position. (Layout of the modern Port)

The exact position of Jidda port is 21°23' N., 39° 11' E., 190 miles from Port Sudan and 711 miles from Suez.

The modern port is well sheltered by lines of reefs and the sea within then is comparatively smooth. The outlying reefs form three nearly parallel lines, about ten miles long, northward and southward, between Ras Qatraz, the northern entrance point of Jidda bay, and Ras al Aswad, the northern extremity of a low sandy projection, about 9½ miles southward (see Fig. 98).

Anchorage

The harbour is divided into two anchorages, known as the inner and outer anchorages. The outer anchorage is situated to the west of the Island of Bahri between the second and third line of Reefs of Jidda.(1)

The inner anchorage, which lies between the coastal reef fronting the town of Jidda, on the eastern side, and Sheikh Ras ar Radhem and Barri, on the western side, is encumbered with reefs and shoals. The principal such features bordering the fairway are Sheikh Ras ar Radham, Barri, a reef extending 1½ miles southward from a position close westward of the south-western side of Sheikh Ras ar Radham;(2) Bahri, a reef which dries on the northern side of the entrance to the inner anchorage, about 1½ cables westward of the southern end of Barri, extending about 6¼ cables northward and southward. Abu Harith is about one cable south of Bahri, dries, and extends about 1½ miles southward.

(1) Campbell, F.S. The Ports of the World. The Blue book of Shipping. London, 1962, p.478

(2) Red Sea Pilot. p.302

The inner anchorage is wide and has depths of from 24 to 63 ft. The approach from southward is through a very narrow channel, between shallow banks on either side; a depth of at least 28 ft. can be expected in this approach.(1)

There are three gateways leading to the main port. The North gateway, the entrance to which is situated 1½ miles north-eatward of Qaham beacon, is a narrow channel, with depths of 21 and 27 ft. in the fairway.

Middle gateway, in which there is a depth of 33 ft., lies about one-quarter-mile to the south of the North gateway. It is about one cable wide and is the passage most usually taken (see Fig.98).

South gateway, southward of Falahiyat reef, is very narrow, and there are several sunken rocks on its southern side.(2)

Growth of Port Facilities.

Before 1951 traffic in Jidda sea port was somewhat problematical. Vessels had to anchor away from the port and unload their cargoes into sailing dhows, delivering to the old customs quay. In 1951 a pier was completed by the International Bechtel Corporation. This pier is 1,845 ft. overall length and the approach causeway and trestle is 1,285 ft. long, carrying a roadway 24 ft. wide.(3) The pierhead is 100 ft. by 500 ft. and it accommodates two freighters simultaneously. In 1957 the International Bechtel Corporation constructed a new pier, 5,500 ft. of causeway and 1,845 ft. steel trestle.(4) About 6½ cables north of the main port the Saudi Arabian Mining Syndicate had constructed

(1) Campbell, F.S. op. cit. p.478
(2) Red Sea Pilot. p. 304.
(3) Twitchell, K.S. op. cit. p.95.
(4) Report by the Authority of Jidda Port. 1962.

a pier in 1937.[1] This extended 3,200 ft. from shore and carried a 12 ft. roadway. At the pierhead the two fathoms depth of water provided for the berthing of two 50-ton steel lighters operated by a 60 h.p. tug. Supplies for the mine landed here and the gold ore concentrates and precipitates were exported. Since the mine was worked out in 1954 and the company liquidated, this pier and installation have reverted to the Saudi government according to the terms of the concession.

Berths.

Alongside the main pier there are two berths, each 550 ft. long and 32 ft. deep. Along the marginal quay there is one berth, 400 ft. long with a depth of 18 ft. (Fig.98).

Inner Anchorage: On the south side there can be accommodated four ships, with depth 15 ft.; on the northside, there is room for the accommodation of 10 small ships, with depth 20 ft.

About 1½ miles southward of Jidda pier, there is a berth with a dolphin, 12 ft. in height, surmounted by a platform, 20 ft. square, connected to the shore by a pipeline.[2] Oil tankers, when discharging oil at the northern pier, anchor off the head of the pier with their sterns secured to the mooring buoy. The new oil terminal is used for imports of refined petroleum products, petrol, kerosene and diesel fuel oil. Several tanks are located at a distance of about 350 metres from the shore; they are connected by a pipeline with the shore. There is a depth of 30 ft. at the dolphin. (Fig.98).

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(1) Twitchell, K.S. op. cit. p.95
(2) Supplement No.2, 1959. Relating to the Red Sea Pilot. p.28

Heavy Lift

There is one crane fixed at the end of the main pier which is capable of lifting up to 50 tons at 40° from vessels lying at the north berth only. There are also the following mobile cranes[1] available for discharging lighters and sambouks (country crafts).

1 crane,	lifting	capacity	20	tons.
2 cranes	"	"	15	"
1 crane	"	"	10	"
6 cranes	"	"	3	"

There are 120 sambouks (country craft) of 5/25 tons capacity also available. These sambouks are utilised for livestock, timber, asphalt, fruits and vegetables and rarely for general cargo.[2] Each sambouk can carry about 12 tons of cargo.

Tugs

There are two tugs, one of 1,000 h.p. and another one of 700 h.p.; there are also two motor boats of 180 h.p. each for towing lighters.

Warehouses

The selection of sites of wharves is more or less determined by the physical environment. All the deep-water wharves and wharf warehouses are built on the western shore of the island on which the port is constructed, and which is connected to the land by a causeway. It seems that no space can further be spared for the building of new warehouses. At present, most of the transit sheds and warehouses are reinforced concrete structures and are of one-storey buildings. The total storage including open ground is about 50,000 tons.[3]

(1) Report by The Authority of Jidda Port, 1962.
(2) " " " " " " " "
(3) Ibid.

Port Facilities

Stocks of oil fuel and diesel oil are held for ship bunkering purposes. Fresh water is laid on at the stone wharf.

Future Development

Numerous plans for improving harbour facilities are currently under study. The latest plan for the development of Jidda port (Fig.99) will be started very soon. The plan will afford many warehouses and the dredging of the inner harbour for large vessels. Handling equipment will be available for dealing with import and export cargoes, and will include tugs, powerful floating and other cranes. The extension of the port area will be to the north over the shallow coral reefs, as shown in Fig.99. Proposed industrial district will be to the east of the port.

The fish quay will be finished very soon, on the seaward side of the reef traversed by the causeway from Jidda pier to Jidda, extending about 4 cables northward and 2¼ cables southward of the rest of Jidda pier. There are several rocks and shoals off it.

Recent growth of Jidda Town

Until 1947 Jidda was a walled city with three gateways; the gate facing south was called and Yemen, the one facing toward the Holy City, the Mecca Gate, and that facing north was the Medina Gate. In 1947 the walls and ggtes were demolished (1). Between 1947 and 1961 the town's area has grown and become about 20 times as as large as the original core's area.(see Fig.100). The town and its airport now cover an area of 30 sq. kms. approximately. This rapid growth has taken place without any effective municipal control. Around the original core, the town plan developed in a ring-radial form. An urban ring of about 2 kms. width had been built up surrounding the original core. This extension swallowed the old bedouins settlements within. The radial extension took place northwards in a ribbon form on both sides of the Medina road. The same thing had happened eastwards along the Mecca road.(2) To the south, extension did not take place because the road to Tizan in the south is not yet constructed. Instead a sector of a ring has been developed between the harbour and Mecca Road.

Figure 101 shows the general condition of the residential areas of Jidda, the location of the shopping centres and the other main uses. It shows also east towards the airport a small farm which is irrigated from the rain water floods coming from the nearby valley.

To-day the majority of the population of Jidda live in below-standard housing conditions, in slum and blighted areas. These areas

(1) Twitchell, K.S. op. cit. p.107.
(2) Makhlouf, A. Report on Jidda, UNTAO. Unpublished report, Jidda 1961. p.14

cover a considerable portion of the urban fabric of Jidda, yet while the people have all the evils of slum and blight, two positive values could be observed in them.(1) First, there is a remarkable social cohesion between the inhabitants; secondly is the successful solution by the town-builders in minimising the effects of the sun and of the hot weather. This is witnessed inside the buildings with their patios, and by walking through the narrow lanes.

As regards the recently built areas, the situation is altogether different. There are building units having a high standard of accommodation, relying on mechanised means for air-conditioning.

Everything was built in a hurry without due regard to any consideration except profit and self-expression. The result was mediocre architecture without any ethical background.(2) The situation in these areas was aggravated by the lack of any effective municipal control, e.g. many builders annexed planned streets to their property.(3)

<u>Recent expansion of Jidda</u>

The expansion of Jidda is now influenced by seaborne traffic, the pilgrimage season and by commercial and administrative activities.

The rapid increase of traffic after the development of the port attracted expansion southward, though growth in this direction has now nearly ceased because the road to Tizan, which is 465 miles south of Jidda, has not yet been constructed.(see Figure 101).

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(1) Makhlouf, A. op. cit. p.15
(2) Ibid
(3) Observed during the field work by author in 1961.

Northern Extension

This extension took place in a ribbon form on both sides of the Medina road, for a distance of 10 miles, effected by the pilgrimage traffic to the Medina, the second Holy City. This extension will, in time, reach the village of Rabigh, which is 25 miles to the north of Jidda. This northern extension is limited to the east by the airport and to the west by the Red Sea.

To-day the cement factory, which is about 9 miles to the north of Jidda, adds to the recent expansion of this district. Its site has a disadvantage, from the town-planning point of view, in being in the north of the town (prevailing winds blow from the north and north-west).[1] The best place for the industrial area would have been to the south of the town.

The northern sector is the site of all foreign embassies, legations and delegations, the principal of which are the Embassies of the United States of America at Rawies, six miles north of the centre of the town; Spain, Egypt, Syria, Lebanon, Iraq and Italy, at the Bagdadia quarter which is 1½ miles to the north of the town centre. The embassy quarter is the most modern and tidy quarter in all Jidda. To the west of this sector there is the Saudi Educational Settlement, which is bounded by the coast. Here there is a complete centre for primary and secondary education, the industrial school, the hostel administration, the Directorate for the Maintenance of Scholastic Institutions, and the Health Unit for Jidda region.

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(1) See figure 101.

The Medina Road passes through the northern residential extension and before it ends at the periphery of the inner-ring it crosses a shopping area which extends for half-a-mile to the north, and contains shops and stores meeting the direct needs in goods and services of the people of this quarter. South of the shopping area there is the large building of the Ministry of Foreign Affairs.(1)

The Central Area

Around the original core, the central area developed in a ring-radial form. An urban ring of about 1¼ miles width had been built up surrounding the original core.

The most characteristic feature in the central area is the main street (Faisal street), which runs axially through the town in one direction to the docks, and, in the opposite direction, joins the pilgrim way to Mecca. Along Faisal street are located offices of shipping agencies and the modern shopping area. The second part of the business section lies to the west of Faisal street preserving its historical characteristics. Despite the spread of modern life in Jidda, the old city, which nearly covers the whole central area, retains many of the characteristics of a Turko-Arab town. In its narrow streets the buildings are relatively lofty. The built-out wooden balconies are enclosed by lattices made of carved rosewood to capture any breeze, the only way in which the architects could minimise naturally the effects of the sun and the hot weather.

Running from east to west and north to south stretches the great

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(1) see Fig.101

collection of open-fronted shops representing innumerable trades, known as the 'souk' (market).[1] This market is oriental, a haphazard winding, eminently colourful avenue of old-style commerce, which look primitive in some ways.

The bar serves as the commercial and economical focus of the surrounding area as well as of the town itself.

It is organised into sections according to the activities of the merchants or the categories of goods sold. Permanent shops are generally separated from temporary booths and are usually concentrated along the bazaar's main streets, long narrow mazes of arcades lined with booths on both sides.

Permanent shops are likely to specialise in the sale of a single product or a certain category of products and to deal more in imported goods than in domestic products. Local agricultural produce and livestock generally are sold by transit peasants and nomads in a special area set aside for this purpose.

There is another 'souk' (market), known as Tidd, the big market, which provides the inhabitants of all Jidda with their food requirements.

Along the road which joins S

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There is another 'souk' (market), known as Jidd, the big market, which provides the inhabitants of all Jidda with their food requirements.

Along the road which joins Faisal street with the Mecca road there is another shopping area extending on both sides of the road, with three hotels, one of which is a first-class hotel (Al-Haramain). During the pilgrimage season these hotels become so crowded that the accomodation problem is acute.

(1) Idris, S. Destination Mecca, London, 1951. pp.59-60

(2) Lipsky, G.A. op. cit. 243

To the south of this road thereis an old business core called the Yemeni Souk (the market of the Yemen), the majority of the population in this district being Yemeni immigrants to work in Jidda attracted by the employment opportunities in the building industry and at the port. Before the road joins the route to Mecca there is a residential colony, consisting of many huge and modern buildings, mainly for foreign officials; the government hospital, which is called Bab Sherif Hospital, is located nearby.

Eastern Extension

The most characteristic feature in this sector is the Mecca road which passes through this residential ribbon for a distance of 10 miles (Fig.101).

This sector is modern and is mainly for residential purposes with many private villas and palaces for the Royal family. On the Jidda-Mecca highway, some two miles out of Jidda, lies the Royal palace, beyond which is Fahed City. The latter consists of many foreign residences and housing for the upper income group. Here there is also a small shopping area, meeting the direct needs of the people of this residential area. At kilometre 6 there is a private school for the Royal family (El-thager school); at kilometre 10 there are two rest houses. After that there are a few scattered buildings before the road enters the desert on its way to Mecca.

To the east of Jidda lies the new airport, which is an important aspect of Jidda's modern life. It is about 4 miles from the centre of the town. to-day there are two paved runways, 6,000 ft. and 6,500 ft. long, ample for nearly all types of plans. There is an up-to-date central tower. At approximately 5 miles to the east of the airport there is an oasis called Hedda. Sheikh Abdullah Sulaiman has devoted considerable funds to the establishing there of an important agricultural project - dates, vegetables, melons, fruits and grains are being raised,(1) using well water raised by mechanical pumps for irrigation.

(1) Twitchell op. cit. p. 34

The functions of the town

The main function of Jidda is that it serves as a point of entry for Moslem pilgrims to Mecca and as the main port of Saudi Arabia on the Red Sea, through which the greater percentage of the whole import and export trade of Saudi Arabia is carried on. The performance of this function at an increasing rate contributed to the rapid growth of Jidda; in particular during 1947-1957 as a result of the sudden change in economic conditions of Saudi Arabia after the large-scale exploitation of oil.

The establishment of the port and the construction of modern roads connecting the port with the other urban centres of the country attracted many settlers from the country as well as from abroad to work in many civil projects that have been started. More functions were then created and an additional number of people moved into the town. All these new functions are, nevertheless, of secondary importance and would not have been developed if the main first two functions of port and pilgrimage did not exist.

The secondary functions of Jidda are, a commercial and business centre mainly in connection with the port trade. It is also one of the main administrative centres of the country and the central Government is transferred to Jidda two months of the year during the pilgrimage season. Most of the ministries have branches in Jidda; the Ministry of Foreign Affairs and the Diplomatic Delegations are permanently in Jidda. Jidda is also a small industrial centre, the most important industry being that of cement.

There are good reasons to believe that the port activities will grow as the country develops. It has also been decided in future to develop the old port of Yenbo to the north of Jidda, in order to serve the Medina region. However, no survey, even of a preliminary kind has been put in hand yet, and a vast amount of funds will be required for the development of the new port. Thus it is assumed that during the next generation no major change should upset the prediction that the harbour of Jidda will continue to serve as the only major port of Saudi Arabia on the Red Sea Coast.

Jidda - Urban Functions

Today the city area of Jidda can roughly be divided into five districts; commercial-residential, industrial, wharves, administrative and residential, though, since districts are often intermingled, this is but a general method of classification. (Fig.102).

1) Commercial-Residential District:

This district represents the old core of the town and is the main shopping and business centre in Jidda. It is the most densely-populated area; the population density is in direct proportion to the length of history of each district. Most of this district is slums, but the main shopping and business centre is sited here.

2) Port District:

This district is to the south of the city.

3) Industrial Districts:

These are distributed nine miles to the north of Jidda and beyond the densely built-up area.

4) Public and Communal Buildings:

The administrative centres are the Royal Palace, situated in the centre of Jidda, the Ministry of Foreign Affairs on the Medina Road and most of the Embassies, also along Medina Road. Most of the Ministries have branches which are sited in the central area and along the airport road.

Residential District

It is divided into three sub-district:

Modern Residential: these are scattered at various places, to the north on both sides of Medina Road, to the east along the Mecca Road and to the north-east on both sides of the airport road. There is also a modern residential district extending to the south of the centre of the town along the Sagala (Port) road. This district extends to the east till it reaches the Royal Palace. There are many new structures, such as office buildings, hotels, and apartment houses, up to nine storeys in height.

Densely Populated & Slum Districts:[1]

The largest stretch of the higher residential district is the centre of Jidda and the surrounding parts of it: El-Kandara, El-Ammaria, and El-Sahiefia to the north east, and El-Sabeel and El-Hindawiyah to the south. There is also a stretch to the south of the Royal Palace called El-Nazla El-Yemeni.

To the north there are three districts, El-Sahrkiha to the east

(1) See Figure 102

of the east of Medina Road, El-Rowies to the west of the same road and Nazlit Banie Malik to the north of the airport. Most of these districts are slums and over-populated.

Industry

Industrial development in Jidda and its hinterland is as yet only on a small scale. Probably less than 5 per cent of the population of the region derives a livelihood from industry; and of this total a considerable proportion is still engaged in handicrafts and remains unaffected by modern large-scale methods. Lack of fuel, chiefly coal, is a principal cause of this restricted development, but scarcity of raw materials and poor communications are other serious adverse factors. The shortage of surface water, however, is a basic obstacle to industrial development and the lack of underground water sources is falling as a result of the recent heavy use of water by cities and farms.(1)

To-day the Government has realised the importance of industry, thus modern Saudi Arabia is expanding on new industrial ventures, particularly in coastal cities, such as Jidda, to meet some of its industrial needs and to limit imports.

Industry in Jidda is still on a very small scale, except for the cement industry. In 1956 a cement factory project was established 9 miles to the north of Jidda. Site selection was determined by the following considerations:-

a) Nearness to the quarries of the raw material.
b) Availability of ample space for the factory and its future extension.
c) Accessibility to an established main road (Medina Road).

The production is 1,000 tons per day in order to meet all requirements of the country.

There are also many service industries scattered over the densely

(1) Lipsky, G.A. Saudi Arabia. p.222

built-up area. These include the soap industry which was founded at Government expense. The initial capital outlay has been increased to S.R. 5 millions (£500,000) with a view to diversifying its production. The factory is not confined today to the production of soap only; it produces as well 900 tons of glycerine and 7,000 tons of vegetable fats every year, over and above meeting the local needs for soap.(1) There is also an up-to-date leather plant, active in drying, tanning, finishing and drying leather. Its products are sold on the local market. This plant has a branch factory engaged in making shoes, handbags and other items. In 1958 its capital was S.R. 2.5 millions (£250,000) permitting for a daily production of some 700 pairs shoes.(2)

Building Material

Numerous plants have been founded in Jidda for producing building bricks. These plants are large in size and are equipped with modern mechanical devices capable of producing hundreds of thousands of bricks of all kinds, e.g. ordinary and decorated.

Wooden Furniture Industry

In Jidda there are many workshops engaged in this industry. Their production has enabled the country to become self-sufficient.

Shipbuilding

Shipbuilding is an important industry in Jidda. Wood is cut from trees grown in the inner mountains of Saudi Arabia for the purpose of building ships. Since early times, Arabs have been known as masters of the art of shipbuilding. A shipyard has recently been built in Jidda

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(1) Facts about Saudi Arabia. op. cit. 1958.

(2) Mirza, A. Kingdom of Saudi Arabia. Al-Ahram, Cairo, June 1955. p. 48

to build small cruisers.[1]

Other industries in Jidda include Coca Cola, Pepsi Cola and other soft drinks, which are sold throughout Saudi Arabia and are also sufficient to meet local demand, except during the summer months.[2]

Alternative natural resources offer little scope as a base for industry. Agricultural production is slight and often unable to compete with imported products and consumer goods. To the paucity of complete absence of natural resources other than oil must be added the high cost of skilled labour, the necessity of importing all machinery and equipment, and the limited market, all deterents to industrial activity.

Manual industries include gold cutting, pottery, stone cutting, decoration, painting, manufacture of weapons, straw mats and metal utensils,embroidery, extraction of oils, pearl fishing, and manufacture and extraction of corals for making rosaries which are very delicate. A large number of rosaries are sold every year to pilgrims. These manual industries are developing at great speed to meet all national needs. There is, however, one import manual industry which is already of national status, namely weaving. Arabs are excellent at weaving sheep wool in sufficient quantities to meet with their needs. Chief among their products are the coarse heavy textiles used for tents and camel upholstery, carpets, sheets, rugs and heavy coats.

Industry is expected to grow at a fast rate in Jidda, mainly due to the concentration of a large number of people during recent years, and the rise of the average income per capita has already increased the demand for industrial goods. In particular this is more noticeable in manufactured goods and handicrafts.

Commerce.

The importance of shopping in the social structure of the town may be readily appreciated when it is realised that, apart from providing employment to a substantial proportion of the people, it is also the process by which every household obtains its first necessities.

In Jidda the majority of shops are concentrated in the cnetral area. This is the main shopping centre which constantly attracts a large proportion of shoppers from all suburbs, with the result that some of the residential areas have few or no shops at all. Thus in the future planning of the town it is generally admitted that a more rational distribution of shopping centres should be achieved. Each large residential community should be served by a local shopping centre, while the main shopping area should remain for the whole markets.

Growth of Jidda's Population

Saudi Arabia has had no official population census. In al-Hejaz the great majority of the inhabitants are Arabs, although there are small ethnic minorities, especially those who have entered the country on pilgrimages.

Recently Mecca has become the largest city of al-Hejaz. The permanent population is estimated at 250,000; a figure greatly increased during the pilgrimage session.(1) Prior to its present rennaissance, Jidda's population was estimated in 1942 at 25,000, but it has now jumped to about 200,000(2) people. Among the inhabitants of Jidda are many Arabs of Eastern origin who, settled in this coastal city and now constitute an assimilated part of its population. Among these are Egyptians, Sudanese, Syrians, Lebanese, Yemeni, Hadhramis, Palestinians, Pakistanis, Indians and others.

As a result of the sudden change in the economic conditions of Saudi Arabia, many people from abroad were attracted by the chance of work in the building industry and in many civic projects that have been started. Another particular reason that permitted the increase of population in Jidda was the discovery of new water resources which provides 5 millione gallons of water per day.

The exact number of population during 1947-1957 has not been accurately defined. Estimates differ between 200,000 and 300,000 (200,000 is more probable)(3).

(1) Twitchell. op. cit. p.139
(2) Maklouf, A.H. op. cit. p.13
(3) Information by W.H.O. - Malaria eradication centre in Jidda.

After 1958, the end of the building boom in Jidda, the population number decreased. According to the estimates given by the W.H.O. - Malaria Eradication Centre in Jidda, the total number of population in 1959 was only 110,000 - 70% of them foreigners.

Commerce and construction enterprises have given Saudi Arabia a new class of people, many of whom have been abroad or who are in touch with the modern world around them. Thousands of these live in Jidda. Jidda is now passing through a period of development which will result in the improvement of its social and economic structure. It is assumed that the influx of rural population and foreigners into Jidda will continue in proportion to the increase of port activities. Older migrants, who came alone in order to find work, will bring their families and tend to settle permanently, while the importance of the town will attract new settlers from the countryside.

Public Utility Provisions

Water Supply

The water supply of Jidda has always been a matter of concern. The Turks, some 60 years ago, constructed a water system which tapped a stream from the Wadi, or river bed, at Ain Wazira, 6.8 miles east of Jidda. The water runs through 5-inch terracotta pipes to the city.(1) In order to supplement the water situation in the city, there are two other sources of water. Two plants for condensing sea water were built in 1926 and in 1928; the production was about 135 tons of fresh water in 24 hours. In 1932 the Waziria system was repaired and improved by the installation of a 16 ft. windmill, the water thus obtained ranging from 30 to 50 gallons a minute.(2)

In 1942 the United States Agricultural Mission investigated and reported upon an adequate fresh water supply which would take spring water from the north side of Wadi Fatima to Jidda through 34 miles of pipe or covered masonry conduit. In accordance with suggestions by ARAMCO engineers and by the U.S. Mission, water has been tapped in the Wadi Fatima. About 360 springs have been used during the past centuries for irrigation purposes.

The water in conveyed from Aby Sheib in a 12-inch diameter main to a reservoir of 1,000,000 capacity. This was constructed on the north side of the Mecca road, 9.3 miles east of Jidda. From this reservoir a 15-inch main pipe was laid along the north side of the highway to

(1) Twitchell, K.S. Water Supply of Saudi Arabia. The Geographical Review, Volume XXIV, July 1944.

(2) Ibid.

the city outskirts, whence various distributions lines were laid throughout the city. The total length from the most northerly spring to the centre of the city is 50 miles and the entire cost was approximately ₰2,137,000; this project was opened in late 1947. Additional water sources are now being developed and planned. In 1945, a 24-inch diameter pipeline was added to increase the supply of water to 5,000,000 gallons per day in order to meet the requirements of more than 200000 persons and for domestic purposes. The water supply of Jidda is of vital importance because of the annual pilgrimage to Mecca.(1) During the pilgrim season more than 150,000 men, women and children land at Jidda on their way to the Holy Places.

In 1960 a new project to add a 30-inch diameter pipeline was finished and the total quantity at present available is about 12,000,000 gallons per day.(2)

Sewerage and electricity

Sewerage presents problems of much difficulty and today there is no sewerage system in Jidda. A firm has recently made a study for a complete sewerage system, including sewerage disposal, since many residences are located near the lagoon in the northern part of the city where there is no drainage. The numerous new buildings have modern European plumbing, but to be sanitary it is vital that sewerage disposal is adequate.

Electricity

Jidda is supplied by a Sa'udi Company. In addition to the power

(1) Makhlouf, A.H. op. cit. p. 15.
(2) Report by the Authority of Ain Azeizia, Jidda 1961.

plant operated by this company, many modern buildings have their own generators. Electricityis used, not only for lighting purposes, but also in industrial work. Many plants have their own generators, while others receive the electric current from the city's power plant. Power plants in Jidda, totalling 9,300 k.w. furnish light, air conditioning and small power units for this rapidly growing city.(1)

Community Services.

Recognising that a large number of people have missed the chance of education at an early age, the Government has turned its attention to the spread of education. At the present time there are 25 primary schools for more than 3,000 students.(2) Secondary schools in Jidda are of three kinds, (a) secondary schools (3), (b) secondary religious institutes, and (c) secondary industrial schools. Religious institutes, which prepare the student for joining the Shari'ah (Muslim Law) and Arabic Language Faculties, graduating as teachers; in Jidda there are two schools of this kind. With the expansion of industrial projects in Jidda, the Government established a school for industrial education to turn out a considerable number of skilled workers and technicians. This school is equipped with the necessary machines, tools, implements, raw materials, and the like. An adequate number of classrooms, workshops and laboratories were provided. In working out the curriculum, due consideration was given to the prevailing conditions and the country's need for mechanical industries; recently a department of Marine has

(1) Jidda Municipality, 1961
(2) Ministry of Education (Jidda) 1961

Been established in this school. Languages and general knowledge are also taught.[1]

Health

The policy of the Government is to prevent epidemics by injections, inoculations and vaccinations. Pilgrims come from all parts of the world. Practically all the seaborne pilgrims arrive at the point of Jidda and have to pass through a quarantine examination. Today there is a quarantine station, south of Jidda, built by the Ministry of Health. It consists of an isolation hospital, a hospital for treatment, a chemistry-bacteriology laboratory and a nursing school.[2] This station cost roughly $3,000,000. No pilgrim is allowed to enter or leave the country unless he receives the necessary medical injections required by law.

In Jidda hospital there are about 300 beds for patients. There are also several privately owned and run nursing homes.

However health services are still few for the present population of Jidda.

Other Community services.

Essential cultural institutions, like public libraries, do not exist in Jidda. Except for two football grounds, the urban fabric of Jidda does not contain recreational facilities. The recreation that one can have is a drive along the Medina and Mecca roads, where there are a few clubs.

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(1) The author worked as a teacher in this school for two years.

(2) Report by the Ministry of Health. Jidda, 1958.

There is a beach for swimming about 19 miles to the north of the town, the only place for people to swim along the coast of the Red Sea. There are two problems; sharks, and the wealthy people who have taken vast areas along the beach. If this is not stopped it would be impossible for many years to come to create a public recreational beach.[1]

The Municipality

The Municipality of Jidda is actively working to improve the general conditions of the city. It is widening the old roads and paving them with the help of up-to-date American machinery, cleaning and watering the streets and planting trees to provide shade. It is also organising market places and building ovens to dispose of the rubbish and use it in producing fertilisers.

(1) Makhlouf, A.H. op. cit. p.16

Transport and Trade Routes

Traffic through Zidda

The present functional structure of the town, with the existing location of its different elements (housing, shopping, business, etc.) cannot be considered among the causes of the traffic problem. This statement is supported by the fact that the town is relatively small, its elements are simple. Industry has not emerged yet with a scale which would have complicated the traffic between different residential areas and places of work. Even the majority of the workers who might be compelled to travel comparatively long distances usually go to their places of work on foot. Elements which would have caused multitudes of traffic journeys, like recreational or places of entertainment, do not exist within the present urban structure. The main shopping centre is properly located with respect to the whole town. In each sector there is a hierarchy of local shopping centres which are reached easily by foot from all houses in their service areas. The common origin and destination points of the traffic in Jidda are the main centre, the harbour, the airport, Mecca road and Medina road. These, theoretically speaking, are properly related by two ring roads and four radial roads.(1)

Thus, present traffic problems in Jidda are due mainly to the deficiencies in its existing road pattern.

The existing road pattern at present covers two types of roads

(1) Makhlouf, A.H. op. cit.

major and minor; only the main roads are asphalted. The layout of the main roads consists of two ring-roads and four radial roads, the backbone of the present town pattern.

Medina Road

This road passes through the northern residential area. For a length of 2½ miles it is interrupted by frequent intersections from both sides. Before it ends, at the periphery of the inner-ring, it crosses a shopping area in which the traffic is slowed down by frequent pedestrian crossings and by the parking of cars.

Mecca Road

This passes through the eastern residential ribbon. For a length of 6¼ miles it is interrupted by frequent intersections from both sides. Its worst part is the strip connecting the two ring roads where shopping activities are found along both sides.

Airport Road

It passes through the north-eastern residential area connecting the town with its airport, almost two miles in length and 10 metres wide. The radial connecting the airport with the inner-ring has similar defects where it crosses a shopping strip in the densely built-up area.

Sagala (Port) Road

Connects the inner ring with the harbour, the only main road in which both directions of traffic are separated by an intermediate island. Its main defect is the delay caused by lorries transporting goods from the harbour.

The local streets

Inside the built-up sectors of Jidda there are three types of lay-out for local streets: first, the medieval labyrinth of streets. This is found in the central core and the slum areas (whose origin were the bedouin settlements outside the old well of the town); secondly, an irregular layout of streets in the densely built-up areas; thirdly, traces of a gridiron pattern of streets, found in the two ribbon extensions along the roads to Mecca and Medina. None of these streets is asphalted. Their inadequacy for motor cars throws most of the cross traffic to the main roads.

Transport to and from the hinterlands

Roads.

For long the great size and difficult topography of Saudi Arabia, together with thinly spread population and limited natural resources proved very considerable obstacles to the construction of communications. Isolation and remoteness were in turn regarded as important contributory causes of the slowness in economic development.

At the present time the only means of transportation between the port and its hinterland is by road.

A few years ago there were no safe and effectively motorable roads. The trip by car between one town and another, lying no more than 60 miles away was difficult, attended with dangers and hardships, particularly in the sandy tracts. This led, at the time, to the retardation of activity and production, particularly in the agricultural sector.

The greatest travel is between Jidda and Mecca, a distance of

46 miles, on a road well laid-out by the Egyptian engineers. It has lately been repaved according to American practice by the Industrial Bechtel Corporation.(1)

The second important highway was constructed in 1956, 350 miles long, to connect Jidda with Medina. This highway construction was initiated by John Howard & Co., a British Company, (see Fig.104) which lost so much money that it withdrew from Saudi Arabia and turned the work over to Braithwaite Ltd., another British organisation. A total of 64 miles of paved road had been completed when this firm withdrew from its contract and the work lapsed in 1953. Some time thereafter a Saudi Arab Sheikh, Mohammed bin Ladin, took over, after purchasing much of the British equipment, and completed the project. It was opened in 1956 to connect Medina, the second holy Islamic city with Jidda seaport. It is mainly to serve the pilgrimage traffic.

Next in importance to the trans-Arabian highway from Jidda through Riyadh to Damman is a road to connect Jidda with Tizan, south of Jidda. The distance of the route travelled is 527 miles, but an efficiently surveyed and located road would doubtless decrease this distance. The present road conditions are terrible.

The government is eager to develop the richest agricultural part of Saudi Arabia in Asir and make it more accessible by construction of adequate motor roads connecting the capital, Abha, with the Red Sea port,

(1) Twitchell, K.S. op. cit. p. 79

Jidda.

Table 131 Roads Completed

From	To	Distance Kms.	Distance Miles	Metres	Feet
Jidda	Medina	425	263	8	26
Jidda	Mecca	73	45	8	26
Mecca	Arafat & Holy Places	37	23	12	40
Mecca	Taif	120	74	8	26
Yenbo	Bader	90	56	9	30
		Roads under construction			
Medina	Tarbouk	740	459	7	23
Jidda	Taif	820	508	-	-
Jidda	Tizan	750	465	-	-

Railroads

The first railroad in Arabia was that constructed by the Turks during their rule over al-Hijaz. This single-tracked line from Damascus to Medina was built between 1904 and 1908 to take pilgrims to the holy cities. Its length is 840 kilometres, or 522 miles, but it has not been in operation since 1924; the Saudi Government now plans to put it back into service.

This railway will be of value for links with Jordan and the Hijaz and the line would be a safeguard against the Gulf of Aqaba being blocked.

Trade Routes in Saudi Arabia

Before the 20th century most of Saudi-Arabian trade was carried by caravan routes. There are main cross-country routes which are now of little more than historical interest.(1) The coasts of the country have always been better known that the interior. The monsoons helped the development of commerce in the Indian Ocean, and the long inlets that separate Arabia from Africa and Persia are natural trade routes. For centuries Eastern products have been brought up the Red Sea to Egypt for distribution in North Africa and Europe, or taken overland from the Persian Gulf to the Syrian ports. For a time the sea-route from India by the Cape of Good Hope was used in preference, but since the opening of the Suez Canal in 1869 life has returned to the ports of the Red Sea.

Saudi Arabia is bounded in the north by the Gulf of Aqaba, Jordan, Iraq and Kuwait; two neutral areas along the northward border are administered jointly with Iraq and Kuwait respectively. In the south it is bounded by Yemen, Aden, Muscat and Oman; except for a mountain ridge on the Yemenite border, the boundary is not marked. On the east are the Persian Gulf, Qatar and Trucial Oman.(FIg.105) The majority of these countries bounding Saudi Arabia, except Iraq, Yemen and Jordan, are arid countries just like Saudi Arabia. There is therefore little possibility of trade with them. There are moreover no trade routes to the southern neighbours of Saudi Arabia except the Yemen, whence there

(1) See Chapter IV

is the ancient trade route north-north-west to Mecca, thence through al-Medina, Ma'an and Petra; a branch extended north to Damascus, another via Aqaba to Egypt. Today these routes are used only in the pilgrim season.

Thus the orientation of the Saudi Arabian trade is towards the Red Sea in the west, the Persian Gulf in the east and Iraq in the north. Jidda port is the most important port along the coast of the Red Sea in Saudi Arabia. Damman port on the Persian Gulf, 26° 34' N., 50° 11' E., and Ras Tanurah are two important ports for Saudi Arabia, the first a general cargo port, the second serving the export of oil.

Traffic Pattern of the Port

Navigation traffic

The importance of the location of Jidda is further reinforced by the fact that it lies nearest to Mecca, the chief town of El-Hedjaz, and has, in consequence, become the most considerable place on the Arabian coast of the Red Sea.

Table 132 The growth of Traffic through Jidda Port (Fig.106

Years	No. of Vessels	Tonnage (1)
1950-51	411	142,716
1951-52	439	177,093
1952-53	566	298,669
1953-54	658	391,355
1954-55	696	575,394
1955-56	774	705,940
1956-57	770	579,234
1957-58	958	648,370
1958-59	953	529,897
1959-60	901	491,196

From the above table it is clear that Jidda port has developed and attracted an increasing number of vessels since 1950. This is mainly as a result of the sudden change in the economical condition of Saudi Arabia since the discovery of oil. Traffic, before the discovery of oil, was limited and mainly in connection with the pilgrimage.

Arrivals at Jidda port rose from 411 vessels in 1950-51 to

(1) Statistical department of Jidda Port, 1961

910 vessels in 1959-60; the average tonnage through the port has been increased from 142,716 in 1950-51, to 491, 196 in 1959-60. The decrease in tonnage in 1956-57 was due to the closing of the Suez Canal and the recent decrease in the number of vessels and tonnage was mainly due to the development of the eastern port of Saudi Arabia along the Persian Gulf, which attracts traffic from Europe, India and U.S.A. However, traffic through Jidda port assumed greater importance after World War II,[1] when the extraction and exportation of oil led to an import boom, despite some decline in the other traditional exports, i.e. dates and hides. Recently several steamship lines have begun to make regular calls at Jidda.

Pilgrimage Traffic.

Domestic commercial activity is intensified at the time of the annual pilgrimage.[2] The pilgrimage to Mecca is one of the great unifying factors in Islam, of economic as well as of social value for it brings together Moslems from all over the world. The trade of the region is created mainly by the needs of the pilgrimage. Mecca, which is 45 miles to the east of Jidda, has had a good position as a trade centre from ancient times, and is a commercial market during the annual pilgrimage. Traders from all parts of Islam bring their wares to Mecca and, before the oil industry, pilgrimage traffic was the primary source of income for the state. Until recently the majority of the population

(1) No official statistics are obtainable before 1950.
(2) For sixteen hundred years followers of the Prophet have been making the pilgrimage to Mecca. It is one of the pillars of faith and an act of pity required of all Moslems who can afford it. The great pilgrimage or Hajj occurs after Ramadan. Since the Moslem calendar is variable, once in thirteen years the pilgrimage occurs during mid-summer.

Table 133 Number of Pilgrims in 1961

From	Coming to Jidda Port	Coming by Air	Coming by Land	Total
U.A.R.	38,861	2,755	24	41,639
Syria	3,579	2,097	39	5,715
Lebanon	200	1,234	63	1,497
Palestine	5,339	214	1	5,554
Iraq	1	5,483	2,262	7,746
Capetown	81	33	-	114
Bokari	11	13	-	24
Afghanistan	-	2,276	112	2,388
Iran	-	15,049	117	15,162
Turkey	181	387	-	68
Jordan	2	307	2,600	299
Yemen	10,851	850	59,321	71,029
Tunisia	229	319	-	548
Algeria	78	1,246	1	1,325
Morocco	1,844	696	49	7,289
Hadramaut	1,178	653	5,450	7,281
Aden	37	80	550	667
China	24	5	-	29
Nigeria	12,025	2,598	-	14,623
Somaliland	194	237	-	531
Buganda	282	237	-	519
Sudan	22	172	-	194
Sangal	1,798	3,511	-	5,309
Burma	129	1,410	-	1,539
Pakistan	99	71	-	170
India	14,159	1,649	1,407	17,215
Ceylon	20,179	1,178	-	21,357
Indonesia	106	78	106	184
Malaya	11,655	29	-	11,684
Siam	6,467	13	-	6,480
Phillipines	2,359	8	-	2,367
Indo-China	1,218	3	-	1,221
Libya	-	16	-	16
Mauritius	2,393	169	-	2,562
Cyprus	-	150	-	150
Ghana	-	15	-	15
Genia	72	239	-	311
Malia	11	978	-	989
Chaid	423	306	-	729
Volta	2,732	84	-	2,816
Niger	374	271	-	645
Kameron	475	129	-	737
Dahomie	24	79	-	103
Tanganyika	-	42	-	42
Zanzibar	1	15	-	16
Kenya	5	12	-	17
Kashmir	42	7	-	49
Greece	39	1	-	40
Jugoslavia	153	-	-	153
Germany	-	1	-	1
Britain	-	3	-	3
U.S.A.	-	2	-	2
Canada	-	3	-	3
Kuwait	-	61	8,281	8,342
Katar		325	938	1,263
Dobie	-	19		
El Bahrein	-	200	2,262	2,462
Amman	-	3	967	970
Other Nationalities	2,717	527	-	3,244
Visitors during Ragab	6,787	1,923	-	8,780
Grand Total	149,834	51,130	85,084	285,948
From Saudi Arabia				900,000
				1,185,948

of Mecca, Jidda and Medina lived from the pilgrimage, acting as guides and directors during the sacred ceromonies, and contractors for transporting the pilgrims. Considerable sums are also realised by the letting of houses, of which many more exist than the permanent population require. Besides the resident merchants, traders of these three towns do profitable business during the season lasting for about four months every year.

The statistics (see Table 133) of the 1961 pilgrimage show the scale and origin of the traffic, and the importance of Jidda port in this traffic.

Much of the wealth of the holy cities and Jidda continues to stem directly from the pilgrim trade. Pilgrims are not taxed as they were in the past but provide revenue for food and lodging. Much of the prosperity of the large bazaars in the cities of El-Hejaz also is attributed to the pilgrims, many of whom bring products from their own countries to sell.

External Trade

Foreign trade has always been of major importance to Saudi Arabia. Before the discovery of oil a very few exports and the services provided for the pilgrims were the only means of paying for imports, particularly foodstuffs and textiles which are essential in maintaining even a marginal, standard of living for the bulk of the population.

Imports

Imports consist of a wide variety of goods, including the traditional essentials of Foodstuff and textiles, as well as imports of tobacco and metal manufactures and such luxuries as perfumes, turquoises from Persia, and rubies from Burma. Food which must be imported includes rice and other cereals, not grown within Saudi Arabia, coffee, tea, sugar, spices, and some meat, fresh fruits and vegetables and increasing amounts of canned and preserved food, to satisfy both the prosperous few and the changing tastes of a growing middle class. These imports are supplemented by construction equipment, motor vehicles, medicine and chemicals, luxury manufactures, such as air conditioners and other electrical appliances. Today, construction equipment, heavy vehicles and foodstuffs are the leading imports by value. The phenomenal increase in such imports reflects a general surge of building activity and the expression in communications facilities.

Exports:

Pilgrim traffic, the major "invisible export", earns some $50 million annually through the purchases by pilgrims. The government formerly imposed a £28 head tax on pilgrims, but because of the rise in oil revenue, the levy was abolished in 1952. Traditional exports were mainly dates, horses, camels, skins, hides, dyes, pearls, gum arabic and charcoal. The demand for many traditional exports, such as camels, donkeys, horses, dates and pearls is decreasing; they have, in any case, been rendered unnecessary by the enormous receipts from exports of crude oil and petroleum products. At present Saudi trade is flourishing but is vulnerable to the dangers inherent in reliance upon the export of a single commodity.(1)

(1) Lipsky, G.A. op. cit.

Table 134 Total of the Main Imports Sections for the Y ear 1959 - 1960

	Sections	Value in S.Riyaals	Kilos	Quantity Tons
1.	Live Stocks & Kingdom's Animal products	45548347	743	10195
2.	Kinhdom's plant products	190071813	856	325716
3.	Fats, tallow & oils (animal & vegetable) products dissolved by edible oils & waxes of animal and vegetable origin	14667741	520	11466
4.	Food manufacturing products beverages, vinegar, tobacco and cigarettes	66727853	949	82061
5.	Mineral products	40877637	442	403956
6.	Chemical products industries & allied industries	57043127	436	22078
7.	Resins, plastics & allied manufactures, natural & synthetic rubber & its manufactures.	255651541	190	5190
8.	Leathers, hides, skins & its manufactures, saddlery, travelling requisites, Morocco-leather, fodder materials intestine manufactures	1978473	640	373
9.	Timber, charcoal & wooden manufactures, cork, mattress & basket manufactures.	19067019	650	43301
10.	Materials for paper manufacturing, paper & its manufacture.	9634016	843	4205
11.	Textile materials & its manufactures	105803937	660	18284
12.	Footwear, head covers, umbrellas, artificial flowers & fans.	11292870	546	1971
13.	Stone, cement, asbestos & mica manufactures & allied items	12646157	868	12341
14.	Pearls, precious & semi-precious stones, precious metals, ordinary metals covered with precious metals & manufactures of such materials traditional ornaments, coins.	5863389	319	87
15.	Ordinary metals & its manufactures	75869753	114	79776
16.	Instruments, tools, electrical equipment & parts	15522030	760	22669
17.	Transportation equipment.	100943038	651	21020
18.	Optical accessories & instruments, photographic measurement, tests, medical & surgery, fine accessories, watches, tape recorders & amplifiers	13429524	847	1417
19.	Arms & ammunitions	119257	853	80

Yedda Chamber of Commerce & Industries Directory - 1960.

Contd.

Table 134 Total of the Main Imports Sections for the Year 1959 - 1960 Contd.

	Sections	Value in S.Riyaals	Kilos	Quantity Tons
20.	Clinical & surgical furnitures, engraving & moulding materials, sieves & cribbles, toys, sport articles & sundry manufactures, brooms & brushes.	11899993	904	3211
21.	Art giftwares & monumental pieces	29527	579	5
	Grand Total of Imports Sections	964716972	279	1069415

Jedda Chamber of Commerce & Industries Directory - 1960.

Table 135 Total of the Main Exports Sections for the Year 1959 - 1960

	Sections	Value in S.Riyals	Kilos	Quantity Tons
1.	Live Stocks & Kingdom's Animal Products	63538	932	102
2.	Kingdom's vegetable products	535819	116	4400
3.	Fats, tallow & oils (animal & vegetable) products diss-olved by processed edible oils & waxes of animal & veget-able origin.			
4.	Food manufacturing products beverages, vinegar & tobacco (cigarettes)	3132	925	5
5.	Mineral products	2944477208	648	51210685
6.	Chemical products industries & allied industries	16770	145	11
7.	Resins, plastics & allied manufactures, natural & synthetic rubber & its manufactures.	88000	601	89
8.	Leathers, hides, skins & its manufactures, saddlery, travelling requisites, Moroccoleather, fodder & in testin e manufactures.	506442	483	751
9.	Timber, charcoal & various timber & cork manufactures, mattresses & baskets.	603658	718	7020
10.	Materials for paper manufacturing, paper & its manufs.			
11.	Textile materials & its manufactures.	36083	571	38
12.	Footwear, head covers, fans & artificial flowers	2880	720	
13.	Stone, cement, asbestos, mica & allied products, porcelain wares, glass & glassware.	4500	600	3
14.	Pearls, precious & semi-precious stones, precious metals & manufactures of such materials, traditional ornaments, coins.			
15.	Ordinary metals & its manufactures.	1335739	473	6751
16.	Instruments, tools & electrical equipment & parts.	7218	632	2
17.	Transportation Equipment	11150	690	1
18.	Optical accessorie s and instruments, photographic measurements, tests, medical & surgery fine accessories, watches, industrial tape recorders & amplifiers.			
19.	Arms & ammunitions.			
20.	Clinical & surgical furniture, engraving & moulding materials, sieves & cribbles, toys, sports articl es, sundry manufactures, brooms and brushes.	259619	63	36
21.	Art Giftwares and monumental pieces.			
	Grand Total exports	2947951 756	317	51230232

Source: General Department of Customs Saudi Arabia.

Table 136 Total Imports Value & Its Quantities in Proportion to the Country & Sources of Imports for the Year 1959 - 1960

European Continent	Value in S. Riyals	Quantity in Kilos
Europe		
England	68078538	58936572
France	7437369	3708645
Holl and	47218384	27382058
Belgium	24562167	47658078
Italy	55478811	45471085
Sweden	4952631	26814620
Norway	225319	248278
Finland	7416	5160
Switzerland	3327559	56308
Greece	954348	5392953
Czechoslovakia	194227	327627
Poland	532666	938885
Rumania	3369434	64777149
Yugo slavia	2100237	27497360
Austria	871354	116936
Germany	58316044	38118806
Hungary		
Spain	11037	2782
Denmark	1682013	9302076
Ireland	377	190
Portugal	32019	4473
Russia		
Luxemborg		
Asia		
India	20463457	5827562
Pakistan	419344	365284
China	6578732	2103654
Siam	38779458	80209401
Malaya	5772341	8627733

Contd.

Table 1 36 Total Imports Value & Its Quantities in Proportion to the Country & Sources of Imports for the Year 1959 - 1960 Contd.

European Continent	Value in S. Riyals	Quantity in Kilos
Indonesia	6589	5611
Burma	1035087	1858280
Iran	105991	186977
Iraq	11483482	38915032
Syria	39728875	27809735
Lebanon	37967335	15937974
Aden	11667357	10145118
Hadhramout	49913	56015
Bahrain	51233514	38356157
Kuwait	17746161	8861858
Qatar	200645	207886
Dobai	226430	334073
Japan	53268585	81584903
Ceylon	14339019	4083629
Jordan	5876151	11362599
Yemen	3373643	640478
Oman	123077	128762
Philippine	2929	5593
Africa		
Egypt	31910725	135141206
Sudan	18062501	20461126
Ethiopia	7915513	5690014
Eritrea	2418621	2086736
Jiboti (Fr.Somaliland)	11944688	8408228
Barbara	11016765	747
Zanzibar	3122	1072
Mombasa	72294	52943
Algeria	605791	4085792
B ritish Somaliland	422382	1069022
Tunisia	979776	10868740
Libya	478	181
Other African Countries	46714	46714
U.S.A.	267656177	149675651
Canada	4775919	1 4381424
Australia	7034326	5190942
New Zealand	16433	3629
Argentine	100489	14364
General Total Imports	964716972	1069415279

The hinterland of Jidda Port

To analyse the hinterland structure of the port of Jidda involves consideration of the flows moving to or from the port by road. Mecca is the major focus~~e~~ in the hinterland of Jidda. Medina, which is 263 miles to the north of Jidda, is located in the discontinuous hinterland of Jidda, since the natural harbour is Yenbo, 131 miles distant. Medina has never acquired the commercial importance that Mecca has in the Hejaz, for the pilgrimage to Medina is not compulsory, and only a small proportion of the Mecca pilgrims prolong their visit so as to include the Prophet's tomb.

The annual Moslem pilgrimage to Mecca has, for thirteen centuries, been the greatest source of wealth in El-Hejaz. The thousands of pilgrims each year led to routes being established and kept open, created markets, focused trade, and gave the inhabitants of the hinterland a rich source of income.

Significant among imported commodities are the petroleum products off-loaded via pipeline at Jidda and stored at the Aramco bulk terminal, whence such products are further distributed over a wide area of El-Hejaz and Asir.(1)

The destinationsof imports tend to be in the main towns of El-Hejaz and Asir. The hinterland of Jidda is naturally limited by a physical factor which hinders it from extending to the east to include other ports of the country. Nafud, the land of sand dunes, extends north from the

(1) Petroleum products are coming mainly from Saudi Arabia's oil field along the Persian Gulf,

immense desert of the Empty Quarter up to the Jauf near latitude 30° north. The width varies from 100 miles west of Sulaiyil to 170 miles lying south of Jauf. Its length from Sulaiyil at the northern edge of the Empty Quarter is about 800 miles.

The Foreland

The direction of trade in Saudi Arabia has been determined increasingly since 1953 by Aramco's sale of oil and petroleum products for currencies other than dollars. However, the United States, over a period of years has enjoyed a preferential position in the Saudi import trade, a position established mainly by Aramco's original practice of purchasing equipment and goods from American firms.

An important development since 1950 has been anphenomenal expansion of German trade with Saudi Arabia and similar gains made by Japan, Britain, Germany, France and Italy have also emerged as leading suppliers and Burma and India have improved their position as rice exporters to Saudi Arabia. British trade with Saudi Arabia suffered from the early capture by American businessmen of the Saudi market for machihery and vehicles and from the dynamic approach to Saudi trade of continental European competitors. Since 1953, however, Britain has also benefited from the tendency for Saudi and Aramco to seek European suppliers for their products.

CHAPTER XII

HODEIDA PORT (YEMEN)

GEOGRAPHICAL ASPECTS OF THE PORT AND TOWN

Physical setting - Historical development - Layout of the modern port of El-Ahmedi - Hodeida town - Population - Public Utility provision.

EXTERNAL RELATIONS

Tradesport and trade routes in the Yemen - External trade - The hinterland.

Hodeido Port

Physical setting

A part of the explanation for Yemenis isolation lies in its geography. The coastal waters of the Red Sea are shallow and full of reefs, which make difficult the approach of vessels. The Red Sea mountains fall steeply towards the sea in most places, leaving only a narrow coastal plain. There is no natural route for a road inland from the coast because the difficulty of crossing the Red Sea mountains. The maritime ranges throw out low foot-hills towards the coast, but here and there they culminate in massifs rising to 5,000 ft. or so above sea level.(1) Such are Jebel Bura and J. Reimah, while the town of Manakhah itself, which is situated in this zone, is 7,500 ft. or so above sea-level, and the neighbouring peak of Shibam 9,000 ft. The maritime ranges are much intersected by wadis and, although the Hodeido San'a road does passthrough, it is only by severe gradients. The next zone is the Tihamah or the plain. This zone varies very much in width, from 30 miles to almost a mere beach line at Sheikh Sa'id in the south. It is chiefly soft, sandy and sterile desert, but there are some oases and settlements in the larger wadis by which it is transversed from east to west.(2)

Because of rapid transition from plain to interior plateau, there is a succession of climatic zones and hence of patterns of human occupation. The plain is desolate, and occupied by a very small and

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(1) Handbook of Arabia page 145

(2) Fisher, W.B. The Middle East page 455

mixed population chiefly of African origin.[1] Hodeido is the only outlet for trade from the interior highlands and has little contact with its immediate hinterland, the barren coastal region. Without the plateau, which is rich in agriculture, this port could not exist.

Thus all natural conditions in the area of Hodeida are most unfavourable for human settlement. The town is neither an oasis nor a gathering-point for surrounding settlements. It has no suitable site and a very exacting climate, and it is therefore solely its port function that determines the existence of the town.

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(1) Scott, Hugh <u>In the high Y emen</u> - London 1 947

Historical development of the port

Hodeida grew in importance after the second Turkish conquest of the Yemen in 1849, when it became the chief Turkish base and port of entry for the Y emen and attracted part of the trade of Mocha, (13° 19' N., 43° 15' E.) which was founded in the fourteen th century and was the principal export centre for coffee. The development of Aden port in the nineteenth century however killed the trade of Mocha, which also lost ground heavily to Hodeida, and between 1824 and 1884 the population fell from 20,000 to 1,500.(1)

After 1906 the Turks planned the building of a deep-water harbour behind Ras Katib to the north of Hodeida and laid 5 miles of metre-gauge railway track along the spit. The project was abandoned after the bombardment of Hodeida by Italian ships during the Italo-Turkish war of 1912 had destroyed much of the material. In 1918 Hodeida was bombarded and occupied by the British, who handed it over to the Idrisi of Asir in 1921. His government proved unpopular, and the Iman of Yemen recovered the port in 1925. Later on in 1934 the port was occupied during the Saudi-Yemen war, but the peace treaty restored it again to the Yemen.(2) Though Hodeida is the chief port of the Yemen coast, it was until recently undeveloped.

The harbour is an open anchorage off a straight shoreline. There is a small artificial boat-harbour of limited usefulness, made by two projecting moles and a breakwater, silted so much before the

(1) Western Arabia & the Red Sea
(2) Bury, G. The Turks in Yemen London 1915

construction of the new port, that loaded lighters could not berth alongside the short quays and light boats could barely do so at low water.[1] Dhows anchored just outside the boat harbour and unloaded by p ortage, while large ships anchored in the roads 1½ miles off shore and were unloaded by dhows. There was no port equipment and capacity was estimated at 100 - 150 tons daily.

In 1959 the Government of Yemen decided to have a modern port for its external trade. With the help of Russia the construction of a new port was finished in 1961. The new port is 2 miles to the north of Hodeida. The Russians built the port mainly to be a naval port and for handling heavy and bulk cargoes.[2]

However it was realized that developing Hodeida will be a difficult job, which will require constant dredging. The harbour is an open anchorage, approach to the harbour is very difficult and vessels have to anchor 1½ miles off shore. Further up the coast to the north is a very good harbour about 2 miles from Hodeida. The U.S.S.R. experts decided in 1959 to give up the idea of developing the old port and directed their efforts towards Khar Kathib, where natural conditions are much better than in Hodeida. The only problem for the developing of the new port is that the depth of Khar Kathib will not be sufficient for large vessels. The Russians succeeded in 1 960 in dredging a channel 8 miles long, to a depth of 25 feet. The total amount of dredging reached to 4,500,000 square metres.

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(1) Kheirallah, George - Arabia Reborn

(2) Campbell, F. Ports of the World. 1962, page 490.

By 1961 three berths of total lengths 400 metres had been constructed, two berths for cargo and the third for oil, a tank farm being erected in 1960. The oil terminal is used for imports of refined petroleum products, petrol, kerosene and diesel fuel oil. The tank farm consists of 18 tanks of a total capacity of about 8,000 cubic metres, located at a distance of about 200 metres from the sea. They are connected by steel pipes, about 8 miles long,[1] to the oil terminal. The modern port has handling equipment for general cargo (motor cranes, lift trucks, etc.) and a line of fine deep water mooring buoys, with lighting equipment. There are living quarters for port staff and another quarter for labourers working in the port.

(1) Report published by the Yemenis Embassy in Cairo, May 1961 pp.5-7

Ahmedi Harbour

From a position about 7 miles southward of Juban, a small village, a peninsula trends about 5 miles north-westward to Ras al Jadin and thence about 4 miles northward to Ras Kathib. This peninsula forms the south western and western sides of Khar Kathib: Ras Kathib is low and sandy. Khar Kathib is a confused system of 1 agoons and reefs, but at its northern end there is sheltered and unencumbered anchorage between the mainland and Ras Kathib.(1)

The port of Ahmedi is situated at the southern end of Khar Kathib, a shallow bay encumbered with banks, reefs and low islets, through which a channel has been dredged to the port (Fig.); off the channel there is a dredged basin.(2)

Harbour facilities

A concrete quay, 1,378 feet (420 m.) long, lies on the south-eastern side of a basin, dredged to a depth of 24 feet (7 ms.), and entered from the channel at its northern corner. There is a dredged depth of 26 feet (7 ms) alongside the quay from its eastern end to within about half a mile off its western end. A tanker berth is situated on the western side of the basin, near its western corner and a pipeline extends along the south-western side of the basin, from the quay to the tanker berth.(3)

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(1) Red Sea Pilot - supplement No. 3 - 1962, page 43

(2) Report by the Government of Yemen 1961

(3) Red Sea Pilot - supplement No. 3 - 1962, pp. 44-45.

There are three 4-ton electric travelling cranes on the quay and a large concrete warehouse 6,000 sq. ms. There are two tugs for serving vessels entering and leaving the harbour. Fresh water is available in the port but it is brackish. There is a modern road about two miles long connecting the port with Hodeida.

Hodeida town and its functions

Hodeida town stretches along the shore for 1,400 yards and is about 400 yards wide. There is a walled inner town and scattered outer suburbs. Within the walls houses are tall, large, rectangular, and built of stone; the bazaars and many of the other alleys are roofed over. In the outer town straw huts mingle with large stone houses and are often linked with them into compounds by wicker fences. Many of the stone houses are richly ornamented with carved woodwork or plasterwork patterned with geometrical designs or interlaced with wavy lines.(1)

The main function of Hodeida is that it serves as the only outlet in the Yemen. The need for such a function was the main reason for which the old town was established. The establishment of the modern port of El Ahmedi 2 miles to the north of Hodeida town and the connection of the port with the other urban centres of the Yemen will attract more settlers to Hodeida for working in the port. Hodeida is also a commercial and business centre mainly in connection with the port trade. Hodeida is the administrative centre of its district but its significance becomes more important because of the existence of the port. Hodeida is also a small industrial centre with weaving the most important industry. Boat building is also carried on at some small yards along the beach south of the town. These boats are called dhows or sanbugs, and are used for coastal trade between Yemen and its other small local ports like Mocha. However there are good reasons for believing that

(1) Western Arabia and the Red Sea

Hodeida town will extend towards the new port of El Ahmedi in the near future and that extentions to the north will depend entirely on the development of the port activities.

It is believed that the port activities will grow as the country develops under the new régime. The programme of shipping facilities expansions provided for the increase of traffic volume to 400,000 tons per annum.(1)

The town of the future

The growth of the existing port functions in Hodeida and the increase of population will create a demand for the development of the town. This developm ent should be based on three policies: clearance of congested areas, amelioration of existing areas and the further expansion of the town. Clearance of congested areas is to be applied to the old wall which is surrounding the town and to the old quartersin the town. Development should comprise the construction of new communities with all the essential community facilities and buildings in which the slum dwellers would be resettled. Amelioration is to improve conditions in the existing communities, e.g. amelioration of houses, sewerage systems, internal community roads etc. The new expansion of the town should include the expansion of the port, exp ansion of other places of production including the civic and business centre and new-integrated housing communities including special industrial housing schemes.

(1) Report published by the Yemenis Embassy. op.cit.

Consequently, the Master Programme for Hodeida should include a programme of immediate action to cope with the problems requiring urgent solution, while the long-range programme should be re-examined and possibly revised in specified periods. In order to achieve this flexibility the future Master Programme should anticipate an increase of population during at least one generation and even plan for a further increase during the next 50 years. The estimate therefore of the future population of Hodeida port, together with its present and future needs, determines, more than anything else, the problems for which policies should be set. It is only after such a procedure, that is, after the preparation of an integrated Master programme based on the present and future social and economic structure of the town that the Master Plan may be drawn up in a way ensuring its realization.

The functions of the town

The main function of Hodeida is that it serves as the only gateway to the whole of the Yemen. The secondary functions are as a commercial and business centre mainly in connection with the port trade, the town is also the administrative centre of its district.

Population

Hodeida had a population estimated at about 50,000 in 1955.[1] According to the recent development of Ahmedi port to the north, it is expected that more people will come from other Yemeni towns, attracted by the better living conditions in the port-town and in search of work. Thus it is expected that the number of population will double itself in the next five years, affected by the development of the commercial and industrial activities which will take place in the near future.

Public utility provisions

The growth of the population and its economic activity raise the demand for water and electric power in such degree that underground water coming from the Red Sea hills will be insufficien t soon. The water is brackish, so it is important to produce fresh water from the sea by using condensers. There is a power station serving the new port of El Ahmedi and in future it could supply the town by electricity.[2]

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(1) The Middle East survey 1959

(2) Report by the Government of Yemen - published by the Yemenic Embassy in Cairo 1961.

EXTERNAL RELATIONS

Transport & Trade routes in the Y emen

There are no railways in the Yemen, and until recently there were no modern roads. Recently road construction is developing with the help of the Peoples Republic of China. The road between the new port of Hodeida and San'a is reported finished in 1962.

In Yemen from time immemorial this region, with its relatively well watered highlands, described by Roman traders (Arabia Felix, in contrast to the desert lands further north) has been engaged in international trade, exporting incense to Egypt. In recent years the export of coffee, primarily from Hodeida, has also become important.

Before the development of the new port, Aden and Massawa acted as entrepot ports for the Yemen's foreign trade. Aden was an important outlet for Y emen products, which are usually shipped either in native sailing vessels at various coastal points in or near the straits of Bab-el Mandeb, or by using an inland trade route to Aden. To the east of Y emen there is no trade route since the desert isolates the country from the Persian Gulf. To the North there are several trade routes connecting the Yemen with Saudi Arabia, and there is no real frontier or barrier to trade between the two countries. Lack of statistics is an obstacle for making a comparative study among these trade routes. However the Yemen is trying to develop the new port in order to cope with the whole foreign trade of the country.

Few details are available, concerning the trade of Yemen, but the greater part of all finished goods are imported, as well as a considerable proportion of foodstuffs. Thus cereals, rice from India, dates from Iraq, petroleum from Kuwait, cotton piece goods, yarn, iron and steel goods, silk, and general stores are the chief imports. Despite the local textile industry, most of the cotton and all the wool and silk fabrics are imported from Japan, Syria, China and Europe. The chief exports are hides and skins, and coffee, transported either by camel caravans or by dhows from Hodeida to Aden for transhipment.(1)

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(1) Helfritz, Hans: The Yemen: A Secret Journey pp. 172-173

The Hinterland

The inhabitants of Yemen being settled and in great part occupied in cultivation, the conditions which favour the pastoral or Bedouin type hardly exist except in the littoral plain.[1] Yemen has always been noted for its agriculture and general fertility; though this refers chiefly to the highlands and the central plateau, not to the maritime ranges, nor to the Tihamah, which is mostly desert except where great wadis cut their way through to the sea. The principal crops of the region are coffee, maize, red and white millet, bearded wheat and barley. The distribution of crops, according to zone, is much as follows:

The Tihamah is, in the main, sterile and saline, but gardens may be maintained by constant irrigation near some of the larger settlements.

Among the hills of the maritime range little cultivation is possible (except in valleys of considerable size where flood water comes down and can be utilized); the crops are grown in the spring as the rain falls in the foot-hills in April. Millet is the staple crop, with maize and sesame next in importance.[2]

The highland zone is the most productive of Yemen, though the soil is not naturally so fertile as the lowlands and must be artificially renewed from time to time. The rainfall there is more abundant and

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(1) Handbook of Arabia page 154

(2) Sanger, C. The Arabian Peninsula New York 1954.

regular. The staple production is coffee; then follow bearded wheat and barley.

Coffee, as an Arabian crop, is peculiar to the Yemen highlands. The plant flourishes at any altitude between 4,000 and 8,000 ft., and is first met between Hodeida and San'a after leaving Hazeilah. It is not indigenous to Arabia, but was introduced from Abyssinia during the Ethiopian invasion before the dawn of Islam. The berries used for seed are first placed in the sun to dry until the husk cracks of itself and can be easily opened, care being taken in so doing not to injure the inner skin of the bean. To produce young plants the farmer selects a patch of ground free from stones with at least one foot of good soil. He damps this and smooths it down, presses each bean to a depth of a few inches in the prepared ground, and covers them with a further inch or so of loose fine soil.(1) Artificial shade is then provided, usually of branches, leaving an aperture at the top so that sunlight may fall for an hour or so daily on each part of the planted surface. The bed is watered every two or three days and the shoots appear in about a month. The seedlings may be planted out about four months after they appear; the plant reaches maturity in five years, attaining a height of from 8 to 10 ft., and is too old to be profitable after about twenty years.

The plantations are laid out in terraces up the hill-sides and following their curves: these are faced with stones, sometimes

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(1) Handbook of Arabia, page 155

enclosing a strip only a few feet wide and sometimes an acre or so; the soil is often only a foot or two deep. Great care has to be taken to prevent the destruction of the terraces by accidental water-courses caused by thunderstorms. Every accessible and suitable spot on the mountain side is utilized. Many terraces were constructed centuries ago, and they give a peculiar and characteristic aspect to the Yemen landscape. The watering is done from cisterns of cemented masonry, built in every cleft or ravine where surface water can be intercepted. The harvest, broadly speaking, is in autumn, but the berries ripen at different intervals according to their position on the tree and the amount of sun to which a plantation is exposed. The Haraz district, west of Menakhah, produces coffee of the highest quality, and that ground by the Anis and the Beni Matar is also well known. Ta'izz is the centre of the southern coffee districts. The Yemen exports of coffee are approximately 12½ million lb. per annum.(1) Thus coffee is undoubtedly still the most important crop of the Yemen, in spite of prices dropping owing to the competition of Brazil and the present insecurity and difficulties of transport. Local consumption is enormous, but the local Arabs use, indeed and seem to prefer, the husk and keep the berry for market. The outlets for the marketable berries are Hodeida; the majority goes to U.S.A., Italy, France, Germany and Egypt.

Thus there is no doubt that the utilization of Hodeida port opens for the economy of the Yemen new resources and modern outlets, that will play an increasing role in the economy of the country.

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(1) The Middle East Survey 1959

PART IV

Chapter XIII

FUNCTIONAL CLASSIFICATION OF THE RED SEA PORTS

Classification in response to physical conditions - classification in response to site and situation - classification according to functional relationship - classification according to economic activity - classification according to predominant type of carrier - classification according to size of population - classification according to the value and volume of trade.

FUNCTIONAL CLASSIFICATION OF THE RED SEA PORTS

The basic function of all ports of the Red Sea is to provide facilities for the two-way exchange of traffic between inland and sea transport. Most major ports have a long and complicated history of development dating back to the time when they provided no more than simple landing places for loading and unloading goods from sailing ships. Their subsequent development has been influenced by a number of factors: the geographical characteristics of their situation, their proximity to sea lanes serving other countries, the growth of trade and the improvement of inland transport facilities serving the hinterland. A few ports, like Port-Sudan, Assab, Eilath and Hodeida, have a relatively short history and there has been a tendency in recent years to develop new ports or large-scale extensions of existing ports to meet the trend towards larger ships.

CLASSIFICATION IN RESPONSE TO PHYSICAL CONDITIONS

The character of the harbour is mainly determined by the natural topography of the coast. Geographers recognize two main coastal types, emergent and, conversely, where drowning is dominant. Coral reefs can only grow in warm seas, but there they build reefs which often enough lend themselves excellently to the formation of harbours, since the coral polyps do not grow vigorously on the inner side of fringing reefs and there is bound to be a large development of shallow lagoons behind the growing reef. Furthermore, corals cannot grow in fresh water, so that there is often a fairly deep passage through the reef opposite the mouth of a river of a wadi, just where human settlement is most likely to occur.[1] The majority of the Red Sea ports are inlets through the coral reefs of the coast, e.g. Port-Sudan, Suākin, Massawa, Jidda and Hodeida.

Scattered along both sides of the Red Sea is a series of ports. The majority of them are protected from wind and sea on all sides, spacious enough to accommodate a considerable number of large vessels, and sufficiently deep to permit access by large vessels.[1] No coastal embayment, either natural or man-made, which fails to meet all requirements can rightfully be considered a first-class harbour. If it is unprotected against sea and wind from any direction, it is not suitable for year-round use. Shallow embayments are obviously unavailable to modern vessels and a coast with such features is scarcely more inviting than a linear shore. Small and narrow embayments likewise cannot rank as first-class harbours, even though they may be both deep and well-protected.

However, the Red Sea ports which meet the above requirements are not all of similar character and equal value. There is almost infinite variety in the combination of depth, size, shape, degree of shelter, and ease of access. Some cover a fraction of a square mile while others are many times that size. There are, therefore, all kinds of harbours ranging from excellent down to fair. Similarly, all the harbours of the

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1 The average steamer draws about 20-25 feet of water when loaded; large liners usually draw from 30-35 feet of water. The smallest ocean-going steamers draw 15 feet or more. Hence, harbours with a minimum depth of less than 15 feet in the channel of approach and in the anchorage, at mean low tide, have been considered unfit for modern vessels.

Red Sea are not equally well equipped. For instance, the highly developed harbours of Suez, Port-Sudan, Massawa, Assab and 'Aqaba, with their complex and costly port facilities (dock, wharves, warehouses, loading and unloading facilities, refuelling and repair equipment, etc.) contrast strikingly with the almost undeveloped harbours, e.g. Safaga, Quseir, Suākin and Yenbo, where port facilities are meagre.

The following table indicates the political distribution and character of the Red Sea ports.

TABLE 137: POLITICAL CHARACTER & DISTRIBUTION OF THE RED SEA PORTS

Country	Depth	Type of Harbour	Whether Developed
EGYPT			
1. Suez	34 ft.	Artificial	Developed
2. Hurghada	24 ft.	Natural	Undeveloped
3. Safaga	28 ft.	Natural	Undeveloped
4. Quseir	24 ft.	Natural	Undeveloped
5. Tor	25 ft.	Natural	Undeveloped
6. Abu Zenima	-	Natural	Undeveloped
THE SUDAN			
1. Port-Sudan	30 ft.	Natural	Developed
2. Suākin	20 ft.	Natural	Undeveloped
ETHIOPIA			
1. Massawa	27 ft.	Natural	Developed
2. Assab	27 ft.	Artificial	Developed
ISRAEL			
1. Eilat	27 ft.	Natural	Developed
JORDAN			
1. 'Aqaba	33 ft.	Natural	Developed

Country	Depth	Type of Harbour	Whether Developed
SAUDI ARABIA			
1. Wejh	-	Natural	Undeveloped
2. Yenbo	-	Natural	Undeveloped
3. Jidda	32 ft.	Natural	Developed
4. El Lith	-	Natural	Developed
5. El Qunfidha	-	Natural	Undeveloped
6. Gizān	-	Natural	Undeveloped
THE YEMEN			
1. Hodeida	30 ft.	Natural	Developed

Thus there are two types of harbour along the Red Sea coast, natural[1] and artificial, developed[2] and undeveloped.

However, the development of international trade in the past led to a steady increase in the average size of ships, and this trend is likely to continue in the future. Complete information for world tonnage is not available, but the following figures are indicative of the growth in the

1 "Natural" harbours depend upon the configuration of the coastline for protection against wind and wave, "artificial" harbours depend primarily upon piers and breakwaters for such protection, e.g. Suez and Assab. Many "natural" harbours have, of course, been deepened by man, e.g. Port-Sudan, Jidda, 'Aqaba, Eilat and Hodeida.

2 Developed harbours have fair to good port facilities, which include some or all of the following: wharves, storage facilities, loading and unloading equipment, means for repairing vessels, and available fuel and water supplies. Undeveloped harbours have few or none of these facilities.

size of ships, particularly oil tankers.

TABLE 138 : VESSELS OF OVER 15,000 GROSS TONS IN WORLD FLEET[1]

Type of Vessel	1952	1961
Oil Tankers	108	924
Other Vessels	122	244
Total	230	1,168

It is worth noting that at the end of 1961 there were about 300 oil tankers on order or building of 25,000 tons deadweight or more (of which nearly 200 were of 45,000 tons deadweight or more) and about 60 dry cargo bulk carriers on order or building of 25,000 tons deadweight.

These large ships do, of course, need a greater depth of water than conventional tramps and cargo liners, and the economics of their operation usually call for considerable investment in discharging plant. Their development clearly demands a radical re-assessment of port reception facilities. However, the general trend towards bigger ships has created a demand for berths with a greater length of quay and a greater depth of water alongside, as well as wider locks, and this demand will persist in the future.

The Red Sea ports are poor in deep water dry cargo berths compared with the majority of European ports and the larger Mediterranean ports. The following table compares some of the major European ports with three

1 Source: Lloyd's Register of Shipping.

Red Sea ports as regards numbers and depths of dry cargo berths.

TABLE 139: DRY CARGO BERTHS BY DEPTH OF WATER[1]

	Limiting Depths of Water						
	Over 15 ft. Under 20 ft.	Over 20 ft. Under 25 ft.	Over 25 ft. Under 30 ft.	Over 30 ft. Under 35 ft.	Over 35 ft. Under 40 ft.	Over 40 ft.	Total
European Ports							
Port of London	25	32	71	60	15	4	207
Southampton	12	6	4	10	13	-	45
Liverpool	16	56	54	71	13	-	210
Hamburg	50	38	107	92	15	-	302
Rotterdam	9	31	18	71	84	-	213
Antwerp	19	39	12	54	125	-	249
Red Sea Ports							
Suez	4	4	6	1	-	-	15
Port-Sudan	1	2	8	1	-	-	12
Massawa	3	6	1	1	-	-	11

This table shows very clearly that, compared with the Red Sea ports, European ports have many more deep water dry cargo berths, both proportionately and absolutely.

1 Source: Ministry of Transport, Report of the Committee of Inquiry into the Major Ports of Great Britain, London, 1962, p. 250; and the Port Authorities of Suez, Port-Sudan and Massawa, 1962.

Thus the ports of the Red Sea, whether natural or artificial, need more deep water berths, mainly dry cargo berths and deep water berths for the discharge of petroleum. The above table provides a striking illustration of the superiority of the European ports in this respect. Schemes which can provide such berths where conditions are favourable and which can be put in hand without too much delay should be pushed ahead. The advantages of the site of Suez Port are a strong recommendation for giving very high priority to the development of the port by constructing more deep water berths. Cargo for other Red Sea ports could be transshipped at Suez, which in such cases would thus be serving as an entrepôt port. However, in recent years many ports in the Red Sea have been developed, and they are playing a very important role in their respective countries, for example Assab, Eilath, 'Aqaba and Ahmedi Port (Hodeida). Indeed, they sometimes offer even better and cheaper facilities to certain ocean-going ships; however, the regular ocean-going trade of those countries must be based on ports which can offer a comprehensive system of wharves, docks, quays, cranes, stores, roads and railway links, etc. It is noticed that the quays and sheds of the Red Sea ports are often congested with cargo and are ill-equipped to deal with road transport. In many cases, of course, quays were originally designed to serve rail transport only, e.g. Suez, Port-Sudan and Massawa. They are often too narrow and in this respect compare very unfavourably with those at reconstructed European ports. Thus in planning for construction and improvement of these ports, port authorities in the area should take a long-term view of the probable future trend of port and shipping developments.

CLASSIFICATION IN RESPONSE TO THE SITE AND SITUATION

For port development physical configuration, as it affects the orientation and concentration of inland routes upon particular stretches of coastline, makes situation of far greater consequence than local conditions of site. However magnificent a site may be for the approach and accommodation of shipping in a sheltered harbour, it cannot create a port unless the situation allows the development of all-important relations with a hinterland.[1]

From comparative studies of the ports of the Red Sea, it is clear that although Suez is an artificial port, it is the most important port along the coast of the Red Sea, mainly because it depends on its particular situation commanding one of the most important trade routes of the world.

As the two arms of the Red Sea, represented by the Gulfs of 'Aqaba and Suez, are navigable up to their heads, both Suez and 'Aqaba seemed to stand an equal chance of becoming the chief port of the Red Sea area. It was geographical determinism which underlined the advantages of Suez. Taking absolute distance into account, it is apparent that Suez is only about one half as distant from the Mediterranean as 'Aqaba; in addition, the stretch of desert that lies between the Gulf of 'Aqaba and the Mediterranean is of more difficult topography. Moreover, 'Aqaba is further than Suez from any well-settled and effective hinterland. However, it

1 Smailes, E.: The Geography of Towns, London, p. 57.

must be remembered that Suez port had a much older history behind it than the Suez Canal, but prior to the opening of the latter it had been almost moribund and the Canal had revivified it. It has a good situation according to the nearness of the Nile and its branches to Suez afforded relatively easier communication with the Mediterranean, facilitated at certain periods by routes linking the Nile Valley with the head of the Gulf of Suez. Thus there is no doubt that Suez Port has been the Canal's gift to Egypt, but equally true is the statement that Suez is the gift of the Nile, for its existence absolutely depends on the Sweet Water Canal, drawing water from the river to supply Suez. If, therefore, the Canal be the mother of Suez, the river waters are, fittingly enough, its "foster mother".[1]

Some of the Red Sea ports do not have a good situation. Such is the case of the numerous mining centres along the shores of the Red Sea, which are purely geologically based and are thus sites rather than situations, since they are cut off from the Nile Valley by the Red Sea mountains; they include Hurghada, Safaga and Quseir.[2] Such, too, is the case of Jidda, whose evolution has been dominated by site and not situation changes. Its main function is to serve the pilgrim traffic to Mecca, since Jidda is the nearest point to Mecca.

Suakin, Yenbo and Mocha are ports demonstrating the considerable influence which can be exerted by political factors on the fortunes of

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1 Hamden, G.: Studies in Egyptian Urbanism, Cairo, 1959, p. 29.

2 Ibid.

ports. These were formerly good harbours, possessing both good sites and good situations, but have now given way to, respectively, Port-Sudan, Jidda and Hodeida.[1]

Assab Port was only a small village on the Red Sea coast, just inside Bab-al-Mandeb which was a military site for serving the proposed Italian invasion of Ethiopia rather than a situation. Today the relative value of the situation of Assab have changed due to various new factors: firstly, the federation between Ethiopia and Eritrea; secondly the development of the port facilities, and thirdly the connection of Assab with the Capital, Addis Ababa, by a highway. These factors succeeded one another in attracting the trade of southern Ethiopia to Assab instead of to Djibouti. All situations are, of course, inherited from the accumulated changes of previous decades, but in the case of Assab the above factors inaugurated a process of selection and elimination, thus creating new locational values which gave a different configuration to the features of the urban centre.[2]

The situation of Port-Sudan and Massawa is naturally "given", although the story here begins with site consideration. Because of deep inlets through the fringing reef, the situation itself has its fixed geographic value. The location is such as to make Port-Sudan and Massawa the nearest major nodality to the outer world, in the Sudan and Eritrea, by sea route. In the case of Eilath, the port has a good site on the

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1 See Historical Section.

2 Hamden, G.: <u>Op. cit</u>., p. 41.

head of the Gulf of 'Aqaba. From this side-door port, Israel has regular sailings to the east coast of Africa and eastern Asia. Its situation is not good, because cargo handled at Eilath, destined for the settled portions of Israel, has to travel overland a distance exceeding one hundred and sixty miles, and effective costs of inland transportation are high. As the contiguously inhabited part of Israel can be reached more cheaply through the ports of the Mediterranean, which have both good sites and good situations, it seems that only bulk cargo destined for Eilath and adjoining parts of southern Israel, such as crude oil and petroleum products, or exports of minerals to Asia, can be handled economically through Eilath. However, efforts to find markets for minerals in countries reached by shipment through the Red Sea have failed, and, in addition, the limited supplies of well-water available in the region of the Gulf are brackish and unsuitable for future expansion.

'Aqaba Port was sited from a purely geological point of view, but nevertheless has a good situation also, since it is the only gateway for Jordan to the outer world. Historically, 'Aqaba was a site rather than a situation, when Jordan had its own ports along the Mediterranean, but after the Palestine War it was cut off from these ports and has had to develop the port of 'Aqaba, to serve the foreign trade of the country.

The present century has witnessed the creation of a considerable number of new ports, such as Port-Sudan, 'Aqaba, Eilath, Assab and the small ports along the coast of the Red Sea in the Egyptian Territory. Their existence depends on the needs and riches of their hinterlands.

For instance, Gemsa Port, which lies at the south end of the Gulf of Suez on the African coast, was a busy little port serving the traffic in oil after the discovery of the latter in 1908. Port activities increased after the development of the oil trade; the population increased, too, and reached 1,015 in 1917.[1] After the decline of the production of oil, the population decreased very rapidly to 300 in 1927,[2] and today the place is completely deserted, the only signs of the former activity being the oil-wells and the jetty. The same phenomenon will occur in Hurghada Port in the near future, unless new functions arise to develop the port and to attract people to the port once more.[3]

CLASSIFICATION ACCORDING TO FUNCTIONAL RELATIONSHIP

World, national, or local patterns of human activity yield a classification of ports, as international, national, regional or local. Such a classification is based on the extent of the port's hinterland and foreland, with respect to the port's radius of activity.

The following table indicates the status of ports of the Red Sea according to their functional relationship with their own countries and with others.

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1 Census of Egypt, 1917.

2 Census of Egypt, 1927.

3 Oil production decreased from about 38,000 cubic metres in 1950 to about 30,000 cubic metres in 1962.

TABLE 140: FUNCTIONAL RELATIONSHIPS OF PORTS OF THE RED SEA

Port	International	National	Regional	Local
Suez	x	x		
Hurghada				x
Safaga				x
Quseir				x
Tor				x
Abu Zenima				x
Port-Sudan		x		
Suakin				
Massawa			x	
Assab			x	
Eilath		x		
'Aqaba		x		
Wejh				x
Yenbo				x
Jidda			x	
El Lith				x
El Qunfidha				x
Gizan				x
Hodeida		x		

From the above table, it can be seen that Suez is the only International port among the Red Sea ports, as it serves the transit traffic through the Suez Canal. It is also a National port, since it does not serve a special region but serves the whole country. Other ports along the Egyptian coast of the Red Sea serve as local ports according to their limited hinterlands, with respect to their radii of activity.

Wejh, Yenbo, Rabigh, Qunfidha, Gizan, Luheiya and Mocha are all small ports on the Arabian coast of the Red Sea which serve local and coastal trade, a considerable amount of which is based on fishing activities.

Port-Sudan, 'Aqaba, Eilath and Hodeida are all national ports since they serve as gateways for their countries; they serve the whole of their respective countries, and not merely special regions of the countries.

Massawa, Assab and Jidda are regional ports, since they serve particular regions rather than the whole country. Massawa, for instance, serves the northern region of Ethiopia, and Assab the southern region. Jidda mainly serves the Hejaz, its hinterland not extending to the Persian Gulf, where there are other ports serving the eastern part of Saudi Arabia which have good connections with the capital, Ar-Riyadh, by means of railways. However, Jidda is a considerable distance from the capital and there is very little connection between the two, because of the lack of good roads

CLASSIFICATION ACCORDING TO ECONOMIC ACTIVITY

The ports of the Red Sea show the widest variety of nomenclature when classified according to economic activity. The name of the principal commodity handled may be used, or what is done with the greater part of the cargo may determine whether the port is industrial, commercial, etc.

The following table indicates the status of ports of the Red Sea according to the principal commodities handled in each (in thousand tons).

TABLE 141: MAIN ECONOMIC ACTIVITIES OF PORTS OF THE RED SEA[1]

Port	Principal Commodities	Quantity	Total Trade
Suez	Mineral Fuel Oils	2,311	4,099
Ras Gharib	Crude Oil	1,065	1,066
Hurghada	Crude Oil	32	33
Safaga	Phosphate	101	108
Quseir	Phosphate	216	217
Tor	-	-	-
Abu Zenima	Manganese	150	156
Port-Sudan	Agricultural Products	1,150	1,653
Massawa	Agricultural Products	90	300
Assab	Agricultural Products	60	152
Eilath	Minerals	90	177
'Aqaba	Minerals	500	734
Wejh	-	-	-
Yenbo	-	-	-
Jidda	Agricultural Products	-	-
El Lith	-	-	-
El Qunfidha	-	-	-
Gizan	-	-	-
Hodeida	Agricultural Products	-	-

1 Statistics supplied by the Port Authorities in the Red Sea area.

The ports of the Red Sea may also be classified as Industrial, Commercial, Transit or Trans-shipment.

The following table indicates the status of the ports of the Red Sea according to their functions.

TABLE 142: FUNCTIONAL CLASSIFICATION OF PORTS OF THE RED SEA

Port	Industrial	Commercial	Transit	Trans-shipment
Suez	x		x	
Hurghada	x			
Safaga	x			
Quseir	x			
Port-Sudan		x		
Massawa		x		
Assab		x		
Eilath	x			
'Aqaba		x		
Jidda		x		
Hodeida		x		

The classification is based on the activity of greatest importance in each port. All large urban centres are more or less multi-functional, and the classification of the port town as industrial does not imply the absence of trade or other activities. It should be noted also that the original function of the port town may be no guide at all to the most important activity at the present time; a state capital which owes its chief growth to manufacturing is here classed as an industrial contro.

Two sets of figures which aid in the determination of the principal activities in each port town, occupation figures and employment figures, are not available in the Red Sea area.

It is quite obvious that sea ports, with their possibilities for relatively cheap bulk transportation, tend to have many advantages for industry. The advantages must be considerable when direct oceanic contacts occur, because of the fact that a much wider area is to be drawn upon through the established transport systems and methods.[1]

The majority of the Red Sea ports are in general favourable for the location of industries, since raw materials are available at reasonable costs both from the hinterlands and from overseas producing areas. Because of the good transport facilities and the possibility of reaching a varied buyers market for the industrial products, industrial sea-ports have many advantages, though of course not all the Red Sea ports are in the same favourable conditions. Small ports, for example Eilath, Safaga, Quseir and Yenbo, without an extensive hinterland, will not be able to maintain worldwide contacts. Conversely the hinterland has its profit from the favourable location of the port for world transport relations. The more flourishing industries which the hinterland possesses, the better it is for the port, and the more the population of the port will increase, e.g. Suez, Port-Sudan and Massawa. The growing population in these ports

1 Boerman, W.: The need for special examination of particular aspects of Port Geography; Report of the Commission on Industrial Ports, Washington, 1952, p. 6.

will give an ample and differentiated labour market as well as an important local market for some industries (biscuits, furniture, etc.). These These will also have opportunities for fitting out and stocking the ships and the industries may eventually have opportunities of exporting products to foreign overseas markets. Another possibility of industrialization in connection with the ports of the Red Sea could include ship-building, ship-repairing, engineering works, construction yards, etc., while the large female labour supply may contribute to the introduction of the manufacture of clothing, confectionery and tobacco products, etc. The fish-processing industry in the ports of the Red Sea could be one of the area's most valuable potential industrial developments. Initial investigations under the United States' Technical Assistance Programme and United Nations' sponsorship indicate an opportunity for large-scale commercial fishing operations to be developed in the Red Sea.[1] Fleets working from these ports, served by icing and cold storage, could place a port such as Suez in a position not greatly inferior as a fishing centre to Boston in the U.S.A. or Grimsby in England. Thus the expansion in fishing operations in the Red Sea will create many other industries which depend mainly on the fishing industry, for example ice plants to supply ice, manufacturing of wooden crates or waxed paper containers to suit the needs of the products shipped, fish-canning plants for small fish to be cooked and canned in oil, other plants for drying and salting operations,

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1 Little, A.: Op. cit., p. 80.

plants to handle sharks for skins or shark liver oil, extraction plants to produce commercial fish-oil, fish-smoking plants and fish-meal plants. These are some of the operations in an industry which could develop ports such as Suez into centres of that industry on the same scale as some of the European ports.

Industrial development in the Red Sea ports should be based primarily on the utilization of natural resources in the area. Another important industry which could develop in the majority of the Red Sea ports is the fertilizer industry. This is a basic necessity if agricultural productivity in the countries of the Red Sea area is to be increased.

Thus the industrialization of the Red Sea ports in the future will create more goods for export, reduce imports, add value to agricultural products, increase employment opportunities, and raise the income and purchasing power of the people.

CLASSIFICATION ACCORDING TO PREDOMINANT TYPE OF CARRIER

Ports have been classified according to the type of carrier which predominates in their traffic patterns, such as liner, tramp or tanker. This classification demands a knowledge of the nature of trade at sea, so that we may understand fully the nature and activity of ports. All ships afloat are not a number of interchangeable units which may, subject to limitations in the physical size of ports, use any or all ports. Ships fall into several classes according to the trades in which they are engaged, and the nature of these trades greatly affects the ports which they frequent. An analysis in these terms is justified because it is a functional analysis: it will explain a great deal about the Red Sea ports in relation to their nature and size.[1]

The following table indicates the status of ports of the Red Sea according to these functions.

TABLE 143: PREDOMINANT TYPES OF CARRIER IN PORTS OF THE RED SEA

Port	Tramp	Liner	Tanker
Suez	x	x	x
Hurghada			x
Ras Gharib			x
Safaga	x		
Quseir	x		
Abu Zenima	x		
Port-Sudan	x		
Massawa	x		
Assab	x		
Eilath	x		x
'Aqaba	x		
Jidda	x		
Hodeida	x		

1 Morgan, F.: Ports and Harbours, 1961, p. 78.

The Red Sea ports participate to a varying degree in the three great divisions of sea trade - the tramp trade, the liner trade and the tanker trade. Some are dominated by one or another. Suez, with its good location near the Suez Canal, attracts all kinds of ships, and therefore serves all three divisions of sea trade. Hurghada and Ras Gharib are tanker ports. Port-Sudan, Massawa, Assab, 'Aqaba, Jidda and Hodeida are tramp ports, while Eilath serves both the tramp trade and the tanker trade.

CLASSIFICATION ACCORDING TO SIZE OF POPULATION

Classification of urban areas along the coasts of the Red Sea according to size of population implies more than a numerical distinction. It implies a relationship between population and urban functions; that is, with increasing size the urban settlement becomes more complex, more differentiated, and increasingly multi-functional. Classes of urban settlements, according to size, have commonly been referred to as villages, towns, cities and metropolises, with the implication that for each class in ascending order of size additional functions are encountered, or establishments become differentiated.

The following table gives the population for each of the twelve main ports of the Red Sea.

TABLE 144: THE POPULATIONS OF PORTS OF THE RED SEA

Suez	203,000	Eilath	7,500
Jidda	200,000	Assab	6,000
Port-Sudan	47,000	Quseir	5,366
Hodeida	30,000	Hurghada	4,301
Massawa	27,000	Ras Gharib	3,799
'Aqaba	9,273	Safaga	790

It is obvious from the above table that Suez, Jidda, Port-Sudan, Hodeida and Massawa are the most important urban centres along the Red Sea coast. Suez Port, with its wide range of activities, has the largest population in the area. It seems that there is a relationship between the activity of Suez Port and the size of its population. In 1882, the population figure was 11,316, increasing to 203,000 in 1960, due to the increase of the port functions, which attracted immigrants from other poorer centres. The following table shows the rate of growth between these dates.

TABLE 145: RATE OF GROWTH OF THE POPULATION OF SUEZ (1882-1960)

Year	Population	% Increase	Year	Population	% Increase
1882	11,316	-	1927	40,523	31
1897	17,366	36	1937	49,686	23
1907	18,347	6	1947	107,244	155
1917	30,996	69	1960	203,000	84

Jidda is the next important centre, mainly for its pilgrim traffic and commerce, for which it has been noted since ancient times. It is followed by Port-Sudan, Hodeida, Massawa, 'Aqaba, Eilath and Assab, which are relatively small urban centres.

The mining port towns along the Egyptian coast of the Red Sea are small and specialised, e.g. Ras Gharib, Hurghada, Safaga and Quseir. Each town originated in connection with the discovery and exploitation of a certain mineral. They are modest in the size of their population, unlike completely urban settlements; more correctly, they are short-lived camp colonies which begin to mushroom from boom towns and soon end as ghost-towns.[1] Quseir is the most important, dating back in history some 3,000 years, one of the most ancient ports of Egypt. At the opening of the 20th Century it was moribund, unmentioned in the 1882 Census and figuring in 1897 with only a population of 1,802. Thanks to phosphate mining, it reached 5,366 in 1947, and is now the biggest mining settlement on the Red Sea coast. Hurghada appeared with the flow of oil (4,301 inhabitants in 1947), while Ras Gharib, which had not existed before its oil-fields in 1938, reached 3,799 in 1947.

Thus the ports of the Red Sea will certainly be affected by the development of their functions. From the information collected it is understood that the growth of the population of these ports is due in a large measure to internal migration. A high proportion of the people living in these ports were born elsewhere. It is noticed also that there is a

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1 Hamden, G.: Op. cit., p. 30.

very high percentage of male population in all the Red Sea ports, a phenomenon mainly due to the increase of economic activities, which continue to attract large numbers of the male rural population towards these ports. However, the growing population in the ports will give an ample and differentiated labour market, and because of the fact that the labour demands of the ports and many of the associated industries will be for male workers, there may well be broad opportunities for the location and establishment of industries employing female labour in the ports.

CLASSIFICATION ACCORDING TO THE VALUE AND VOLUME OF TRADE

By what standard should the Red Sea ports be judged? By the weight of cargoes landed and shipped? Then Ras Gharib, Abu Zenima, Safaga and Quseir would rank among the leading ports in the Red Sea area, comparable with Port-Sudan, Assab, 'Aqaba and Jidda. Important though these oil and ore ports are, it would be generally agreed that the weight of cargo alone is insufficient to determine the relative importance of the Red Sea ports. Value of cargo is not much better as a criterion for the figures fluctuate with every rise and fall of prices. Thus neither weight nor value give a true idea about the ports of the Red Sea. Net tonnage of shipping using these ports could be a guide, for several reasons. It applies to all ports except naval ports, and includes all ships which come to the ports. It includes all classes of traffic - the passenger liner with little cargo and high net tonnage figure, the tramp with a great weight of cargo in proportion to its net tonnage figure, the cargo liner, the passenger cargo liner, the tanker, the collier and the packet or ferry steamer. Thus the net tonnage figure of shipping using a port is the most comprehensive figure for evaluating the Red Sea ports.

TABLE 146: CARGO LANDED AND SHIPPED FROM RED SEA PORTS (1960)

Port	Tons	Port	Tons
Suez	4,730,916	Massawa	303,000
Abu Zenima	156,000	Assab	175,000
Ras Gharib	1,066,000	Eilath	177,000
Hurghada	33,000	'Aqaba	685,000
Safaga	107,000	Jidda	492,000
Quseir	216,000	Hodeida	400,000
Port-Sudan	1,653,000		

TABLE 147: NET TONNAGE OF THE RED SEA PORTS (1960)

Port	N.R.T. (000 tons)	No. of Vessels	Port	N.R.T. (000 tons)	No. of Vessels
Suez	138,230	19,082	Massawa	1,544	769
Abu Zenima	82	84	Assab	871	487
Ras Gharib	534	128	Eilath	-	55
Hurghada	23	29	'Aqaba	-	433
Safaga	64	23	Jidda	-	901
Quseir	122	35	Hodeida	-	-
Port-Sudan	3,976				

From Tables 146 and 147, it is observed that Suez is the leading port, and it is noticed that the net tonnage is very high compared with the cargo landed and shipped. This is because vessels coming to Suez are mainly seeking a passage through the Suez Canal. Next in importance is Port-Sudan, both according to the figure for cargo landed and shipped, and the net tonnage figure. Ras Gharib has a high figure for the weight of cargo since it is an oil port. Massawa has a high net tonnage figure but this is of little consequence when compared with the weight of cargo handled. The net tonnage figure in 1960 was 1,544,000 tons as opposed to 303,000 tons of cargo handled. The same applies to the majority of the Red Sea ports.

It is noticed that the ports of the African coast of the Red Sea are more prosperous than those of the Arabian coast, due mainly to the richness of the hinterlands of the African ports, whereas the Arabian coast is mainly desert and is limited in its economy. Though the number of vessels visiting Jidda Port is high, the quantity of goods handled is very small, since Jidda depends almost entirely on pilgrims coming, from the whole world, to Mecca during the pilgrimage season.

Thus each of these classifications is based on specific criteria which presumably characterize the ports of the Red Sea by a predominant function. The names of many ports will already have been found to occur in more than one "class", the reason being that they perform more than one function. However, when we appear to classify ports by giving them names, we must remember that we are not doing so in a strictly scientific sense. Nevertheless, the activity which we ascribe to them in this way is real, but the degree to which it is a complete statement of this or that port's activities may vary enormously. Many ports are multi-functional and our so-called classification, therefore, is neither complete nor rigid, but is valuable in drawing attention to the varied functions of ports.

CONCLUSION

The Red Sea represents a barrier between Africa and Asia, separating two similar regions of arid and semi-arid climate. The land adjacent to the Red Sea is generally mountainous, flanked on the eastern side by the high tableland of Arabia and on the western side by a range of mountains from 4,000 to 6,000 feet. In the deep trough between the shores and the high land are plains of varying extent; behind the hills lie deserts. The coasts are almost without economic activity. Communications on the African side are extremely poor, with limited access to the Nile valley, where the economic life of Egypt and the Sudan is concentrated; on the Arabian side, communications are rudimentary.

Of particular importance to the growth of urban centres along the Red Sea coasts is water supply, representing a problem confronting many urbanized areas. Supplies of ground water are becoming exhausted or insufficient to meet the needs of rapidly expanding ports. The strip between the mountains and the sea is a desert plain with rainfall so slight as to be negligible. It is, furthermore, extremely variable both in quantity and distribution, confined to sudden showers which flood the wadis but have no lasting benefit. Thus it is difficult to maintain large centres of population, and most of the inhabitants along the coasts are semi-nomadic Arabs. Other urban centres along the coast owe their existence either to mineral resources, for example Ras Gharib, Hurghada, Safaga and Quseir, or to the need for trade, because they are the only gateways to the outer world, such as Port Suez, Port-Sudan, Massawa, Assab, Eilath, 'Aqaba, Jidda and Hodeida.

The economic possibilities of these ports are determined more by the richness and size of their hinterlands than by physical factors, which can be modified by man if the need is great enough. Since the opening of the Suez Canal in 1869, and even before that, the Red Sea had long been one of the most important routes serving international trade between Europe and the East. These factors developed the ports on the shores of the Red Sea and they became prosperous through shipping and commerce, chiefly as intermediaries between the Orient and Europe. In the fifteenth century, however, the rise of the Ottoman Turks and accompanying piracy made the Red Sea route hazardous if not impossible to use. Moreover, the discovery of the route to Asia round the Cape of Good Hope created a safer and easier seaway connecting Europe directly with the Orient. As a result, ports in the Red Sea found themselves in the backwater of world ocean trade and traffic for more than two centuries and a half. An era of rejuvenation began with the opening of the Suez Canal, together with the advent of the steamship, continued industrialization in north-western and central Europe and the need for raw materials from the Orient. The Red Sea again became one of the world's principal ocean highways, benefiting the ports located on its shores.

The Red Sea ports differ from European ports, in serving mainly their more distant hinterlands rather than the immediate umland; the latter serve particularly their umlands and thereafter the distant hinterlands. European ports are mainly industrial ports where foodstuffs and raw materials are imported for the needs of industry, and manufactured goods are exported to overseas markets. There are a number of reasons why it is impossible to make valid direct comparisons between these ports and the Red Sea ports. They have access to a hinterland which is larger and potentially wealthier than that of any Red Sea port. An extensive inland waterway system of high capacity, together with good road and rail communications, provides them with exceptionally cheap and effective means of tapping this hinterland, for example Antwerp, Hamburg and Rotterdam. Concerning the Red Sea ports, they are far away from the economic life of their countries, for example Port-Sudan serves Khartoum, the main market in the Sudan. Khartoum is 490 miles from Port-Sudan, Juba, in the south of the Sudan, being 1,590 miles from the port; Assab Port is 538 miles from Addis Ababa. Communication with the hinterlands of the majority of these ports is still limited, and industry is also very restricted in the ports. Having made these reservations, however, it is essential that in many directions the Red Sea ports have much to learn from European and other well-advanced ports.

The differential growth of population and industry, and changes in the pattern of trade, are likely to affect the relative importance of the Red Sea ports to a great extent. Continued growth in the size of ships and the growth of inland transport will develop the ports to suit these new factors. Plans for constructing or reconstructing berths should look many years ahead and make ample allowance for the likely increase in the overall size of ships.

Port authorities in the Red Sea area should consider carefully how the latest technical advances in transferring cargo from ship to shore or direct to inland transport might be applied to their port, and whether plans for future development need to be modified. Quays should be kept as free of cargo as possible, and provide clear access for road vehicles; port facilities should be adequate. The inland transport system is a critical factor in port efficiency; thus the ports of the Red Sea in the future should be served by a variety of forms of inland or, more accurately perhaps, onward transport, for example rail, road, inland waterways if possible, coastal shipping and pipelines. Port authorities should consider the improvements which are necessary on the routes linking their ports with their principal markets.

However, the ports of the Red Sea basin, according to the recent economic development in the area, will retain much of the existing lay-out, adapted to new uses, and in addition new lay-outs and installations suited to more advanced types of ship and improved methods of cargo handling.

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