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### The Main Trade Ports on the Coasts of the Indian Ocean

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THE MAIN TRADE PORTS ON THE COASTS OF THE  
INDIAN OCEAN

Senior Thesis

by

ANTON LUGER

submitted to the Departments of Economics  
and Geography at Oberlin College in ful-  
filment of the requirements for the de-  
gree of

Bachelor of Arts.

Oberlin, Ohio  
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## INTRODUCTION

### Significance of the Seas in World Commerce and World Traffic

The seas have been a means of vessel traffic for centuries. Already in the Antique and in The Middle Ages long voyages were made in the oceans with the smallest vessels. But even Columbus had still to fight against the greatest difficulties during his crossing of the Atlantic on his dangerously small ships. Today, the traffic and the crossing of the oceans has become a matter of course. The ocean, having divided lands, countries and continents, has become an element which makes the separation of space almost inefficient. In periods of low civilization the oceans divided the nations; in a period of advanced and higher civilization it prepares an interchange of goods and thoughts and becomes by degrees the greatest necessity for the countries, because a most comfortable, most important and almost unrestricted traffic with every part of the earth is possible on the Seas.



## CHAPTER I

### PORTS and HARBORS

The word "port" is derived from the Latin "porta" which means "gate". Generically, it signifies an entrance. In essence it is a gateway from the land to the sea or other waterway, or from the latter to the former. It is a place where freight and passengers carried by steamers, sailing vessels, or other water craft, can be landed or taken aboard. It also serves as a connecting link between two or more water routes. Geographically a port is a point and not an extended coastline. Its area is restricted to a comparatively few miles of waterfront, generally located in some harbor, natural or artificial.

A harbor embraces the water area which accommodates the vessels of commerce while they are engaged in loading and unloading their traffic, making necessary repairs, and awaiting time of departure, together with the space available on or near the shore for the movement and storage of freight. Much of this latter space is devoted

to wharves, beside which ocean vessels or subsidiary craft may land.

It is characteristic of ports that they grow in accordance with the requirements of trade and along the lines of recognized traffic routes. No amount of mere local harbor convenience or suitability will originate the growth of a port if the inducement of trade is lacking. There are many natural harbors, where ports could be established with requisite accommodations for ships and cargo, which have never been developed - sometimes not even utilized -- because of the absence of favorable trade conditions.

At the same time a good harbor is an important factor in port development. A well-sheltered inlet with water of sufficient depth for large water carriers will itself influence, and sometimes determine, the course of a trade route. Vessels need landing or anchoring places, where some shelter is afforded from ocean storms, and where space and equipment can be provided for the transfer of freight and passengers.

A port, therefore, must have a favorable "hinterland" and a requisite harbor. The term "hinterland", derived from German, means "land back of the port or coast". Used in connection with water terminals it includes tributary areas of various kinds. These areas may be "contributory" or "distributary", according as they feed or absorb water-borne traffic -- in other words,

export or import. The hinterlands of the world's leading ports are generally both "contributory" and "distributary". There are some important ports which are primarily exporting or importing terminals. Where this is the case the hinterland is likely to be either restricted in area and given over to the production of one or a few raw or crude products, or larger in area and densely populated but having other trade outlets for its productive energies. In the former case the port is essentially an exporting terminal; in the latter, which is much less common, the port receives much more freight than it contributes, the tributary areas finding a more convenient outlet for its products elsewhere.

It might be desirable to draw, once more, a distinction between a port and a harbor, which will be recognized as important. A port may possess a harbor, but a harbor is not necessarily a port. Any natural creek, or inlet, on the coast, with adequate depth of water and sufficient shelter for shipping, fulfills the essential conditions of a harbor. To make it a port in the accepted sense of the word, there must be in addition, accomodation and facilities for landing passengers and goods and some amount of trade overseas. The idea of loading and discharging goods is therefore fundamental and, to some extent, the idea of shelter runs parallel, since shelter is an essential condition of the operations of cargo handling.

It is clear then, that a port, whatever its particular functions may be, embodies essentially the two characteristics mentioned above. Shelter for shipping is primarily a natural factor, but it can be improved and extended by artificial means, and many natural disabilities in a situation favorable for trade may be removed by engineering skill, so as to render the development of a port dependent, practically almost entirely, on the expansion of its trade. Trade, therefore, becomes the dominant factor.

The sources of trade which promote and foster port development are numerous, including the presence of local mineral deposits, extensive production of grain and other foodstuffs in the "hinterland", establishment of manufacturers there, or even merely the needs of a large population in regard to the necessities and luxuries of life.

#### Classification of Ports:

1) According to the predominant nature of traffic:

This division would segregate ports with a primarily passenger traffic from those which are chiefly freight terminals. The distinction between terminals having a relatively heavy trade in raw materials, and those with a more general freight tonnage also serves as a basis for grouping ports according to nature of traffic. Raw material ports are usually exporting terminals - places



where the outgoing freight greatly exceeds incoming traffic. Raw material production usually involves the utilization of labor which is small in proportion to output. As this output is often heavy and of comparatively low value relative to bulk, it moves to the nearest available harbor in order to save transportation costs. Hence it often reaches places on the seacoast where population is not large and sometimes even sparse. Local ports are those which maintain only connection, or traffic for a restricted area, between ports of the same coast of the same ocean. Some of the former important ports have lost their importance because of the building of larger and deeper ships, which are now unable to land there there. Many of these ports were therefore compelled, if they wanted to play their former important role, to improve their harbor facilities.

If we want to be more specific in the case of port predominated by the nature of their traffic - and I mean here only the freight ports -, we can speak from coaling ports, grain ports (Karachi), rice ports (Rangoon), jute ports (Calcutta), cotton ports (Bombay) etc.

2) According to location and general character:

The kind of waterway on which the port is situated determines the classification of harbors according to location and character. This classification would group such waterways into natural bays or inlets along the

seacoasts, artificial bays or roadsteads, rivers flowing into the sea and of sufficient depth and volume to accomodate ocean carriers along part of their sources, canals built for the purpose of connecting interior centers of population with the coast, and a combination of river and bay port.

Natural bay ports are located on waterways affording ample room for the movement and anchorage of ocean vessels with one or more natural openings to the sea. Sometimes terminals of this character are located on bays or inlets which form part of some larger bay or gulf. In some cases the bay on which the city is located has to be dredged to accomodate the deep craft vessels now employed in ocean commerce. The city located on a bay of ample area, and of thirty feet and more in depth at low tide, can provide a terminal for handling ocean traffic at a relatively small expense; but the trade of a city so located will generally be less than that handled at a city located near the mouth of a large river because the river affords connection with a large inland area of production and consumption.

Artificial bays or roadsteads are created at government expense on the ocean shore where no natural harbors exist. Costly breakwaters are constructed to afford quiet water for landing or anchorage. The enclosed basins are usually dredged.

River ports which are at the same time sea ports,

are usually located near enough to the coast to be practically at sea level. Often the depth of the water in these highways is influenced by tidal changes. River ports include a large proportion of the world's leading ocean terminals (London, Hamburg, Rotterdam, etc.). The cheapening of the rail transportation in the last decades and in the most recent times the increasing importance of truck transportation are giving the roadstead and bay ports even greater importance, by enabling them to compete with river ports over a wider traffic area. But the extensive improvement of inland waterways and the technical development of inland navigation are likewise building up the trade of the river ports. The location of an ocean port on a river many miles inland no longer has the advantage that it possessed before the development of railroad transportation. Unless located near the mouth of a large river, a river port may be at a disadvantage, particularly in the passenger, express, mail and general cargo services, where promptness in delivery and arrival at destination are important.

Canal ports are made such by virtue of artificial waterways from the coast of interior cities or settlements.

A city located on the head of a bay and also on a large river has the most favorable situation possible.

3) The classification of ports with reference to administration groups those terminals according to their ownership



and the authority exercised in their operations. Roughly speaking, ports according to this classification may be divided into:

- (a) Public ports which are owned and administered directly by states or municipalities.
- (b) Semi-public ports, whose properties are owned in some instances by private individuals or companies and in others, by states and municipalities, and over which some public control obtains.
- (c) Public trust ports, which are owned and administered by non-salaried representatives of the municipality and commercial interests centered at these ports.
- (d) Private ports which are owned and primarily controlled by private interests.

These are the three main classifications of ports, but there are some other interesting points of view used to distinguish different kinds of ports.

4) The German Geographic Richtshofen for example makes the following distinction:

- (a) Ports on the delta of navigable rivers which can be navigated on its lower course by seaships and later on some routes allow the smaller ships to way further to the interior. Important is that near those large valleys is the highest intensity of

population and therefore also the highest economic intensity. (examples are: Calcutta and the Ganges-delta, Rangoon and the Irrawadi-delta)

- (b) Ports on the delta of not or only incomplete navigable rivers. The ports are in this case within the delta of the river or in its immediate neighborhood. The rivers make its way through areas of its largest intensity of population and production not in its lower, but in its centre course. (an example here is Karachi and the Indus)
- (c) Embayments and roadsteads with none or only an unimportant connection to the next river.
- (d) Island ports as crowning points of important trade and traffic routes. These are often also fuel stations (Singapore, Zanzibar)

5) Besides there is another notable distinction in summarizing ports: The distinction in Transit - and Non-Transit ports.

The important feature of the first group is, that they are only stations for the ships on their way from the port of departure to the port of destination; while on the latter goods for other places of destination are loaded and unloaded.

Non-Transit ports can be:

- (a) Fishing ports are the oldest type and served originally only to supply their hinterland. Some of them have now become also export ports or also transit stations.
- (b) Special Trade ports are those which export particularly one article. (example is Rangoon as a rice port)
- (c) General Trade Ports are staple markets for many goods which are delivered to the trade centers of the hinterland. The word staple market is a good term to characterize their function. This kind of port was very important in the middle ages in Europe (for example Marseille). Today these so-called port markets are strong developed in the less civilized areas. Their function is that of a collecting station on the one and that of a distributing station on the other hand in case of a large and little approachable hinterland; they are sometimes of considerable importance, because there is almost no industrial activity in the hinterland and their demand is for the simplest articles. Most of the African ports fall in this category and Madras in India is an outstanding example for it.
- (d) Industrial Ports provide and supply industrial areas with raw materials and carry out the shipment of the production goods. There is no example of this

kind of ports in the area of the Indian Ocean but in all of its ports the larger part of the exported goods consists in raw materials and the larger part of the imported is finished goods (though Bombay f. c. imports a large quantity of raw cotton from East Africa).

Typical ports of this kind are Antwerp in Belgium and Boston in The United States.

Transit Ports:

- (a) Ports of embarkation as Ostende or Calois
- (b) Ports of call like Aden, Singapore
- (c) Ports of ramification like Colombo

6) To conclude our classifications we can make a last one according to the volume of trade and distinguish between Small, Moderate, Large, and Main Trade Ports and at last World ports, called so only if they have connections with all parts of the earth.

To be complete in our port terminology we have briefly to mention the so-called "free-port". A free port is a land or a water area, or a land and water area not subjected to the payment of tarrifs; foreign goods can be imported without payment of any duties and the export goods are subjected to the same regulations. They are large markets which attract numerous buyers and therefore promote the country's own trade and sometimes even industry. The best situation for a free port is an area easy to reach from both land and sea.

We shall now briefly consider the conditions which are necessary for a first class harbor. A first class harbor must be:

- (1) well protected from wind and sea on all sides
- (2) spacious enough to accommodate a considerable number of large, ocean going vessels simultaneously, and
- (3) sufficiently deep to permit access to many of the vessels plying the ocean today.

The average steamer draws about 20 - 25 feet of water when loaded. Large liners usually draw from 30 - 35 feet or more. Hence, harbors with a minimum depth of less than 15 feet in the channel of approach and in the anchorage, at mean low tide, have to be considered unfit for modern vessels.

No coastal embayment, either natural or man made, that fails to meet these requirements can rightfully be considered a first class harbor. If it is unprotected against sea and wind from any direction it is not suitable for year round use, for when strong winds blow from the open ocean ships must evacuate the harbor and operations are suspended. 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 can not rank as first class harbors even though they may be both deep and well protected.

The harbors that meet the above requirements are not all of similar character and equal values. There is



almost infinite variety in the combination of depth, size, shape, degree of shelter and ease of access. Some harbors are elongated, others have an oval or irregular shape. Some cover a fraction of a square mile while others are many times that size. There are, therefore, all kinds of harbors ranging from excellent down to fair. Similarly, all the harbors are not equally well equipped.

The close relationship of the rise and power of port cities to the development and spread of civilization is well known. The remains of ancient harbor works have been found in Crete, attesting the commercial intercourse between Crete and Egypt nearly 4000 years before the Christian era. As early as the 13th Century B. C. the Phoenicians built harbors at Sidon and Tyre and on the basis of the commercial intercourse thereby developed, a great civilization was reached. The numerous harbors developed in the Mediterranean basin in ancient Greece and Rome constitute the foundation upon which was erected the great commercial development and the glorious culture of ancient times. The Middle Ages were stirred from intellectual stagnation by the commercial intercourse and contact with the Eastern World which followed in the wake of the Crusades. The unparalleled splendor of the Renaissance, its arts, literature and early scientific inquiries, had its material basis in the great Italian ports and in the wealth flown out of a radiating network of world wide commercial relations. The association of the trading town along the

Baltic, known as the Hauseatic league, continued in full strength for over three centuries. The impetus given to commerce by this remarkable association of maritime towns carried trade to all points within the Baltic basin, west to England and east to Russia.

The great trade ports of the different countries occupy a special position. They are open doors, connecting the country with other parts of the world, doors through which the trade flows; food, raw material, finished products. They arise, grow, win power and wealth. While the importance of the ports which were able to adapt themselves to the varying streams in economic life outgrew centuries, others disappeared almost completely after a short boom (Carthago!). The discovery of new continents and until unknown searoutes caused a shift in the trade routes. On the coasts of the Indian Ocean, in Asia and in Africa new ports were developed by the Portuguese, Spaniards, Netherlands, and later by the French and English. Again a shift in the bay trade routes followed the opening of the Suez Canal, which was of importance for the future of many sea ports, for some of advantageous for others not. The extension of the Europeans in oversea areas led to an expansion of the sea traffic in all oceans, to all coasts and was the reason for the rapid growth of international sea routes; on their crossing-points large trade settlements (Singapore, Malbourne, Calcutta, Colombo) were established.



## CHAPTER II

### THE INDIAN OCEAN

The sea routes of the Indian Ocean have already a long history, since the border countries of this ocean consist in old cultural areas. They represent, because of the immense length of the coastlines, a gigantic space in topographical extension on the one hand and as scene of historical changes on the other.

The Indian Ocean has about 28 Mill. squ. miles, is only one-third smaller in area than the Atlantic, but two-thirds smaller than the Pacific. Open to the south towards the Antarctic Ocean, bounded in the West, North and North-east by the huge land masses of Asia and Africa, it only offers toward the East and Southeast edged with numerous islands, a loose border to a neighbor-ocean - over Timor, Snuda, Java and East Sumatra to Singapore. The most important by-seas of the Indian Ocean are the Red Sea and the Persian Gulf, while the Arabic Sea and the Bengal Bay are only large gulfs of the ocean.

The form of the Indian Ocean is more unfavorable for an oversea traffic than the proportionately more narrow form of the Atlantic. The main difference between the two

is, that the tropical character of the climate of the former with its rhythmic air, and water-streams, compelled its sea traffic - especially in former times - to an extraordinary regularity.

In course of time there was a shift in the seats of old cultures, spheres of activity of trade and navigation nations, and in economic and political centers trade relations were altered and, as a consequence, direction of trade too. As long as navigation in the Indian Ocean was restricted to sailing boats - to the small primitive kind - it was of course also restricted to coast trade only. Out of that coast trade there developed first navigation in small seas, where the neighborhood of populated coasts was of some security. In the oldest times, long B. C. the trade was therefore restricted to the northeastern part of the Indian Ocean, where at that time people of high civilization lived. Farther and real over-sea voyages were started in the Indian Ocean from India, and brought this country, by using the monsoon, in connection first with the Persian Gulf and the Euphrat and Tigris countries and later via the Red Sea with the Mediterranean Sea and its countries and cultures. While here the periodic winds in the northern part of the Indian Ocean - using at the same time the sea streams - promoted an extensive trade between the Red Sea and the West coast of India, the south-east "trade-wind", the great wind stream in the middle part of the Indian Ocean made first possible the trade and traffic

between Madagascar and Zanzibar.

(Since the northern part of the Indian Ocean is surrounded by land from three sides a steady stream of cool air flows upcountry, that means from SW to NE, during the summer, while it flows in the opposite direction during the wintertime. The Northeast monsoon therefore is a huge, for months continuing land breeze and the southwest monsoon an equal sea breeze. To the areas near the equator, with its high temperature and its proportional low atmospheric pressure - the so-called "calm" zone - there is a substitute flow from the sub-tropic areas with their high atmospheric pressure. This flow develops, diverted by the rotation of the earth, to a north-east "trade-wind" in the northern hemisphere.)

In the northern Indian Ocean, after the establishment of Alexander's the Great Empire, the Greeks became the exponents of the trade. But they were cautious and sailed along the coast from Egypt to India, which took them quite a long time. And it was not until the first decade B. C. that they started again, as the Indians had already done, to use the southwest monsoon and to cross directly the Arabic Sea.

We see therefore that the significance of monsoon and "trade wind" was already important for sea-navigation in the antique; and still today, the regularity of those winds and the sea-streams influenced by them, are of importance - at least for the sailing navigation in the

Indian Ocean. The discovery of the usefulness of the monsoons especially decreased the significance of the minor trade areas - Red Sea and Persian Gulf - and made the main ocean to the chief exponent of trade and traffic, which status has remained until today.

During the early medieval times trade and traffic were not particularly promoted in the Indian Ocean. Only the Chinese had an active sea trade with some of the western countries; the connection was continued to the middle of the 14th Century, and then absolved by coastal trade. With the increasing trade-activity of the Arabs - the most important sea - and trading nation of the Indian Ocean during the Middle Ages - , bringing especially East Africa in trade connection with other countries, there developed, favored by the auspicious climatic conditions in the central part of the ocean, a first important transversal route between East Africa and South Asia. During the time of the caliphs the Persian Gulf became important, especially as a transit route in the world commerce, and until the beginning of the 15th Century as a main route for the "Levante" trade (Trade with Venice). The Red Sea had lost in the Middle Ages its former importance.

But it was not until the period of the great discoveries, that the decisive change was brought about also for the Indian Ocean. Vasco de Gama disclosed at the end of the 15th Century the whole Indian Ocean for the European nations and a direct connection with the far

spice-countries. The Red Sea and the Persian Gulf became more and more unimportant; one reason was the advance of the Turks, and the other - and more important one - was the fact, that since 1498, when Vasco de Gama had discovered the "Cape of Good Hope", the main trade route from Europe to the countries on the Indian Ocean became the direct route around the Cape. The Indian Ocean became now more the great transit and connecting ocean between Europe, South and East Asia, and Australia, to which function it is naturally adapted because of its Australian-Asiatic interposition and the situation between Atlantic and Pacific. The route from the Cape was between the 40 and 45 parallel, since in those southern parts the influence of the monsoon is not that important. The route back was farther north before the North East or South East trade-wind. So, the Cape route was for a long time the only one from Europe to the Indian Ocean.

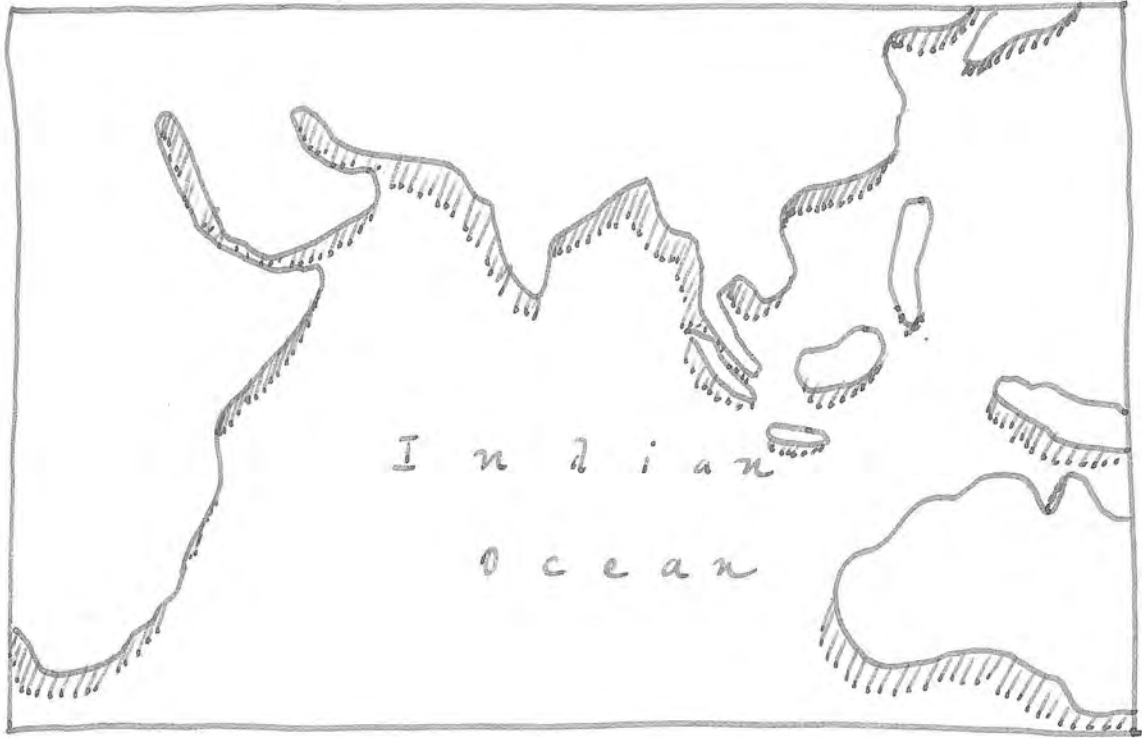
The border towards the east is by far not so closed. Here the Malayan Archipelago is the border, allowing by its numerous passages ways navigation and sea trade to the countries on the Pacific. The most important passage at that time was the "Sunda-Strait", having better wind conditions than the "Strait of Calakka".

The year 1825 in the Indian Ocean introduced steam-navigation did at first not cause any alteration in the trade-routes. A fundamental change did not occur before the opening of the Suez Canal in 1869.



The lands of the Indian Ocean provide vast and varied supplies of foodstuffs and raw materials that are in great and increasing demand in the industrialized countries of the West. To this area come a large proportion of all the homeward bound merchant vessels of Great Britain, the Continent, and the United States that are engaged in world-wide, as contrasted with coastal, trade. They start out from the Home Countries loaded with every variety of manufactured goods - especially textiles, iron and steel goods, machinery, plant and hardware - together with coal and, in the case of the United States, mineral oil. These goods they deposit partly in Europe or Africa, on the way for the Indian Ocean, partly at the great ports of the Ocean; and partly in Australia or the Far East, before loading up for the return journey.

When these merchant vessels reach the Indian Ocean, whether via the Suez or by some other route, they have, as a rule, already deposited part of their cargo and are no longer fully laden. Moreover, the return cargoes from the Far East and, to some extent at least from South Africa, to the West are, normally, less bulky and often also less valuable than the outward-bound cargoes. The result is that on balance the load index (is the relation between the actual cargo carried and the maximum cargo that could be carried) of vessels entering the Indian Ocean is relatively low, whereas that of vessels leaving the Ocean is extremely high. Thus in 1925 the load index of vessels





passing from north to south through the Suez Canal was only 36%, while that of vessels passing from south to north was 61%. In 1926 the corresponding figures were 50 and 56, and in 1927, 40 and 60. (These percentages, which are only rough approximations, are obtained by multiplying the net tonnage of shipping, in any particular case, by two, in order to obtain the maximum tonnage of merchandise that could be carried, and then calculating the percentage of the total formed by the tonnage of merchandise actually carried.

The relatively large amount of tonnage passing through the Suez Canal from south to north as compared with that passing from north to south is also increased by the facts of Australian trade. In 1925 the merchandise shipped from Australia through the Suez Canal amounted to 2.2 million tons as compared with only 1.1 million tons traversing the Canal for Australia. This in itself does not illustrate, of course, the fact that the Indian Ocean is a collecting centre, but as a considerable amount of Australian coal is marketed in the Indian Ocean this leaves room for the produce of the Indian Ocean to be loaded in its place.

The trade statistics of the ports of the Indian Ocean also illustrate the fact that the exports of merchandise are much greater than the imports, for all the main trading areas of the Ocean. Every major port (except Madras in certain years) has a surplus, and usually a

The Trade of some important Ports of the  
Indian Ocean, taken the Average from  
1921-22 to 1925-26

-----  
in crores ( 10 Mill. ) of Rupees

1 Rupee ----- 1 s, 6 d

Port	Import	Export	Total
Singapore	118.3	120.6	238.9
Calcutta	85.8	122.4	208.2
Bombay	87.9	102.1	190.0
Colombo	29.6	37.4	67.0
Penang	22.3	38.7	61.0
Karachi	24.9	34.2	59.1
Rangoon	20.3	34.2	54.5
Madras	16.5	13.7	30.2
Belawan Deli.	5.2	18.8	24.0
Aden	7.3	5.8	13.1
Malacca	1.8	9.6	11.4
Mohammerah	1.5	6.7	8.2
Dar-es-Salaam	2.4	1.2	3.6

Sources: Various.

large surplus, of exports over imports of merchandise even on the basis of value.

The great trade routes that centre upon or traverse the Indian Ocean include the following:

- (a) The direct route via the Suez Canal between Europe, and to a lesser extent America, and the Persian Gulf, India, Ceylon, the Eastern Archipelago and East Africa
- (b) The route via the Suez Canal to the Far East and Australia and back again (Here the vessels call at ports in the Indian Ocean on both the outward and homeward journeys. It is, for instance, convenient for vessels to load with goods partly for India and partly for Australia. At the Indian ports they discharge some of their cargo and load up with Indian produce to be consumed in Australia. Similarly on the return journey they discharge Australian goods in India, and load up with Indian products to be consumed in the west.)
- (c) The route from Europe and America via the Cape to India and the Far East.
- (d) The return route from Australia to America via Suez, taken by vessels, which made the outward journey direct to Australia by the Cape or the Pacific (These vessels return by the Indian Ocean if they cannot obtain full cargoes in Australis for America. This refers to both, North and South

America).

- (e) The route between Australia and China which passes through Manila, the chief port of the Philippines, and Saudakan (British North Borneo).

The ports of the Indian Ocean, in their historical development and with the variety of their specific tasks, form a real interesting part of the ocean-trade of the world. Though these ports are on the average inferior to those of the Atlantic, nevertheless they offer also many interesting problems and are in many respects different. As a whole it can be said that there is quite a number of ports of the Indian Ocean which can be considered as "world ports" in the above defined sense (examples: Bombay, Calcutta, Colombo, Singapore). The ports of the Indian ocean have to be considered from a different viewpoint than the ports of other oceans. Because of the importance of numerous ports in the Indian Ocean as fulcrums, and because of the ocean's mediator-function in this world commerce, frequently there is a larger shipping traffic against a proportional smaller cargo loading or unloading and passenger traffic. But even the trade ports on the Indian Ocean have often a relatively high shipping traffic, since they are mostly not turning points of the routes, but as intermediate stations they receive or supply only parts of the cargo.

## CHAPTER III

### THE MAIN PORTS IN AFRICA

#### AQ Introduction:

The whole western border of the Indian Ocean is the African East coast; its numerous ports can be divided into those on the South coast (Union of South Africa and Mozambique), those on the East coast (Tanganyika and Kenya), and those on the Northeast coast (north of Kenya).

Considerable diversity exists in the harbor facilities of the various sections of the African coast. The part best on the Indian Ocean in Africa is from central Mozambique northward along the Tanganyika and Kenya to the boundary of Italian Somaliland with 14 harbors (generally spaced from 20 to 100 miles apart) which is sufficient in number to offer adequate commercial outlets to the adjacent hinterlands, either for present or future development.

The most deficient part in harbors of the coast of Africa on the Indian Ocean is the 1,900 mile coast line of Italian and British Somaliland which has only three harbors (lacks harbor facilities for distances as

Shipping through the Suez Canal

A) North to South

Year	Net shipping tons (millions)	Max. tons possible	Actual tonnage	%
1925	12.3	24.6	8.3	36
1926	12.0	24.0	9.8	40
1927	13.5	27.0	11.0	40

B) South to North

Year	Net shipping tons (millions)	Max. tons possible	Actual tonnage	%
1925	14.4	28.8	17.7	61
1926	13.9	27.8	15.6	56
1927	15.4	30.8	18.4	60

See pages 21 and 23 of the text.

Sources: Various



great as 500 - 1500 miles.)

Great Britain has by far the largest part of the East African coast in its possession. In general her possessions are well supplied with harbors and where adequate natural facilities are lacking the deficiency has been remedied by the construction of artificial ones (Port Elizabeth, East London, Suez). Regions with the most adequate array of harbors include Kenya and Tanganyika and the Cape area.

Portugal possesses in East Africa 12 deep sheltered embayments in Mozambique. Northern Mozambique offers one of the outstanding examples of a super-abundance of fine harbors; seven excellent bays are there concentrated along a 300 mile coast line. Portugal has made less use of her African harbors than any other colonial power. A few ports have been developed artificially, it is true (Lourenco Marques) but most of them are still almost unused, awaiting the time when the demands of commerce will bring them to life. With such undeveloped potentialities it is understandable why no artificial harbors have been constructed by the Portuguese.

French possessions are very small on the East African coast. The only port of importance is Djibouti in French Somaliland.

The Italian possessions in East Africa are, despite their long coast lines extremely deficient in good harbors. Most of them are though unutilized because of the arid, unproductive hinterlands. The one with port facilities



(Mogadiscio) is a man-made structure and was built for military more than commercial reasons.

Let us look now at the summary of the East-African harbors (going from South to North).

Union of South Africa (British):

(1) Simons Bay	24 feet,	artificial,	developed
(2) Port Elizabeth	60 "	"	"
(3) East London	28 "	"	"
(4) Durban	31 #	"	"

Mozambique (Portuguese)

(5) Lourenco Marques	25 "	natural,	"
(6) Inhambane	18 "	"	"
(7) Bazaruto Bay	deep	"	, undeveloped
(8) Beira	23 Feet,	"	developed
(9) Quelimane	18 "	"	undeveloped
(10) Mokambo Bay	54 "	"	"
(11) Mozambique	20 "	"	"
(12) Port Nakala	deep	"	"
(13) Momba Bay	"	"	"
(14) Porto Amelia	66 feet,	"	"
(15) Ibo	30 "	"	"
(16) Mocimboa Bay	33 "	"	"

Tanganyika (British)

(17) Mitindani	30 "	"	"
(18) Lindi	30 "	"	"
(19) Kilwa	54 "	"	"

(20) Dar-es-salaam	20 feet,	natural,	developed
(21) Tanga	20 "	" "	undeveloped
(			
Kenya (British):			
(22) Mombasa	33 "	" "	developed
(23) Manda Bay	34 "	" "	undeveloped
Italian Somaliland:			
(24) Mogadiscio		, artificial,	developed
(25) Chisimaio	20 "	natural,	undeveloped
British Somaliland:			
(26) Berbera	30 "	natural,	undeveloped
French Somiland:			
((27) Djibouti	24 "	artificial,	developed
Eritrea (Italian):			
(28) Annesleg Bay	54 "	, natural,	undeveloped
(29) Assab	35 "	" "	" "
Sudan (British):			
(30) Suakin	42 "	" "	, undeveloped
(31) Port Sudan	63 "	" "	, developed
Egypt (British):			
(32) Suez	30 "	, artificial,	" "

(Depth figures refer to approximate minimum depth in Channel of approach and at anchorage during mean low tide.)

"Natural" harbors depend upon the configuration of the coastline for protection against wind and waves.

"Artificial" harbors depend primarily upon piers and breakwaters for such protection. Many natural harbors have of course been deepened by dredging.

"Developed" harbors have fair to good port facilities, which includes some or all of the following: wharves, storage facilities, loading and unloading equipment, means for repairing vessels, and available fuel and water supplies.

"Undeveloped" harbors have few or none of those facilities.

#### b) South Africa

##### (Union and Mozambique)

The earliest statistics relating to the over-sea trade of South Africa are those of the Cape of Good Hope, dating from 1826. From the year 1862 records of imports and exports are available for Durban, and from 1905 the figures relative to the trade with the Transvaal through Delegoa Bay become accessible, although the railway line from Lorenzo Marques and the Transvaal was opened as early as 1893. Prior to the last mentioned date the whole trade of the States now comprised within the Union

union was carried through Cape and Natre ports, but after the opening of the Delagon Bay - Transveal railway line an increasing volume of Trade was carried along that route.

There are no natural harbors on the coast of the Union, and in the more northern Mozambizue, where there are plenty of them, the disadvantageous influence of the hot and feverish tropical climate makes there development impossible; besides, the connection to the hinterland is very difficult, because the hinterland, after a small strip of flat coast area, becomes mountainous. These circumstances are the reason that the port-development and also the development of the hinterlands was largely dependent upon adequate means of transportation to that hinterland. The completion of the railroad net in the Union was therefore of decisive influence for the port development, since the rivers are mostly not navigable because of their strong falls or because they are covered with sand.

In respect to the sea traffic, only the most southern part of the Union is well situated (Capes route). Otherwise the remoteness from the large economic areas of the world and the absence of any opposite coast have opposed the growth of the ports in South Africa.

The most important ports in this area are Durban, Lorenzo Marquez, East London, Port Elizabeth, and Beria.



The Trade of the large South African Ports  
1913 - 1925

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in 1.000 NRT , average of ex- and import

Port	1913	1919	1921	1923	1925
Durban	3.992	2.959	3.408	3.967	4.259
Lourenco Marquez	2.605	?	2.279	?	3.164
East London	1.909	827	1.590	2.036	2.272
Port Elisabeth	2.060	890	1.698	2.115	2.263
Beira	1.488	?	1.530	1.872	2.098

sources: Various

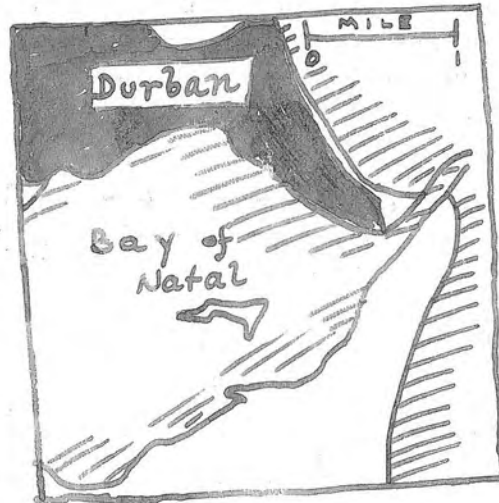


Durban: or Port Natal:

Durban is a very old port, but it became only of increased importance when the English took it over. It is today one of the most important ports of transshipment and trade places in the Indian Ocean and the most important one of the African coast on the Indian Ocean, and has the greatest tonnage of all African ports. The situation is especially advantageous with respect to the gold fields of Transvaal, since it is the starting point of the shortest railway there. Besides it is a neighbor of the rail province of Natal and therefore also chief port and most important trade centre for the sea. In addition we have excellent harbor facilities.

The goods turn over (transshipment) was 1925 for instance three times as large as that of Capetown, namely 4.66 million tons. (1919 it was only 2.55 h.h.t.) Its participation on the complete trade value of the Union was on imports in 30% average during 1910-1914 and 34% in 1924.

Durban is an increasing competitor for Capetown in the shipment of high-valued ores and minerals. But its most active item is the increasing and very high coal exports from the extensive coal fields in Northern Natal. The important export goods are wool, maiza, sugar, hides and skins, manganese ores, cotton, ostrich feathers, raw-gold, fruit and jam. Imported are especially manufactured goods, foodstuffs, timber, oil fuel, and machines.



Durban ( Port Natal )  
Southafrica.

Source: Deasy , G.F : The Harbors of Africa  
Economic Geography, Oct. 1942  
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Durban occupies the northern rim of the large oval bay of Natal, the sole significant natural shelter along the eastern shore of the Union of South Africa. This embayment was formerly obstructed by a sand bar at its mouth and was rather shallow, but the bar has been partly removed and the harbor dredged so that now vessels drawing 35 feet of water (20,000 gross tons) can enter and maneuver freely. Continued excavation is necessary, however to maintain those depths. Two jetties, each half a mile long, extend seaward from the entrance of the bay to help prevent silting of the channel. There is no need for projecting wharves within the bay; ships tie up broadside at the quay to load and unload. Harbor facilities are, as mentioned above, excellent and include much warehouse space, grain elevators, chilling rooms, efficient coaling apparatus, South Africa's largest floating dock, and coal loading docks.

Port Elizabeth:

This is a comparatively young port. Its situation is like that of Durban and East London on the South East coast of South Africa with its abundant precipitation and proportionately high population and high production. These three ports are in advantageous nearness of the extensive production area on Orange river and are connected by a ramified railroad system with the mountainous hinter-

land. It can be considered in ex- and import trade as a competitor of Capetown. It is situated on the Algoa Bay. Around 1890 its freight and passenger traffic was very high because of new discovered gold and diamond mines in Transvaal. Today its importance lies in the export of wool, and is often called the Liverpool of South Africa. Besides wool it exports hides and skins, ostrich feathers and fruit.

The imports consist in machines, timber, and motor cars.

#### East London:

Its development was, because of almost the same situation parallel to that of Port Elizabeth, since this port became also the starting point of a railroad system to the Northwest towards the Orange River. So East London is not only trading centre for its immediate hinterland, but also for the large areas of the Transkei, rich and fertile countries with a high population. The harbor is formed by the mouth of the Buffalo River, the entrance to which has to be maintained by dredging.

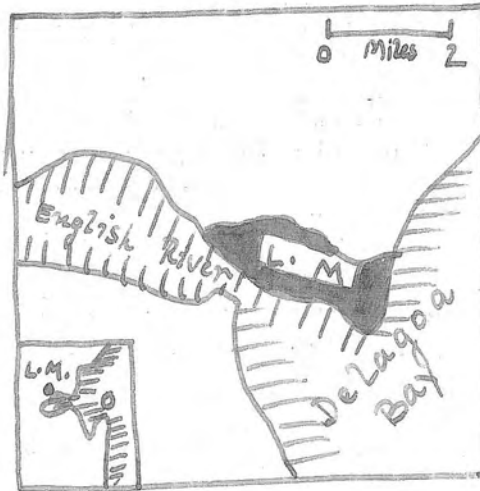
The most important export item is also wool, and besides hides and skins, maize, and fruit.

Important import goods are machines, paper, and foodstuffs.

Lourenco Marques: or Delagoa Bay

This port was already known since the years of the great discoveries and is now in a narrow sense the main port of the Portuguese Province of Mozambique. Nevertheless it is under influence of the trade to the British hinterland. For Lourenco Marques is a neighbor of the British hinterland and is connected with it by a railway line, leading to the heart of Transvaal, to Johannesburg and Pretoria, since 1895. The ramified railway system of the Union brings that port also in connection with Mashonaland, Rhodesia, Nyassaland and the Congo colony. On the contrary, the small strip of the Portuguese hinterland is of too little economic capacity and not enough developed to cause a large trade. In addition to the advantage of the situation there come the sound climate and especially the natural bay which makes Lourenco Marques to the best natural harbor in South Africa.

The port is built on the north bank of the submerged mouth of the English, or Espirito Santo, River at the point where it enters Delagoa Bay. This bay, about 20 miles broad, at its maximum width, is sheltered to the east by Inyach Peninsula and Island but is open to the north. The true harbor, providing safe, all weather anchorage, is the two miles wide English river estuary which is approached through the dredged Polena channel. (low water depth of 25 ft.). The harbor can be entered at any hour of



Lourenco Marquez  
Mozambique, South Africa.

Source: Deasy, G. F. : The Harbors of Africa  
Economic Geography, Oct. 1942  
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of the day or night without the help of tugs, and independently of the tides. A mile long concrete wharf, with depths of 28 feet and more alongside, can accommodate 12 to 15 large steamers at one time and is provided with warehouses, railway lines, cranes, coal-hoists and pre-coaling chambers.

Lourenco Marques is beside Capetown and Durban the most important port of South Africa. As mentioned above, its main significance lies in the transit trade from the English colonies in its hinterland, especially in the shipment of coal and Katango Copper. Other export goods are sugar, cotton, maize, caoutchouc, fruit, parts of it are products of Mozambique itself.

Imported goods are textiles, timber, oil, iron-ware, machines, motor cars, butter, rice, flour, wine, beer and brandy.

Lourenco Marques has also a high passenger traffic, since this port is gathering port for the emigrants of the Portuguese colony. These come from the smaller ports to Lourenco Marques and go from here by railroad to the Belgian or British hinterland.

Now the own trade of Mozambique becomes of growing importance in Lourenco Marques, but it is not in the first place a British port, which equipment are mostly built with English capital.

Beira:

Beira is the chief port for Nyassaland and North and South Rhodesia, and also for the Congo colony. It is situated on the mouth of the Pungwe-Bafi River and is endpoint of the Rhodesia railways and the Trans Fambesi railway line.

Beira is after Lourenco Marques the most important port in Mozambique, and is also largely under influence of the British possessions. For its immediate Portuguese hinterland Beira is important as main trade port of the "Companhia de Mozambique" and is of great importance for large areas of the Portuguese colony as port of distribution, in which the goods from overseas are loaded on small coast vessels and so brought to the smaller ports. But its main significance lies in the fact that Beira is the door to South Rhodesia and - especially about twenty years ago - to the gold fields of Mashonaland. The above mentioned Trans Fambesi line is in existence since 1922 and gave Beira an improved connection with Rhodesia and Katanga, and Copper became important as an item of its exports. From the British hinterlands the exports consist of hides and skins and cotton and from Mozambique itself especially sugar, sautchouc and wax. Imported are mining and agricultural machines, oil in bulk, timber, motor-cars, textiles, cement, and wheat.

Beira is also in connection with the Congo land and has some transit trade from there and this connection

with Rhodesia and its quite important coal export from the mines on Fambesi are of further advantage. Beside the own Portuguese hinterland is by far not fully developed.

To consider one port as an example of the rather important undeveloped ports of Portuguese East Africa we shall glance at Mozambique. The port and the city are on an island some miles in front of the main land and its principal import goods are cotton goods, iron, dry goods, wine, beer, brandy, fruit and vegetables. While its exports consist in oilseeds, maize, sisal, and cotton.

#### c) East Africa

(Tanganyika, Kenya and Zanzibar)

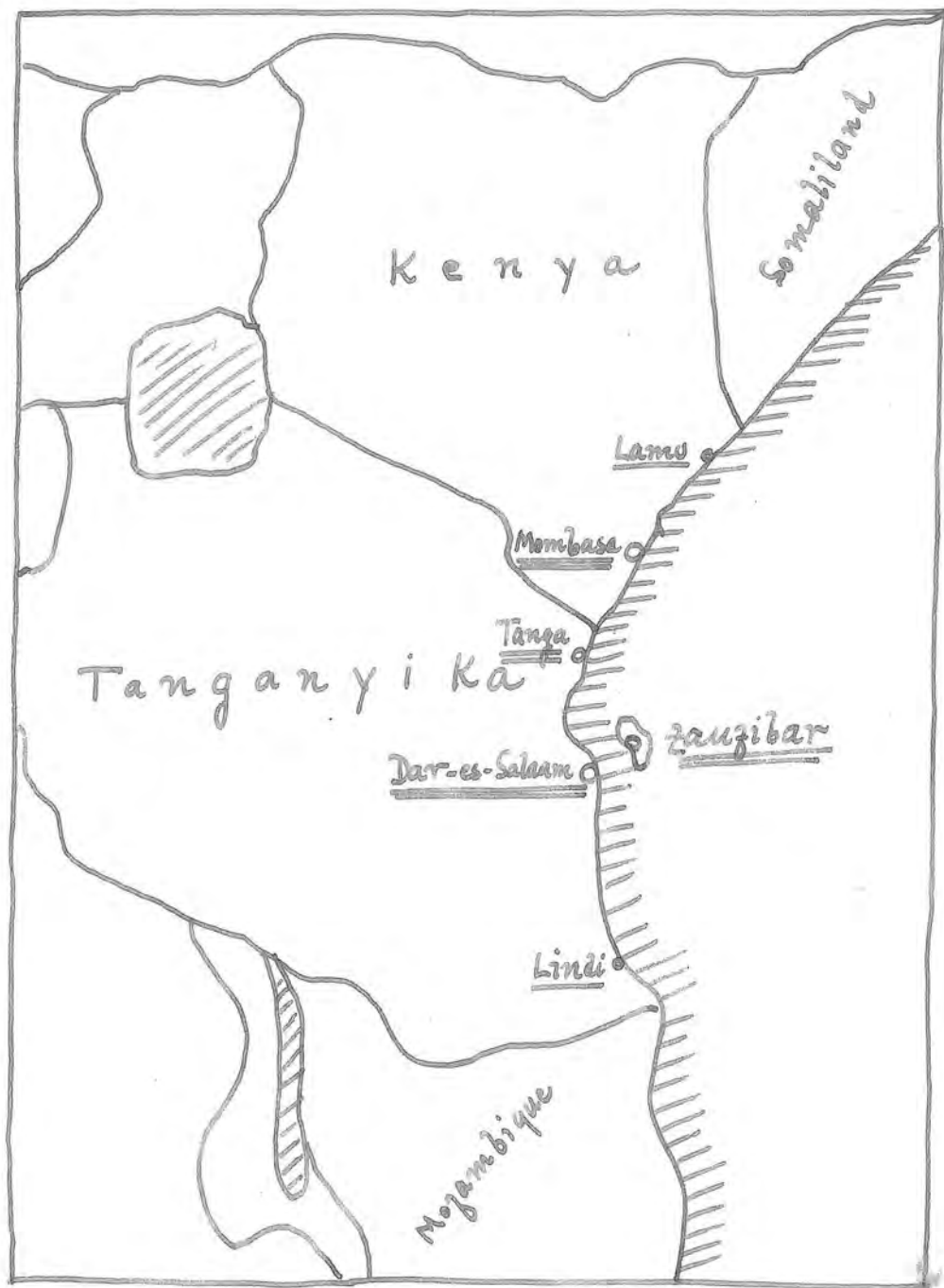
As in South Africa, there are also only a few good harbors in East Africa. The coast line is very little indented, and either very steep with no harbor facilities on the landside, or very flat with no harbor facilities on the sea side (strong breakers and most of the time not to use for larger vessels because of the sandbanks). The majority of the ports in this part are therefore roadsteads and only the in course of time by the sea filled up river valleys, the so-called Creeks offer various good natural harbors. The unfavorable situation of East Africa in respect to the great inter-national trade routes and in respect to Europe especially, together with the partly still undeveloped hinterland and the difficulties of the

land transport facilities, have therefore, accompanied by the above mentioned unfavorable coast, formed only a few important ports.

In Tanganyika we have Dar-es-salom and Tanga as the only important ports, while Bagamojo Kelwa, Lindi and Pangani have lost there former importance, partly because of the vanished slave-trade and partly because of , and since, the development of the open sea trade on these coasts. (The large vessels could not use any more those shallow and only for the "Dhais" trade qualified ports). The old island port Zanzibar on the other hand is still of considerable importance. In Kenya we find the large port Mombasa-Kilindini and beside Melindi, Lamu, Vanga, Gazi, Kilifi, Port Duraford and Kismaya, all of which I just mention as a matter of completeness.

#### Dar-es-Salaam:

Dar-es-Salaam was founded by a Sultan of Zanzibar in 1862, but it was deserted on his death in 1870, and it was not till 1887 that it was occupied by the Germans, who established a factory there. It became the seat of the government in 1891. And it is since that time, that Dar-es-Salaam became one of the most important ports and trade centers of East Africa. Before that it was completely over shadowed by the neighboring Zanzibar. Decisive for its development was the building of a railway, the





Tanganyika or Central railway, connecting Dar-es-Salaam with Tabora, the most important trade centre of the inland. It gave to the port a dominant position for the oversea trade of the central table-land and the North-West of the colony. Before the First World War, Dar-es-Salaam was the most important sea port and trade centre on the coast of German East Africa and was also, as seat of the government and therefore with numerous white inhabitants, of considerable importance for the passenger traffic. In addition to that favorable situation there was the qualification of its natural harbor facilities. The "Creek" harbor gives shelter and good anchorage. Completion was therefore restricted to a quay for lighters, which are to maintain the connection with the anchored ocean steamers on the roadstead. The first world war shut down almost completely the trade of this German port. But after 1918 Dar-es-Salaam quickly regained its former significance as administration center of the English colony Tanganyika.

Dar-es-Salaam takes now care of about 70% of the whole oversea trade of Tanganyika, while Tanga participates with about 20%; the rest left is distributed to Lindi and the other small ports. Its principal export goods are sisal, cotton, coffee, ground nuts, hides and skins and ivory. Imported are machines, cotton textiles, and cement.

Zanzibar:

Zanzibar is an island of 640 square miles, 23 miles on the eastern coast of Africa, and a British protectorate since 1890. It was for a long time the most important port on the East African coast. The central coast position gave it its place as the natural emporium and distributing centre of the trade of East Africa with the other countries on the Indian Ocean and later with Europe, making Zanzibar, especially during the middle of the past century, to a very important port of transshipment. In the present century, the transit trade to the central part of Tanganyika turned more and more to Dar-es-Salaam, and the trade to the northern part of the country to Tanga, and because of the Uganda Railway, to Mombasa. This happened because of the development of the hinterland in Tanganyika, Kenya and Uganda first, because of the completion and development of the ports on the coast of the mainland (Dar-es-Salaam, Tanga, and Mombasa), second, and finally because of their good connections to that more developed hinterland (especially railroads). In spite of that facts, the trade of Zanzibar - the ships have, by the way, to anchor on the roadstead on the eastside of the island - increased until the beginning of the first world war, caused by the general trade-increase in East Africa, which was also for the benefit of its former most important port. But it never recovered after 1918, because almost no improvements were made on its harbor facilities, which

we can then consider as the fourth cause of its decline - though it was a consequence of the first three.

Zanzibar exports mainly cloves, - the production of cloves on Zanzibar and the neighboring Pemba yields the bulk of the world's supply - coconuts and copra. Imported are rice and cereal, piece goods, motor spirit, and petroleum, cement, coal, foodstuffs, iron and steel-goods.

#### Tanga:

This is the second important port of Tanganyika, especially of significance for the northern part of that country. In former times Tanga was important as starting point for many ivory and slave caravans to the "Massailand" and to Lake Victoria; but it was avoided by the Arabian slave-dealers since the prohibition of the slave-trade, since it was often called by British war-ships at the beginning of the 19th century for provisions-purposes. One hears about Tanga again in 1891, when German vessels anchor there. It owes its importance to its good railway connections to Moshi and Arusha (Usambara or Northern railroad) and its connection with Naicobi. Because of this railroad Tanga became the collecting and transshipment center of the products of the former German East Africa, while Dar-es-Salaam's importance lay more in the passenger and import trade from Germany. Before 1914 when the plantations of Usambara were in full working order, the export trade from

Percentage of Volume of Trade  
passing through ports

of TANGANYIKA TERRITORY.

Port	1923	1925	1926	1927	1928	1929	1930
Dar-es-Salaam	46.6	56.0	53.9	49.8	48.5	51.1	56.0
Tanga	19.0	16.1	17.9	20.7	20.9	23.8	21.8
Lindi	5.5	3.8	3.0	2.8	2.8	2.8	2.3

After 1930, no figures for the different individual ports available.

Source: Report by His Britannic Majesty's Government to the Council of the League of Nations on the Administration of Tanganyika Territory (Reports for 1919 - 1938)

Volume of Trade of  
TANGANYIKA TERRITORY in  
1,000 Pound Sterlings.  
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	1921	1925	1929	1933	1935	1938
Import	1.426	2.864	4.286	1.947	2.990	3.449
Export	1.246	3.008	3.988	2.543	3.445	3.708
Transit	142	1.356	2.531	183	279	343

Source: Report by His Britannic Majesty's Government to the Council of the League of Nations on the Administration of Tanganyika Territory. ( Reports for 1919 - 1938 )



Tanga was more than double that of Dar-es-Salaam.

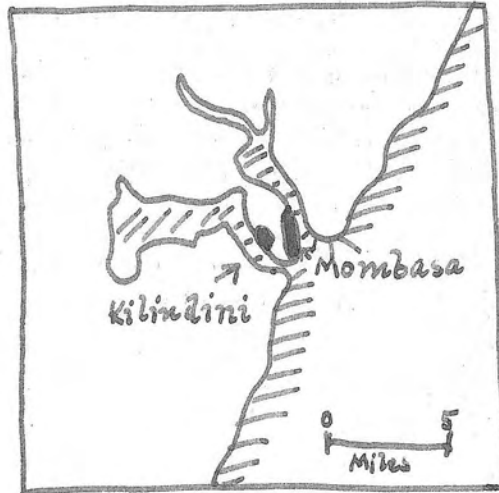
The decline of the trade of Tanga after the first World War, was caused first by favoring more and more Dar-es-Salaam not only as import but also as main export port of the country, and second by establishing of a connecting railway line between Usambara and Uganda railroad, turning so the trade of northern Tanganyika more towards Mombasa.

The principal exports of Tanga are sisal, hides and skins, copra, sugar, tea and timber, while machines are imported. All steamer cargoes at Tanga - as well as at Dar-es-Salaam, Lindi, and Zanzibar - are discharged into lighters and landed at the custom wharves.

Mombasa: (Mombasa-Kilindini)

This is the only important, and already very old, port in Kenya; it owes its significance also to a railroad, the Uganda line, built 1896-1902, which, because of the connection of Tanga with the countries on Lake Victoria, gave this port a huge advantage against the other countries in East Africa. The railway shortened the journey to Lake Victoria from two months to two days. In accordance with the railway construction, there was also a completion of the harbor.

Mombasa occupies the south-eastern portion of Mombasa Island, which lies within one of the finest deep water bays of Africa, formed by the drowned lower courses of several converging minor streams. The town itself is



Mombasa-Kilindini  
Kenya, East Africa.

Source: Deasy, G. F. : The Harbors of Africa  
Economic Geography, Oct. 1942  
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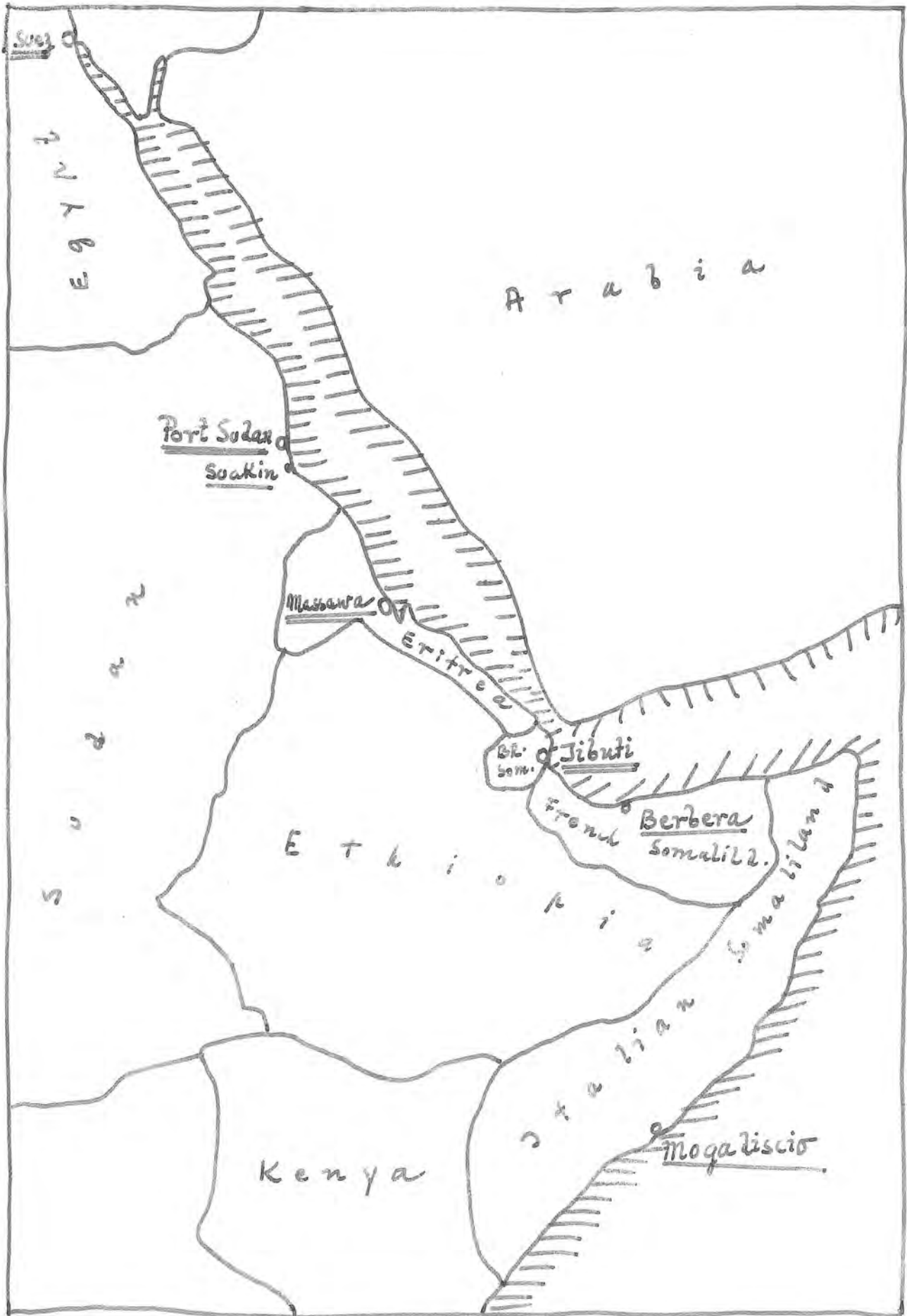
an ancient Portuguese port but it is located on shallow water and is little used by commerce today. Kilindini, on the south-east side of the island, has, the modern, sheltered, deep-water harbor. Depths of 100 feet and more are found over a large area, and vessels drawing 33 feet can come alongside to up-to-date wharves. Shipping facilities are very good and the rail connections tie both towns to the mainland and the interior.

The main export goods are raw cotton, coffee, sisal hemp, hides and skin, copra, carbonate of soda, ivory, tea, and oilseeds. The import consists in machinery, foodstuffs, piece goods and sugar.

#### d) North-East Africa

(Italian, British and French Somaliland, Eritrea, Sudan and Egypt)

The important ports of North-Eastern Africa are situated on the Red Sea, and not on the Indian Ocean itself. Their trade is restricted because of the desert and undeveloped hinterland, because of lack of connections with that hinterland, and frequently because of the unfavorable natural harbor conditions on the hot coast. This coast on the Indian Ocean in Northeastern Africa is shallow, sandy, and almost without useful embayments, so that the ships have to anchor on roadsteads. The long coast line of Italian



Somaliland has only the small and unimportant ports of Mogadiscio, Brava and Merca, and British Somaliland the not tremendously more significant ones of Berbera, Bulbar and Zeila. In comparison with those, Djibonti, the chief port in French Somaliland on the exit of the Red Sea towards the Indian Ocean, is of considerable importance. On the Red Sea, the port qualifications are restricted by the many coral reefs, and, on the side of the land, the difficult and insufficient connections to the high situated hinterland is an impediment for port development. Here, Massaua, in Eritrea is of some importance; in the Anglo Egyptian Sudan we have, beside the small port of Suakin, the important Port Sudan and in Egypt the unimportant trade port of Kosseir, while Suez is significant as ending point of the Suez Canal.

Djibonti: (and Gubbet Karah)

Djibonti is the only natural harbor on this stretch of coastline and was acquired by France as early as 1862. Djibonti (Tibuti) owes its importance almost completely to the export trade of Ethiopia, for which country it is first trade port, because of its central situation on the coast on the entrance to Tadjura Bay, and because of its railway connection with Addis Ababa, constructed in 1917. The harbor was established in 1888.

The bay of Gubbet Karah is the largest and deepest

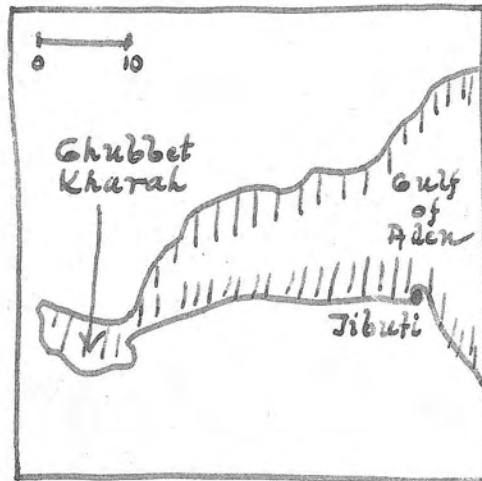
sheltered indentation of Africa, with a width of from five to thirteen miles and a depth of hundreds of feet over most of its extent. It is presumably a drowned structural depression, probably associated with the great Rift Valleys of East Africa. The entrance into the bay from the adjacent Tadjura Bay, an arm of the Gulf of Aden, is somewhat encumbered in places with shoals and strong currents, but it can be navigated by the largest vessels. Several good anchorages exist close inshore within the bay, but none is used at present. Ghubbet Karah is an example of the many excellent but undeveloped African harbors.

As mentioned above, Djibouti is the main port for the transit trade from and to Ethiopia. Export goods are hides and skins, coffee, tobacco, cotton, salt; imported are cotton goods, other textiles and alcohol and foodstuffs.

Massawa: (Massawa)

This is the principal port of Eritrea, 900 miles from Suez and 380 from Aden. The old Arabian town is built on a coral island and is connected with a second island closer inshore by a dike suitable for wheeled traffic and over which the railroad runs, and this in turn is connected with the mainland by a causeway about three-fourths of a mile long. The climate in this low region is hot and malarial.





Jibuti and Ghubbet Kharah  
in French Somaliland,  
Northeast Africa.

Source: Deasy, G. F. : The Harbors of Africa  
Economic Geography, Oct. 1942  
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Massawa was in former times well known as "Saba". The recent significance is again caused by a railroad line, by that to Asmara, the capital of Eritrea, finished in 1912, and 1922 prolonged to Kerea, so that the connection of this port especially to the North-west of the colony are fairly good. The former rather important transit trade of Ethiopia is now very little, since Massawa's situation is much more unfavorable to these highlands than that of Djibouti and its only connection with this country is an old, caravan road.

As an activum of Massawa we have to mention its good and up-to-date facilities for shipping. We have a stone quay alongside which ocean-going steams may come for loading or discharging cargo, equipped with a railway on the quay.

Its exports are coffee, hides and skins, cement, pearls, salt, and mussels, while important import goods are cotton and silk goods, iron goods, glassware and timber.

#### Port Sudan:

Port Sudan is a very young harbor and was selected as the leading port of the Sudan in 1907, when the port was opened. This decision was caused by the fact that Suakin, until this time the main port of the Sudan, because of its numerous coral-reefs became dangerous for the larger

vessels. Of extraordinary importance for Port Sudan is the railway line to Berber, opened in the same year as the port. This railroad connects Port Sudan with the important line which leads via Wadi Halfa, Berber, Khartoum and Sennar and has many branches and ramifications, so connecting the port with extended economic areas.

Suakin, the old and picturesque native port, resembling a feudal town, continues active as in the past, as the port for Mecca pilgrims and for the small local coasting trade. The entrance to Suakin is narrow, winding and dangerous for vessels of over 20 feet draft, while Port Sudan is well placed and large enough to be extended in order to handle all the Sudan over-sea's trade. The broad streets and clean European quarter of Port Sudan are in striking contrast to the old congested native quarters of Secakin, 30 miles south. Port Sudan is protected by the north and east winds by a strip of land known as east town, where the customs, police, post office, private warehouses, oil tanks, and railroad tracks are located. The entrance into the harbor is made from the South through an entrance 600 feet wide and from 18 to 19 fathoms deep. This is also the average depth of the harbor. The entrance is well marked, by a line of signals or lights, and vessels may enter or leave by day or night.

The initial expenditure in arranging and equipment was five million dollars. There is a shift of the bulk of trade formerly shipped in transit through Egypt.

The principal export article is gum arabic, since the Anglo-Egyptian Sudan is the principal source of the world's supply in gum arabic. Besides, cotton, cotton seeds, sesame, senna leaves and pods and ivory are exported, while the imported goods consist in sugar, cotton-goods, flour, timber, iron and steel, machinery, coffee, tea and clothing.

### Suez:

Suez at the head of the Gulf of Suez was formerly the ranking port of Egypt on the Red Sea and had already significance in the trade with Ophir. It became important for the English since the middle of the last century as fulcrum for the route to India. It serves primarily as bunkering station providing the ships with coal and oil and has a railway connection with Cairo. Its port facilities and equipment, constructed at the same time as the Suez Canal were at first sufficient, but when the trade increased - and it increased very quickly - Suez was surpassed by Port Said, the entrance port to the Suez Canal on the Mediterranean.

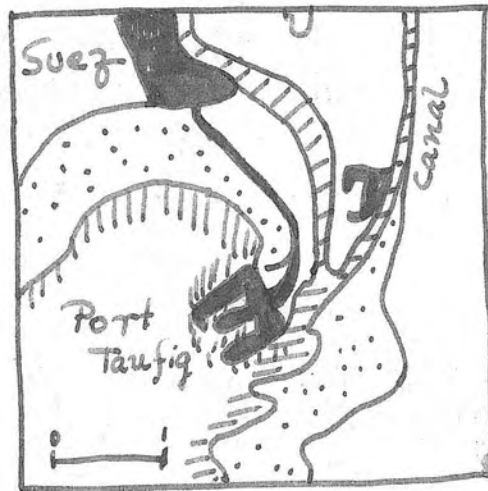
Today it is separated from the Suez Canal by a sand bank almost two miles wide and although a small canal has been cut through the sand it is too shallow (6 ft.) to admit large vessels. The true southern terminus of the canal is Port Taufiq, outport of Suez and connected to it

by a railroad running across the sand flats on an embankment. Port Farifig has one of the world's most "artificial" harbors; protection to shipping is man made on all sides. The harbor is rather small (only one-half mile wide) since it is primarily a transit port for the Canal, but it has a depth of 30 feet and excellent facilities, particularly for refueling ships. No other port like it exists in Africa.

The export of Suez, consists only in transit goods, while coffee, building material, flour, coal, machinery, and silk are imported.

#### e) Madagascar, Mauritius, Reunion

Madagascar is an island off the east coast of Africa from which it is separated by the Mozambique Channel (240 miles wide at its narrowest point). It came under a French protectorate in 1885 and was declared a French colony in 1896. It has various ports about equal in size and importance, the single port without great significance, but together they have a considerable trade. The coast is, with exception of the north shore, sandy, boggy and shallow. In the North the naval port, Diego Suarez is a fairly good natural harbor, even if its large bay is open to the winds. On the east side is the main port of the island Tamatave, beside Diego Suarez the only some-



Suez.

The light stippled area represents sand and mud flats.

Source: Deasy, G. F. : The Harbors of Africa  
Economic Geography, Oct. 1942  
Page 333



what good natural harbor. Beside Tamatave is favored by its railroad connection with the capital, Tananarivo and its neighboring situation to the island Mauritius and Reunion. The ports on the west coast, Nossi-Be, Majunga and Tullar are of minor importance. The significance of the ports of Madagascar has its natural restriction in the capacity of the island, which is, to be sure, the largest in the Indian Ocean. For, as a center for a considerable continental trade, like Zanzibar for instance, it is not qualified, because it is too far away from the East African coast.

Tamatave exports hides, coffee, vanilla, graphite, cloves, and sisal. Imports: Machinery, building materials, drinks.

Diego Suarez exports timber, copra, hides and vanilla.

Majunga exports copra, rice, hides and imports ironware, cement, cotton goods, wine and brandy and food-stuffs.

Nossi-Be exports hides, copra, sugar, coffee, pepper, beeswax and imports agricultural machinery, timber, hardware and building materials.

Mauritius is an island 500 miles east from Madagascar. Port Louis is the capital and chief seaport. To mention is the favorable situation of this British island on the route from Africa to India. The main export product is sugar and besides copra, rum and aloe fiber. Imported are

foodstuffs, fuel, motor cars, cotton - wool and silk goods, iron, rice, machinery, wine and brandy.

Reunion is an island about 420 miles east of Madagascar, and has belonged to France since 1643. Its chief port is Pointe de Galets; it has considerable traffic because of its situation, which is about the same as that of Mauritius. Export goods are sugar and vanilla, while rice and cereals are imported.

## CHAPTER IV

### THE MAIN PORTS IN ASIA

#### a) Arabia

The ports in Anterior Asia are only to a very small extent on the main ocean, but to a great number on the Red Sea and on the Persian Gulf. We have here the tremendous long coast line of Arabia on the Indian Ocean and its by-seas, the narrow maritime area of Iraq (Mesopotamia) and the long coastline of Iran (Persia) on the Persian Gulf.

Arabia, the largest peninsula in the world, lies in the southwest corner of Asia, bounded on the North by Iraq and Jordan and enclosed by the other three sides by the sea - the Red Sea on the West, the Arabian Sea on the South, and the Persian Gulf and Gulf of Oman on the East.

Arabia's Red Sea coast is, like the opposite shore of Africa, accompanied by coral-reefs, which makes the landing and anchoring of larger vessels very dangerous, and has besides a hot and unsound climate. The water in the harbors and on the whole coast is not very deep, but

the harbors are sandy. Since these ports are therefore almost never used by ships of the Suez-route, and since in addition the trifling economy of Arabia and the difficulty of transportation to the coast allow only a very restricted oversea trade, none of these ports could reach greater importance. We have to mention first Janbo and Jedda as pilgrim ports for Mecca and Medina (Jedda also being trade port for Yemen and the chief port Arabia's on the Red Sea). Yemen is a relatively fertile part of Arabia and has the ports Mocca, Hodeida and Lohega. It lost its strategic importance since the English have occupied Aden, Perim and Kamaran. But the freeport Aden also took over more and more the sea-trade of its neighbor ports. After Aden, the important navigation fulcrum on the end and exit of the Red Sea, follows the long coast line of Hadramaut without and useful harbor, with the possible exception of the unimportant Macalla. The long coast line of Oman on the other side has various good natural harbors, but only Muscat and Matrah are used. The still more unfavorable situation of the Arabian coast on the Persian Gulf from the great oversea routes has prevented here the development of important bunkering stations. The only ports to mention are Kuwait, capital and chief port of the Sultanate of Kuwait and the Bahram Islands off the Arabian coast in the Persian Gulf.

Jedda:

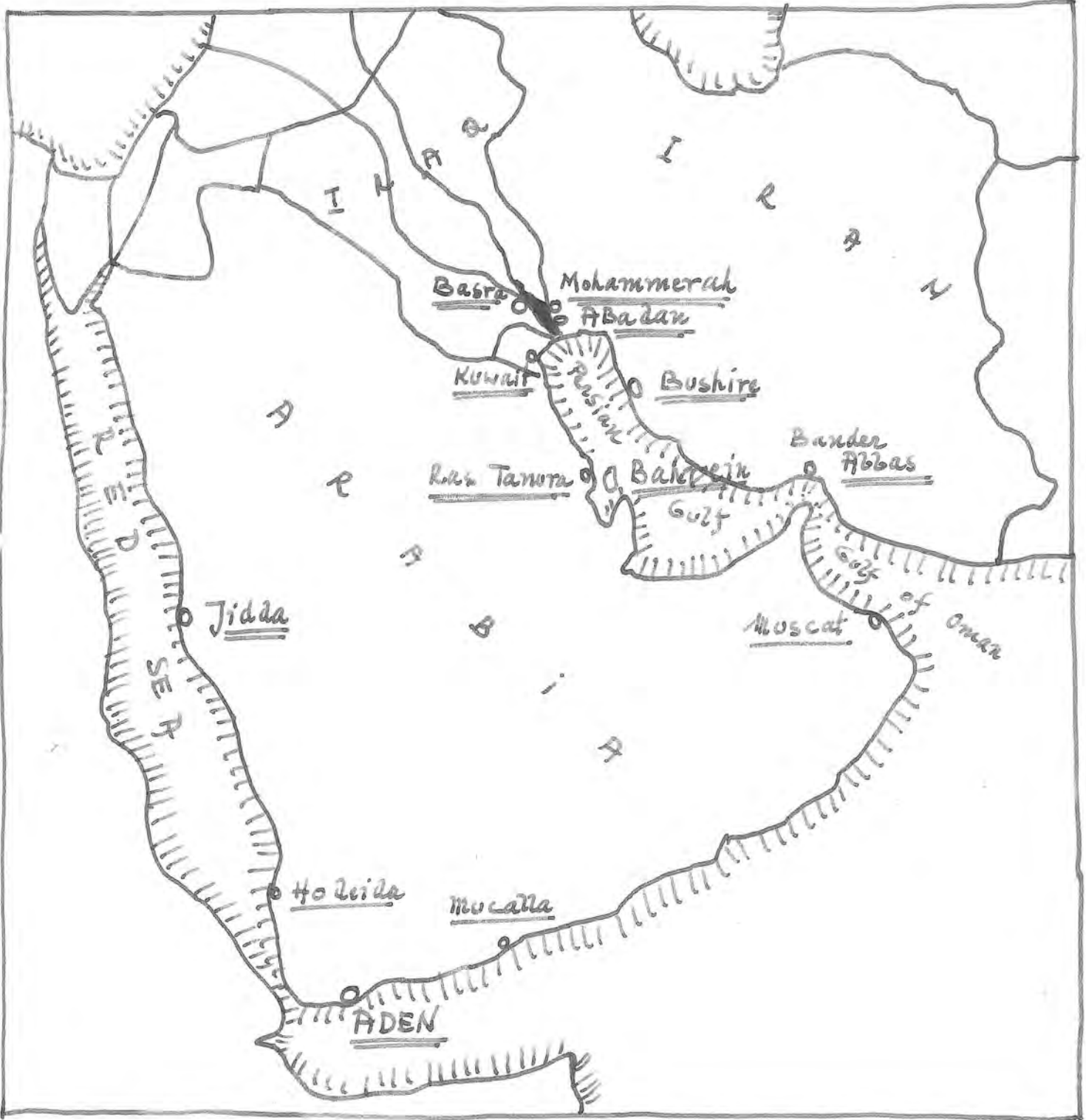
Jedda is the pilgrim port for Mecca. The environment is desolate, its climate hot and damp. The coast plain is almost treeless and without springs, the roadstead bad. The harbor is full of coral-reefs and a very careful guidance and pilotage is necessary to use it. Exported are hides and skins, imported especially food-stuffs like rice, flour, cereals, sugar, coffee, and tea, also cotton piece goods, motor cars, cement and timber.

Hodeida:

This is the only port of at least some significance in Yemen. Chief export product are coffee-beans. In former times Mocca, now a village, was more important. The roadstead of Hodeida is also not too excellent.

Aden:

Albuquerque, the Portuguese conquerer, called Aden one of the three keys of the world. It was already during the time of the Roman Empire - and possibly earlier - the most important port of Arabia. During the best period of the caliphate it was a competitor of the rich cities of India in wealth and pomp. Still in 1275, Marco Polo estimated its population to be 80,000. Until then, it has always been the "age of Yemen", almost the only good port of the desert country, which just here extends a connected series of oasis toward the coast. The attacks of the Portuguese, Egyptians and Turks in the 16th century destroyed





the city almost completely. When the English occupied Aden because of its high strategic situation (fulcrum on the route to India and control of the Red Sea), the population was only 600 (1839).

Since the opening of the Suez Canal, Aden owes its significance to its extraordinary favorable situation on the entrance to the Indian Ocean, which makes it especially qualified as supplying station for fuel and victuals, even though, because of the desert hinterland, everything has to be brought there by boats first. Therefore Aden became already at the end of the last century a centre of the European ocean traffic through the Suez Canal. There its equipment had to be qualified for fuel- and combustible material provisions, and beside, almost no completions had to be made, since Aden is the only natural harbor on the whole Arabian coast. The ocean vessels can anchor in the main harbor (there are two of them, an exterior and in interior) and there the further transportation of the goods takes place, or the vessels receive their fuel by lighters. To mention is also Aden's position as emporium for Arabia and North-East Africa, caused by its nomination to a "free port" in 1850 and by its large traffic since the opening of the Suez Canal. In its volume of trade, however, Aden has suffered a loss in the first decades of the present century by railway constructions in East Africa, especially by the railway leading from Jibouti to Addis Abbaba. But nevertheless, Aden will probably always, because

of its natural qualification, play its part as a place of intermediate trade among the ports of the Indian Ocean and the Atlantic, and also as station for fuel and provision supply.

Its imports consist in coffee, cotton, cotton- and silk piece goods, rubber, beeswax, ivory, hides, cattle, metals, foodstuffs, seeds, tobacco, ammunition, wine, beer, brandy.

Export goods of importance are salt (which is worked out in Aden), beeswax, coffee, cotton- and silk piece goods, dye-stuffs, ostrich feathers, grain, rubber and rosin, ivory, hides and skins, tobacco.

In this list of export and import goods we can see the importance of Aden as a transit port, since almost the same goods which are imported are exported also.

But as mentioned already, Aden's main significance lies in its provision of supply of oil, bunkering coal and other supplies and in its facilities for ship repairs.

#### Muscat:

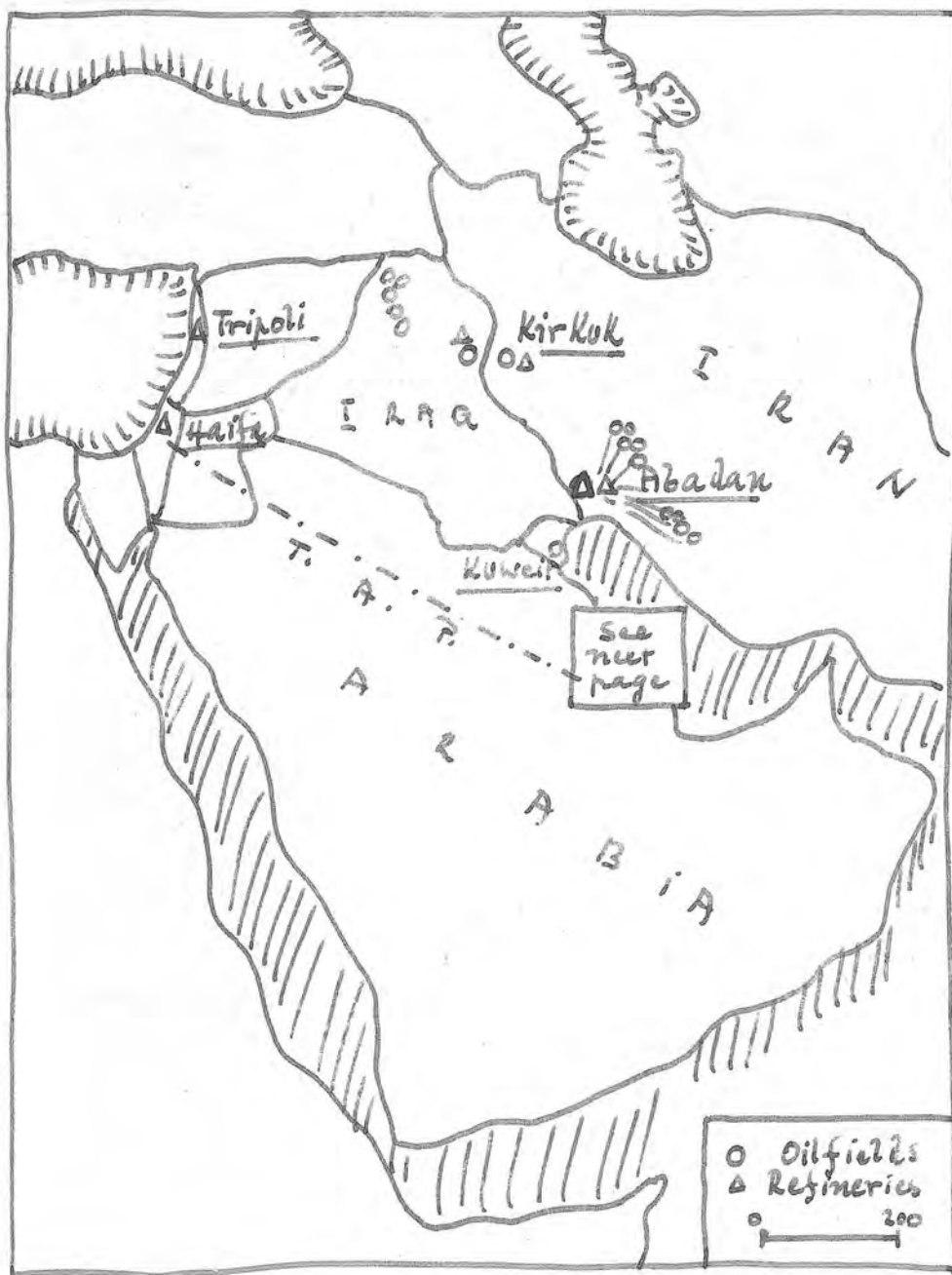
Muscat is the only seaport of the Sultanate of Muscat and Oman, which occupies the southeast position of the Arabian peninsula with a coast line of about 1000 miles. The chief exports are dates, pomegranates, limes, and dried fish. Food supplies and textiles are imported.

Bahrein Islands:

I have said in my introduction to Arabia that there are no ports of importance on the coast of Arabia on the Persian Gulf. I had better said, there were, since the last ten or fifteen years, because of the discovery of petroleum resources in Saudi Arabia, Kuwait and the Bahrein islands this area has become of considerable importance concerning its oversea trade.

In the early 1930-ias Standard Oil Company of California bought an option to petroleum development possibilities on Bahrein Island. Geologists have been wary of Arabia because the structure that had made Iran so rich in oil seemed to have been eroded away on the west side of the Gulf. A hunch that deeper sands might yield oil, plus a reasonable option price, prompted exploration. The Bahrein Petroleum Company was formed and subsequent years proved that not just an option to an island had been bought, but also a veritable ocean of oil. Production on Bahrein, structurally composed by one anticlinal dome, began in 1933.

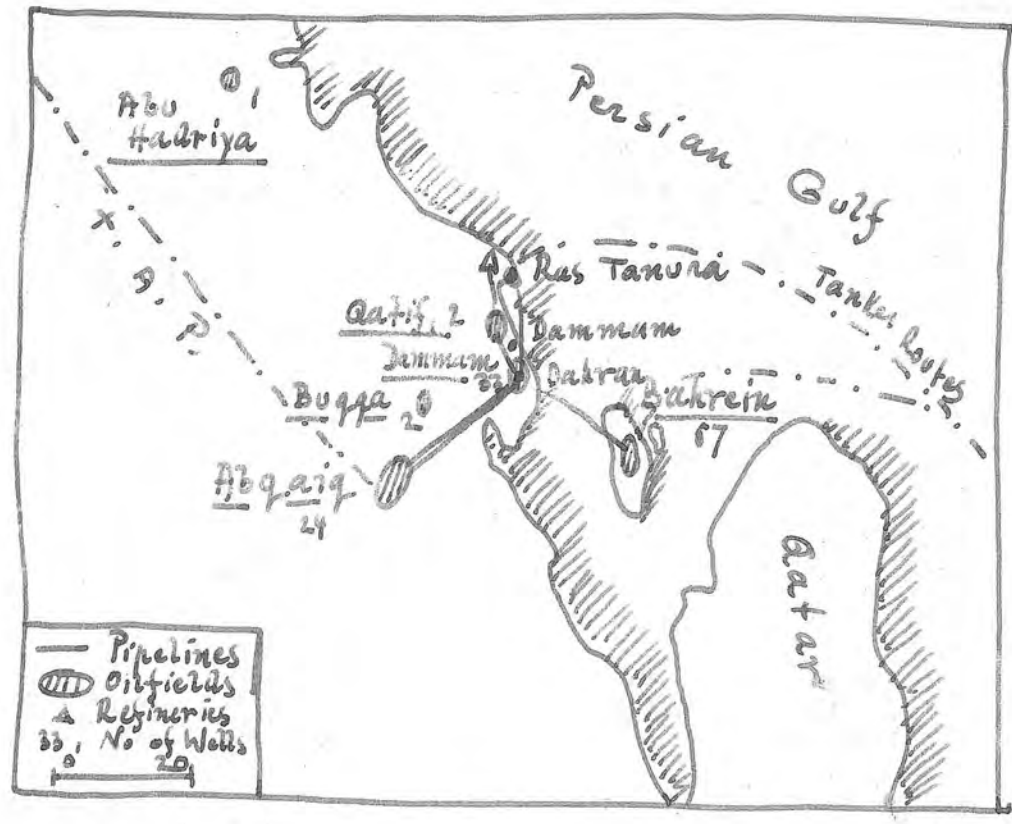
Bahrein has the second largest refinery in the entire Middle and Near East. It is located along the Eastern side of Bahrein Island facing Sitra Island. The original refinery, constructed in 1936, handled the output of the Bahrein field. Increasing commercial quantities coming from the mainland demanded installation enlargements. Despite the modern refinery and loading wharf at Ras Tanura,



### The Middle East.

Within Saudi Arabia, Iran, Iraq and Kuwait lies 40% of the world's known oil reserves. Note the regional relationship of the Arabian oilfields (inset) to the other fields in the Middle East.

Source: Stevens, G. P. Jr.: Arabia's Petroleum Resources. Economic Geography, July 1949 Page 217



Arabian area of petroleum development in Hasa Province, bordering the Persian Gulf.

Source: Stevens, G. P. Jr.: Saudi Arabia's Petroleum Resources Economic Geography, July 1949 Page 218

Bahrein still provides the outlet for more than one-third of the total output from the Arabian fields through the twelve inch submarine pipeline - the longest in the world - from Dammam on the main land. Before its construction, and the construction of the main land refinery (Ras Tanura), Arabia's entire output had to be barged to Bahrein. Due to the shallow coastal waters, a special wharf was projected far out from the shore to load large tankers efficiently. It is off Sitra Island. Beside the development of petroleum resources and the export of oil, the chief export goods is pearls.

Ras Tanura:

This is the place for the export of oil from the Arabian main land. The earlier geological studies at Bahrein suggested the possibility of oil on the Arabian mainland, a short distance across the Gulf of Selma. California Standard Oil obtained a concern on there in 1933 and formed the Arabian American Oil Company (Aramco). The total Aramco concession covers now some 450,000 square miles, about equal in extent to the states of Texas and California's combined. Following years of exploratory and drilling work, commercial production began in 1938. Just prior to World War II there was one field, the Dammam, with a total of twenty wells. Today five fields exist with a total of sixty-two wells. In 1939 Aramco produced about 9,000 barrels of petroleum a day. Now daily production nears



the 300,000 barrel mark.

The refinery of Ras Tanura ranks third in total daily crude oil capacity in the Middle east. But only since the end of World War II have large scale refining operations been carried on here. In 1943 the large refinery at Ras Tanura was approved and rushed through as a war project (along with the rapid expansion of other facilities) in a year and one-half with a laboring force of about 12,000 men. While rated in advance to have a capacity of 50,000 barrels daily, it actually operates at a daily rate of 115,000 barrels.

The same shallow coastal waters as in Bahrein prevail in front of the Arabian coast and therefore special wharves to load large tankers were here projected too. Each marine terminal handles four tankers at once. The average tanker loads in about twelve hours. The tankers take the route through the Persian Gulf, around Arabia and through the Red Sea and Suez Canal to the Mediterranean.

#### Kuwait:

Kuwait is the capital of the Sultanate of Kuwait and a quite important port on the Persian Gulf between Mesopotamia and Nejd. The American Independent oil company won an oil concession in 1948 in the neutral zone between Kuwait and Sandi-Arabia, but oil resources

in Kuwait itself are exported since 1946 and its production of crude oil was 1947 already larger than that of Bahrein. Kuwait can be considered as having two ports, since the cargoes concerning the Kuwait Oil Company are treated completely separate from all others on a place approximately three miles away from the town and regular port.

Export goods are, beside crude oil, hides, horses, wool, dates and pearls, while the imports consist in sugar, cement, motor cars.

#### b) Iraq and Iran

The coast of Lower Mesopotamia in the north western part of the Persian Gulf, that means the areas on the mouth of the Shatt-al-Arab, is shallow and marshy, and therefore not very good for harbors. But here the large streams offers the entrance to several important ports of which Basra with its harbor Maqil, belongs to Iraq, while Iran has here the two ports Mohammerah (Khorramshahr) and Abadan. From Maqil, the Shatt-al-Arab has been developed downstream as a waterway for seagoing vessels by dredging the dangerous bar. The foreign ships call here and handle the greater part of Iraq's imports and exports. The Shatt-al-Arab ports (Maqil, Abadan, and Mohammerah) totaled in 1935 - 136,929 steamers and a gross tonnage of

A Comparison of the Daily Petroleum Pro-  
duction of the four leading areas and the  
Rest of the World.

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Area	Barrels Daily in 1000		Percentage of World Total	
	1941	1946	1941	1946
U. S.	3.842	4.749	63.1	63.00
Caribbean Area	749	1.177	12.3	15.62
Middle East	204	690	3.4	9.16
Russia	652	438	10.7	5.81
Rest of World	643	483	10.5	6.41
World Total	6.908	7.538	100.0	100.00

Source: Stevens, G. R. In  
Saudi Arabia's Petroleum Resources  
Economic Geography, July 1949  
Page 219

Middle East Crude Oil Reserves  
( bil. barrels )  
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Country	Crude Res.*	Crude Res.**	% of Worldtotal*	% W.T.**
Iran	9.500	7.000	13.80	10.44
Iraq	7.500	5.000	10.90	7.46
Saudi Arabia	6.000	5.000	8.72	7.46
Kuwait	5.000	9.000	7.26	13.43
Bahreïn	300	275	0.43	0.41
Qatar	250	1.000	0.36	1.49
Total	28.550	27.272	41.47	40.09

\* 1947 World Oil Atlas

\*\* Oil and Gas Journal, December, 1947.

Source: Stevens, G. P. Jr.  
Saudi Arabia's Petroleum Resources  
Economic Geography, July 1949  
Page 219

Middle East Oil Refineries.

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Capacity in bbl. daily

Refinery	Crude Capacity	Cracking Capacity
Abadan, Iran	420.000	125.000
Bahrein, Bahrein Is.	125.000	23.600
Ras Tamura, Saudi Arabia	115.000	14.000
Haifa, Palistine	63.000	33.000
Alwand, Iraq	6.900	-
Mohammerah, Iran	2.100	-
Baba Gargar , Iraq	1.500	-
Tripoli, Lebanon	1.500	-

Source: Stevens, G. P. Jr.  
 Saudi Arabia's Petroleum Resources  
 Economic Geography, July 1949  
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Middle East Crude Production History

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1000 barrels of 42 U.S. Gallons.

Year	Bahrein	Iran	Iraq	Kuwait	Arabia	Total
1913		1.857				1.857
1914		2.910				2.910
1915		3.616				3.616
1916		4.477				4.477
1917		7.147				7.147
1918		8.623				8.623
1919		10.139				10.139
1920		12230				12.230
1921		16.673				16.673
1922		22.247				22.247
1923		25.230				25.230
1924		32.373				32.373
1925		35.038				35.038
1926		35.842				35.842
1927		39.842		338		40.026
1928		43.461		713		44.174
1929		42.145		913		42.943
1930		45.828		798		46.741
1931		44.376		830		45.206
1932		49.471		836		50.307
1933		54.392		917		55.340
1934	31	57.851		7.689		65.825
1935	285	57.273		27.408		85.946
1936	1.265	62.718		30.406		97.789
1937	4.645	77.804		31.836	20	117.467
1938	7.762	78.372		32.643	65	119.808
1939	8.298	78.151		30.791	495	120.465
1940	7.589	66.317		24.225	3.934	102.691
	7.074				5.075	
1941	6.794	50.777	12.650		4.310	74.531
1942	6.241	72.256	19726		4.530	102.753
1943	6.572	74.612	24.848		4.868	110.900
1944	6.714	102.045	30.943		7.794	147.496
1945	7.309	127.407	32.349		21.311	188.376
1946	8.010	144.896	32.777	5.990	60.341	252.014
Total	78.589	1588.242	343.636	5.990	112.743	2129.200

Source: Stevens, G.P. Jr.: Saudi Arabia's Petroleum Resources  
Economic Geography, July 1949  
Page 221



5,342,809 R.T. Since then Maqil and Abadan have been further developed into important and modern harbors. The rest of the Persian coast is partly steep and the mountains sometimes reach the coast. We have therefore no good natural harbors and the three ports to mention in this area. Bushire, Lingeh and Bander Abbas, are roadstead ports. This coast is sandy, extremely hot, and primarily inhabited by Arabs. The climate is extraordinarily detrimental and Bander Abbas is called, and compared with "the hell" for example, because of its hot climate.

Basra - Maqil:

The town of Basra lies on the Shatt-al-Arab, some 85 miles inland from the Persian Gulf; it has, however by the Shatt-al-Arab a very good navigation route, which gives it a good connection to both, the Persian Gulf and the hinterland, especially Baghdad. The inland situation destines Basra for a good trade port of Mesopotamia, and as ending point of the ocean navigation in the Persian Gulf, it had already gained importance in the so-called "Levante trade" of Venice - in former times an exceptional position in ocean trade and sea-traffic.

Before the First World War, there were no modern port facilities at Basra, except three customs examination sheds. The bar at the mouth of the Shatt-al-Arab made it impossible for vessels drawing more than 19 or 20 feet to

Steamers entering the Ports

BASRA and ABADAN.

Year	Number	Basra	Number	Abadan
		Gross tons in 1,000		Gross tons in 1,000
1920-21	428	1,484	180	858
1921-22	304	1,147	275	1,466
1922-23	209	783	321	1,799
1923-24	221	818	415	1,958
1924-25	188	758	413	2,439
1925-26	194	758	481	2,799
1926-27	162	674	506	3,047
1927-28	171	709	550	3,289
1928-29	168	714	560	3,304
1929-30	177	799	643	3,588

Source: Report by His Britannic Majesty's Government  
to the Council of the League of Nations on the  
Administration of Iraq  
( Reports 1920 - 1932 )

Cargo Tonnage at the Port of  
BASRA

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( in 1.000 s of tons )

Year	Import	Export	Total
1920-21	455	7	462
1921-22	273	66	340
1923-23	206	306	512
1923-24	182	393	574
1924-25	207	246	453
1925-26	247	178	425
1926-27	196	212	408
1927-28	217	407	624
1928-29	223	275	498
1929-30	252	317	569

Source: Report by His Britannic Majesty's Government to the Council of the League of Nations on the Administration of Iraq ( 1920-1932 )

Tonnage of Dates and Grains  
exported from BASRA.

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Year	Dates	Grains
1922-23	123	151
1923-24	126	237
1924-25	148	60
1925-26	145	0.4
1926-27	80	99
1927-28	151	209
1928-29	116	120
1929-30	135	136

Source: Report by His Britannic Majesty's Government  
to the Council of the League of Nations on  
the Administration of Iraq ( 1920-1932 )

enter the river. All loading and unloading of ships was done in the stream by means of lighters, and, in general the conditions were exceedingly primitive. With the outbreak of the first World War and the subsequent influx of large numbers of troops, conditions gradually changed. Port equipment of the most modern type was brought out, wharves were constructed, land was reclaimed and railway sidings were laid down at heavy expenses. The Village of Maqil some four miles upstream from Basra itself was chosen as the site for the main wharves, since there is deep water close alongside the river bank at this point which reduces wharf construction to a minimum. Basra is of course the chief place for imports to and exports from Mesopotamia. Its Imports consist in piece goods, foodstuffs, liquor, tobacco, sugar, tea, machines, iron-goods, glassware, clothing, leather manufactures, cement, and timber. While its main export products are dates, wheat, barley, wool, hides, horses, rubber, drugs, carpets, and petroleum and petroleum products. (though the large oil fields of Mesopotamia are in the North near Mosul and oil is led from there to Haifa and Tripoli on the Mediterranean coast)

Mohammarah (Khorramshahr):

This is an old Persian port and also situated on the Shatt-al-Arab, south of Basra on the left bank. It has the advantage of a very good connection to its Persian

hinterland. For this port is on the junction of the Karun River and the Shatt-al-Arab and the former connects it with the oil fields of Persia, developed since 1913. The crude oil is led by a pipe-line from Abwaq to Mohammerah (only ports, since the main oil port is Abadan). Besides there is the great caravan-road Mohammerah-Teberan, giving the port a straight connection with the rich northern provinces of Iran, which can therefore avoid the round-about way over Mesopotamia and also the transit-tariffs. A disadvantage is the unsound climate. Mohammerah has - excluding oil exports - the highest share among the Persian ports on Persia's trade on the Persian Gulf.

Export goods are - besides a small part of the Persian oil - dates, wool, grain, carpets, - while the usual general merchandise from the industrial West is imported. Mohammerah is forty-four miles up the Shatt-al-Arab and cargo is taken over on the open river (roadstead) by lighters.

#### Abadan:

Abadan is the third important port on the Shatt-al-Arab, about ten miles down the river from Mohammerah. Abadan is pure oil port, and this explains its peculiarity and its tremendous development. Even though the Karun River opens for Abadan as well as for Mohammerah the large and rich Persian hinterland, everything else is by far outweighed by its exports on oil, which comes from the extended



fields on the South-west edge of the Persian highland, explored since 1913. In 1925 already the export of Iran on oil was as high as the whole export value of all other goods of the country. The port was rented by the English in 1912; extended refineries were established (today, the Anglo-Arabian refinery plant in Abadan is the largest in the world); and the volume of trade has developed very rapidly, so that Abadan became within a few years one of the main ports on The Indian Ocean. Tremendous extensions of port and harbor facilities were carried through, so that Abadan today is one of the most important oil ports in the whole world. Abadan has today eleven moles for oil loading and three for cargo and beside there are three moles for oil near Kabda, ten miles down the river on the left shore.

Bushire (Abushebr) :

Bushire is the ending point of the important caravan routes through Middle Iran. Therefore it could become, since its foundation in 1763, most important trade port of Iran on the south coast, though the great caravan route to Shiras is very steep and difficult to go. Hence, transportation costs were very high (example: before the first world war the sea-transportation costs from Hamburg to Bushire for one ton of cargo was 25 mark. The costs for transport of that same cargo from Bushire to Shiras were eight times as much). But since the twentieth century there exists a highway from Bushire to Shiras which allows

of course a quicker and cheaper transportation of goods. Beside there is only a roadstead for ships to anchor, or better, there are two of them: one about six miles west of the town for vessels with more than 2,000 tons and the interior roadstead about two and one-half miles off the coast. Loading and unloading has to be done by lighters. Its volume of traffic is in comparison with its trans-shipment high, since the vessels on the route Basra-Bombay call regularly at Bushire.

Bushire receives the products of the Isphahan-district (opium, wheat, cotton, poppy) via Shiras for exportation. The agricultural products of Iran are gathered in Shiras and are sent from here to Bushire, the main port of southwest Iran. Beside the above mentioned products we have exports of gum Arabic, attar of roses, carpets, dates, and hides and skins, while goods of all kinds are imported from Europe and rice from India. Bushire's importance was higher before the first World War, which means before the development of the Persian ports on the Shatt-al-Arab, and has declined since then.

#### Bender Abbas:

Bender Abbas is the entrance port for all goods to south eastern Iran. It has good connections with its hinterland and is trade and export center for the province of Jedd. The climate is very, very hot and its inhabitants compare it with "the hell".

Total Trade of Ports in Iran 1923-24

45 Krans - 1 Pound Sterling

Port	Total Trade in Mill. Krans
Mohammerah	249.7
Abadan	212.9
Bushire	176.3
Bander Abbas	62.0

Source: Anstey, V.  
The Trade of the Indian Ocean  
Longmans 1929.

Exported are cotton, carpets, dates and imported cotton piece goods, sugar, tea and woolen goods.

c) Pakistan, India, and Ceylon

The long coast line of the Indian peninsula is not very favorable to modern navigation, since its coast is, similar to the East coast of Africa, very emergent. Deep bays or peninsulas are completely lacking and shallow and flat coastal forms prevail. The branches of the monsoon stream, active on the coast, charter huge masses of sand and mud of the rivers. Therefore the ocean is very shallow, even in long distances from the coast. On many places, there come into being long sand bars and behind them large lagoons. Hence, extensive and expensive port and harbor construction has been necessary in order to overcome the natural difficulties of coastal and overseas communications, and to cope with India's enormously increasing foreign trade. This, together with the fact that India's railway system converges upon a few large ports and commercial centres, has tended to concentrate the bulk of India's foreign trade on a relatively small number of ports. In fact, if we include here Burma and its main port Rangoon, we can say that 90% of the total foreign trade of India passes through the five premier ports (when I speak from India I mean the whole peninsula, including Pakistan, and this

time also Burma) Calcutta, Bombay, Karachi, Rangoon, and Madras. These ports are administered, under Government supervision, by specially constituted bodies called "Port Trusts" (they have power to levy dues and taxes, and to carry out port and harbor improvements). In 1928 Chitagony was declared to be a "major port", and is now administered in a similar manner.

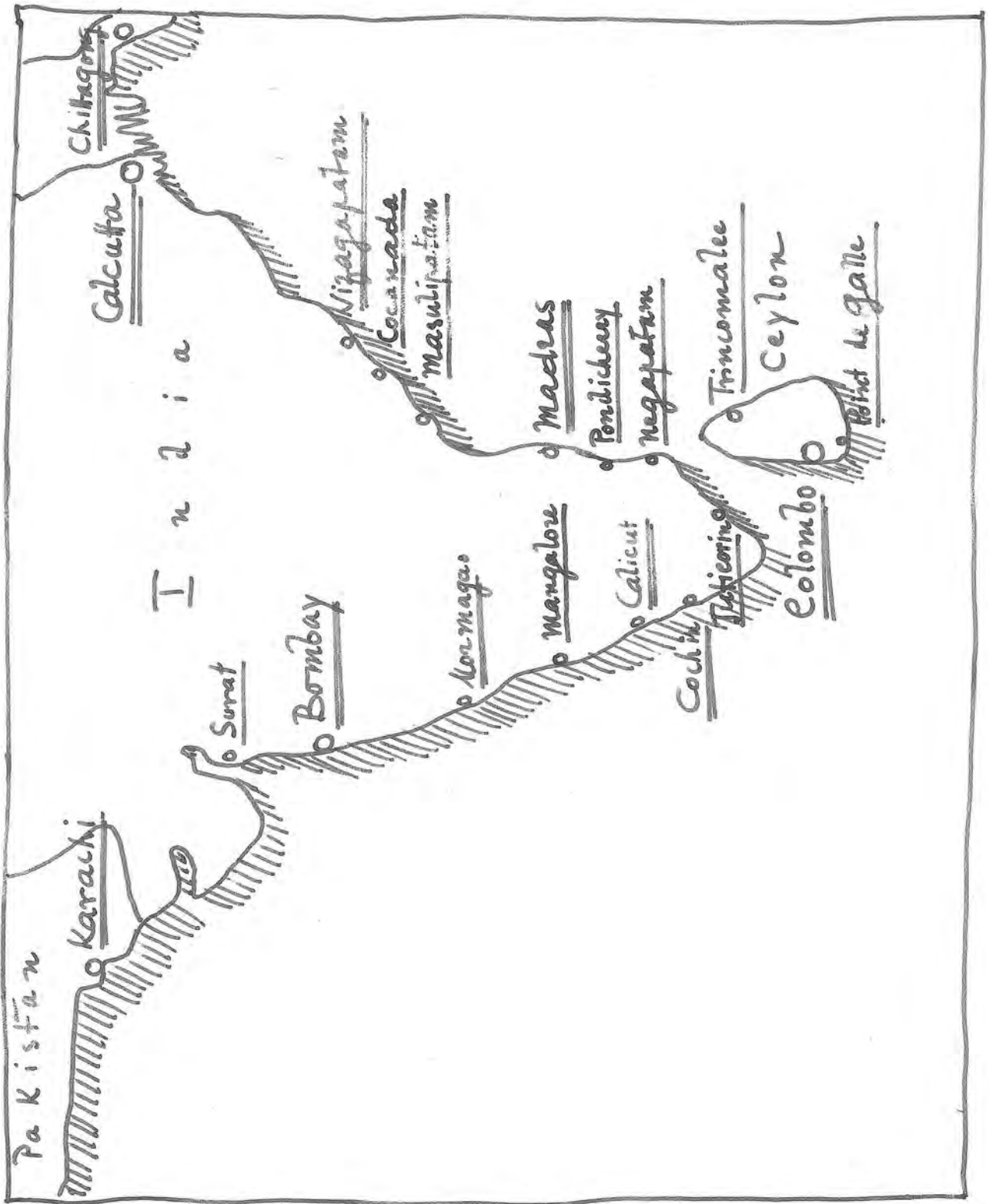
The coast of Baluchistan is very similar to the one in Iran and does not have any port of significance. The first important and natural port on the Indian west coast is Karachi, situated off the northern edge of the Indus Delta. Southward from the mouth of the Damangana river to the southern boundary of the Portuguese territory of Goa, the coast gradually, but continually becomes bald, rockbound, and stern in appearance. Until the harbor of Bombay is reached, sandy strips, capped with low dunes of shifting sand, are common. Southward from this harbor, a sea cliff, rising several hundred feet above the water is the most outstanding characteristic of the coast. Where streams have cut their ways to the sea, low valleys add variety to the rocked cliffed shoreline and provide bays on the otherwise regular littoral. These valleys vary in width from narrow gorges to broad open lowlands, a mile or two wide. At the outer part of the wide valleys the shore is low and sandy, with a row of sand dunes about twenty or thirty feet high, overlooking

the embayed section. Most of the coastal towns and villages are visited daily by small steamers except at the time of the southwest monsoon. The numerous buoys and warnings which mark the places of danger along the coast are taken in during this season and it is almost impossible for a ship to anchor safely. The hinterland produces very little material for export and is a poor market for imports. Therefore the seaborne trade of the coastal towns is small and most of the exports are either from the immediate hinterland or from nearby waters. The coast south of Bombay harbor has been submerged and a relatively wide continental shelf has been formed. The shallow waters are splendid feeding grounds for fish.

Bordering the sea in the southern part of the west coast (Malabar coast) is a sandy littoral backed by numerous lagoons and covered with groves of coconut palms. These lagoons, or "Nayals", although not continuous have been connected by canals until it is possible to travel continuously by water in a north-south direction for over two hundred miles. The lagoons vary in size from two or three square miles to several hundred square miles in area. When the depth is sufficient to permit the entrance of ships, they make excellent harbors and it is in such sites that many coast towns have grown (Calicut, Cochin, Mangalore).

The entire east coast is characterized by high temperatures and seasonal rains. Means of communication are well developed as the relief, in general less than 600





The Trade of Principal Indian Ports

in crores of rupees  
 1 rupee - ( R ) -- 1 s, 4 d.  
 1 crore -- 10 Mill.

Port	Pre 1.WW Average	1. WW Avg.	1923-28	30-31	32-33	36-37
Bombay	145	158	240	161	142	136
Calcutta	160	162	250	158	89	112
Rangoon	49	52	93	75	28	32
Karachi	48	47	95	53	29	40
Madras	20	21	42	37	25	32
Chittagong	7	7	14	11	4	-
Tuticorin	7	8	12	9	5	-
Cochin	6	6	10	10	4	-

These figures include all foreign and coastal trade, except Government stores, in merchandise. The coasting trade is about one quarter of the whole. These eight ports have about 95% of the total seaborne trade of India.

Source: Stamp, L. D.  
 Asia: A Regional and Economic Geography  
 New York 1938  
 Page 254

Number and Nationality of ships entering  
ports in British-India 1931-32.

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Nationality	Number	1000 Tons	Perc. in tons
British	1,859	5,593	66.8
British-India	186	80	1.0
Native	674	54	0.6
Japanese	172	599	7.2
German	127	553	6.6
Italian	125	524	6.3
Dutch	80	271	3.2
Norwegian	110	242	2.9
American	47	198	2.4
French	27	136	1.6

Source: Stamp, L. D.  
Asia: A Regional and Economic Geography  
New York 1938  
Page 254.

Export of cotton from Indian Ports in 1927

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in tons.

Port	Continent of Europa	Gr. Britain	Rest of World	Total
Bombay	68.400	3.600	297.720	369.720
Karachi	65.340	6.840	65.490	137.670
Madras	9.000	720	1.080	10.800
Tuticorin	180	900	7.560	8.640
Calcutta	3.960	360	3.060	7.380
Cocconada	360	180	-	540

Sources: Various

feet, with the greater part below 300 feet, presents but few obstacles to the construction of railroads and highways. This low relief likewise does not offer serious handicaps in the construction of canals, and these are used both for irrigation and transportation in the interior. The coastal sediments dip gently toward the sea and as a result deep water is not found near the coast which accounts for the absence of good natural harbors. Artificial works are necessary on account of the surf and in order to prevent the formation of sand banks. Madras was converted from an open roadstead into a safe anchorage in all weathers by the construction of seawalls. Calcutta and Chittagong are handicapped by the sand bars which tend to form at the river mouths, and which necessitate continual dredging. The other main eastern ports are Tuticorin, Dhanushkodi, Negapatam, Pondicherry (French), Masulipatam, Cocanada, and Vizagapatam.

The west coast has three main natural ports: Bombay, Karachi and Mormugao. (New Goa). These have been greatly extended and improved by harbor works, and are still the only western ports not closed to traffic during the monsoons. Surat - situated 14 miles from the river mouth of the Tapti River used to be the chief of the East India Company's factories, but already by the nineteenth century had quite lost its importance. Mormugao suffers from restricted inland communications, and its trade has dwindled to insignificance. Kochin is partially barred

by silt. The only other western ports of any magnitude are Mangalore (the north-west terminus of the South Indian Railway), Telicherry, Calicut, and Allepey, all of which are available for small vessels only. The other minor ports are only engaged in coastal trade. Conditions in Ceylon are very similar to those of the peninsula. The island of Ceylon is 60 miles off the southern tip of India. The coastal area of the island, like in India, does not offer favorable conditions for navigation and harbors. Especially the northern and western part of the coast is very flat and shallow and lagoons prevail like we have seen especially on the Malabar coast in South-western India. In the east we have partly a steep coast line. The most important port of this coast for the world traffic, the southern part of the west coast has the disadvantage of reefs, sea-streams and strong surf. Even Point de Galle, until about 1880 the first port of Ceylon is supposed to be dangerous. And only since the roadstead of Colombo is sheltered from the strong surf during the time of the southwest monsoon by huge dams and breakwaters, Ceylon has a port, qualified for modern navigation and trade. The best natural harbor of the island is Trincomale, one of the most beautiful ports in Southeastern Asia, is situated on the east coast and therefore off the world traffic routes.



Karachi:

Karachi is the capital of the new formed Dominion of Pakistan and at the same time its first trade -, traffic -, and export centre and its chief port.

I want in this case to deviate from the usual line of describing the various ports and examine more completely just in this particular case (to do it with every harbor would be impossible, since it would by far surpass the provided volume of this paper). The hinterland of Karachi, involving and more completely treating the tern hinterland in general, too. Let us consider the regions approached through the port of Karachi. It may perhaps provide a useful illustration of the difficulties incident to the definition of a hinterland. We can discover, in this case, well marked barriers of mountains and desert, and, by neglecting the small quantity of traffic which penetrates these barriers, we can define a block of country of which nearly the total external trade passes through Karachi. In this block however, the distribution of population is far from uniform; it is most dense in the Punjab, very thin or non-existent in districts nearer the coast. The picture derived from an examination of the commercial statistics of Karachi is that of a small traffic from the nearer part of the block, a small traffic which filters through the distant passes of the mountain barrier, and a very large traffic from the Punjab. Even if we decide to exclude areas such as Afghanistan from our view, we are

still left with a picture of a hinterland which displays violent contrasts in the matter of distribution of population. This contrast is a vital geographical fact. It is quite possible to imagine, statistically, the same area, the same trade and the same total population, but the last differently distributed over the area; from the point of view of geography or economics, however, the real picture would be entirely changed.

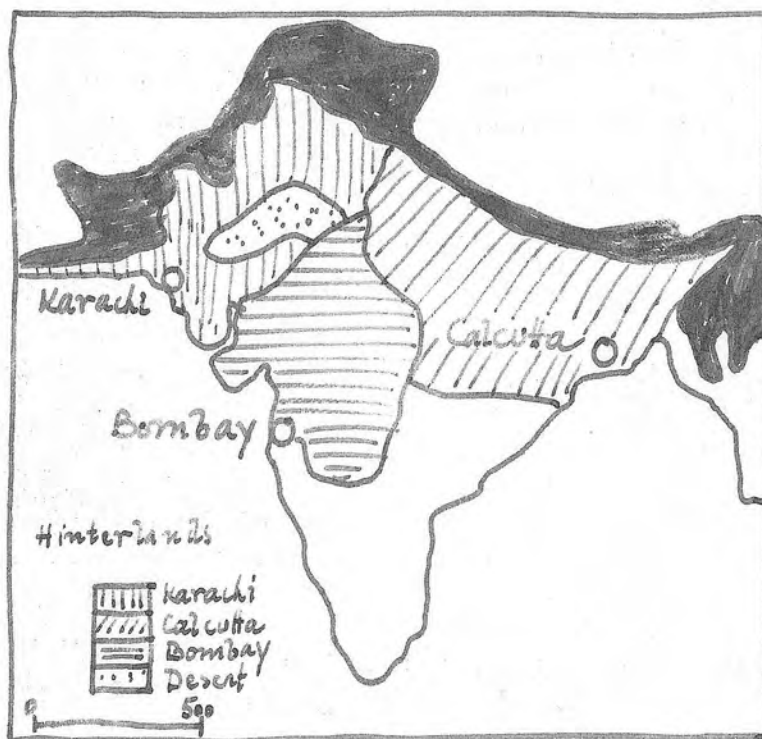
As soon, therefore, as we attempt to give a definite meaning to the term hinterland, we find that the meaning varies, it is special to the particular part concerned; but, given the necessary statistics, we can define our conceptions to any desired degree of accuracy in each separate case. The degree of accuracy will vary from port to port, but the term hinterland is of the greatest utility as indicating a group of conditions to be defined and localized, with reference to a given commercial outlet or inlet. Such conditions, however, are far from being purely geographical. Karachi may suggest an illustration.

On the general principle that goods for export tend to seek the shortest, that is, normally, the cheapest route to the sea, Karachi on the map seems to be the only "natural" outlet for the Punjab, at any rate for bulky products; yet it is possible that, even for a product such as raw cotton, the actual outlet may be by all-rail to Bombay. To explain this, we must consider two factors which may modify conditions based simply on geography. In

the first place, although the cotton may be destined ultimately for Europe, Bombay is the chief marketing and shipping centre for cotton and possesses facilities, which are not found at Karachi. Even so, it seems that it ought to be cheaper to ship via Karachi and coastwise to Bombay, rather than by the all rail-route. It might be so, as a matter of actual freight charges, but there are other things to be taken into account. The merchant is concerned only with total delivery costs, not with the cost of any particular portion of the transportation.

Transshipment at Karachi is necessary. The actual cost of this technical operation depends on the equipment of the port and the cost may be increased by damage in handling and storing. Time also enters into the calculation. It is possible, therefore, that goods may be forwarded by a dearer route, as measured by actual charge for transport. This charge, it is true, may be related more or less closely to geographical conditions, but the interference of such technical and commercial factors renders difficult the application of conceptions based purely on geography.

Karachi is the only important port of the west section of Pakistan. Since the river Indus, because of its mud-bars, is not navigable for larger vessels, the whole overseas trade of the river area is led over Karachi, which is off north from the Indus Delta. Karachi is the first reachable port on the Indian coast for the Suez route



The approximate hinterlands of the three leading ports of India.

Source: Stamp, L. D. : Asia  
 A regional and economic Geography  
 New York 1938  
 Page 255

The Main Export Goods of Karachi.

for 1925-26

1 R ----- 1 s, 6 d

Merchandise	to Mill. of Rs.
Raw Cotton	22.1
Grain, pulse, and flour (mainly wheat)	5.5*
Oilseeds	2.9

\* This is an exceptionally low figure, owing to the failure of the monsoon.

Source : Anstey, V.  
The Trade of the Indian Ocean  
Longmans 1929  
Page 83



and lays beside on the route India-Persian Gulf.

Karachi dates its prosperity from the American Civil War, the opening of the Suez Canal and the consequent rise of the great wheat export, and the establishment of direct railway communication with the Punjab in 1878. Its expansion, however, has been held up partly because it had only narrow gauge connections with its hinterland, partly by the limited water supply which has made port extension difficult, and partly by the fact that it is not an industrial centre. Nevertheless it is India's great wheat port, as the production of wheat is primarily confined to North West India, the Punjab being the principal wheat producing province. Furthermore the dry climate of Karachi is peculiarly suitable for the storage of wheat before export. A large quantity of raw cotton is also exported, particularly from the irrigated areas of the Punjab. Other important export goods are oil seeds, wool, hides, salt, fish, carpets; while the imports consist in piece goods, cotton goods, metals, sugar, silk, tea, liquor, petroleum, liquid fuel, coal, railroad equipment and machines.

#### Bombay:

Bombay is the outstanding industrial city of India and commercial center of the entire west coast. Its good natural harbor, fourteen miles long and five miles wide with docking facilities to care for the largest ships, its



rail connections with the interior of the peninsula by means of two passes in the Ghats, and its proximity to Europe via the Suez Canal are all factors which have added to the importance of this port. The Island of Bombay, upon which the city is mostly concentrated consists of two roughly parallel ridges of trap with alluvial deposits between.

Bombay has been long important as a cotton manufacturing city and as a port for shipping raw cotton. An explanation for this may lie in the fact that Bombay is located adjacent to two passes in the Ghats which makes communication with the cotton area of the Deccan easy. Along the entire east side of the Island of Bombay is the port section. From its earliest history the activities of Bombay have been centered about the harbor and it is still one of the finest ports in the Orient. The value of the harbor is greatly enhanced by the fact that even at the height of the southwest monsoon quiet waters may be found here.

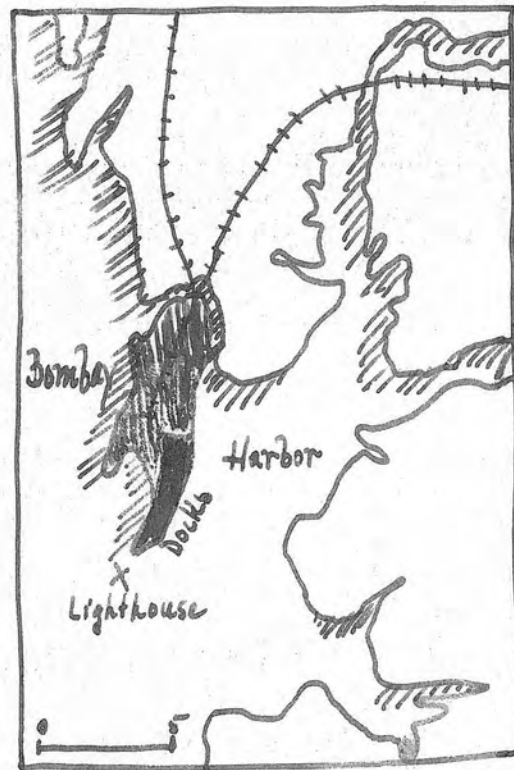
Bombay was founded in 1509 by the Portuguese and was taken over by the English in 1601. It became of first class importance as an industrial and commercial centre only after the construction of the Great Indian Peninsula and Bombay, Baroda and Central Indian Railways linked it up with the cotton field of the Deccan and with the wheat and cotton fields of the Punjab. It received an enormous stimulus during the cotton boom caused by the cutting off

of American supplies to Lancashire during the American Civil War, and has competed with Calcutta for the first place amongst the Indian ports since the 1880ies. A new scheme of port development, including large extensions and improvements was completed by 1919.

Bombay is the principal outlet for the staple products of Western India, in particular of the raw cotton of the Deccan, the Punjab and parts of Central India (since the Punjab is now a part of Pakistan it can be assumed that this part of the raw cotton goes to Karachi) and of the products of the great cotton mill industry of Bombay. In addition large quantities of oilseeds, manganese ore, food-grains and coal are exported. It is the nearest port of call for the traffic of the Suez Canal, and hence receives the bulk of India's imports of manufactured European goods. It is also the most convenient port for vessels from the Cape and East Africa. The principal imports are iron and steel, motor cars, petroleum, fuel oil, tea, glassware, and timber.

Mormagao and Pangim:

These two ports are in the Portuguese possession of Goa. The largest part of the trade is transit trade. Goa was in former times a centre of the European trade in India, while it is today almost without any importance. Export goods are manganese ores, cotton and cotton seeds, oil cakes, chrom ores, and ground nuts; rice, sugar, coal,



The position of Bombay, India

This sketch demonstrates the magnificent harbor, but emphasizes the restricted area of the island on which Bombay is built and the consequent difficulty in expansion. "Back Bay" which is being partly reclaimed to provide more land is the bay west of the city and north of the lighthouse.

Source: Stamp, L. D. : Asia  
 A regional and economic Geography  
 New York 1938  
 Page 313

The Main Export Goods of Bombay

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in 1925-26

1 R ----- 1 s, 6 d

Merchandise	10 Mill . of Rs.
Cotton, raw and manufactured	68.7
Oilseeds	11.8
Grain ( mainly rice )	2.6
Wool and Woollens	2.0

Source: Anstey V.  
The Trade of the Indian Ocean  
Longmans 1929  
Page 82

ironware, machinery, petroleum are imported.

Mangalore:

Mangalore is near the northern limit of the division on the lagoon formed at the mouths of the Netravathi and Gurpur rivers. The city has many brick factories which obtain their clay from the nearby hills. Mangalore is the terminus of the South Indian Railroad, which connects the West Coast with Madras via Palghat Gap. The vessels have to anchor on roadstead, and loading and disloading occurs by lighters. Exported are bricks, hides, pepper, timber, coffee and spices; imported - sugar, rice, salt, dates, grain, machinery, piece goods, coconuts.

Calicut:

Calicut developed into a commercial city early. The interest of Europeans was drawn to Calicut following Vasco de Gama's first trip to India in 1498, for with this trip began the commercial relations between Europe and India. Numerous sailing routes focused on the city and soon it became the trading centre for spices and cotton cloth in the Orient. Portuguese interest increased and attempts were made to get permanent locations in the town but they were soon informed that foreigners were not wanted. Several years of struggle ensued with the result that the city was twice bombarded and finally burned, thus



greatly retarding its commercial growth; it is very doubtful if it will ever attain again the important position it once held along the West Coast of India. As in earlier days, the port reflects the hinterland it serves. Coffee and tea are brought down to the harbor from Mysore and Coorg, and traded for piece goods, salt, etc. Coffee, coir, and pepper make up half of the exports of Calicut, less important items being copra, timber, ground nuts, tea, bricks, raw cotton, cotton piece goods, bananas, and soap. Salt, rice and other grains, piece goods, metal ware, sugar and cement make up the chief imports. Much of the trade of Calicut is carried on through Bombay, but rice is imported directly from Burma and Bengal. Calicut is a harbor with a roadstead too.

#### Cochin:

Cochin, lying on the lagoon at the mouth of the Cochin River, has a magnificent natural harbor, several square miles in area with a deep basin of seven to nine fathoms near the mouth which is kept free from silting by tidal scour. However, a bar about a mile off shore prevented the entrance of large ships, since while it carried a maximum of eighteen feet of water at high tide, it had only twelve feet at low tide. This necessitated the anchorage of large ships out beyond the bar and loading had to be done by means of lighters. Nowadays a dredged channel, 450 feet wide and more than three miles long leads into the interior harbor; its depth tends to alter during



the south west monsoon, but at all times, vessels up to thirty feet can enter the harbor.

Cochin was in the 17th and 18th century an important trade centre for the Dutch and is today the most important port on the Indian West coast beside Bombay and Karachi. It has a fertile hinterland and is also favorably situated for the European trade with India. It serves also as an entrepot port for the cities farther south along the coast. The shallow offshore water makes it impossible for even the large coastwise trading boats to call at the harbors of Allepy, Qwillon, or Trivaudrum. Each of these cities is also located on the lagoons and most of their trade is carried on through Cochin by means of flat bottomed boats on the lagoons. Cochin has therefore a large coastal and also quite a foreign trade. The most important exports are coir, oil cakes, spices, tea, coffee and wood. Rice, grains, textiles, machinery, chemicals, piece goods and coal are the chief imports.

#### Tuticorin:

This port in the Gulf of Manar is the most southern port of India. But in spite of its rich hinterland it could never gain high importance, since the near port of Colombo on Ceylon is more favorable as a port of call, and Madras better qualified as port of transshipment for the ocean trade of the southern part of the Indian peninsula, than the unsheltered and little equipped harbor of Tuticorin.

Nevertheless, it carries on much of the trade with Ceylon. It exports cotton, salt and grain. Imports are of general and various nature.

Madras:

Madras is the metropolis of the Indian East Coast. It has an artificial harbor that permits ocean going vessels to anchor a short distance from shore, which was constructed because the whole eastern coast is flat, shallow and sandy and does not have any natural harbors. But on the other hand, there was naturally, ~~because~~ because of the considerable economic activity of the long coast line, the necessity for a good sea port. Hence, the construction of an artificial harbor was started in 1860, and Madras got an exceptional position for an extensive hinterland, which was later reduced by the influence of Bombay with its nearer situation to Europe.

Today the transfer of cargo is made by flat-bottomed boats known as masulas from the ocean going vessels anchoring only a short distance from the shore. Even though the site is not favorable the situation accounts for the greater size of Madras in comparison with the other coastal cities. Industrially the city is of little importance, since there are but few small manufacturing establishments such as cotton mills, cement works, iron foundries, and cigar factories. These, however, are not comparable to the larger industries of Bombay and

Calcutta. Madras is the focal centre for highways, railroads, and canals. The connections by canals are both to the north and to the south, and the railway connections are excellent. As a result of the convergence of transportation lines and the artificial harbor over half of the exports and imports of the east coast passes through the port. The city spreads over an area having a sea frontage of nine miles and a depth of four miles. In many parts it is almost rural in character and only to a limited extent does it present a compactness as might be expected in a city of its population. The dominant factor in the growth and importance of the city is the fact that Madras has the entire east coast, a part of the west coast and a portion of the Deccan Plateau for a hinterland.

Madras is of declining importance, chiefly because it serves no great hinterland producing specialities for the world market - unlike the other great Indian ports that do (Karachi: wheat, Bombay: cotton, Calcutta: jute, Rangoon: rice) - but has a hinterland that is more or less self-sufficient as regards both foodstuffs and manufacturers. Moreover, Madras, like Calcutta, is off the main ocean routes. The principal exports are raw and manufactured hides and skins, cotton and cotton goods, oilseeds, ground nuts and beside ores, tobacco, vegetables and other foodstuffs. Its import consist in almost everything, starting with coal and coke, over oil, fertilizer, metals, rice and other grains, timber, motor cars, motorcycles, railroad

The Main Export Goods of Madras

for 1925-26

1 R ----- 1 s, 6 d

Merchandise	10 Mill. of Rs.
Raw and manufactured hides and skins	6.5
Cotton and cotton goods	4.7
Oilseeds	4.1

Source: Anstey, V,  
The Trade of the Indian Ocean  
Longmans 1929  
Page 84



material, textiles, sugar, cement, chemicals, iron- and glassware, tea and paper to wine, beer and crandy.

Vizagapatam:

This port became of considerable importance when the railway line to Rappur (on the Bengal-Nagpur Railway) has been completed. It had only a small trade before that and expanded quite rapidly. It is now an important outlet for the products, particularly the manganese, of the Central Provinces and of Central India as a whole. Beside manganese ore, Blax-seeds, oil-cakes, hemp and ground nuts are exported, while Vizagapatams imports consist in chemicals, machinery, teak and food-stuffs. Beside, it is the chief port dealing with the coolie traffic to Burma. A disadvantage is its inadequate harbor.

Calcutta:

Calcutta is located on the east bank of the Bhagirathi-Hooghly River, about 86 miles from the sea. The elevation of the city is between 18 and 21 feet above mean sea level. The importance of Calcutta is due to its excellent position at the mouth of the vast Ganges Valley. It is situated on a navigable river and has good communications with its productive hinterland. Politically Calcutta is the capital of the province of West Bengal in the Union of India; economically, it is the focus of trade and commerce of all eastern India.

Calcutta is the great outlet for the agricultural products of the Great Ganges plains (which include some of the most fertile districts of the whole country), for part of the great tea area of Northern India (the other part of the tea is exported from Chittagong in Pakistan), and for the great Bengal jute industry. The difficulty of obtaining sufficient outward-bound vessels for Calcutta's large exports besets its trade as a whole, and is accentuated by the fact that Calcutta, unlike most of the other large Indian ports, is off the main trade routes of the Ocean. Tramp steamers are not attracted, as they have difficulty in obtaining cargoes of imports. Another disadvantage of the port is that it is situated more than 80 miles from the open sea, up a difficult river with a shifting bed. The actual port facilities are, however, excellent and up-to-date.

Calcutta was founded by the English in 1700 out of nothing by the establishment of Fort Williams; ten years later its population was 10,000, one hundred years later it has grown to 200,000 and today it is with more than two millions, the city with the largest population in India, and also its commercial center together with Bombay. Responsible for its exceptional position today are both the river- and canal ways connecting Calcutta with the Ganges and Brahmaputra valleys and the excellent railroad connections, which brings it together with additional extensive areas of India. In addition, the harbor of



Calcutta, not too good qualified by nature and originally only an inland river port, was transformed into an excellent ocean harbor, where vessels up to 15,000 tons can call.

Calcutta is the principal port exporting raw and manufactured jute. It also serves the coal areas of Bihar and Bengal, and exports food-stuffs such as rice and oil-seeds, and tea, hides and skins, opium, manganese, cotton spices, and hemp. The imports of all the principal Indian ports are very similar, consisting mainly of the various manufactured goods. Cotton piece goods, machinery, metal ores and manufactures, sugar and beside salt, wine and beer, petroleum, tobacco, and cloths are particularly large in the import trade of Calcutta.

#### Chittagong:

This is the most important port in the eastern part of Pakistan and ranks at the first place of the Indian middle ports (that means right after Madras). It is on the river Karnafuli, about 10 miles from the sea. After former flowery - it was called "Porto Grande" by the Portuguese - the port lost its significance. And only after the construction of the Assam-Bengal railway in 1904 it began to develop again. This railway connects Chittagong with the areas of East Bengal (now East Pakistan), Cachar and Upper-Assam, so that its trade soon started to increase. And since Eastern Pakistan produces more jute than the Union of

The Main Export Goods of Calcutta  
1925-26.

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1 R --- 1 e, 6 d

Merchandise	in Mill. (crores) of Rs.
Jute, raw and manufactured	94.7
Tea	17.7
Lac	6.8
Hides and Skins	4.9
Oilseeds	4.3
Grain ( mostly rice )	3.8
Metals and ores	2.7

Source: Anstey, V.  
The Trade of the Indian Ocean  
Longmans 1929  
Page 81

India and beside ranks third in the tea production of the world (after India and Ceylon), and the only oversea outlet in the country is Chittagong, there can be expected a further development of this port. Beside jute and tea, wax, hides, cotton, tobacco, rice and eggs are exported, while the import consists in salt, oil, machinery, coal, and railway material. It is possible for vessels with a length of 500 feet and a depth of 23-25 feet to go up the Karnafuli river and to call at Chittagong. Although high hopes are laid now of the development of Chittagong as the natural outlet for East Pakistan, such major port development takes time and money, and it is not likely that Chittagong will soon rival Calcutta with its immense hinterland, vast industrial development (nearly one-third of India's large industry is located in Calcutta) and all the power of vested interest and finance.

Colombo:

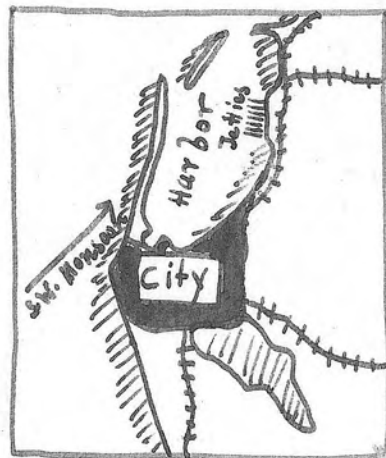
Is the great port-of-call and bunkering port on the route between Suez and Australia and Suez and the Far East, so that the total shipping entered and cleared is almost as great as that entered and cleared in all the ports of India. Colombo gained this exceptional position because of its extraordinarily favorable situation to the trade centres of South- and East Asia on the one hand, and Near East and Europe on the other. Especially the neighborhood of the Indian peninsula lends Colombo both a considere

able goods - and passenger transit traffic, increased by improved connections with the southern part of India. Beside, the trade of Ceylon itself is quite high and increasing, and goes almost entirely through its main port Colombo, which also has the most fertile area of the island as its immediate hinterland. At last, as mentioned above, Colombo is, since the opening of the Suez Canal, a great port of call for purposes of coal and oil bunkering for ships from Suez to East Asia or Australia. With the exception of Singapore - which we can consider as to be situated on two, the Indian and the Pacific, oceans - Colombo is the largest port-of-call on the whole Indian Ocean and is touched by almost all the ships and lines from Europe to Asia and Australia. The completion of its port facilities meets the high claims.

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Almost all of the total shipping of Ceylon enters and clears at Colombo, so that for all practical purposes the trade of Colombo may be taken as synonymous with the trade of Ceylon (The only other ports that engage a little in foreign trade are Galle and Trincomalee). The tonnage of vessels calling at Colombo solely to obtain coal or liquid fuel for bunkering purposes is registered separately from that of vessels that actually carry on trade with Colombo, and bunker fuel is not included amongst Ceylon's imports and exports. Ceylon has no coal or oil of her own, and has to import all that is needed for bunkering purposes.

Ceylon's and therefore Colombo's main exports are



A sketch map of the artificial harbor of Colombo, Ceylon, showing how it is sheltered from the south-west monsoon.

Source: Stamp, L. D. : Asia  
A regional and economic Geography  
New York 1938  
Page 390



The Trade of Colombo in 1925

The figures used here are those for the trade of Ceylon, since they are almost identical to those for the trade of Colombo.

Figures in lakhs of Rupees  
 1 lakh ----- 100,000  
 1 Rupee ----- 1 s, 6 d

Imports		Exports	
Rice .....	9.66	Tea .....	19.96
Cotton and cotton goods ..	2.83	Rubber (excluding reexports) ....	16.99
Mineral oil .....	2.26	Coconut products ..	7.79
Coal, for internal use	1.76	Cinnamon and areca-nuts .....	72
Rubber .....	1.53	Graphite .....	29
Fertilisers .....	1.27	Cacao .....	23
Refined Sugar .....	1.26	Citronella oil .....	22
Fish .....	80		
Motor-cars and lorries	74		

Source: Ansbay, V.: The Trade of the Indian Ocean  
 Longmans 1929  
 Pages 96 and 97.



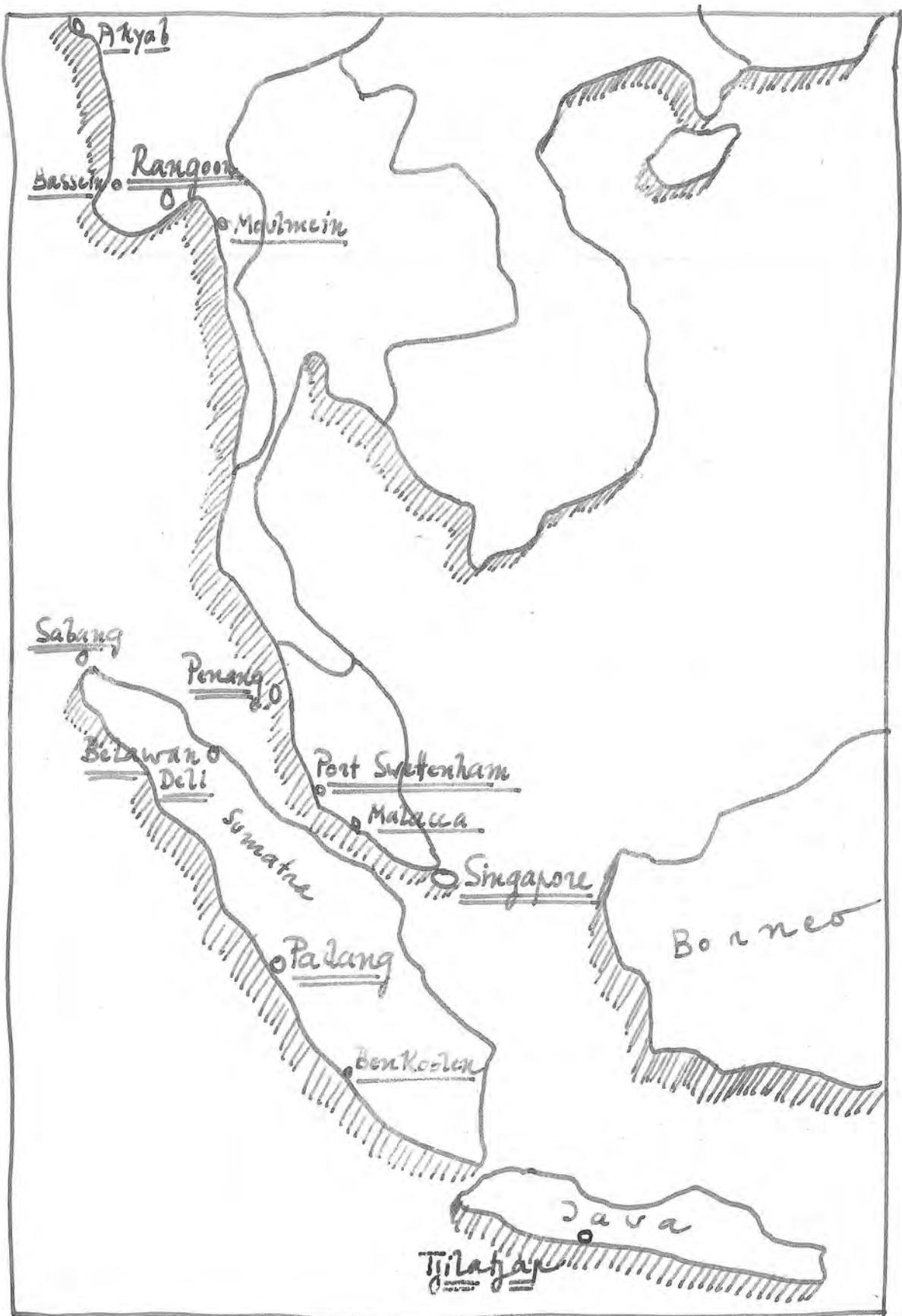
tea grown inland in the highlands, rubber grown on the western slopes of the hills, coconut products, grown especially on the west coast, coffee, cinnamon, copra, tobacco, graphite, and woods. The principal imports are rice, mainly imported for the consumption of the Indian coolies who work in the tea and other plantations, and who refuse to eat Ceylon rice, which they allege is lacking in sustaining power, coal for internal use, machinery, railway material, spices, ironware and finished goods.

d) Farther India, Malaya, Indonesia

In this region the coast is, similar to that of the Indian peninsula little articulated, as a rule shallow and equipped only with very few useful natural harbors. The connections with the hinterland are comparatively good, but a part of the trade of this area - the greater part of Indonesia and also a portion of the Malay Peninsula - through the ports on the Pacific coast. Beside the hinterland is by no means that extended than that for the ports of India. On the other hand, especially the southern ports of the Malay Peninsula are situated more favorable to the great trade routes of navigation. In the Street of Malacca - between Sumatra and Malaya - many routes combine.

Here, therefore, ports could develop, which are not only trade ports and outlets of their hinterland, but at the same time transit stations of the trade between foreign countries and also important bunkering stations for the navigation.

Considering the ports of Burma, Rangoon is by far the most important one both in trade and traffic. Beside there are to mention Bassein, Akyab, Victoria Point and Moulmein and some other minor parts, known only because of their export of rice, otherwise, however, rather unimportant. There is no port of any significance on the part of Siam on the west coast of the Peninsula. The most northern port in this area is Penang, an island belonging to the Strait Settlements. The next one is Port Swettenham, the main port for the former "Federated Malay States" and especially for the province of Malangor. (Since 1948 there exists the Federation of Malaya consisting of the four former Federated Malay States, the five former Unfederated States and the two British settlements of Penang and Malacca). Farther south we have Malacca, in former times one of the important transit trade places to the East, but already before the first world war only outlet for its immediate hinterland, and today by far surpassed by Singapore and Penang. On the extreme end of the Malay Peninsula, at the end of the Street of Malacca and also on the border between Indian and Pacific Ocean we have the large port of Singapore.



Sumatra and Java, the two large islands of Indonesia continue the eastern border of the Indian Ocean. Because of their intermediate position between the Indian Ocean and the East Asian Seas they are of high strategic importance. For, as already stated above, the Street of Malacca between the northeast coast of Sumatra and Malaya is now the main entrance route to the Pacific and between Sumatra and Java there is The Sunda-Street, very important in former times. In addition Indonesia serves as connecting link between South Asia and Australia. Traffic and trade of Java are mainly concentrated on the northern - that means Pacific - side of the island, since on this side the other great islands of Indonesia are situated, with which there is an extensive trade. Beside there the natural harbor conditions are more favorable than on the steep coast on the south. Therefore most of the ports of Java are on the northern coast. On the Indian Ocean, only Tjiletiap - which is the best natural harbor of Java - is of some importance, its disadvantage being the situation on an almost trafficless shore. Tandjok Priek, the port of Batavia belongs already to the Pacific and has not to be treated in this connection.

The good natural harbors of Sumatra, however, are situated to the greater part on the Indian Ocean; and this, in spite of the fact that the south-west coast is steep and rich of breakers and reefs. But here the hinterland is most developed and it is the part with the highest density of population. They are the good natural harbors

of Emmahaven near Padang in the centre of the south-west coast; Sabang on Palo Weh on the northwestern end of Sumatra, important because of its situation; Talok Belong on the southeast end of the island is rather unimportant, also Bencoolen; on the east coast we have the rather young port of Belawan Deli on the Street of Malacca, and therefore still belonging to the Indian Ocean.

Rangoon:

Rangoon was in 1852 at the English occupation an unimportant fisher-village. The port was established in 1853, and since that date the growth of Burma's external trade has been phenomenal. There was a slight decrease during 1939-40 in the number of ships entering the port, but there has actually been an increase in the value of trade. In 1879 the limits of the port were defined and control was placed in the hands of Port Commissioners. Since the British occupation of Lower Burma Rangoon has handled between 80 and 90% of Burma's maritime trade and is therefore largely responsible for the commercial development of the country. It has restricted entreport characteristics, a good deal of its activity being a transshipment trade with the minor Burma ports.

A chain of wharves with modern loading and unloading equipment has been constructed to accommodate fairly large ocean vessels, and there are smaller wharves and jetties for the use of the Irrawady Flottilla steamers

The Main Export Goods of Rangoon.

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for 1925-26

1 R ----- 1 s, 6 d

Merchandise	to Mill. of Rs.
Grain , pulse , and flour (mainly rice)	28.1
Cotton and cotton goods	3.6
Ores and metals	3.0

Source: Anstey V.  
The Trade of the Indian Ocean  
Longmans 1929  
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Shipping entering the port of  
RANGOON .

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Year	Vessels	Net tons in 1,000
1860-61	438	157
1880-81	874	598
1900-01	1,304	1,575
1920-21	1,701	2,801
1938-39	1,568	4,311
1939-40	1,573	4,237

Source: Spate and Trueblood  
Rangoon: A Study in Urban Geography  
Geographical Review, Jan. 1942  
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The principal export goods of  
RANGOON.

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( in 1000 tons )

Year	Rice	Mineral Oil	Timber	Bran	Minerals
1932-33	1.924	736	113	175	133
1933-34	2.309	726	129	192	164
1934-35	2.637	787	166	223	167
1935-36	2.179	797	206	215	173
1936-37	2.031	849	217	222	175
1937-38	2.096	840	209	270	172

Source: Spate and Trueblood:  
Rangoon: A Study in Urban Geography  
Geographical Review, Jan. 1942  
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(Rangoon is situated on the east side of the Irrawady Delta, 24 miles from the sea), country boats, and the like. Because of the vagaries of the Rangoon River, it has been necessary to build two training walls to maintain the channel. The construction of the first, near Seikgyi where the river was cutting its right bank in the bend at the southwest corner of the city, was a difficult engineering fact. The wall had to be built in a swift current of water ranging in depth from ten to seventy feet in an open tide way, on a bed of shifting sandy silt. The second training wall, at King's Bank, keeps open the channels at the confluence of Rangoon River with two smaller creeks. In addition, large modern dredgers are used to maintain the present deep water channels. Experiments with a large scale tidal model indicate that the port will always be accessible for ships of not more than 28 feet draft.

Although Rangoon lies off the main east-west ocean trade routes, it seems likely that it will continue to handle most of the maritime trade of Burma, and also - not taken into consideration the political situation at the present time - an increasingly large trade through the "back door" into China. Although its hinterland is not comparable with those of Bombay and Calcutta, Rangoon was the fourth port of the Indian Empire (after Bombay, Calcutta, and Karachi) and still ranks as one of the greatest immigrant and emigrant ports of the world. Development indeed

is somewhat limited by the fact that Burma has no rail connection with any of its neighbors (though Rangoon has excellent ones with its own hinterland of Burma) and good road connection with China only, to some extent also Rangoon is in a steamer backwater and thus can never hope to rival such ports as Singapore and Colombo, situated at great ocean crossways.

The most important exports from Rangoon are rice and rice products, and oil and teak, large proportions of which go to India. Oil and teak exports are practically constant, but rice exports show a rather strong seasonal activity, most of the crop being shipped during the first half of the year, even though today considerable quantities of paddy are stored to await a possible rise in price toward August and September. Other export goods are hides and skins, cotton, ivory, wax, rubber, grains, potatoes and ores. Imports include all kinds of manufactured foods from Europe, America, India, Japan and China (???)

Penang: (Georgetown)

Penang, an island with various anchoring places has become at the beginning of the 19th century at the cost of Malacca to the main port of the Malay Peninsula. But after the foundation of Singapore it had itself to give the leadership to that port and remained only of local

significance. Its second development then was connected with the economic display of the neighboring Malay States. Beside Penang is situated that near to the Street of Malacca that it became also important as a port-of-call, since in addition the capital Georgetown has a good sheltered harbor, and Penang has railroad connections with Kodah-Taiping, Bang-Nok and Singapore. Hence, the island is still one of the main ports of South Eastern Asia, its importance laying in the fact that it is the chief trade part of its Malay hinterland. In Penang itself we find large melting plants for tin brought from Malaya, and an extensive chemical industry. So, the port is also an industrial centre, which is also a stimulus for the oversea trade. The main export goods of Penang are tin and para rubber, and beside some pepper, copra, spices, coffee, hides and tobacco. It imports piecegoods, iron, and machinery.

Port Swettenham:

It is situated on the mouth of the Clang River and owes its existence and development in the first place to the extension of rubber plantages in Malaya, which made it desirable to create an own and direct connection with Europe and to avoid the shipment over the large port of Malaya. A number of landing places for smaller vessels were established and the already soon considerable high cargoes of rubber and beside also tin

and copra were brought by lighters to the ocean vessels. Some trade of Sumatra goes also via Port Swettenham. But it could not gain any advantage from the traffic through the Street of Malacca, since of course Singapore is the much more favorable situated port-of-call. The exports consist in rubber, tin, copra and bananas, the imports in general merchandise, iron and ironware and rice.

Singapore:

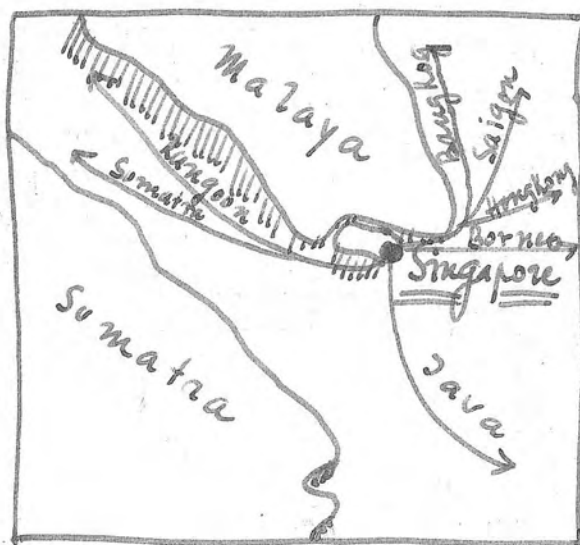
The island of Singapore is about twenty miles long and four miles wide, and may be compared in area with the Isle of Man. It is separated from the southern extremity of the Malay Peninsula by a strait about three-quarters of a mile in width, across which a causeway for road and rail has been built. The port of Singapore, at the southern extremity of the mainland of Asia, dominates the great highway of commerce between the Indian and Pacific Ocean. Its commercial interests are far more extensive, for it is one of the world's entreports and commercial marts for the products of Europe, Africa, Australia, the Far East, and the western coasts of the Americas. The growth of the entreentrepot trade of Singapore is due to its establishment as a free port by Sir Stamford Raffles in 1819. Within a few years it attracted a considerable junk trade with China and nearby countries though this was somewhat harassed in early days



by Malay piratical practices. The growth of port facilities began with the conversion of a mangrove swamp into a port in 1905.

Singapore is an assemblage port for the products of Malaya, Siam, Sarawak, British North Borneo, and the greater part of Indonesia; and a market centre from which the manufactured goods of more distant countries are distributed to those regions. The functions as the chief port of Malaya and the transshipment centre of the Archipelago have allowed Singapore to acquire a world monopoly in two staples of commerce, tin and rubber.

From the Straits of Malacca vessels pass the islands of Blakang Mati and Pulo Brani, and reach the port of Singapore via Keppel Harbor. The Inner Harbor is protected from the north-east monsoon by a mole of granite rubble about one mile in length. Many vessels discharge and load cargo in the Inner and Outer Harbor by means of lighters. The majority of ocean vessels are berthed at the wharves of the Singapore Harbor Board, which exceed 13,000 feet in length. Steamers of 42,000 tons can approach the wharves at all stages of the tide. About 260,000 tons of cargo can be stored in godowns, which are linked with railways. Large quantities of coal are stored. Commerce is attracted to Singapore not only by its existence as a free port but by the exceptionally low charges of the Board, which offers free storage facilities for transshipment goods over extensive periods.



The strategic position of  
Singapore.

Source: Stamp, L.D. : Asia  
A regional and economic Geography  
New York 1938  
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The Direction of the Trade of Singapore

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The proportions are percentages of the total imports.

Country	Singapore exports	Singapore imports
U. K.	6	12
British Empire	18	15
Europe	7	4
U. S.	34	1.5
Japan	9	8
Netherland Indies	9	36
Total	96 ( \$ 41 Mill.)	100 ( \$ 43 Mill.)

Source: Dobby, E.H.G.: Singapore : Town and Country  
Geographical Review, 1940  
Page 108.

It says: The movements in trade for the last entire year available, but does not state what year that is.

Many changes which have occurred during the last century have led to inquiries about the maintenance of the entrepot trade of Singapore. These changes include the development of nearby countries which have attained a high degree of self sufficiency, and have constructed ports suitable for ocean vessels; the extension of direct lines of ocean transport between these countries and the markets for their products; the growth of trading facilities such as through bills of lading, credit associations, and cable communications; and the industrialization of Japan, India, and China. In general the trade of Singapore has shown an increasing concentration on Indonesia, especially on the island of Sumatra.

Statistics of the trade of Singapore do not indicate its full volume, as goods on through bills of lading are unrecorded and it is impossible to distinguish exports from re-exports in the official returns. Its main export products are rubber, tin, pepper, pineapples, copra, sage, palm oil, hides, coffee and timber, while its imports consists in the general merchandise of textiles, machinery, cigarettes and other goods from industrialized countries.

#### Belawan Deli:

When in the last decades of the 19th century the north-eastern part of Sumatra began to develop on a scale like no other province of the island, this development resulting from an enormous extension of the agricultural

estates (tobacco, rubber, tin), could not fail to have great influence on Belawan Deli the chief harbor of that area situated on the west side of the small island of that name, which is bounded on this side and the north by the deep Belawan River and on the east by the shallow and much sand carrying Deli River. Here in 1890 a harbor establishment was started which put an end to the method of loading and unloading with lighter transport between the shore and the vessels anchored on the Belawan River. But still at the beginning of the first World War it was rather insignificant, but in 1925 it ranked already on the first place among the ports of Sumatra. And now the great extension of its harbor facilities were made, since the immensely increasing trade of Sumatra needed a good sea-port. Today, Belawan is equipped for large ocean steamers. It is connected with Medan, the main city of this area, by a railway line, and can be counted to the good ports on the Indian Ocean; its importance will probably still increase, as the development of Sumatra continues. Its increase in traffic goes primarily at the cost of Malaya, since many oversea vessels call Belawan now directly and this port does not have to transship its goods to the great ports of Malaya any more.

Its main export products coming from the hinterland of Sumatra, are tobacco, rubber, and tea, and beside coffee, copra, and palm-oil, while rice, flour, machinery,

ironware, cement and petroleum are imported. The port is now after the Japanese occupation in a transit stadium.

Sabang:

This harbor falls somehow outside the range of others. It is situated on the island of Poloe Weh about thirty miles north of Kota Radja and was built in 1887 by the firm De Lange of Batavia, supported by the Netherland Trading Company after the latter had obtained a concession to establish a coaling station on the bay of the above mentioned name. The exceptionally favorable situation Sabang with regard to world trade, close to the entrance of the Street of Molecca, was a favorable factor for the purpose of a coaling station and a place for trans-shipment. That part of Sabang Bay where the harborworks are built is sheltered against heavy breakers and dangerous winds by mountains and higher stretches of coast. Dams and breakwaters are therefore unnecessary.

Sabang is a free port and a port-of-call for numerous ships going to the East and therefore coal is prevailing in its trade. In spite of its favorable situation Sabang did not fulfil the expectations to become a serious competitor for the British coaling stations Penang and Singapore in Malaya. It did not succeed because those have an equally favorable situation and beside and in addition a rich hinterland, which lacks Sabang almost completely, since the consumption and production of the



island on which it is situated is almost nothing. Hence the trade of this free port - except in coal and oil - is very small and the trade of the neighboring Malay Peninsula goes almost completely through its own great ports.

Today Sabang suffers from destructions through the last war and though its reconstruction takes place it still has only very restricted bunkering possibilities and only smaller repairs can be done.

Padang: (Emmahaven)

Padang is the principle harbor of the entire westerly coast of Sumatra. The main purpose of its construction during the 1880ies was to create an opportunity for the shipping of Omibilin coal. Troesang Bay, situated farther south, also offered a good location for this purpose. The nearness of the flourishing town of Padang, however, gave Queens Bay the preference. Therefore, Emmahaven looks like a typical coal and bunkering station. But coal does not serve here as bunkering material - Emmahaven is not that favorably situated with respect to the great trade and traffic routes - but is exported. Apart from the coal industry, this port is important as an import and export harbor, so far almost alone for the region directly back of the west coast of Sumatra, which is, however, economically still rather underdeveloped. Beside, the small native craft navigation

between the island and the coast places to the north and south, call at Padang, where the commercial houses are established. Exported beside coal are especially coffee and then hides, rubber, tobacco, copra and cement. The imports consist in iron, piece goods, flour, rice and salt.

Tilatjap:

This harbor is the most favored by nature of all the harbors of Java. It is situated on a peninsula, bounded on the east side by the Indian Ocean and on the west side by the Donan River. The mouth of this river, to which a passage gives entrance of such natural depth that ships of 21 feet draught can enter at all times and those of 24 feet draught at ordinary high tide, affords an absolutely safe anchorage, protected by the heave of the Indian Ocean by the island Noesoe Kembraugen which lies opposite. In spite of all these favorable circumstances, and though its hinterland is also not without importance, the harbor, because of its more isolated location on the south coast of Java, outside the ordinary shipping routes, has not been able to develop to the extent of the ports situated on the north coast.

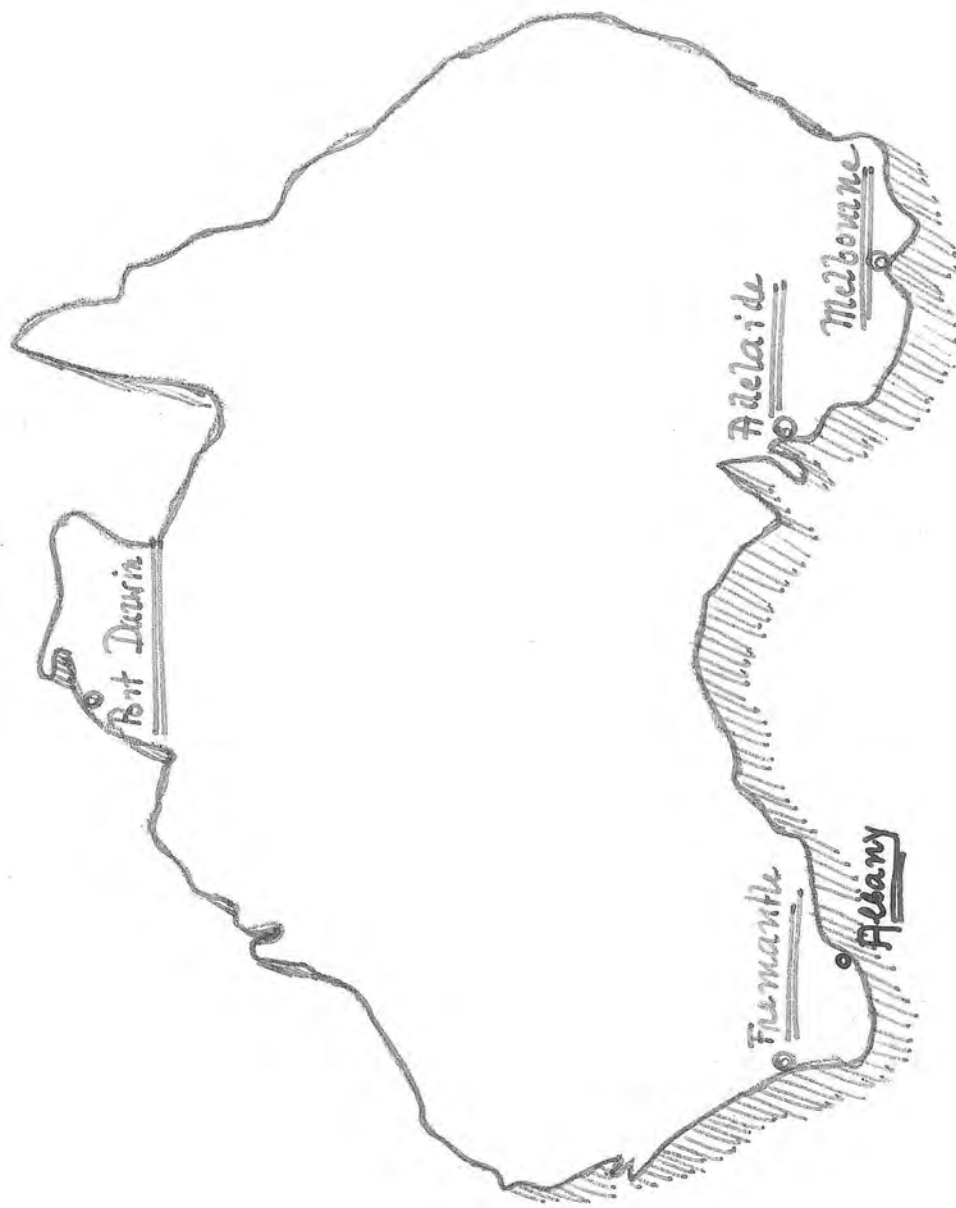
## CHAPTER V

### THE MAIN PORTS IN AUSTRALIA

As a final link in the East, Australia borders with the Indian Ocean. To the south the Ocean opens to the Southern Polar Sea, which forms, because of its conditions of climate and the absence of almost any navigation, a border towards the Indian Ocean. Hence, the huge island of Australia, in its lonely situation in the southern hemisphere and bordered by an almost trafficless ocean has from the beginning a disadvantage with respect to trade, traffic and navigation. Beside the development of its ports has been checked by the form of the coasts. Australia's coast has the same character as that of the other southern continents, Africa and South America: projecting towards the west and narrowing towards the South, Australia - as the other southern continents - is a compact mass with mostly uniform coast-line and lack of larger coastal islands. We have very few peninsulas and also very seldom large bays. But just here the coastal form is of special significance, since Australia as an

island can only be reached by water (except by air).

The coast of Australia on the Indian Ocean is in general sandy and flat; it begins in the north with Port Darwin and the Cambridge Gulf and reaches as far as the Bass Strait (Cape Wilson) in the south-east. The north-west coast is comparatively steep and we have here numerous peninsulas and bays, which made possible the establishment of various, though mostly unimportant ports, the best of which by nature is Port Darwin. On the other hand, the west coast is extremely sandy and flat, and has therefore, though, at least in the northern part, there are quite a number of bays, almost no ports. Only in the southern part we have steep coast with some good bays; on the northern border of this region is Fremantle the large harbor of Perth, the capital of Western Australia, and on the other end Albany on King George Sound. From here till the Spencer Gulf, the south coast is almost without any articulation and completely exposed to strong surf of the Indian Ocean and therefore without any ports to mention. It is not till we come to the large bay of Spencer Gulf that we find some smaller ports, the most important one of them is Port Pirie, with exports of ores. Then follows the Saint Vincent Gulf with the important port Adelaide. The most favored coast line of Australia begins with Cape Otway and ends high up on the eastern coast. Here are numerous good natural ports on the steep and high coast, and since the climate is here very temperate and qualified for Europeans and Americans, which promoted especially



Tonnage of vessels called at the main  
Ports of Australia

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in 1000 tons.

Port	1910	1923-24
Melbourne	5.314	6.918
Adelaide	2.867	4.193
Fremantle	1.980	2.708

Sources: Various



here the European settlement, the port development was stimulated. From the ports on the coast are only Melbourne and the small harbor Geelong, on the coast of the Indian Ocean, while the great ports of the east coast, like Sidney, Newcastle and Brisbane, are situated on the Pacific, as well as the only important port of Tasmania, Hobart.

Port Darwin:

This is the only port of some importance in the Australian frontier province of Northern Territory. Its trade is very small and restricted. Among the industries of the Northern Territory, pearling was carried on from Darwin before the last war, and the pearling beds were rich with very good quality pearl shell. Since Darwin was heavily bombed in 1942 by the Japanese, this industry was devastated, many of the pearl vessels being sunk or badly damaged and it will require a great deal of reconstruction and assistance both in equipment and divers before it can again be a tangible asset to Australia. Another thing is the export of buffalo hides.

Fremantle:

Fremantle is situated on the mouth of the Swan River and is since 1829 the port of Perth, ten miles east and capital of Western Australia. It is the first port reach-

ed by the European over-sea-lines and is also most favorably situated to the countries of Southern Asia. Its advantage is further, not the situation on the river, but the railway connection with Perth, which is starting point of the State Railway and the Australian Trans-Continental Railway. The port was established on the mouth of the river. At first trade and traffic increased very slowly because of the, though large, but under-developed hinterland, poor on inhabitants. But already at the end of the last century Fremantle became the most important export- and import port Both for the oversea- and the coastal trade of Western Australia. This was a consequence partly of the good railway connections and partly of the discovery of the extensive gold fields of Western Australia in 1887. Beside Fremantle became for numerous European passengers end- and starting point, since one could avoid the mostly stormy voyage to the Southeastern part of the country by using the good railroad connections. As a port of transshipment Fremantle is among all Australian ports on the Indian Ocean only exceeded by Melbourne and Adelaide. The principal export goods are wheat, wool, hides and skins, flour, fruit, timber, and gold. Imported are manufactured goods, ironware, machinery, textiles, fuel-oil, artificial manure, and general merchandise.

Albany:

Albany is also a port of Western Australia but on the south coast and situated disadvantageous in comparison with Fremantle. It was in former times first port of call of the steamers going to Australia, and was beside Fremantle of considerable importance. But since Fremantle because of its better railway connections is also called by the overseas mail-boats Albany can not compete with it any longer, though it has a better natural harbor. It is situated on King George Sound, a well-sheltered bay, where various harbor facilities have been constructed. Its main export goods are wool, hides and skins, wheat, flour, fruit, rubber and meat, while cement, iron and general merchandise are imported. The trade of Albany is very strong liable to fluctuations according to the varying harvests of the fertile agricultural areas of Western Australia.

Adelaide: (with Port Adelaide)

Adelaide is the capital of South Australia. It is the starting point of various railway lines, which make port and city to the centre of the dense populated south-eastern part of South Australia. But there are railroad lines also to Victoria and New South Wales, connecting the port with a wide hinterland. Beside, its situation in the eastern part of the so-called "large Australian Bay"

brings it in neighborhood to farther areas of the two South Australian states than the situation of Melbourne or Sydney, so that, since it is also reached by the ships from Europe earlier than those two other ports, it became important mail and passenger port for Australia. Adelaide is situated on the east side of the St. Vincent Gulf. Here among the various with the town by rail connected anchor places, especially the Inner Harbor, about seven miles up the river, is carefully and excellent equipped. According to its situation Adelaide became of course important in the first place by the trade of South Australia, most of the goods of this state go through this port. Even though South Australia did not take such a jumping development as Victoria, extensive agriculture and cattle breeding gave a continuity to the trade-development of the state which can be seen in the trade of its most important port. Adelaide is a great export port for wool and wheat, and beside gold, copper, flour, salt, hay, hides, fruit and others are exported, while the imported goods are coal, jute, oil, iron and steel and timber.

#### Melbourne:

Situated on the large bay of Port Phillip it is the most important trade port of Victoria and the largest port of Australia on the Indian Ocean. Melbourne has because of its close situation to the Bass Strait, through which the routes from Europe to the islands of the South Sea and the

Pacific coast of America are leading, a great advantage. After the discovery of the gold fields of Victoria in 1851, the then small settlement of Melbourne rose within ten years transitory to the biggest city of Australia. Its direct hinterland, the state Victoria, is the richest, from the economic point of view most important, and densest populated province of Australia. A whole net of railway lines start from this port, making so Melbourne to the Chicago of the continent of Australia. Therefore considerable port and harbor completions and extensions were done. Especially the two outer ports of Williamstown and Port Melbourne can be used now, because of deepening and quay-constructions, by ocean steamers. By all its extensive constructions of harbor facilities Melbourne succeeded to increase its significance, already given to it by its excellent natural position. Melbourne again is the great export trade for wool and beside butter, flour, grain, dry fruit and frozen meat are exported. The imported goods consist mainly in manufactured goods, - coal, timber, fuel oil, paper, iron, and steel.

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