



**Problem of Communications
in Sind
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THE PROBLEM
OF
COMMUNICATIONS IN SIND.

BY
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KARACHI

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Maps of Sind and of Greater Karachi showing Communications to accompany

THE PROBLEM OF COMMUNICATIONS IN SIND

By: Prof. M. B. Pithawalla, F. G. S.

INTRODUCTION

One of the potential problems of the geography of Sind is that of communications. No province in India, least of all, Sind, can thrive without the necessary lines of efficient intercourse within the region and with the neighbouring lands. The toy bullock carts, excavated from Mohenjo Daro, indicate that even the people of prehistoric times, living in Sind, knew the value of free communication and indigenous transport.

The various conquerors of Sind followed the course of the Indus river, prevailing in their days, and established their own routes throughout the districts. The Arabs crossed the Mihran by their special devices of boat-bridges, while the Imperial troops of the Moghuls chalked out their own trunk roads even through the desert, which were disused soon after their downfall.

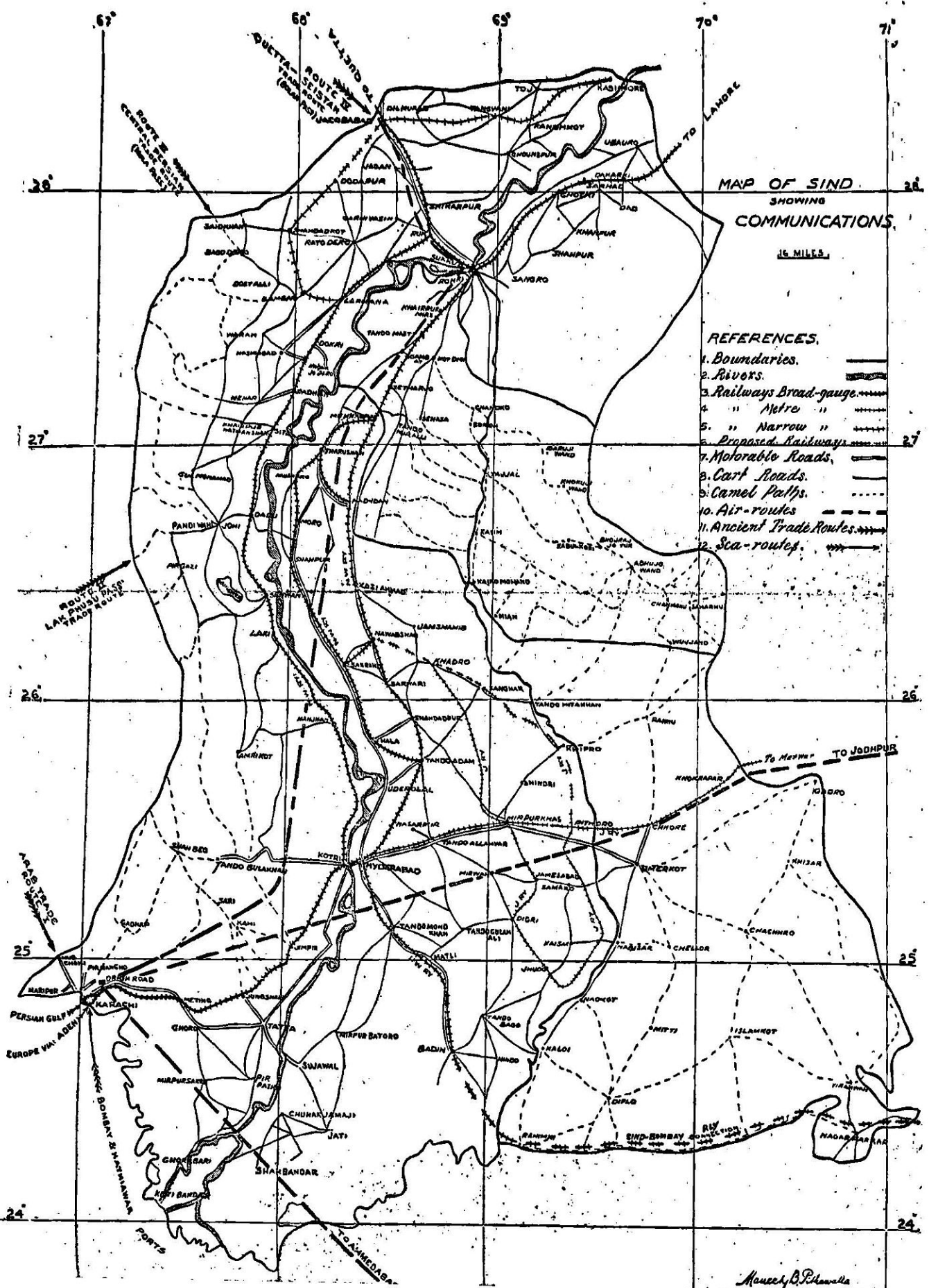
Even before the separation of Sind from the Bombay Presidency, the people clamoured for good roads and railways, the benefits of which were unfortunately denied to them for centuries. Year after year, the District Local Boards made pointed references to the quite inadequate means of transport in Sind, in their addresses to the Governors of the Presidency. There was not one single provincial road, worth the name, throughout the region from north to south.

But with the opening of the Barrage, the problem has become keener than ever before; and one way, in which the huge irrigation system can be made a success, is by improving the system of railways, water-ways, roads and camel paths, with which the province is not well equipped. For, even if the Barrage is an engineering as well as an agricultural success, and if the crops are doubled and trebled, economically Sind will not flourish unless the increased products are conveniently and rapidly transported to suitable markets outside its boundaries. In fact, new markets must be sought now and at once, in order to maintain this very rate of increase of the crops.

PHYSICAL CORRELATIONS

In connection with this problem, it is necessary to record some solid geographical facts, which must determine the nature and extent of all lines of communication.

The total area covered by the whole province is 46,400 square miles, out of which nearly half is waste and unculturable land, in Kohistan, the Delta and the Desert Sections, which may not need our immediate attention. The valley proper, to the extent of about 20,000 square miles, must be traversed well by any means. Again, the population of Sind is largely rural. There are very few towns, only about 30, but thousands of villages which serve the cultivated and irrigated areas and upon which the potential wealth of Sind crops depends. Sind, therefore, will not require great railways in the interior to link up any large cities or industrial towns but a network of good and durable roads, even *Kutch* or grass-covered roads, for which some districts are well-known. It has been estimated that 60 per cent of the agricultural produce in Sind can only be carried by camels, while bullocks are required for ploughing the fields. Besides, after the perennial system of irrigation has been



MAP OF SIND
SHOWING
COMMUNICATIONS.

16 MILES

REFERENCES.

- 1. Boundaries.
- 2. Rivers.
- 3. Railways Broad-gauge.
- 4. " " Metre "
- 5. " " Narrow "
- 6. Proposed Railways.
- 7. Motorable Roads.
- 8. Cart Roads.
- 9. Camel Paths.
- 10. Air-routes.
- 11. Ancient Trade Routes.
- 12. Sea-routes.

Manjee B. P. Khawaja

introduced, certain areas have got water-logged and Kalar soils are produced. What should be the best means of transport and what lines of communication will be required in various parts.—these are the questions to be solved first of all. In some parts of Sind, the difficulties of relief are great; there is no soil, nor vegetation, no water available for any kind of transport in Kohistan or the desert area.

In a country, which is spread over with a network of canals and water channels and which is now and again, visited by floods, bridges have to be built by hundreds and ferries are required for crossing and recrossing them.

The main artery of the region, the Indus, is an awkward river, rising irregularly twice a year, and continually changing its course from time to time. No stable engineering works can be built across it or in its neighbourhood without an elaborable system of river-training. The fall of the country being towards the south, the canals run mostly in the north-south direction and consequently the communication will always be controlled by these water courses. In the desert area, there are Dhands or salt lakes, and such parts are even below the sea level, so that the paths throughout cannot be continuous but broken and haphazard. *Sar* grass, suitable to cover earth roads, grows well in many parts of Sind.

The delta of the Indus, being low and marshy, there is no coastal road possible as in the case of Gujarat and Deccan. Here the traffic can only be by water, and cross channels are required to connect creeks and river branches.

At the same time, there are some favourable geographical circumstances, which are to be taken advantage of while establishing the required communications. The Indus valley is an aggraded one and nearly flat for the greater

part of its length. Both roads and railways are easy to make, there being no tunnelling or levelling of the ground required. Luckily the river is fixed at two points in its course through Sind, where it could be easily bridged, *viz.*, at Kotri and Sukkur-Bukkur, though at the latter place, on account of the gorge, only a cantilever bridge could be erected.

The rainfall, being scanty, there is no possibility of continuous wearing and no necessity of constant repairs of the roads on that account. But as the bed of the river is some feet higher than the surrounding country, there are chances of heavy floods and consequent destruction of the lines. These can be avoided by *Bunds* and loops.

Along the whole of the Khirthar on the west, the danger of hill torrents is considerable; not only roads and passage ways, but the fields are ruined at times, though it is possible to make a good use of the hill springs in making roads, after the floods have passed.

Limestones and sandstones from the rocks of Kohistan can be utilised as road metal. But it does not stand heavy rains or floods. The clayey condition of the former and the arenaceous state of the latter are ruinous. Fortunately, better kinds of road metal, *e.g.* quartz porphyry from the Jasai quarry very near the railway station along the Jodhpur Railway and Deccan trap in the Laki Range are also available.

Black Kalar soil, obtainable in some parts of the valley, forms a very good road surface

The Khirthar mountains are folded, and in some convenient parts there are good passes in these barriers. These have been utilised by man as trade routes in the past,

e. g. the Bolan pass for the Quetta-Seistan trade route, the Mula pass for the Central Persian trade route and Lak Phusi for the Makran-Baluchistan trade route. There is also a fourth passage-way across the Hab, called the Arab trade route. It is possible to utilise the same passes for renewed communications with the plateau of Iran even in these days. Some lines of camel paths are also possible through the fractured anticlinal valleys of Kohi- and the valleys of sandhills in the desert.

LINEs OF COMMUNICATION

Before the occupation of Sind by the British, there were practically no roads but only tracks and "mere banks of earth raised above the level of fields" etc. But now it is fairly connected with Makran, Baluchistan and Afghanistan on the west and all parts of India on the north, the east and the south.

(I) *Camel Paths*.—These camel paths exist in the Kohistan area, generally running east-west and communicating with the passes in the mountains. They lie roughly in the elongated valleys in the sedimentary rocks, which get weathered soon. In the Karachi district these paths converge towards Thano Bula Khan and proceed to Shah Beg, Amri Kot and, *via* other villages, to Sehvan. In Upper Sind, there are fewer paths and they are invariably destroyed by the hill torrents. These parts are inhabited by hungry hillsmen or dacoits who suddenly come down, rob the villagers of their goods and escape through the circuitous paths back into the mountains. There is, at present, no healthy intercourse between the adjoining territories, no regular caravans pass in and out at any time of the year. Even Alexander is supposed to have passed through one of these passes and Mahommed Kasim, another conqueror of

Sind, had entered the province similarly. It is greatly desirable that these camel paths and the old trade routes should be reopened, put in proper order again and systematic caravan services introduced.

In the Desert Section, there is another labyrinth of camel paths running in many directions. No roads are possible through the sand-hills, but as they strike N. E.-S. W. towards the south and almost N.-S. as we go to the higher latitudes, the paths get similarly oriented. Most of them cross at convenient points, such as Diplo, Islamkot, Chhachhro, Umerkot, Khisar, Gudro, Chhor, Ranhu, Samarhu, Adhujowand, Bhojraj-jo-Tur, Baruji Wand etc, and seek entrance into the neighbouring states of Rajputana (Jodhpur), Bahawalpur and Gujarat. There are no chances of improving the camel paths in this part of the Sind desert, except the Musafarkhanas at the various stages and a better supply of water.

The camel is the only 'ship' of this sea of sand. The journey is generally made in the night and some 120 miles are covered during the period of 10 to 12 hours. Drinking water is carried on camel back.

(2) *Water Ways*.—A separate paper has been already published by me on "*The Indus—its Navigability and Navigation*", to which the reader may refer, as regards the use of this water-way in the past. It is true that the Indus has not proved to be a very good navigable river, its vagaries being many. But it has afforded facilities for navigation, since the time of Darius the Great and upto the introduction of the N. W. Railway in 1858. The Indus Flotilla existed since 1835, plying between Kurrachee and Multan, and even as far as Lahore, through the Punjab rivers the native boats sailed successfully for many years. These

boats, made of native wood, were small and flat-bottomed. At times they were substituted by floats of reeds or grass and were used for carrying timber, fuel, hay and agricultural produce.

After the Barrage, the navigability of the Indus has been further reduced, there being practically very little water running below Sukkur and as far as Kotri during the winter season. But when the gates are fully opened during the rainy season, the intercourse is renewed for some months. Below Kotri and through the various mouths and channels of the Indus, native jetties ply.

Very little attention has been paid by Government to the improvement of the coastal traffic between Kutch, Kathiawar and Sind. Flat-bottomed boats can sail through, at least as far as Kotri and much stimulation can be given to the trade in rice, reeds, grass, fuel etc. within the Indus delta.

Ferries are used for crossing the river at convenient points in the whole course of the Indus even at present, but the service is not well organised.

The Eastern Nara, after the opening of the Barrage and owing to the new Nara cut through the old Aror gorge, is now a navigable river, but there is no systematic service as yet introduced for the thousands of villages to whom it would be a great relief. Forests exist on both sides of the Nara and a good trade can be established in their products. There is, however, a danger in the E. Nara due to the existence of numerous crocodiles,

During the monsoon season, even the Ghar and the Western Nara are navigable and boats ply on them.

But for some falls, *e.g.* Tando Musti Khan, in the course of the Rohri canal, which is no less than 208 miles long, good communication could have been organised on it.

The excellent geographical position of Karachi and the ever evolving state of the Keamari harbour have enabled Sind to take its place among the trading nations of the world, thanks to the zeal and foresight of the Port Trustees*. The fact that Karachi is actually nearer to Southampton by about 200 miles than Bombay should make it the first Indian harbour for all European trade. But still the P. & O. mail does not call at our port, and even the coastal service is not satisfactory. There is only one mail service during the week, while the B. S. N. Co's cheaper steamers are a boon to our people to some extent. Due to these restrictions and also the fact that for the whole monsoon season of 3 or 4 months the seas are high, the coastal traffic is more or less suspended. Thereby Karachi and Sind suffer a great loss. There must be some improvement made in these services by sea, so that the communication, not only with other Indian ports but also with foreign countries, may be regular, rapid and cheap for those, who cannot afford time and money for long and tedious journeys through the desert by railway. The seaborne trade could also be developed, if private companies are encouraged to join.

(3) *Railways*.—As stated above, it is easy to construct railways in a flat plain like ours, but the consideration with the railway authorities is only economical. A thinly populated province could only have a single main permanent way with a suitable structure of light feeder railways.

*For further particulars on the harbour, see my paper on "Greater Karachi", 1938.

Besides this, the maintenance of the lines is rather expensive owing to the river floods and frequent breaches of the river Bunds. Between Karachi and Kotri, for example, there are about 200 bridges under which the whole drainage of Kohistan is made to pass. The railway line on the right bank of the Indus is similarly dangerous due to the Chos or hill torrents from the Khirthar.

Owing to the difficulties of navigation in the delta country, the railway between Karachi and Kotri was laid as early as 1857*. Later on, in 1887 as the traffic increased and the line became a success, Sind was connected with the Punjab and Delhi legitimately and a vast hinter-land was opened out thereby. Still later, in 1896 due to frequent troubles from breaches, the Kotri—Rohri line, on the left bank, was constructed and the journey was also reduced by 38 miles. The Jodhpur-Bikaner Railway was opened in 1892. Thus, we have 1,191 miles of railways in Sind today as under:

330	miles	North Western	broad gauge	(double line)
502	Do.	do.	do.	(single line)
228	miles	Jodhpur	metre gauge.	
131	Do.		narrow gauge.	

1,191 Total mileage.

Of these, about 177 miles of railways run through the desert area, while a little over 1,000 miles through the culturable ones, embracing about 20,000 sq. miles. This gives a ratio of one mile of railway to every 20 sq. miles of the valley, which, in Mr. Stubbs' opinion, "is adequately

*Andrews N. P.—"The Indus and its Provinces" London 1857
Pp 94-95.

served by railways."† Within the Barrage area itself the proportion is still more increased to 1·15, thus showing that "provision of railways has been on an even more generous scale."

However, as the Barrage lands are utilised more and more, and difficulties of transporting crops to the nearest railway stations are keenly felt by the people, who also mean to develop some industries, various proposals have been made, for the improvement and extension of the railways, at least in the *more fertile parts* of the valley. These are located in two Districts especially, *viz.* the areas watered by the Khirthar, Shahdadkot, Warah and the Rice canals in the north western corner of Sind and those watered by the Rohri, the Jamrao, and the E. Nara and their branches in Middle Sind. The increase of crops of cotton, wheat and rice, produced in these parts, cannot be dealt with without a suitable circuit of even light feeders. Two projects have, however, been sanctioned, (1) conversion of two-thirds of the present metre-gauge from Larkana to Shahdadkot into the broad gauge and continuation of the existing line, *via* Dodapur to Jacobabad, a distance of 83·90 miles, and (2) building of a metre gauge line (30 miles), connecting Khadro, on the Jodhpur Railway, with Nawabshah. A large sugarcane factory at Khadro will also be adequately served by this extension of the metre gauge and the desirable circuit round Mirpurkhas, Digri Pithoro and Khipro will be completed in the Eastern Valley Section, in course of time. The conditions of the soil in these areas are such that no roads can be constructed as alternatives to the railway projects.

We have, therefore, no complaints to make so far as these areas are concerned.

†Stubbs S. G.—"Report on Road Development in Sind", Delhi, 1934 P. 114.

Sind-Bombay Railway Project

But the bone of contention between the people and the Government is the project of constructing a direct Sind-Bombay railway.

Here the Stubbs Report does not come to our rescue. A broadminded policy of providing our province with greater facilities of communication with Rajputana, Malwa, Cutch, Kathiawar and Gujarat, another vast hinterland for the port of Karachi, is needed. It is not only that we want to export our Sind cotton, the best so far produced in India, to Ahmedabad, but also wheat and rice to the comparatively barren tracts, which a direct line from Hyderabad to Ahmedabad, may cover. Ahmedabad in return, would be able to supply textile and other materials to the hitherto neglected parts of Sind. There is also an inexhaustible store of salt deposits in Lower Sind* to be disposed of, the beds of common salt, Khari Chaniho etc., lying unused or sold cheaply to local merchants. For nearly four months, due to the stormy seas during the monsoon season, travelling by steamers is difficult, nay frequently impossible, even for the well-to-do, while the long and tedious three-day journey by the Jodhpur Railway, *via* Luni and Marwar through the desert, is hated by the poorest peasant, who, however must travel on business. So it is futile to say off-hand: "There does not appear to be any great need for the Bombay-Sind connection". (K. G. Mitchell)†

This question of constructing the direct line has been pending for long. In reply to a question put in the Legislative Assembly by the Hon. Mr. Lalchand Navalrai, Mr. P. R. Rau, Finance Commissioner, Railways, said in February

*See my "A Geographical Analysis of the Lower Indus Basin (Sind) Part I Pp. 313-316.

†Stubbs *op. cit* P. VII.

1935: "The first reconnaissance was made in 1879 and various investigations have been made thereafter. Till 1924 it was considered unlikely to be remunerative but the anticipated development of the country by the Sukkur Barrage led the Railway Board to undertake further investigations in 1927 and thereafter Government are unable to say when a final decision will be reached. The proposed connection is not considered as an essential factor for the disposal of the increased volume of agricultural produce, which may result as a result of the Sukkur Barrage Scheme." Report after report and discussion after discussion have been made on the proposed connection but as yet no decision has been arrived at, as obstructions are put by interested parties. If the risk of building a barrage at a cost of 23 crores of rupees has been taken by the Central Government, they may as well help the province to liquidate this debt by various means possible. Among them, communications should be of the first importance.

There are several important issues in connection with this project: (a) a broad or metre gauge railway connecting Ahmedabad, (b) supply of water through the desert tract, (c) competition with the Jodhpur Railway, the Steamer Companies or road-motor traffic. (a) Looking to the conditions which are likely to prevail in Sind in the immediate future and also the costs (three crores of rupees more would have to be spent on a board-gauge way), I venture to suggest that a *metre-gauge* railway connecting Hyderabad, Badin, Nagar Parkar Suigam, and Mehsana (on the Rajputana-Malwa Railway), or Viramgam on the Bombay, Baroda and Central India Railway, should be constructed without delay. This would complete another suitable *circuit* for Middle and Lower Sind, and transshipment would be easy on the other feeder railways through Hyderabad. The total mileage from

Hyderabad to Viramgam would be about 350 miles and the cost about 3 crores of rupees. This is worth doing, as Sind would then be brought into its proper relation with the neighbouring parts of India and the journey would be quicker and more profitable to all. (b) As regards the supply of fresh water, which would no doubt be deficient, a suggestion can be made to have oil engines between Badin and Nagar Parkar, as the train skirts the northern boundary of the Rann of Cutch. Otherwise a system of tube-wells may be tried. The average rainfall on the Nagar Parkar hills is nearly 15 inches, that is double that at Badin or Hyderabad. There are some chances of getting a subterranean supply of water in this area. (c) There is no question of road-motor competition here; nor is there any real danger of competition with the Jodhpur Railway. Sind's connection with many other parts of Rajputana and the Capital City of Delhi will be continued. Just as traffic is likely to increase in the south, greater prosperity in Sind proper, the Khairpur State and the district of Sukkur should mean more income for any railway that is near by. Lastly, as Bombay was Sind's foster-mother for nearly a century, it is hoped that she will co-operate and ask for the extension of the railway through her territory.

The only possibility of competition is between steamships and the Sind-Bombay Railway and that too for about half the year. But this should not be the reason why an easier and cheaper connection should not be given to Sind at this stage of its development. At present a journey from Karachi to Bombay by a mail train takes nearly 44 hours but by a mail steamer only 36 hours. A direct train route would reduce it to 30 hours.

Suburban Railway

One more side of the communications by rail in Sind also needs development and that is in connection with the

growth of Karachi. In my scheme of Satellite Towns of Greater Karachi, the need of an efficient system of suburban railway has been pointed out. At present, there is practically nothing of regular and frequent local train service between Karachi and its suburbs; nor are there any regular and cheap bus services existing.

No other place in Sind needs a suburban railway.

(4) *Roads*—But the greatest development in the lines of communication in Sind should be in roads. In fact, it is *the most convenient* and the cheapest way in which agricultural produce can be conveyed to markets or to the nearest railway stations.

I have already referred to the non-existence of any roads worth the name in Sind, before the British conquest. Sir Bartle Frere, who may be said to be the first to propose a programme of road making in Sind, remarked in 1851 that there was "not a mile of bridged or of metalled road, not a masonry bridge of any kind, in fact, not five miles of any cleared road"*

Old Roads

Some roads then came into being in Sind, so that till recently it had the following main lines of communication in the different districts with suitable stages or halting places and water supply:—

District.	Main road.		Stages in the District.	
Karachi	... To Sehvan	9
	To Lakhpat <i>via</i> Tatta		...	11
	Kotri to Lakhi	6

*Aitken E. H.—"Gazetteer of the Province of Sind", 1907. P. 341.

†Smyth J. W.—"Gazetteer of the Province of Sind" B. Vols. I to VII.

District.		Main road		Stages in the District.
Hyderabad	...	To Rohri	...	4
		To Umarnkot	...	2
		To Rahim-ki-Bazar	...	6
Sukkur	...	To the northern frontier (for Multan) on the left bank of the Indus	...	9
		To the northern frontier (for Multan) on the right bank of the Indus	...	10
		To Jacobabad	...	3
Larkana	...	To Lakhi <i>via</i> . Sehvan	...	8
Nawabshah	...	To Hyderabad and Rohri	...	9
Thar Parkar	...	To Nagar Parkar and Umarnkot <i>via</i> . Mithi	...	9
		To Nagar Parkar and Umarnkot <i>via</i> . Chhachhro	...	7
		To Umarnkot and Sanghar	...	4
		To Umarnkot and Sufi-jo-goth	...	3
		To Umarnkot and Hyderabad <i>via</i> . Mirpurkhas	...	4
Upper Sind Frontier.		To Jacobabad and Kashmor	...	7

As remarked above, the conditions in Sind are generally favourable to road making. Even the Report, made by Mr. Stubbs, shows the extreme necessity of making new and suit-

able roads and of improving the old ones already existing. He says—"It we judge from the experience of other undeveloped agricultural countries in the world, it may take generations before Sind can reap the fullest benefit from this magnificent (Barrage) Scheme, perhaps the finest of its kind ever built, if early steps are not taken to improve communication."

He recognised the existence of 9,930 miles of roads, only 134 miles of which having been metalled, and some 9,732 being Kacha roads. He recommended the metalling of 585 miles of roads (as feeders to railways) and 9,631 miles more, for all purposes, to be repaired with brick payment, Kalar soil, clay or Sar grass, at a cost of Rs. 77.6 lakhs in the first five years and Rs. 20 lakhs in the second five.

Problems of Road Making

Such an elaborate programme is also beset with inherent difficulties. The roads are mostly in charge of various public bodies (17 Municipalities, 8 District Local Boards and 61 Taluka Boards) with no great central control; half of the province is desert land; the railway lines have already occupied the main length of the valley and there can be no rail-and-road competition allowed; many roads lie below the level of the surrounding fields and get flooded frequently, bullock carts have to be small, and only hired camel transport is possible in the majority of cases. The cultivator is usually poor, his annual income being Rs. 13 per annum.

There are other problems of road-making also for the authorities to consider :

(a) The distances to cover important centres are vast; according to Mr. Stubbs, there are some 37 ginning factories, 11 cotton presses, and 265 rice husking centres in Sind, which have to be approached any how.

(b) The roads pass through clay belts and sand belts, hopelessly entwined, and the soils vary in chemical contents in all localities, *e.g.* black Kalar soil, though good for road making, gets slippery when wet, while light brown Kalar soil is satisfactory only when wet but gets cut up when dry. Similarly, efflorescent Kalar soil is bad with loose top and needs stabilising. Even the proportion of clay and sand varies in the soils of Sind. Those having less than 75 % clay being considered to be third class and quite unsuitable, unless moistened.

(c) There is deficiency in humidity in the air for the greater part of the year and consequently the roads get dried up and cut up under heavy traffic, especially in Upper Sind.

(d) Really good road metal is not near at hand but to be conveyed by rail for long distances and transhipped at Hyderabad.

(e) The finances of Sind are usually bad. Its share of the Petrol Tax is only 1½ lakhs of rupees, while the contribution of the Local Authorities and the District Local Boards by registration etc. is only about 2 lakhs. Mr. Stubbs recommended the raising of a loan of Rs. 68.71 lakhs in addition to the amount available from the provincial revenues but it has not yet been done.

A smaller and more modest proposal was required to be made in the beginning and, therefore, Government appointed Mr H. B. Parikh, I.S.E. as Special Road Engineer for the

purpose. Mr Parikh had already made a scheme to construct 581 miles of trunk roads and 808 miles of feeder roads at a cost of Rs. 3,20,00,000 in 1927.*

But in 1935-36 the estimates had to be reduced to Rs. 39.98 lakhs (since revised to Rs. 38.52 lakhs) only for improving 716 miles of roads as earth roads, 43 miles of metalled roads to be asphalted, 76 miles to be metalled and asphalted and 55 miles to be provided with brick paving, all to be completed in 5 years. Mr. Stubbs' proposals were improved upon by the District Conferences and the Advisory Communications Board, Sind, after duly considering the relative importance of the roads in various districts. A further programme of about Rs. 25 lakhs for the next five years is also under consideration.

The work of improving these lines of communication by roads has been going on as best as possible and it should be said to the credit of Mr. Parikh and his staff that side by side with the constructions, experimental research in road making in Sind is carried on by him with good results.†

Experiments on surface dressings with road tar, liquid asphalt, socofix, Shalimar tar, etc. have been already made and the best ways of making cheap and durable roads have been found. Black Kalar soil has proved to be a very suitable coating in many places, and so it is utilised. Further research is being made on the problem of stabilising the surface of Kucha roads.

* Parikh H. B. "Road Development in Sind" *The Young Engineer* Jan. 1939 Pp. 4-7.

† Parikh H. B. "Note on Experiments in Sind" *Indian Roads* No. XIII June 1938.

Where there is unsuitable Kalar soil, it is covered with an inch or two of Socofix. When moisture is required for the protection of the roads, it is supplied with hygroscopic salts, like CaCl_2 , NaCl and mollasses. Experiments on "ponding" roads, as a protection against floods, have also been made. Earth roads are invariably covered with Sar grass, which is grown on the road side, in the best possible manner. As regards metalled roads, for heavy traffic, quartz porphyry from the Jasai quarry and limestone from the Kathar quarry are used and the soling and coating are suitably made as an experiment on the Hyderabad—Badin road with good results. As there are now two cement factories, newly established in Sind, at Karachi and at Sukkur, concrete trackways, about 2 feet wide, are also tried in some localities, where the soil is good and the cost of road making is considerably reduced thereby.

Thus, all that is best and possible under the circumstances is being done by the Road Division of the P. W. D.

But, after all, this programme of road making is a very modest one for a backward province like Sind. Its present poverty lies in the fact that it was neglected in the past. The separation of Sind from Bombay has this great boon offered to its struggling Haris, that within a period of even five years, transport by bullock carts and camel carts to some extent is possible, whatever the difficulties and troubles may be. So Sind has yet to go a long way. Mr. Stubbs himself recognised in 1934 the existence of 9,930 miles of "roads", while the Mitchell-Kirkness report gave 12,600 miles as another figure! But of these so-called roads, only 198 of miles were metalled roads, including 40 miles of brick-paved roads! Even a hasty soil survey of 1,739 miles, made by the Consulting Engineer, showed only 167 miles having 1st class soil, 256 miles 2nd

class soil, 1,035 miles 3rd class soil, 8 miles *murum* and 255 miles *Kalar* (including 31 miles efflorescent)!! Mr. Parikh's first estimate of cost was nearly $3\frac{1}{4}$ crores of rupees for good trunk as well as feeder roads in Sind, but the Department has to content itself with only a few lakhs! There is no doubt that our resources are depleted. But funds or no funds, for the betterment of our province and for enabling it to repay its colossal debts, proper lines of communication must be provided within the Barrage area and without. Otherwise, there will be no enhanced value of crops and the Barrage will be a failure from this point of view at least.

Even in the whole of the Khairpur State with an of 6,050 square milet, there are only 800 miles of grass-covered earth roads and only 8 miles of metalled roads, though the Rabi crops are more than doubled!

Karachi Roads.

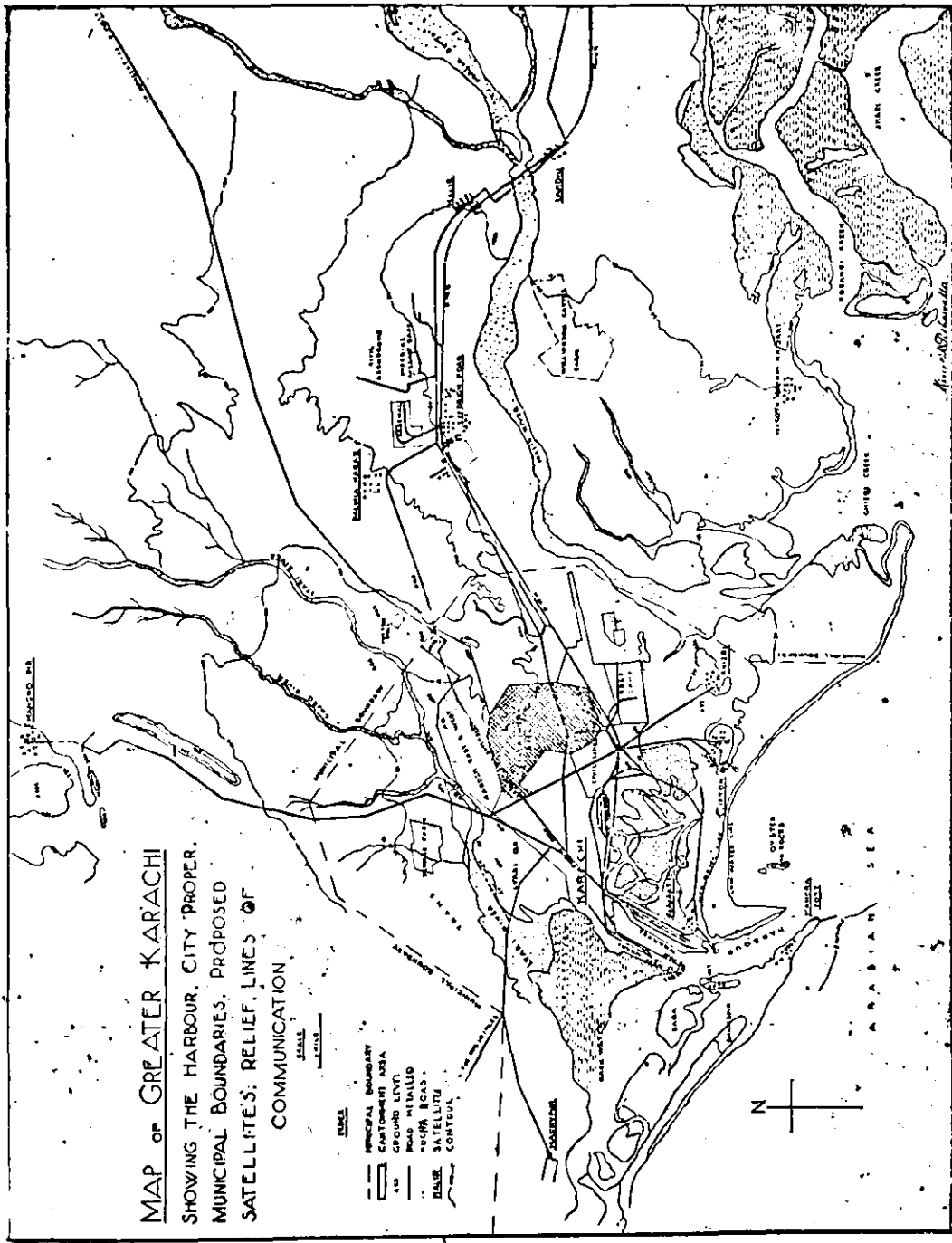
While on the subject of Sind roads, I may say that the city of Karachi is a proud possessor of wide, asphalted and clean roads including a 10-mile long thoroughfare, called the Bunder Road, and the dust nuisance is minimised greatly by the Municipality. What has not yet been to our satisfaction is the construction of proper footpaths every where. If there is anything most remarkable about our city, it is its vastness and yet on both sides of some otherwise excellent roads, cement footpaths are not provided and the traffic is not smooth and regulated. 'Safety First' has yet to be put in force, to keep pace with the latest and fastest models of motor cars, which are being continually imported. A more systematic programme of road engineering and traffic, with proper provision for pedestrians, must be prepared by the Municipality.

MAP OF GREATER KARACHI

SHOWING THE HARBOUR, CITY PROPER,
MUNICIPAL BOUNDARIES, PROPOSED
SATELLITES, RELIEF, LINES OF
COMMUNICATION

SCALE
1:50,000

- MUNICIPAL BOUNDARY
- CANTONMENT AREA
- GROUND LEVEL
- PROPOSED SATELLITES
- RELIEF
- LINES OF COMMUNICATION



Competitive Roads.

Taluka maps, which were not available before, are now issued, so that the information regarding the centres for collecting agricultural produce etc. will have a considerable bearing on the justifiable expenditure on roads apart from railways.

The roads in Sind will have no serious competition with railways especially in the following cases, in which the roads (largely unmetalled) and railways run nearly parallel and the mileage not long:

(i) Karachi-Hyderabad (130 miles).

This is not exactly along the N. W. Railway but is further away and connects out-of-the-way places. The want of a road bridge across the Malir river is more keenly felt now than ever before. The railway authorities should consider the advisability of helping the province by allowing their bridge also for road traffic.

(ii) Sukkur-Jacobabad (28 miles).

(iii) Hyderabad-Badin (60 miles).

(iv) Larkana-Kambar (15 miles).

(v) Hyderabad—Chhor (about 100 miles).

The road is nearly 18 miles south of the railway in some places.

The existing provincial roads to be metalled with bitumen on this account, are the Karachi-Tatta-Hyderabad-Sukkur road, the Sukkur-Jacobabad road, and the Hyderabad-Jamesabad-Chhor road.

1937-1941 Programme

Other roads, which are to be improved but which will not be competitive, are:

Jamesabad-Samaro. (Thar Parker)
 Tando Adam-Berani. (Nawabshah)
 Jhol-Sanghar. (Thar Pasker)
 Tharushah-Bhiria. (Nawabshah)
 Shahdadpur-Jhol. (Nawabshah)
 Sujawal-Mirpur Bathoro (Karachi)
 Bagarji-Chak. (Sukkur)
 Jungshahi-Baghar. Ferry (Karachi)
 Shikarpur-Ratodero. (Sukkur)
 Mirpurkhas-Khipro. (Thar Parkar)

Besides the above, there are 69 earth roads in all the eight districts (total mileage 889) to be made serviceable by 1941, and land acquisition for new roads is to be expedited.

Side by side with this road programme, a proposal has also been made for using canal roads under proper conditions, though they have been primarily built by the P. W. D. for inspection and rapid development of areas under the command of the Barrage canals.

(5) *Airways*.—But the greatest relief to the peoples of the province is bound to be derived from aviation. Already three aerial services, passenger and postal, are in existence in India, thanks to the establishment of India's first Air Port and Gateway at Drigh Road :

- (a) Imperial Airways and other foreign lines.
 Drigh Road-Jodhpur-Delhi-Allahabad-Calcutta (by Aeroplane, 14½ hours).
 Karachi-Rajsamand-Gwalior-Allahabad-Calcutta (by Sea Plane, 11 hours).

(b) South-India Service.

Drigh Road-Bhuj-Ahmedabad-Bombay ($6\frac{1}{2}$ hours).

(c) Punjab and Frontier Service.

Drigh Road-Jacobabad-Multan-Lahore ($5\frac{3}{4}$ hours).

These services are getting more and more regular and efficient, and Delhi, Bombay or Lahore could be reached in a few hours only. We can well hope for a time when the awful journey though the desert will be replaced by a soul-stirring, quick and beneficial aerial flight and the pangs and sufferings of the sick, the depressed and the fallen will also be relieved in times of need and scarcity.

Lastly, the need of establishing Cable and Radio Communications between Karachi and other foreign countries, eastern and western, is now keenly felt. A line of British Cables exists at present only between our port and the important ports in the Persian Gulf, *viz.* Bushire, Muscat, Basra and Fao.

CONCLUSION

The benefits of the British rule and the blessings of modern science must go hand in hand and the lot of the poor cultivators must improve. It is in their happiness that there is the happiness of the State. It is when the inapproachable parts of Sind are made easily approachable, when the transport of goods is made as rapid as the growth of crops and the present deficit province is helped to become really autonomous and self-supporting that the success of the present Government will be greatly achieved.

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