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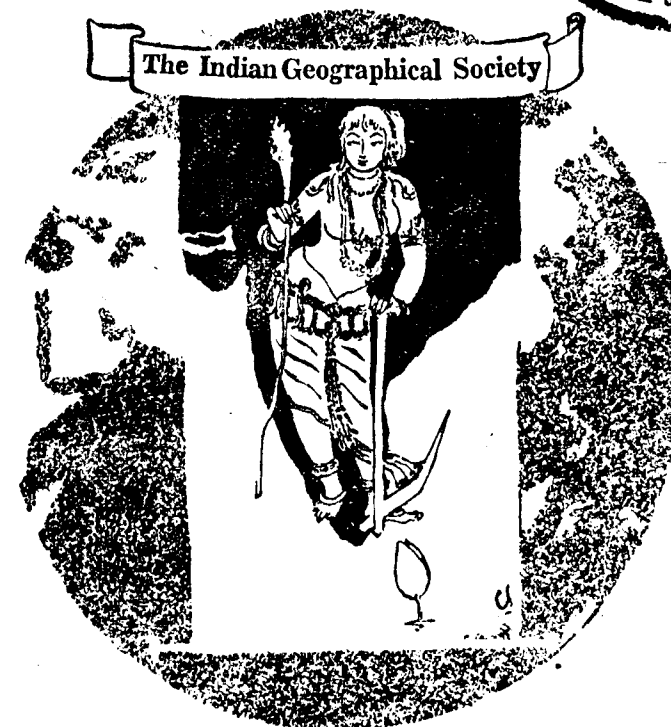
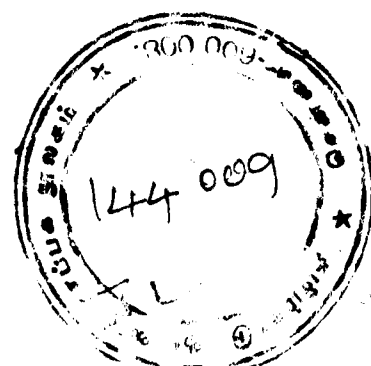
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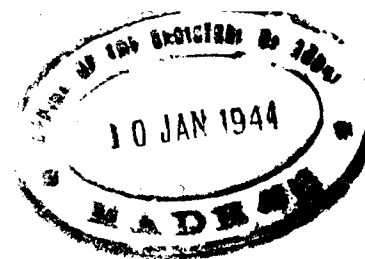
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The Editor takes no responsibility for the views expressed in the Journal. Authors alone are responsible for their respective statements.

EDITOR'S NOTE

In conformity with the paper control order, this number of the Journal had to be reduced so considerably. The Editor is however, happy to inform the subscribers that as a result of his persistent requests, the paper controller has permitted the future issues to be of 34 pages.

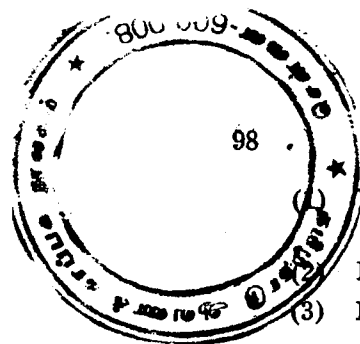
Politico-Regional Division of India

By

DR. KAZI SAIDUDDIN AHMAD

Abstracts from Prof. Coupland's scheme embodied in "the Future of India", were published in the *Dawn* of 1st November, '43. I had a similar scheme in my mind which I had discussed with persons of different views in and outside Aligarh. I held it up from the press till I could find time to put it in a more concrete form, supported by latest figures and maps. The publication of Prof. Coupland's scheme with almost the same regional terminology came as a surprise to me. The Muslim League Weekly, 'Manshoor', in its 2nd issue of Nov. '43 described it as a remarkable example of similar thinking.

An abstract of my scheme was published in the University Gazette of 1st December, '43. I also proposed four regional Republics.



- West India, or Indus Federation, or Sindustan, or Pakistan.
North India, or Gangetic Federation, or Hindustan.
(3) East India, or Delta Federation, or Bengassam or Bengalistan.
(4) South India, or Deccan Federation, or Dravidastan.

But while Prof. Coupland includes the native states in them I had in my mind one more regional unit of *Rajasthan* to incorporate most of the states of Rajputana, Kathiawar and West-Central India. Prof. Coupland thinks of confederation, my idea is of four sovereign states in British India with a statutory provision for an India Council for coordination, with several committees consisting of the representatives of the four sovereign states for discussing subjects of all India concern for common action which may be agreed upon. The India Council is to be maintained out of the contributions of the various states on the basis of a fixed percentage of revenue. All India defence is vested in an Indian Defence Committee. The Republics are free to maintain separate armies—the peace time strength of these armies may be limited by agreement. Native states shall share the defence of India. For purposes of defence Ceylon may be considered a part of India. The Republics have also the freedom in foreign relations. They can have separate representation or a common one through the foreign relations committee. Power of self-determination for each state provides the sanction for mutual understanding.

The scheme is within the frame work of the British Empire on the basis of the statute of Westminster, the Viceroy functioning as the link between the various Republics and Britain on the one hand, and the Republics and the Native states on the other. Right of self-determination is also conceded to the native states. They may continue their relations with the paramount power, or join the Republic in which they lie, or to which their territory is contiguous.

Redistribution of Provinces:—I was glad to learn that a few months later Soviet Russia also recognised the same principles for the constituent states and granted them similar sovereignty.

Each Republic would contain autonomous provinces. The present provinces are more or less arbitrary both in extent and boundaries. They generally represent the territories as they were conquered by the British irrespective of any regional, communal

and linguistic considerations. Within the same province there are found several religious groups and different ethnographic and linguistic blocks. Redistribution of the provinces, creation of new provinces and sub-provinces for the purpose of promoting the separate interests of various cultural groups is absolutely necessary. The provinces and sub-provinces should have as much local autonomy as possible.

India is a vast sub-continent with a great variety of language, race and culture. The population shows great complexity. No one factor mentioned above can alone be chosen as a satisfactory basis for political division. The complexity of the problem warrants a complex basis which makes an allowance for all the important factors. Besides communal and cultural, economic considerations also crop up. It may be unwise to detach one region from another on a communal or linguistic basis, if it has a community of interest with the other from which it is sought to be separated.

A scheme for the political division of India is given below. An attempt has been made to form political units and sub-units on politico-regional basis, keeping in view the homogeneity of the area and the people that inhabit a particular region, utilizing as far as possible present provincial boundaries. It is a suggestion which, if acceptable, can be worked out further with greater exactitude as regards the actual position of the boundary lines. The basis of division is four regional states mentioned above, to include regions of Hindus and Muslims majorities,¹ two each, and a fifth one—Rajasthan. The word majority used here implies not the absolute majority of a community but its being the largest single group.

Besides religion and community, language is an important index of ethnographic unity. Common language promotes common understanding and tends to smooth out social and communal differences. There is little of alien feeling amongst the people who speak the same language. Communal difference between the Hindus and Mohammedans in Northern India have aggravated, ever since there have been attempts to split the common vernacular and to drag it towards Bhasha and Sanskrit on the one hand and

1. Based on the Census of 1944.

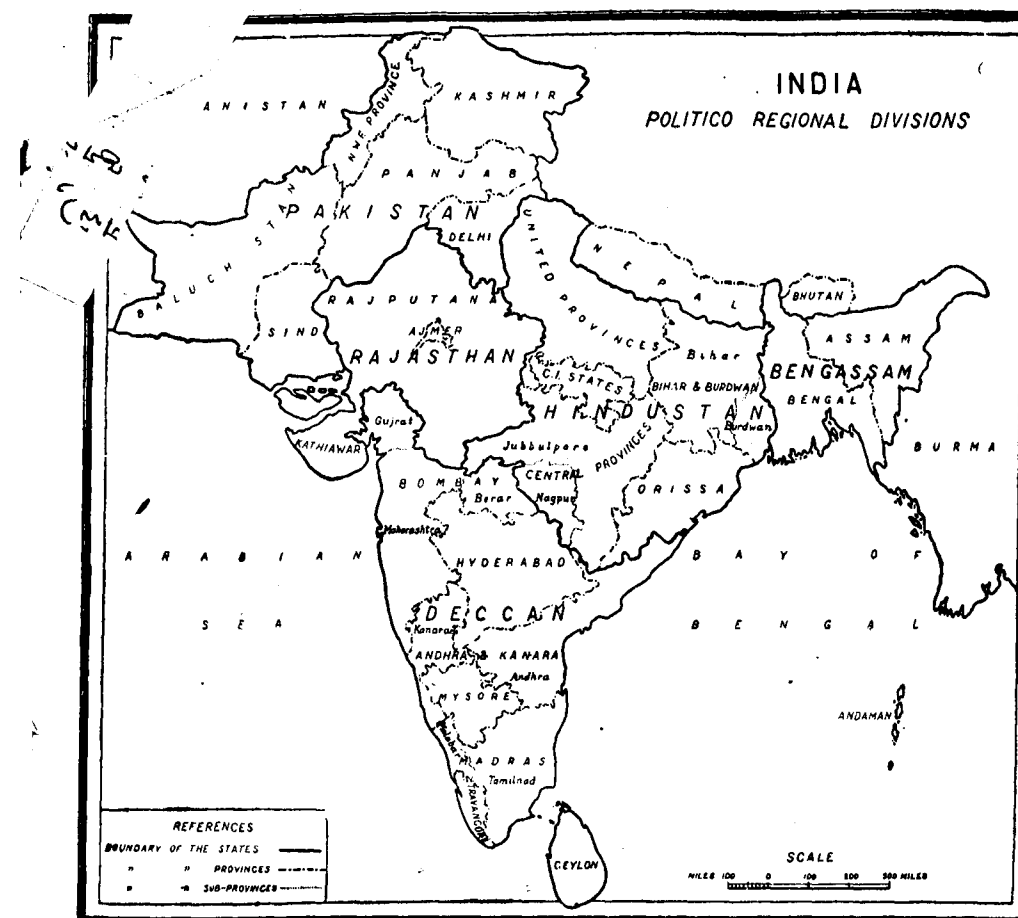
Arabic and Persian on the other. Any readjustment of political boundaries of the provinces cannot ignore the linguistic groups.

Economic considerations are in some cases more important than religious or ethnographic, and community of area has sometimes greater claims for its maintenance than the community of religion or culture. According to the treaty of Versailles, the region associated with the coal-field of Upper Silesia which was economically one, was divided into three parts to be given to Germany, Poland and Czechoslovakia. Such a division, although justified on ethnographic considerations, was one of the chief mistakes of the treaty of Versailles, as it has been a great source of friction.

To facilitate internal and external trade, to provide natural frontiers, to preserve the compactness of the area of the states and to promote their development, minor adjustments of the boundaries, ignoring the factors mentioned above, are inevitable. We have several examples of such adjustments in the treaty of Versailles. In Czechoslovakia, a block of Germans in the Sudetan land had been included in the new state because it was militarily desirable that the mountains surrounding the Bohemian Plateau should form the boundary with Germany in the west. In the south the boundary of Czechoslovakia was extended to the Danube to give it an outlet by water, thus including a block of Hungarians.

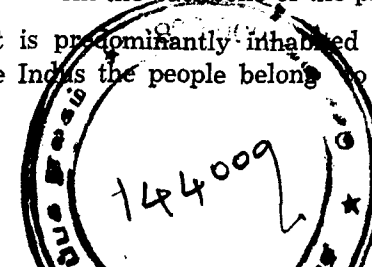
The whole problem of the division of India is therefore a very complex one and has to be solved in a complex way. No one criterion is good enough to apply to the whole of India. Our basis of division is, therefore, bound to vary from one part to another to suit regional conditions.

Four Region States:—Within the frontier of India there are four well-marked geographical regions—(1) the Indus basin in the west, (2) the upper-Gangetic basin in the north, (3) the lower-Gangetic basin or delta region in the East, and (4) the Deccan Plateau in the south. The regions possess not only physical unity but also have more or less social, ethnographic, religious, cultural and economic unity. They can well serve as the natural basis for the creation of four sovereign states which may be linked up by providing a mechanism for the free collaboration of the component states.



Indus basin or Pakistan:—The Indus basin in the west forms a very clear geographical unit. It is bound into one physiographic whole by the Indus and its tributaries. It consists mostly of a plain which drains south-west. Here there is facility of movement in north-east and south-west direction, east and west communication is rendered difficult by the rivers. This region has therefore its natural orientation towards the south-west. The rainfall is generally insufficient to ripen better crops. But fed by large perennial rivers, there is a magnificent system of canals. Fertility of soil and ease of artificial water supply has made this region the granary of India. Wheat in the Rabi and Cotton in the Kharif are the two principal crops over most of the area, and these two together form the backbone of the prosperity of this western region.

It is predominantly inhabited by Mussalmans. On this side of the Indus the people belong to the Indo-Aryan Race while



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across it they are mostly Turko-Iranian. There are several languages spoken in various parts of this region but Urdu is commonly understood.

This region includes the provinces of N.W. F.P., Punjab (West of the Sutlej), Sind, Baluchistan and Delhi. The province of Delhi has been extended to cover the whole of the Ghaggar Plain between the Jumna and the Sutlej. There was a similar province during the Moghul times. The separation of eastern Punjab² to be incorporated with Delhi into a fairly big new province will provide an opportunity for self-administration and self-determination to the Hindus, Sikhs, and Muslims combined, leaving the rest of Punjab with about 65% Muslim majority as is shown by the following figures:

	Total.	Scheduled Castes and Ad-Dharmis.	Other Hindus	Muslims.	Sikhs.
Eastern Punjab ..	*6,937,157	771,072	2,774,349	2,262,066	1,060,957
Delhi ..	*917,939	122,693	444,532	304,971	16,157
Total ..	7,855,096	893,765	3,218,871	2,567,037	1,077,114
Punjab West of Sutlej ..	21,481,662	477,563	3,871,073	13,955,176	2,696,444

The total population of this western region will be

Total.	Scheduled Castes and Ad-Dharmis.	Other Hindus	Muslims.	Sikhs.
37,411,464	1,568,064	8,348,088	22,958,265	3,874,426

Upper Gangetic basin or Hindustan:—Northern India consists of the upper-Gangetic basin. It consists, in the main, of a plain area different from that of the Indus basin. While the Indus basin faces southwest-wards the Gangetic basin faces eastwards and has much greater rainfall. It forms a transition zone between the arid west and the humid east. The rainfall is about 30 inches in the west and exceeds 50 inches in the east. The whole of the

2. The tract lying East of the Sutlej, consisting of the Ambala division and the districts of Ludhiana and Ferozepore of the Jullunder division.

sub-montane area is fairly humid. Both dry and wet crops are cultivated. Wheat and Cotton of the west give place to rice and jute in the east. The sub-montane region forms the principal sugarcane-belt of India.

The northern portion of the Deccan plateau also drains to the Ganges and thus forms part of the Gangetic basin. It is quite rich in minerals. Between the Damodar and the Mahanadi we have the principal mineral belt of India, producing most of the coal and iron and large quantities of mica, manganese and copper.

Hindus form the predominant population and Hindustani is the principal language. The people generally belong to the Aryo-Dravidian race—a mixture of Aryans and Dravidians. There is a large tribal population in the jungles of Chota Nagpur, Orissa and the adjoining parts of C.P.

This region includes the provinces of U.P., Bihar, Orissa and C.P. The Burdwan division of Bengal has been attached to the province of Bihar as a sub-province.³ The Burdwan division has a population of 10,287,369 of which only 1,429,500 are Muslims. The transfer of this division means the transfer of about one-third of the total Hindu population of Bengal from a Hindu minority to a Hindu majority province. They will be still happier because the formation of this area into a sub-province gives them local autonomy. By this transfer the river Hooghly becomes the natural western boundary of Bengal, with Calcutta belonging to Bengal and Howrah to Burdwan. Both the eastern and the northern states are thus ensured of a good out-let to the sea. It may be argued that in Calcutta, Hindus form the largest single group and therefore, it should also be transferred along with Burdwan. But on account of being the seat of the Government and a great business centre, it has a large number of floating population which has been temporarily drawn from outside. And they are mostly Hindus. Besides this, being the capital it is the legacy of the whole province and is its principal outlet to the sea. Geographically as well, Calcutta belongs to the Central Delta region and not to Burdwan. The Suburban district of 24-Parganas in the east of Hooghly cannot also be transferred to Burdwan without thwarting the entrance up the Hooghly.

3. The new province has been designated as the province of Bihar and Burdwan.

Only the extreme north of the Central provinces drains into the Ganges. The rest either drains westward via Narbada and Tapti, or, east or south-eastwards via Mahanadi and the tributaries of Godavari. A large number of its Urdu-Hindi speaking population justifies its inclusion in the northern state. It has been divided into two sub-provinces of Jubbulpore and Jagpur, the former Urdu and Hindi speaking and the latter Mahratti speaking. Berar, to which the claim of the Nizam has been acknowledged, has been transferred to Bombay. Here also the common chief language is Mahratti and the tract has more in common with the adjoining section of Maharashtra in Bombay than with C.P. But for the interception of Berar, which may any day be transferred to Hyderabad, Nagpur should have been better a part of Bombay.

The total population of this region is 123,585,399 as given below:—

Scheduled Castes.	Other Hindus.	Muslims.	Tribal.
21,490,562.	75,760,351.	15,156,950	10,436,763

Lower Gangetic or Delta Region, or Bengassam:—In the east of India there is a large delta region formed by the combined waters of the Ganges, the Brahmaputra, and the Meghna. It is covered by a number of swamps, a net-work of rivers, streams, creeks and shifting channels, and the whole is overlaid by vast quantities of silt, which is renewed every year through floods over a large area. But for the absence of distributaries, the Surma or, Sylhet valley as well as the Brahmaputra valley further north have also all the characteristics of a delta. New land and heavy rainfall physically link this entire area into one whole. In point of agriculture as well, it is clearly marked out from the rest of India. Here rice, jute and tea form the main crops. Large areas are densely forested.

The people have a remarkable community of life. Mussalmans form the predominant population. The people generally belong to the Mongolo-Dravidian race—a mixture of Dravidians and Mongolians. Bengali is the chief language.

This area consists of two provinces of Bengal and Assam. Burdwan, across the Hooghly has been detached from Bengal. This raises the percentage of the Mussalmans in Bengal from 54.7 to 63. Assam may be divided into three sub-provinces of (1) Surma valley—predominantly Muslim, (2) Shillong plateau—tribal, and (3) Brahmaputra valley—mainly Hindu. The tribal area of the Shillong plateau may be given the status of a native state.

The total population of this region is 60,223,889 as given below.

Scheduled Castes.	Other Hindus.	Muslims.	Tribes.
6,220,223.	13,927,039.	35,018,413.	3,667,656.

The Peninsula, or Deccan:—The southern, or Peninsular India consists of a great plateau flanked on either side by coastal plains of varying width. It consists of varied geological formations, differing in fertility according to the type of soil and amount of rainfall. It has varied resources both agricultural and mineral. Cotton, wheat, rice, millets and tobacco form the principal crops. Several minerals are found—gold, mica, manganese, coal and iron.

The southern region is different from the rest of India not only in physical and economic conditions but also in race, language and culture. Here the people are mostly Dravidians in race and speak Dravidian languages. They are found mixed with the Scythians in the western part, being known as Mahrattas. A certain amount of monotony of temperature during the year, contrasted with the extremes of northern and north-western India, has given the people of this area a different pattern of life. Their mode of living, houses, dress, food, customs, and traditions are clearly marked from those of the rest of India.

This region includes the provinces of Bombay, Andhra and Kanara, Madras and Andaman and Nicobar. The province of Bombay, as reconstituted, consists of three sub-provinces—(1) Gujrat, (2) Maharashtra and (3) Berar. The Kanarese-speaking districts of Dharwar, North Kanara, Belgaum and Bijapur have been detached from it.

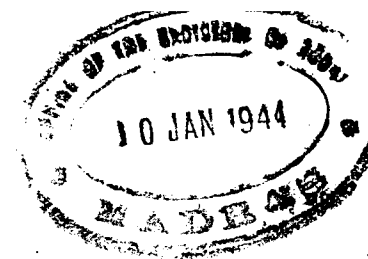
The present presidency of Madras has been split up into two provinces—(1) Andhra and Kanara and (2) Madras. The province of Andhra and Kanara consists of two sub-provinces of (1) Andhra and (2) Kanara corresponding with the Telugu and Kanarese-speaking people. The province of Madras also consists of three sub-provinces of (1) Tamilnad (2) Malabar and (3) Coorg, corresponding with the Tamil, Malayalam and Coorgi speaking peoples.

The total population of this region is 73,999,010 as given below:—

Scheduled Castes.	Other Hindus.	Muslims.	Christians.	Tribes.
10,640,957.	51,808,327.	6,166,719.	2,433,028.	2,480,531.

Rajputana-Kathiawar or Rajasthan:—It includes the contiguous block of the Native States of Rajputana, west-central India, Gwalior and Kathiawar (western India). The province of Ajmer lying in the centre is also included in it as a democratic state. These states may have some sort of central coordinating organisation which may be located at Ajmer. The region has an independent outlet to the sea in Kathiawar. The total population is estimated at about 30 million.

Other inland states, whether they choose to continue their relations with the paramount power or join the regional state in which they lie, may be given facility for free import and export.



The Physical Geography of S. Arcot District

By

V. KALYANASUNDARAM

The district of South Arcot is situated on the east coast of India and forms a part of the Carnatic plain. Except along the south and south-west where the Coleroon and the Vellar separate it from the Tanjore and Trichinopoly districts, the boundary is nowhere physical or geographical but is one devised to suit administrative convenience. Even the Vellar and the Coleroon being of the nature of mature rivers tend to attract people rather than repel them—the population is densest along their courses—and thus they do not form good boundaries.

Relief:—Except in the west where a portion of the Kalrayan hills are included in the district the relief is simple and consists of a coastal plain, 65 miles in width, with a gentle seaward slope which is drained by a number of nearly parallel consequent streams. From north to south the most important of them are the Ponnaiyar, the Gadilam, the Vellar and the Coleroon. The coastal plain slopes down from an elevation of 700' or 800' to sea level in a distance of 64 miles giving an average gradient of 12 feet per mile.

According to relief the region may be sub-divided into

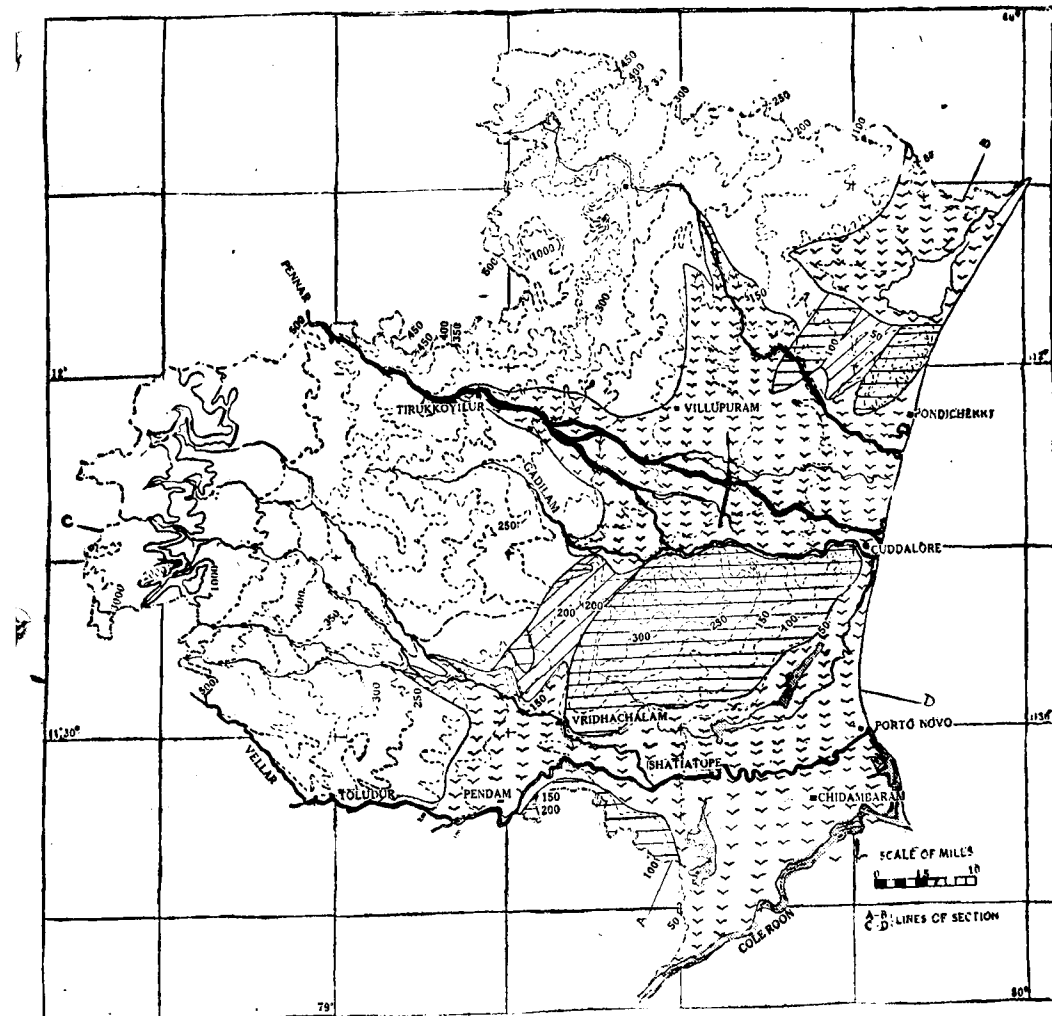
- (i) the high mountainous part of the district and
- (ii) the coastal plain $\left\{ \begin{array}{l} \text{the older division.} \\ \text{the younger division.} \end{array} \right.$

Kalrayan hills:—In the south-west the district includes a portion of the Kalrayan hills but the bulk of the hills lies outside in the Salem district. They rise like a mountain from the plain, the rise being fairly precipitous from about 700' or 800' to over 2,500'. The top surface presents an undulating plateau like aspect but the greater part of the plateau especially the higher parts lie outside the district. The average elevation within the district varies from 2,500' to 3,000' and the maximum is about 3,738', almost 3 miles due west of Terku Tirupathi. The surface of the plateau has been dissected by a large number of streams and this has resulted in the development of a number of isolated settlements occupying the relatively level or undulating stretches of the plateau

along valleys and these are separated from one another by steep-sided gorges some of which are canyon like with valleys 250' or over in depth. The general slope of the plateau is towards the east into the Carnatic plain and following the general slope are a number of streams which get integrated into 3 well defined channels, those of the Mani, the Muktha and the Gomukanadi, all of which are tributaries of the Vellar. The eastern edge of the Kalrayans may at first sight appear to be a formidable obstacle to east and west movement but this is however mitigated by firstly, the presence of 2 major gaps in the continuity of this relief feature—the Attur pass which separates it from the Pachamalais to the south and the Chengam pass that separates it from the Javadi ranges to the north—and secondly, within the hill region itself the valleys of the 3 rivers referred to previously afford valuable access from the plains to the settlements on the plateau; the nature of the settlements and the steepness of the valleys have made them the course of mule tracks only.

The coastal plain:—This is a gently sloping country with a general easterly inclination. When looked into in greater detail, however, the country east of the Kalrayans is more complex than what the term coastal plain may imply. The present relief of the coastal plain may be correlated with the structure of the region. The country east of the Kalrayans is made up of a succession of younger sedimentary formations. Starting from the coast and landward of the coastal sand dune ridge there are outcrops of Cuddalore sandstones—a series of variously mottled red, grey or buff coloured sandstones and grits of probably middle miocene age. The beds forming this series have a generally easterly dip and are found outcropping as low plateaus, 150' to 250' and striking in a NNE to SSW direction. There are two such large plateaus, one forming the 'Red hills' of the Pondicherry area—a low plateau about 4 miles broad and extending from near Usteri tank to a point about 10 miles north of Pondicherry where it reaches the sea, and another, an extensive one stretching from near Cuddalore near the coast as far as Vridhachalam on the Vellar—the Capper hill near Cuddalore forms part of this plateau. These plateaus present an escarpment like face on the west and the surface gently slopes seaward. West from the southern plateau and separated from it by a belt of cretaceous formations are two smaller patches of the same series while west of the red hills of Pondicherry area also a parallel but isolated outcrop of the Cuddalore sandstones are met with. These several isolated patches are obviously parts of

an originally single extensive spread of the Cuddalore formation which has since been cut up into partially disconnected patches by later subaerial denudation.



Landward of the belt of Cuddalore sandstones in the Pondicherry area as well as in the Vridhachalam area are patches of marine cretaceous strata occurring in 3 patches separated respectively by the alluviums of the Pennar-Gadilam, and the Vellar rivers. These consist of sandstones, mainly argillaceous but sometimes calcareous in character—the Ariyalur stage of the Trichy cretaceous. A patch 3 to 5 miles broad by 15 miles in a NNE to SSW direction is to be found between the Manimuktanadi

and the Gadilam—the Vridhachalam area, and a second one, 4 miles broad by 8 miles in a NNE to SSW direction to the north—the Pondicherry-Valudavur area. In the latter area typically eocene fossils have recently been identified and this suggests the possibility of an eocene sequence underlying the Cuddalore sandstones. Both the outcrops are overlaid on the east by Cuddalore sandstones.

Viewed broadly then, the structure of the coastal plain consists of a series of NNE to SSW strips of cretaceous, eocene and middle miocene formations—strips which strike parallel to the trend of the ghats. The character of the several deposits suggests first, the presence during the cretaceous period of a sea washing the eastern shores of India in this region and whose western shore was roughly co-extensive with the western boundary of the cretaceous; and then a gradual recession of the sea to the east leading to the upheaval of successively younger formations. The recession however, was not a continuous process but was punctuated by periods of relative stability and sometimes also by resubmergence after a period of sub-aerial denudation (indicated by the unconformity between the successive formations); the former character of the recession made possible the accumulation of eocene (?) and miocene sequences within the region.

The present relief of the coastal plain is the result of the sub-aerial denudation of this composite structure. The consequent streams must have set to work immediately, probably with some vigour, on the recently exposed sea floor (the streams would have been rejuvenated due to regional elevation). They will thus effect a removal of the upper sedimentary strata along their courses. The thinness of the tertiary deposits in the west where they overlap the older cretaceous strata and the greater erosive power of the streams in the higher parts of the uplifted sea floor would result in the removal of the tertiary cover to a greater extent there than further down the slope and this would probably proceed so far as to expose the underlying cretaceous. Alongside the development of (or the seaward extension of pre-existing) consequent streams, at a fairly early stage in the erosion of the uplifted plain, little subsequent streams may have been initiated. Those working along the zone of contact between the Cuddalore sandstones and the cretaceous Ariyalur beds, must in course of time have developed a relatively broad valley in the area of the latter formations. The Ariyalur beds, the argillaceous, calcareous or shaly character of whose beds lends itself more easily to erosion than the buff coloured and relatively stronger sandstones and grits of the Cuddalore system.

Owing to the easterly slope of the ground and the easterly dip of the strata the subsequent streams would gradually shift their beds laterally, and thus cause a lateral shifting of the western edge of the Cuddalore sandstones and this will in course of time lead to the formation of an escarpment. Upto a certain stage the escarpment will increase in height but after that it will come down.

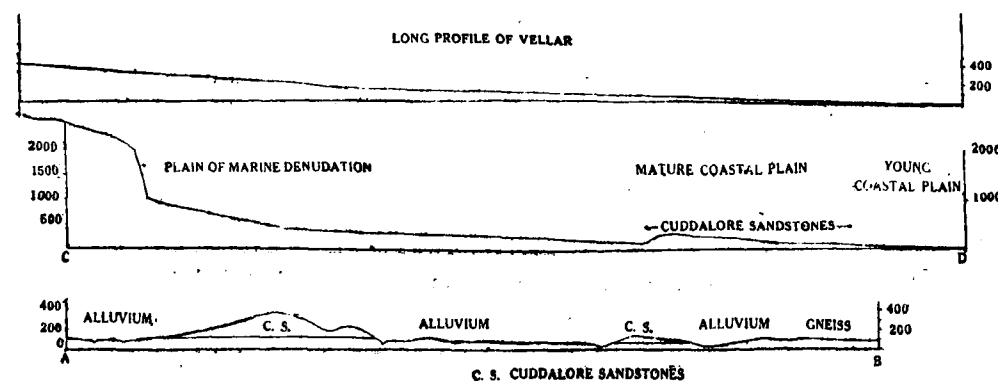
The processes of erosion would thus have resulted in the development of a fairly broad plain sunk into the surface of the coastal plain and filled with alluvial deposits. This alluvial plain in the case of the Pennar and Gadilam systems is in the form of truncated spoon, broad at the head and gradually narrowing towards its tip, and may conveniently be referred to as the Pondicherry-Cuddalore alluvial bay. This has its head a little west of Tirukkoyilur and from this point the bay widens out to the ENE and to ESE. At its broadest part it has a width of about 24 miles but east of this part it narrows down to a width of only 12 miles, where it is hemmed in between the Red hills of Pondicherry and the Capper hills of Cuddalore. A similar alluvial plain or bay is developed between the Vridhachalam patch and the southern patch of Cuddalore sandstones where the plain is developed on the cretaceous deposits of the Ariyalur and Vridhachalam areas and as in the case of the Pondicherry-Cuddalore alluvial bay this bay also narrows between the two areas of sandstones.

This peculiar feature of the alluvial plain may be due to the following sequence of events. Subsequent to the elevation of the cretaceous strata the newly exposed portion of the continental shelf would have come under the influence of the seaward extension of the original consequent streams and the newly formed subsequent streams and will therefore be subjected to sub-aerial denudation. During the next phase of elevation that led to the uplift of the Cuddalore sandstones the main consequent streams that emptied themselves into the bay must have found an obstacle to the free discharge of their waters in the gradually rising Cuddalore sandstones and this temporary obstacle by impounding the drainage probably led to the formation of temporary basins.¹ But the rate of uplift of the Cuddalore sandstones was sufficiently slow to enable the major streams, after a time at least to find an outlet

¹This will probably offer an explanation for the black loamy and black clayey character of the bulk of the soil in the Vridhachalam and Cuddalore taluks. The temporary lakes were the recipients of the sand, silt and organic remains and the black colour may be attributed to its lacustrine origin.

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to the sea by breaking across them—an operation rendered easy by the accumulation of flood waters in increasing quantities to the landward of the ridges. This would mean that the main streams were antecedent in age to the Cuddalore sandstones—a view which is strengthened by the narrowness and steep-sided character of the valleys when they cross the sandstone ridge (e.g.) the gorge developed by the Gadilam in the Cuddalore sandstone near Tiruvendipuram. The Vellar and the Gadilam have a relatively straight course across the stretch of the Cuddalore sandstones while both above and below it they have a sluggish and very winding course. This may be explained as due to the fact that the bulk of the energy of the river was expended in keeping open a channel across the gradually rising sandstone ridge—a process involving the shortest and straightest course and vertical cutting down of the bed—and there was little energy left for eroding the sides. The valleys were therefore relatively straight, narrow and steep-sided. Across the strike of the Cuddalore formations on the relatively level stretches of recently exposed and relatively little consolidated material, the rivers developed a winding channel to the sea. This is particularly well developed in the case of the Vellar in its course below Shatiatope.



To the north of the Pondicherry-Cuddalore alluvial bay is an undulating piece of country with little or no alluvial cover except along some parts of the Gingee valley; and this is dotted with numerous rocky crags and hills some of which rise several hundred feet over the level of the surrounding country, (e.g.) Gingee. The scenery is peculiarly characteristic. The hills that rise above the level of the surrounding country have a core of gneissic rocks—granitic or charnockitic in character, but the sides are covered by an enormous development of tors which entirely

cover the sides of the hills. The sides and the base are concealed by an accumulation of talus from the disintegration of the rocks and this makes movements along the surface extremely difficult. Some of the tors are placed in such very fantastic and sometimes precarious positions as to resemble glacier transported boulders. Apart from the Kalrayans this is the only part of the district which exhibits a certain amount of scenic grandeur and in this is strongly contrasted with the tame topography of the adjacent alluvial plains.

Coast:—The coastline which has a general NNE to SSW direction north of Pondicherry gradually swerves round to a general north and south direction south of that town. The dominant strike of the coastline north of Pondicherry may be correlated with the strike of the ghats and that of the younger sedimentary formations which overlap it on the east. The change in the direction of the coastline further south is most probably due to the fact that here we are gradually approaching the delta of the Cauvery—the largest of the rivers in this part of the peninsula. The triangular delta of the Cauvery represents the mighty task that the river has performed—that of pushing the borders of the land into the sea. The sand and silt poured into the bay form the bottomset and foreset beds by which the delta has been advanced. At the same time a part of the land derived detritus is taken up by the long shore currents which here have a general north and south direction. The currents set up by the south-west monsoon being the stronger leads to a northerly drift of material and this has, during the course of years tended to cause a northerly deflection of the stream channels. The stream mouth is pushed further and further north and this will mean that the delta building is not only outwards but proceeds in a lateral direction as well. The delta formation has during the course of some thousands of years pushed the shore so far from its original position as determined by the structure of the land that the shoreline, no longer determined by the structural characteristic has taken a new direction—here a north and south one. North of Cuddalore, the coast is so far away from the sphere of influence of the Cauvery delta that it still retains the direction imposed on it by the structure or grain of the land immediately behind it. It is little surprising therefore that Chidambaram taluk the southern most in the district bears a closer resemblance to the Tanjore district of which physiographically it is a part, than the rest of the district.

Rivers:—Excluding the Coleroon, the Pennar, the Gadilam and the Vellar are the main rivers and of these, the Gadilam is the only one which has its entire course within the district. The

most important feature to be noticed here is the frequent tendency of the rivers to flood the surrounding regions. Cuddalore and Porto Novo are the scenes of repeated floods and breaches in the rail and road communications. This is partly due to some characters of the rivers themselves and partly due to climate. The Pennar and the Vellar which have their sources in the gneissic country further west flow through a region which has experienced a certain amount of ruthless deforestation, which has resulted in a fairly rapid run off of the precipitated rainfall from the relatively bare surfaces of the hills. The rapid surface run off proceeds along the courses of the streams and leads to a swelling of the volume of flow and hence in their heights as well. In the lower reaches they have a sluggish course along flat valleys across a region with a practically imperceptible slope and a sudden rise in the level of water in the piedmont belt consequent on a rapid run off along a number of channels of the deforested hill slopes increases the volume to such an extent that the sluggish lower courses of the rivers cannot easily handle. Taking the case of the Vellar, from the point where it enters the district till about 8 miles N.W. of Toludur the gradient is about 12' per mile; from there till its confluence with the Chinnar about 4 miles west of Pennadam it is 8' per mile and then the stream bed has a gradient of about 4' per mile upto Shatiatope beyond which it slopes down at the rate of 2' per mile. By the time the water has reached Shatiatope, the volume and hence the water level of the streams will have increased, due to the confluence of a number of streams, to a size that cannot be as easily drained as it is being augmented and this leads to a rise in level of water sufficiently to overflow the banks and flood the surrounding flat country.

Quite apart from the character of the drainage basin and the stream gradients, the climate also actively induces flooding. Cuddalore is at a point on the east coast of the peninsula, which is frequently on the track of cyclones. The bay depressions of October, November and December, very frequently cross the coast near about Cuddalore and when they do so there is a heavy down pour of rain which goes further to swell the volumes of the already swollen rivers. The incidence of the rain is at a time when the sub soil is fairly well saturated with moisture and very little water can be absorbed by the soil. That portion of the rainfall which will normally be absorbed by the soil therefore goes to increase the surface run off. As the rain tends to be heavier nearer the coast there is an enormous rise in water level of the rivers, which has to be quickly drained if flooding is to be prevented.

The stormy condition of the sea however, effects a rise in the sea level locally to a point at least equal to if not higher than the level of discharge of the rivers and this tends to retard the rate of drainage of the swollen streams. Thus the factors, viz., (1) rapid run off from the deforested slopes, (2) the plentiful supply of local drainage due to heavier rainfall near the coast and the saturated condition of the sub-soil and (3) the retardation of the rapid outflow of the river water into the sea caused by the local raising of the sea level, operate together and lead to flooding of the plain country around. Cuddalore being at the bottle neck on the isthmus between the wide alluvial plain of the interior and the narrow coastal plain and also between the two rivers Pennar and Gadilam is consequently the worst sufferer. Porto Novo, Alappakkam and Vridhachalam also suffer from frequent floods.

Conclusion:—Geomorphologically the district is made up of a plateau—an elevated peneplain—in the west, below which is a fairly wide coastal plain which gradually broadens towards the south. The plain appears to be made up of a plain of marine denudation, a mature coastal plain and a young coastal plain. The present relief appears to be due to sub-aerial denudation of a series of easterly dipping strata ranging in age from the cretaceous to the miocene.

Notes (Contributed)

By

DR. M. B. PITHAWALLA

The Bombay Plan:—Planning is in the air everywhere. Economists and politicians of our country are busy with their plans for making India self-supporting in every way. But there is little in these plans to keep their feet firmly on the ground. Few regions in India are so thoroughly surveyed and studied as to make any scheme successful, either for properly industrialising them, or, for making them flourish agriculturally. Besides, to talk about any one country in the world to be self-supporting in every way is futile, nature having so ordained that *certain material wealth shall be available in certain regions only*. Therefore, the need of an inter-provincial exchange in the first instance and then of a judicious inter-national exchange of materials, raw or finished, is very necessary.

Some influential industrialists of Bombay have presented a scheme, now known as the Bombay Plan, which is severely criticised in some quarters. It is a 15-year economic plan and aims at the development of industries at the expense of agriculture in the Presidency, whereas we know for a fact that India's main industry is agriculture alone. Weavers are dying in Bombay villages for sufficient yarn and cottage and handloom industries, which are the life lines of the common people, are getting severely crippled. There is an undue struggle and rivalry between the rural and the urban population of the whole region and inflated prices are cautiously maintained.

Moreover, the Bombay presidency is largely covered by the black-cotton soil called *regur*; Gujarat, Kathiawar and Cutch usually suffer from deficiency of rainfall and famines are frequent with rainshadow areas abounding in many districts, and consequently not many food crops can be produced in them. The whole Presidency has, therefore, to depend upon other Indian provinces for agricultural produce, chiefly cereals.

It has been argued that a larger agricultural output than that estimated in the Plan would find no market and a kind of balanced economy between agriculture and industry is to be maintained, because, after making due allowances for an increase in the food consumption of future India and for the demand of raw materials and also likely exports of raw materials, proportionately larger industrialisation must be necessary. But all these arguments are vague and only on paper. Unless and until the whole area is thoroughly surveyed *geographically* and all the necessary data are

obtained, and unless and until economic calculations are based on such data, no Plan will be successful or at least beneficial to *our own country*.

Much river-training and cultural work is urgently needed. How many of the rivers of Western India need damming and terracing in their upper reaches? What a vast area of agricultural land needs protection from terrific floods every season, and what a tremendous loss the Presidency sustains from soil erosion on account of these causes? Few economists have also understood what valuable mineral resources are yet unexplored and how recklessly raw materials and minerals are exported to other countries without any reciprocal benefits to India. Distressing news has been received from Surat, Bulsar, Kaira, Dhulia and other districts due to recent floods. The damage to crops and property is unprecedented and the sufferings of the people are unthinkable, the rivers being in spate for days and weeks during the season. So it is *only when a region is considered as a whole*, (and nothing but the science of geography can enable our politicians to do so) that there is a possibility of having a *properly and scientifically balanced economy* in our country. Our advice to the Planners is to know the economic resources properly, to improve agriculture as much as possible aided by engineering, and to start industries *from the savings from the agricultural output thus achieved*. There is a vast difference between a narrow-minded immediate plan and a far-sighted long-range plan. Will our *calculating* economists listen to the call?

Wanted Geologists:—Along with other countries in the world, India is also now making desperate efforts for searching for more and more workable minerals. In the past, there has been a reckless export of some of our best mica and manganese ores. The loss of Burma, however temporary, has caused a marked shortage of other minerals such as lead and tin and also of mineral oil. Parts of our tertiary rock formations have to be intensively searched for petroleum deposits. Dr. Krishnan's address published in the last issue of our Journal clearly shows how our country needs a proper development of this important branch of geography, because, even though mineral deposits are discovered by geologists, they must be *clearly proved to be of sufficient quantities and suitable qualities and also assured at reasonable market values*. Means of transport, lines of communication and even factors of climate should affect any scheme of mining etc.

Now that the Geological Survey of India, which has done such a valuable work of mapping the mineral resources, has been allowed a Utilisation Branch by the Government of India, more

and more geologists, particularly local men, are wanted. But it is a great pity that such an important subject has been neglected by Indian Universities and few colleges have opened departments of Geology. Indians, as a rule, complain bitterly against Government whenever foreigners are imported from abroad for such expert services. Now is the opportunity for them for recruiting their own men for this new branch. Sir Cyril Fox, Ex-Director of the Geological Survey, in his address recently delivered before the Geological and Mining Society of India rightly said: "In a calculation I made, based on one geologist to every district in India, both in the Provinces and the Indian States, the total exceeded 300 geologists or *five times larger* than the existing war-time strength of the G. S. of India. I consider 300 as an underestimate for the staff of the Survey. However, even if 150 geologists were sanctioned, it would be difficult to recruit this number of qualified men in India. I should think that it would be difficult to recruit even 50!" Perfectly true! thanks to the leaders of Indian education, particularly University education, who have so long discarded and discouraged the study of Geology and the allied science of Geography for all these decades! The situation is worse with regard to the recruitment of qualified geographers in India. We wonder if even a dozen experienced geography men for field work are available in our country at the present moment to join hands with the department of the Geological Survey. Something must be done now to move the authorities of the various Universities and Colleges in India to these urgent educational reforms.

Progress of Geographical Studies:—We congratulate the authorities of the Punjab and the Calcutta Universities on their opening M.A. classes in Geography. Calcutta has already prepared a batch of young Indian geographers ready to take their place in any scheme of national planning and Lahore has followed suit. We strongly urge the Academic Councils of other Indian Universities to copy these progressive bodies. We also note that the University of Benares has just made a small beginning by opening Intermediate classes for Geography this year, and trust they will soon develop into degree classes. It is indeed a pleasure for us to record this result of our continuous appeal through the columns of this Journal to the Universities of India to do the needful for this young branch of science. The late Mr. Subrahmanyam, the life and soul of this Journal, would have particularly been happy to see the fruit of his labour. We trust that Ph.D. courses in geographical research will also be soon started at Calcutta and at Lahore.

Review

Mountains of India By Bimala Churn Law, President, Calcutta Geographical Society, 1944.

Rivers of India By Bimala Churn Law, President, Calcutta Geographical Society, 1944.

A high authority on Buddhist History and Literature, Dr. B. C. Law is a distinguished student of Ancient Indian History and Culture. In the monographs under review the learned author goes to study some aspects of Ancient Indian Geography. For a long time indological studies were confined to the literature and history of Ancient Hindus, and only recently the importance of geography as a background of history has been sufficiently emphasised. Dr. Law has come to supply this long felt want. In the monograph on mountains, the study is divided into five sections—mountains in Northern India, Rajputana and Western India, Eastern India, Central India and Southern India. The method adopted is what may be called historico-geographical. His identification of Sineru which is Sumeru with Mountain Meru will be accepted. His study of the Himalayas is detailed. In his treatment of hills in Eastern India, the different caves mentioned in Buddhist literature are identified. The Vindhya are identified with the ancient *Rkṣavat*.

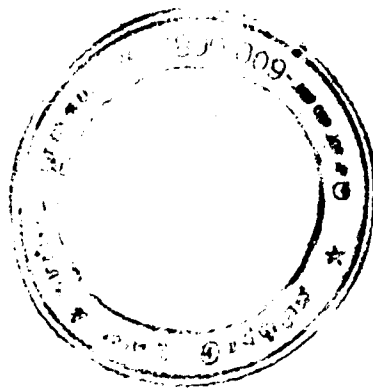
In his monograph on rivers, Dr. Law adopts the same plan and method. The study constitutes five sections. In dealing with the rivers of Northern India, Dr. Law classifies them scientifically. Thus we are treated with the Sindhu system of the Punjab, Sindhu being the modern Indus. Secondly the Desert River System where the Saraswati and Drṣadvati, the two sacred streams of Uttara-patha are described. Thirdly we have the Ganga-Yamuna system. Here are the rivers of the Madhyadesa. With regard to the Ganges and its tributaries the testimony of Greek geographers is furnished. Fourthly there comes the Bhagirathi-Hughli group. Lastly the Brahmaputra-Meghna system. The great rivers of Assam are the Brahmaputra and the Surma. Each has a number of tributaries. This section is concluded with a list of rivers, mainly coastal, to the east of Brahmaputra-Meghna system.

Speaking on the rivers of Central India the author classifies them under two groups—Narmada and Tapti groups. In the last section on the rivers of Southern India the author furnishes as

many as five systems. These are the Godavari system, the Kṛṣṇa system, Pennar system, Southern Coastal rivers, and Malaya rivers in South India. In the last group the river Kṛtamala is identified with the modern Vaigai.

We congratulate the learned author on the success of the task set by himself. A Historical Geography of India is yet to be undertaken, and it is well that our author has shown the proper approach to the subject. A map is appended in each.

V. R. R. DIKSHITAR.



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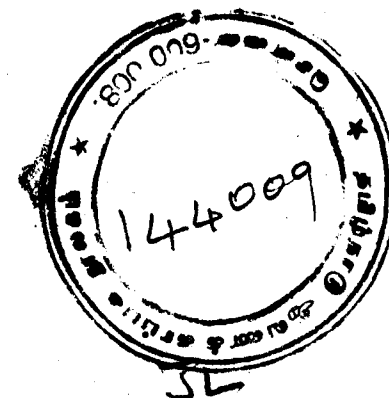
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