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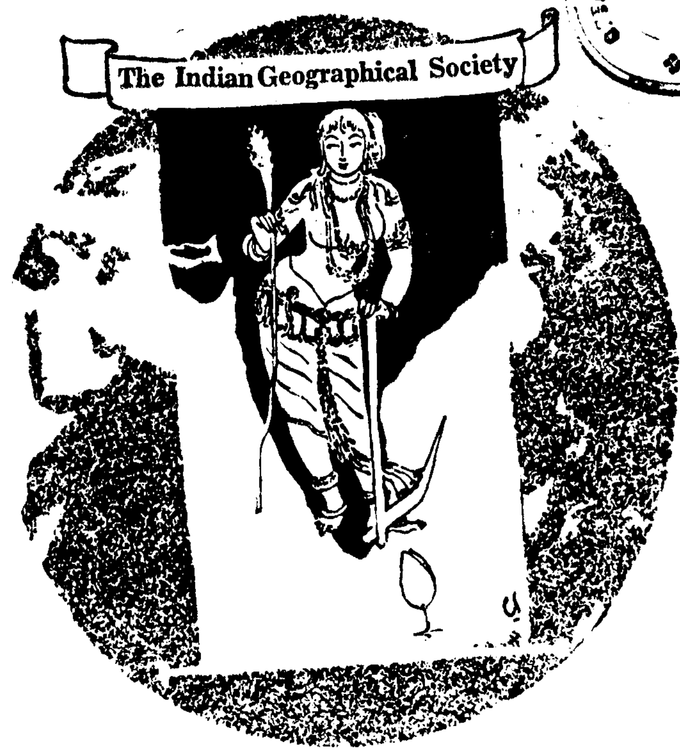

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The Making of India*

BY

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The Structure of India

In the making of the Indian sub-continent two distinct crust-blocks of the earth's circumference, of totally different nature and constitution, have taken part. How they came to be together to build the geographic entity we call India is one of the live problems of geology. One school of geologists denies the Asiatic parentage of India. It suggests that the peninsulas of Asia have wandered far away from an ancient southern parental continent, of which Africa is the surviving nucleus, and fused along the southern edge of Asia, only during a comparatively late date in the geological history of our earth. The impact of these drifting fragments of the southern continent with the shores of Eurasia is held to have ridged up the submerged continental shelf into the imposing chain of mountains which girdle India's Asiatic front all along its West, North and East. The impact further necessitated the underthrusting of a considerable selvage of North India beneath Turkistan and Tibet, while a still wider marginal belt has buckled under the strain of the northerly pressures into a wide and deep trough, stretching from N.W. Punjab to the Arakan ranges. Madagascar, which undoubtedly has some consanguinity both with India and East Africa in its rock-groups and in the structural relations, is held to

*General Presidential Address delivered at the Twenty-Ninth Indian Science Congress, Baroda, 1942.

have started in the wake of India, but broke away from it early in the north-easterly drift. The parallel rocks and structures of Madagascar, Africa and Indo-Ceylon are cited as evidence of their pristine unity in one integral land-mass.

The orthodox school of geologists, believing in the fundamental doctrine that the present forces and agencies of the earth supply a key to the past, while admitting some undoubted merits of this theory in explaining some perplexing problems of stratigraphy and climatology, have questioned such unknown and revolutionary forces in earth-dynamics. It finds no adequate force or agency in the earth's sphere to effect a congregation of continents and their fragmentation and drifting over vast sections of the earth's circumference and is inclined to the belief in the permanence of the great ocean deeps and of the essential framework of the major continents. According to these geologists, the making of India has been an evolutionary process, the two component crust-blocks being always integral and adjacent parts, though pursuing quite distinct geographical course of events—the one a stable land-mass composed of some of the most ancient rocks of the earth and never submerged underneath the oceans; the other a flexible and comparatively weak belt of the earth's crust, for long submerged under the waters of the oceans and loaded with thousands of feet of marine sediments during this submergence. The ridging up of this sedimentary pile into the great mountain wall of India is explained as due to tangential pressures acting on this overloaded and consequently weakened zone of the crust. In contrast with the unpuckered and generally horizontally bedded rocks of the former crust-block of India, the Himalayan segment of India has undergone colossal flexuring and crumpling of strata, sheets of rock being overfolded, disrupted and thrust bodily over the severed members for miles. In these earth plications, masses of crystalline igneous rocks, granites, from the depths of the earth, have been pushed up through the sedimentary cover and now occupy the central zone of highest elevations. The sublime snow-capped peaks of the Himalayas, from Mt. Everest to Nanga Parbat, all are built of this axial granite core, which has risen five to six miles from the earth's interior breaking its way through the sedimentary crust. While the architecture of the crust lies mostly hidden beneath the surface of the rest of India, in the corrugations of the Himalayas over six miles depth of the outer lining of the earth's sphere is laid bare for the geologist's study.

The Himalayan orogeny is not an isolated unit in the mountain system of Asia, but is a part of, and stratigraphically related to, the great mountain girdle of the earth which starts from the Atlantic coast of Europe and traverses the earth along the Alps, the Caucasus, the Iranian arc, and after two or three sharp bends in its passage through India, terminates at the eastern end of the Malayan arc.

On either of the two hypotheses, the sub-continent of India consists of two crust-blocks of different nature and constitution, the rigid Archaean shield of Deccan and the 1,600 miles long folded belt of younger rocks (the Himalayas). Their interaction has produced the third physiographic division of India—the North Indian Plains—built by the alluvial deposits of rivers of the Indo-Gangetic system. These great plains of India cover a trough or depression in front of the earth-waves of the Himalayas pressing from Tibet against the immobile crust segment of the Deccan.

The Three Structural Units

The unravelling of the structural features of these three units of earth-body, integrated into one sub-continent, has been India's contribution to the world of science—the branches of geophysics, isostasy and geodesy deriving their earlier and more vital data from these regions from the labours, since 1860, of the pioneer workers in the departments of the Great Trigonometrical Survey and the Geological Survey of India.

As stated earlier, there is the most striking geographical antithesis between North and South India—between extra-peninsular and peninsular India. The one is a much-folded and contorted pile of sea deposited sediments, thousands of feet in thickness, the other a non-flexible, obviously impassive block composed of ancient, crystalline rocks, which has, since the dawn of geological history, acted as a peg in the earth's crust. The latter circumstance has led to a belief in the absolute immovability or immunity of the Deccan from earth-disturbances of any kind whatever.

In the structure of India, the folded zone has played a comparatively minor part and that also during the last one or two chapters of its history, having but lately emerged from a central Eurasian sea. Regionally it is in part extra-Indian and builds the lofty north frontiers, which, though they have barricaded India from the rest of Asia geographically, have knit India structurally with the Iranian ranges to the west, Tian Shan on the north and the Burma-Malay arc of mountains on the south-east. This folded zone bears evidence of great compression whereby the country between Tibet and the Ganges valley has been shortened by 60-80 miles. Only a small part of the thickening of this belt arising from the compression forms the visible mass of the Himalayas, a considerably larger part being pushed down as the roots of the mountains into the subcrustal, semi-plastic magma which acts, through its buoyancy, as the support of the Himalayas. The visible excess of mass above the surface is thus compensated underground by a displacement of the heavier and denser sub-stratum of rock (*sima*), which underlies the surface crust of the earth.

But the fold-zone of North India is of great interest in the dynamics of the earth's crust. It has profoundly modified and superseded the old trend-lines of Southern Asia. The festooning and curves of the Himalayan arc are caused by the obstructions of the rigid Indian table-land reacting against the plastic earth-folds pressing from the north and moulding their shape on its promontories and bays. Large slices of the mountains have thus slid bodily for miles over the peneplained edge of the Indian foreland, whose broad front has imposed on the mountain range its main trend-lines. The orientation of the Alai—Kuen Lun system of chains in the north, that of the Hindu Kush—Karakoram arc in the middle and of the deeply reflexed Himalayan arc in the south are broadly alike, fusing together in the Pamir vertex or knot. The Pamir is a nuclear point of Asia's mountain-system and it is in axial continuity with the Punjab wedge—the pivotal point of the Indian foreland that has guided the main Himalayan syntaxis. This Pamir-Punjab crustal wedge or knot is thus of critical importance in the orography of Asia and will take a key position in future work on orogenesis and mechanics of crustal motion in mountain-building.

The structure of the extra-peninsula is thus explained in a broad and general sense. The labours of the Geological Survey of India during the last 70 years have explored the outline of this plan and future work will add to and perfect the details. When the structure of the Himalayas is finally worked out from Kashmir to Assam, Indian geology will have made another important contribution to the world of science.

The third division of India—the Indo-Gangetic Plains—is the newest part to be added to the edifice of India and is still not complete. It has grown almost wholly within the human era by the extension of the flood-plains and deltas of the river systems belonging to the Ganges on the east and to the Indus on the west. The dust of the Himalayas, in the technical language of geology—products of erosion of the Himalayas—brought down by these rivers and their thousands of tributaries, has filled up a hollow at the foot of the Himalayas, variously computed by different authors to be from 6,000 to 15,000 feet deep. Though of great interest from human view-point as the source of great agricultural wealth, as an underground reservoir of fresh water and as the principal theatre of India's chequered history since the advent of the Aryans (when the Aryans came to India, probably this section of Aryavarta was not complete for habitation—for large parts, especially of Bengal, were still under the tidal waters of the Bay of Bengal) its importance as a geological unit is only secondary.

The southern limit of the Punjab-Bengal plains possesses a great significance in the sub-structure of India. Along this line gravimetric observations carried out by the Survey of India have revealed a sharply-marked zone of abnormally dense and heavy matter hidden under the alluvium at an unknown depth, roughly along the parallel of 23° N. Experiments with the plumb-line carried out in the middle of the plains show no deflections towards the Himalayas, as one might expect from their great visible mass, but towards a curved line underneath the plains running from Karachi towards Orissa, thus denoting some invisible excess of matter in the south counteracting the gravitative pull of the Himalayas. Similar observations carried out to the south of this line show deflections towards it, their amount gradually diminishing with distance. After repeated observations, the Survey of India has mapped out this subterranean chain of density and named it the 'hidden range'.

The South Indian highlands have not made the same appeal to geologists, mountaineers and naturalists as the snowy ranges of the Himalayas, and thus have attracted much less attention to their framework or sub-structure. Indian geologists, especially of late, however, have demurred to accept the simple view-point of the earlier workers dismissing the mountains of Deccan, South Deccan in particular, as not true mountains of uplift, but as mere relics; or residual stumps, of an old plateau left standing by the denudation of the country around, in the age-long and ceaseless waste of the land exposed to the atmosphere. Gravimetric data too suggest axes of warping and a more complicated sub-structure for these topographic prominences than is implied by mere remnants of a peneplained tableland. Professor Bailey Willis, the noted American geomorphologist, during a tour in 1936 especially devoted to this study, pointedly drew attention to the existence of definite upwarps and downwarps in Southern Deccan.

Although it is beyond doubt that the segment of India south of the Aravalli-Hazaribagh line has never been submerged, *en masse*, under the sea since the Cambrian era, or wrinkled into mountain-chains, it bears scars of several periods of earth-movements, though of a kind quite different from the mountain-building movements. Recent geological work I have been able to do in the last three years in Ceylon has greatly strengthened the new belief. The admirably lucid physiography of Ceylon, exposed in three terrace-like platforms or peneplains, of which this island is built, throws much fresh light on the origin and constitution of the highlands of South Deccan—the Nilgiri and Palni groups of mountains. In some respects, the structure of Ceylon furnishes the key to the tectonics of South India.

* * *

To revert to the structure of South Deccan, a remarkable parallelism of many of the Ceylon phenomena is detected in the Nilgiri-Palni hills, and their southern extension, the Cardamom hills, which for hundreds of miles have their western, and still more prominently, their south-eastern sides bounded by gigantic precipices. The Nilgiri *massif* on its south-eastern face presents cliffs of 6,000 feet height rising above the peneplain of Coimbatore. Standing on the brow of Pykara precipice of 3,500 feet sheer fall, one cannot but ascribe such extraordinarily abrupt inequality of the ground in an ancient Archaean terrain to mechanical dislocation and recent block uplift. The waterfalls of this region, again, are reminders that the topography has not attained maturity, and that some recent great disruption of the river courses have taken place. The fault-scarp nature of the precipices bounding the south-east face of the Palni block of hills is no less apparent to one looking down on the plains of Madura, 4,000 feet below, from Kodaikanal. As in the Ceylon mountains, the steep scarp may not be due to single fractures, but to a system of faults, more or less vertical, in their inclination. Although modified by atmospheric wear and tear of ages they form, in many cases, most striking features of the South Indian landscapes.

That the Nilgiri and Palni escarpments are of different nature from the table-topped square-cut hills of the Deccan trap plateau is at once apparent from their difference in geological structure. In the latter, the vertical stair-like faces of the hills arise from the weathering of rectangularly jointed horizontal lava-beds, while in the former, the cliff faces, thousands of feet high, built of closely

folded and contorted strata are best explained as due to mechanical disruption, followed by relative movement along the walls of the fissure. These hills are not the residual stumps of an eroded plateau, but are upraised mountains with an orographic axis, formed during a late period of earth-deformation, rejuvenating the ancient well-graded drainage-lines of the country.

The Deccan, a much faulted land-mass

The faults bounding the mountains of South India are only a part of the system of faults traversing the inflexible peninsular shield in many directions. Several systems of longitudinal fractures intersect this one-million-mile gneissic terrain, producing a series of sunken basins; which have acted as receptacles of the detritus of the old inland drainage. Chains of such fault-bounded depressions, filled with sediments of Gondwana age, are found along the ancestral valleys of the present Godavery, Mahanadi and Damodar rivers, which form a valuable economic asset because of the important coal-measures locked up in them. The straight and steep contours of the Malabar coast have been known since the early days of the Indian Geological Survey to be shaped by one or more dislocations; while a prominent line of fractures defines the smooth coast-line of the Makran coast of Baluchistan. The basaltic lavas of the Bombay coast, which are sub-aerially erupted flows, are known to extend down to a depth of at least 2,000 feet below the sea, indicating that the coast has faulted down to that extent since their eruption. Two more fracture plains, parallel with the Makran coast fault, remain to be noted. These have given rise to the two prominent lines of steeps in the central Indian landscapes—the Vindhya and the Satpura ranges—and at the same time guided the channels of the Narbada and the Tapti along these tectonic lines. The latter rivers are peculiar in their being the only west-flowing streams of South India, a fact which finds explanation in this accidental circumstance providing them with their valleys.

The westerly courses of the Narbada and the Tapti, in sharp contrast with the rest of the Deccan rivers flowing eastwards into the Bay of Bengal, almost from within sight of the Arabian Sea, demonstrate a singularly interesting structural feature. The easterly drainage is probably the result of an easterly tilt given to the Deccan block at the time of origin of the great Malabar coast fault, the transverse Tapti and Narbada dislocations acting as release lines. The eminent naturalist, Blanford, has dated these displacements of the western coast as Pliocene to post-Pliocene—a date which brings these momentous transformations in the figure of India within the Human Era of geological history. The former date appears to be more in conformity with physical and geological facts.

The severance of Ceylon from India took place at a somewhat earlier date, by the subsidence of south-east Carnatic under the sea. By the middle of the Pliocene, however, the connection was for the most part restored by the uplift of the Jaffna limestone beds laid down on the Miocene sea-bed to form the dry land of North-West Ceylon.

The Indian Peninsula, thus, though still a rigid shield, is not an unbroken unit. Perhaps it is owing to this circumstance of multiple basin-faulting that it has attained equilibrium and isostatic adjustment as a whole and the remarkable immunity of this part of India from seismic disturbance is also to be credited to the absence of any tension between its several parts. Few earthquakes of any intensity have shaken the Deccan Peninsula, while those that have been recorded in extra-peninsular India form a long catalogue of tragedies.

The block-mountain and fault-basin structure of the Deccan is responsible for some highly beneficial features in the exploitation of the economic mineral resources of South India. To it we owe the uncrumpled and generally undisturbed underground disposition of the coal-seams accessible to simple mining in our coal-fields. The presence of large sheets of commercially valuable mica free from buckling and crushing and the wide stretches of richly aluminous laterite, capping the table-lands, also arise from this circumstance. The waterfalls of the peninsula—potential power-resources in coal-less provinces—are also the direct outcome of the same structural peculiarity. Large volumes of water, falling down fault-scarped highlands, provide a source of energy more lasting and economical than that obtained from a coal-field. The surface or near-surface occurrences of iron and manganese-ores, rendering these two most valuable metallic assets of the country susceptible to comparatively simple mining operations, are also indirectly ascribable to this cause.

The remaining orography of peninsular India is represented by the tectonic chains of Aravalli and the Eastern Ghats, all but worn away and now existing mainly in their roots. Once of a size comparable with the Himalayas of to-day, these mountain ranges have played a large part in the succession of geological ages and

their detrital waste has furnished the raw material of the principal rock-systems of India.

The Vindhya and Satpura chains, which form the main divide of North and South India to-day, are not of as great geological antiquity. There is some evidence that in the early Eocene they were non-existent and that a north drainage flowed across their site to central Deccan. These prominent lines of steep south-facing cliffs, like the cliffs of the Western Ghats in the Konkan, have been produced, as stated before, by parallel linear faults, now usurped by the valleys of the Narbada and the Tapti. Though of tectonic origin, these ranges have no axis of folding or compression.

The mountains of the Assam ranges and those of the Salt Range in North-Western Punjab are two unique and rather aberrant structural features of India. Though so near to the Himalayas, their orography is unrelated and independent and their folds, faults and thrust structures present problems that have aroused the keenest interest of geological workers in India.

The volcanic plateau of North Deccan

A large section of the Deccan, so far left out of the above description, now claims attention, portions of Bombay-Deccan extending from Kathiawar to Nagpur, and from Malwa to Dharwar. This part of India possesses the simplest geological structure possible, for these 200,000 miles tract is built up of flat-reposing sheets of lava; forming a pile from 2,000 to 6,000 feet high; completely burying the ancient geography of the land. Time has sculptured this lava plateau into imposing hills, valleys and plains, but these high hills are only the few outstanding portions of the plateau that have withstood weathering, and have no pretensions to be classed as mountains of elevations. They have no orographic axes of folding, but have remained in their original position and altitude. At the time of its completion, this volcanic formation, known as the Deccan trap, must have covered a much wider extent both in area and altitude, and it will not be far wide of the mark to say that 400,000 cubic miles of molten rock was poured out from the bowels of the earth during this volcanic period—a volume of rock exceeding both in bulk and mass that represented by the entire body of the Himalayas, and of an average density one-tenth higher than that of the Himalayan rocks. The transfer of so much heavy matter from the interior of the earth to the exterior must have had reactions on the isostatic adjustments of the neighbouring sections of the crust. Relief would be sought in the downwarp of large tracts whereby the relatively lighter rocks of the upper crust would be depressed and condensed. We might see in this a predisposing cause for the sinking of the long and wide tract of the Indo-Gangetic plains to a depth of some thousands of feet in front of the Himalayas. The completion of the gigantic volcanic discharge of the Deccan trap may be considered as pene-contemporaneous with the first uplift of the Himalayas in Mid-Eocene to Post-Eocene time. No satisfactory theoretical explanation has yet been found for the hidden chain of dense matter detected by gravimetric survey, referred to before on page 5, under the southern edge of the plains. A suggestion may be advanced that the upwelling of the basaltic magma forced up, along the north periphery of the Deccan trap reservoir, masses of ultra-basic, dunitic rocks from the deeper levels of the reservoir to a position in the upper crust near enough to affect the plumb-line and the pendulum. A concentration of masses of heavy rock along this chain was suggested as long ago as 1914 by Sir Thomas Holland as a matter needing further attention of geologists and geodesists. The parallelism of the hidden range with the Himalayan protaxis cannot be entirely accidental and may have a structural significance suggesting sub-crustal redistribution of heavy and light rocks—an upwarp of the sima preceded, or caused by, the downwarp of the Gangetic tract.

The sculpture of time

But in the making of India the constructive geological processes that we have hitherto considered have only given the broad outlines of the country; the shape or figure of India, as we see it to-day, is determined essentially by the destructive processes of Nature. The sea, rain, rivers and other atmospheric agencies of change, by their ceaseless action have cut deep into the profile of India and have removed thousands of feet of matter from off the surface, producing the existing sculpture of the land. The 6,000 to 15,000 feet thick beds of clay, sand and silt, laid down in the Indo-Gangetic plains, are all derived from the decay of the Himalayas. They are only a small measure of the waste of these mountains. The dissection of the originally two miles high volcanic plateau of Malwa-Deccan to the depth of over a mile into the picturesque alternation of plains, valleys and hills is another visual demonstration of the power of surface natural agencies in shaping the surface features of the continents, while constantly lowering their level to the mean sea-level.

These base-levelling processes have in the past, repeatedly peneplained vast tracts of India, but the geological cycle was not allowed to be completed by the supervening earth movements which restored topographic youth. Rajputana and Madras have thus been levelled and peneplained and rejuvenated by timely earth-movements reversing the geological cycle time and again.

Ladies and Gentlemen, the above is mainfestly an incomplete summary of the structure of India. It has dwelt mainly on those aspects which have received some additional facts from the work on which I have been lately engaged.

Seasonal Control of Rural Life and Activities in the Conjeeveram Region*

By

N. Subrahmanyam, M.A., L.T., F.R.G.S.,

Madras.

It is proposed to discuss and bring out in this paper the control of the seasonal cycle over the rhythmic activities of rural life in South India, illustrating it in the Conjeeveram region of Chingleput District.

Climatic control is known to be one of the most potent influences of all controls on earth; and the rhythm of seasonal swing has no less its influence in any region in the most insistent way, not only on plant and animal life but also on human life and activities in spite of the vast advances of science and the innumerable achievements of man.

The Conjeeveram Region has been chosen here for special study as seasonal control on rural life, as it forms a type in itself, occupying a middle position between the Tanjore delta with its practically perennial supply of water for the whole year and the purely tank-fed areas of the Karnatic region, where the off-season is more definite and marked.

Leaving the town of Conjeeveram itself, we take up here the rural areas and units attached to it commercially and culturally. It is not, however, quite easy to delimit this region; and it can be fixed only in a tentative and elastic way. From one point of view, the Taluk boundaries may be considered to fix it, for the reason that the villages therein are under the control of the administrative officers in the headquarters; and this is a great convenience in selecting the Taluk area for the study.

The Conjeeveram region is part of a peneplain, level in nature, sloping gently from west to east as shown by the flow of rivers.

*Paper read before the Geography and Geodesy Section of the Indian Science Congress, Baroda, January 1942.

The soil is covered for the most part by recent alluvium, deposited by the Palar and its tributaries. Compared to the Cauvery delta, the soil of this region is less fertile; and on the whole may be said to be poor, as in most parts of the District.

Temperature.—The region is hot throughout the year; and during the months of April to August, roughly between the two periods of overhead sun, it is hotter than in the remaining months. The mean temperature varies from 85°F. to 90°F. in these hot months, while in the rest of the year, it varies from 70°F. to 80°F. But being dry heat, it is not sticky and uncomfortable as on the West Coast of India.

Rainfall.—The average rainfall of the region is about 43 inches per annum—not much different from that of Madras. Its monthly distribution is as follows:—

Jan.—	Feb.—	Mar.—	Apr.—	May.—	Jun.—	Jul.—	Aug.—	Sep.—	Oct.—	Nov.—	Dec.	Total.
.93	-·41	-.25	-.55	-1.99	-2.62	-4.35	-5.82	-5.97	-7.62	-9.10	-3.30	43.

The region derives the benefit of both the monsoons, though the precipitation is much greater in the north-east monsoon, in the months from September to December, being about 26 inches, or more than 60 per cent of the total rainfall of the whole year. This amount is, of course, too poor for agriculture to be carried on without adequate irrigation facilities.

The Palar and its tributaries.—The Palar, the chief river of the region, runs through it a short distance south of Conjeeveram town; while an insignificant tributary of it, the Vegavathi, which flows through the town itself, joins the Palar a little lower down on the left bank. A few miles lower still, a more important tributary, the Cheyyar, unites with it on the right bank. The Conjeeveram region is almost completely a part of the lower Palar-Cheyyar basin.

The regime of the Palar is something peculiar, unlike the Godavari, the Krishna or the Cauvery. Much of its headwaters is impounded in the Mysore State to feed the Bethamangalam tank for the Kolar Gold Fields; and its floods are nowadays, therefore, much lower and fewer, than they used to be some thirty or forty years ago. For the most part of the year the sand-bed is exposed with very little flow of water; and only three or four short spates occur during the rains of the north-east monsoon. The water is then lead on by channels and impounded in tanks, which stud the whole region as in the rest of the Karnatic plain. Very often the overflow of tanks higher up fills in the tanks lower down, lying along the axis line of a trough or valley. Each village has its own tank; and sometimes a large tank irrigates a number of villages.

Though tank irrigation is the normal mode here, irrigation through spring channels dug in the dry sandy bed of the Palar and its tributary the Cheyyar is another mode peculiar to the villages along this river as in parts of the basins of north Pennar and south Pennar. These spring channels dug along the middle of the river run obliquely across the banks and lead to the several villages lying alongside of it, supplying water to man, beast and the crops. Wells, worked by lifts and picottahs, can only supplement; but rain-fed and river-fed tanks and spring channels are the two chief methods of irrigation in this region. Some villages like Tenneri depend on tank alone; and some others like Angamabakkam and Avalur depend on spring channels alone; while, still others have both the tank and the spring channel.

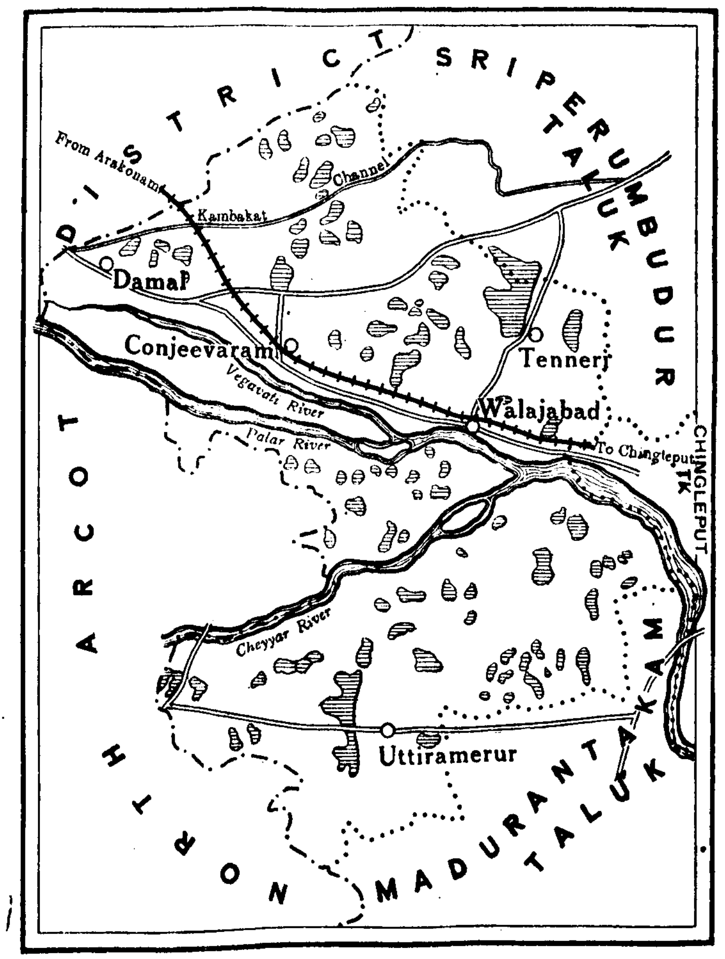
While the tanks get filled in the rains of their own accord, the spring channel requires to be re-formed after the flood season is over, and kept in proper repair from time to time. It is the normal duty of all cultivators in the village to attend to this work co-operatively with the help of teams of oxen. Cattle, which usually form a very important item in the stock-in-trade of the peasant, is required in such villages for the ordinary work of ploughing and carting as well as for the periodical repair and upkeep of the spring channels, just as they are elsewhere required for lifting the water from wells.

The cattle of the region is not quite good; and the better varieties are got at Ranipettai (North Arcot District). In this region itself, Walajabad is a well-known cattle market, where hundreds of animals change hands, especially after the first rains in July (Adi). Not only is the local breed inferior, the feed is also unsatisfactory, especially with the poorer peasants who cannot give more than paddy straw.

Animal droppings and leaves where available are the only manures used; and no fertilisers are ordinarily resorted to. The former are gathered and stored in the off-season, and the latter as and when required for immediate use.

Before tracing the influence of the Seasons on Rural Life and Activities in the region, it will be helpful to describe the march of the seasonal cycle in the East Coast Region of South India, of which the Conjeeveram region is a part.

CONJEEVARAM TALUK (Region)



The Seasons.—The English year is divided into four clear-cut seasons; but the Indian calendar shows six. The latter, however, apply particularly to Northern Indian conditions, and do not fit in exactly with South Indian conditions of winter rainfall, and low range of temperature.

From about the middle of March to the middle of June (Panguni, Chitrai and Vaiyasi) the season is *hot* and *dry*, except for the very occasional thunderstorms, known here as *mango* showers.

From the middle of June to the middle of September (Ani, Adi and Avani), it is *still hot but fairly rainy*, with rains coming from west winds, the remnants of the south-west monsoon of the West Coast Region.

From the middle of September to the middle of December (Purattasi, Arpasi and Karthikai), the heat steadily goes down with the northern winds which blow now, bringing coolness and monsoon rains from the Bay of Bengal.

Lastly, from the middle of December to the middle of March (Margali, Thai and Masi), the rains cease now and dry conditions prevail, but the relatively cool season continues for another three months.

The hot and cold months occur when the sun is North or South of the equator respectively. The rainy and dry months occur during Dakshinayanam (the sun's apparent southern journey) and Uttarayanam (the sun's apparent northern journey) respectively.

This rather rough characterisation of the Seasons here has, however, its nicer gradations and occasional abnormal variations. But on the whole it gives a general idea of them.

SEASONAL ACTIVITIES IN THE VILLAGE

Rural Life in the hot, dry season.—After the Hindu New Year is born, about the middle of April, the midday sun rises higher and higher in the heavens and the days begin to get hotter and hotter. At the same time, all water in the countryside gets scarcer and scarcer, being either used up or dried up. The normal agricultural activities of the village also become gradually slackened, and soon come to a standstill. For the average villager this is usually a time of comparative leisure—an off-season, corresponding to the winter of temperate climes.

Certain industries, however, connected with agriculture such as the making of jaggery, where sugar-cane is grown, are carried on now. A few favoured fields with better water supply have still the crop in the field, and require to be cut. Or, a few plots near a well may be growing garden crops—vegetables, water-melons etc. All this is but a thin streak compared to the busy work of all hands at the full season.

Time is now found for many a subsidiary work which could not be done earlier with the crops in the field; and labour is now abundant. The casuarina trees are now cut for fuel and transported to the town (Conjeeveram) against the demands of the May (Vaisakha) festival, when thousands of pilgrims congregate. Thatches are now renewed and huts are rebuilt against the coming rains. Bricks are now burnt, lime kilns are at work, and fences are put up. The building trade flourishes best at this season, unhampered by rains or by the normal agricultural operations of the village.

Though all the harvest has been gathered, the orchard requires to be guarded, and the fruits have to be sold from day to day as they ripen. Flowers and fruits are now in season both in plenty and in variety. It is now *Vasantha* or spring of the Indian calendar —the season of plenty and pleasure, of feasts and festivals, of marriages and matings. It is now that debts are paid off and mortgages redeemed, lands purchased or improved, wells sunk or deepened, embankments put up or canal dug, journeys and pilgrimages undertaken, or friends and relatives received and entertained.

This is also the season, best enjoyed by the urban youth; for, as it is now the time of summer vacation for schools and colleges, they happen to visit their rural relatives—fathers, uncles or fathers-in-law. Social amenities of rural life are now much in evidence, such as cock-fighting or play-acting of *Gangamma Vesham* or of epic stories, or the singing of Bhajana concerts, celebrating the birth of Rama (Sriramanavami usually falls in April).

While English rural life is controlled by temperature and the English peasant has his period of rest and enjoyment during the long winter evenings, it is interesting to note that Indian rural life is controlled by moisture (water) and that the Indian peasant has his comparative leisure and enjoyment during the dry days of summer. Very true, indeed, are the words of the ancient Tamil poetess Auvai that 'without rain there is no work to be done' (for the farmer)—"*Mari alladu kariyam illai.*"

Rural Activities in the West Wind Season.—From this comparative torpor and lethargy, the village springs up to sudden life and activity with the first rains in June (Ani). Compare with this the springing up of life in England with the coming of the sun. The month of Ani witnesses the drawing up of new lease-deeds of cultivation and the Sub-Registrar's offices at Conjeeveram and Walajabad now get a sudden increase of work. There is also now a sudden demand for cattle for the plough, as the peasants, most of them poor, dispose of their stock at the end of the cultivation season. Droves of them are now led to and from the cattle market at Walajabad, while the middle men ply their business merrily. No doubt, the peasant has often to incur a double loss in the sale and repurchase of the animals; but due to his shiftlessness he undergoes it with no thought.

The western sky is anxiously watched day by day, and at last the rain cloud appears and brings the long-expected rain. An interesting feature at this time is the sudden demand for the services of the village carpenter for mending the plough; another evidence of the shiftlessness of the peasant, who does not get this done earlier. This temporary rise of the carpenter to some importance now and the dislike with which he is looked upon when he comes later on at the time of the harvest to collect his wages of paddy-sheaves, have been preserved in the Tamil proverb "*Adi asari, Thai thachchappayyan*". The Master-carpenter of Adi (June-July) becomes the carpenter-boy of Thai (January-February).

With the first rains commences usually the dry ploughing both for dry and wet crops, the first furrow or *ponneru* as it is called (literally golden plough) being drawn on an auspicious day and hour fixed by the village priest. The village now begins to hum with a new life. The half-built house, the half-cut *tope*, the half-raised wall are all left off suddenly to be taken up for completion at the next slack season. The Indian peasant knows instinctively the immense importance of taking time by the forelock so far as cultivation is concerned, in spite of his inveterate sluggishness in most matters. The sojourner in the town hurries back to his village on the first news of rainfall.

About the time that the courts and colleges reopen in the town, the peasant, too, finds himself harnessed to his work; and for the next three months he gets deeper and deeper into it, day in, day

out, ploughing and sowing, weeding and transplanting, watering and manuring. It is only the better lands with better facilities of water supply that can be cultivated in this season. The occasional rains brought by the west winds during this season of the south-west monsoon, supplemented by the supply of spring-channels and wells, help the growth of this first crop, both dry and wet, the *kar* paddy being the chief wet crop, and ragi, sesame and ground-nuts, and pulses being the chief dry crops.

Rural Activities in the North-East Monsoon.—The monsoon turns about the time of Michaelmas or Dasara in September-October (Purattasi); and now the early *kar* crop and the dry crops are gathered in, while the *samba* crop is in the seedling stage or is being transplanted. During the next two months this principal paddy crop flourishes best in the monsoon rains of October and November (Arpasi and Karthikai). The village is now practically flooded with water; and all the fields, even the inferior ones, are now in crop. All the agricultural operations go on merrily now; and all hands are at it, male and female, young and old.

But, if the monsoon fails, all that the peasant has staked upon is lost; and his labour of three to four months as well as his little capital spent on manures, seeds etc., is all waste, and famine stares him in the face. He runs into debt at a high rate of interest, mortgaging his land or his cattle or his petty homestead.

If, on the other hand, things go well for him and the seasonal rains do not fail, he is able to gather his main crop of the year a little after Christmas time, which synchronises with the winter solstice. On the first of Thai (about the middle of January) the peasant celebrates his fresh harvest and the commencement of the Sun's approach towards him in the *Sankranthi* or *Pongul* (new cooking) festival. As a harvest festival it corresponds to the Malayalee *Onam* and the Autumn Firstfruits in England.

Urgent debts are paid off, now, partly at least; and some marriages are celebrated. This is the season that the urban visitor to the village enjoys best. Except for a little sharpness in the night and for a little mist in the morning, the season is very pleasant and enjoyable, without drenching rain or scorching heat, with water and verdure wherever the eye can reach, and a bracing coolness which invites and compels tramping out.

The peasant stores the grain for food and seed, and sends the surplus in driblets for marketing at Walajabad or Conjeeveram.

Besides the debts to be repaid and his other ordinary expenses, the kist has to be paid in instalments in the next three months. He also stacks the straw as much of it as he needs, and disposes of the rest as need arises for cash.

Activities of the Cool Dry Season.—The peasant, however, cannot have his rest for another three months. The second crop of medium lands, the third crop of best lands or the second dry crop has yet to grow; and all these depend not on rain, which are almost over for the year, but on stored up or baled up water, while the dry crop like pulses depends upon dew for its growth. As all these crops are being gathered, the sun gradually gets hotter and hotter and all the water gets used up or dried up; and by the end of the Hindu year, summer conditions of heat and drought have set in, and the cultivator has perforce to stop his normal activities for the year.

Seasonal Control Contrasted in England and India.—The cycle of rural life and activity elucidated above, closely correlated as it is with the periodical swing of the seasons, forms an interesting illustration of environmental control on human life under certain definite conditions in a particular region in South India. It will be worth while to contrast the different ways in which seasonal control acts, for example, in England and in India. Of the two important factors of climate and weather, the *temperature factor has greater influence in England* on plant life, animal life and human activities, so that winter is the 'sleeping' season there, life springing up and growing up with the coming up of the sun and going down in autumn with the sun's retreat.

In India, on the other hand, there is plenty of warmth for plant growth and animal life even in winter, so that the great need here is for the other factor, *moisture* (*i.e., water*), to ensure plant life and crop growth. Hence, the 'sleeping' season for the Indian peasant is the dry hot season, before the south-west monsoon breaks.

This difference is well illustrated by the two types of deciduous trees that are native to the two countries. The *temperate* deciduous type like the oak tree sheds its leaves in winter, while the *monsoon* deciduous type like the teak tree sheds its leaves in the hot *dry* season.

There is, however, a greater difference between the relative influence of these two factors of control in the two countries; the English winter is more deterministic, giving a definite 'sleeping' season, whereas in India, the supply of the needed water by provision of irrigation facilities in favoured areas affords scope for continuous plant growth, though not so luxuriantly as in the equatorial belt where it pours all through the year.

North-Western India and Conjeeveram Region contrasted.—There is an interesting contrast between the Punjab or any other part of North-Western India and the Conjeeveram region or any other part of South India. The high range of temperature with a low winter temperature in North-Western India has given rise there to the distinction between summer (Kharif) crops and winter (Rabi) crops, without at the same time any cessation of crop growth unlike in England. In South India, on the other hand, crop differences are due to the differences in the availability of water, and not due to differences of temperature.

Malabar Coastal Region and Karnatic Region contrasted.—An important contrast between the west and east coastal regions of South India is to be found in the fact that the main rainy season on the west coast is from June to August (South-west monsoon), while on the east coast it is from October to December (North-east monsoon); and this has led to the difference that the principal harvest is over in the former by September (Onam), while the principal harvest in the latter is in January (Pongul).

Conclusion.—Even in the other sub-regions of the east coast region of South India, similar influence of the seasonal cycle as in the Conjeeveram region can be traced with, of course, local variations and peculiarities in the matter of details.

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Localisation of Crops in India*

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The object of this note is to illustrate a graphical and an analytical method of representing the localisation of crops.

Localisation may be defined as the degree of dissimilarity between the geographical distribution of the cultivated area and the different crops. To study the trends of distribution of the crops in the same area in different periods of time as well as the different crops at the same period we require a statistical measure of this concept. This requires at the first instance a division of the country into a number of homogeneous regions. For each region we know (1) the percentage of the area under the particular crop in that region to its area in the whole country and (2) the percentage of cultivated area in the region to the cultivated area in the whole country. The ratio of these two quantities, which may be termed the location factor, gives an idea of the relative importance of the different regions for the particular crop. If the extent of cultivated area in all regions is the same (1) alone gives the location factor and the usual spot diagram drawn on maps will be sufficient. But as the areas differ another method is required.

Method I.—Now the different regions can be arranged for each crop according to the ascending or descending order of the location factor and then the 2 variables can be aggregated. Plot these sets of points, taking one as x co-ordinate and the other as y co-ordinate. Join the points by means of straight lines or draw a smooth curve through them. A graph of these sets of values gives the well known Lorenz curve. The ratio of the area of the loop ONB to the triangle OAB in Fig. 1, gives the co-efficient of localisation.

*Paper read before the Geography and Geodesy Section of the Indian Science Congress, Baroda, January 1942.

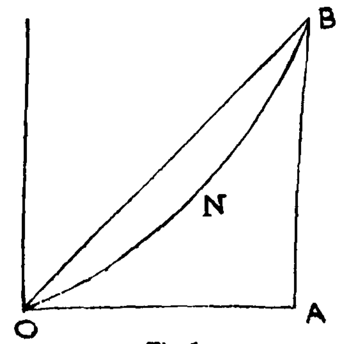

Fig 1

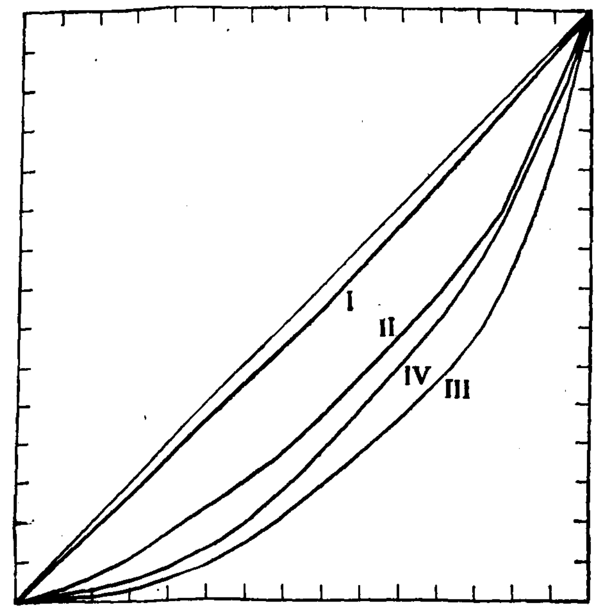

Fig 2

I. Food
II. Oilseeds
III. Sugar
IV. Fibres

Method II.—The co-efficient of localisation may be taken as the weighted average of the absolute deviations of the location factor from 1, weights being proportional to the cultivated area in the region. Shortly subtract the region percentage of the cultivated area from the region percentage of the area under the crop in question in all regions in which the latter is greater than 1. The sum of the differences divided by 100 is the co-efficient of localisation. (*Note*: If different people take different boundaries we get different co-efficients).

The above methods are applied for the distribution of crops in the major provinces of British India mainly Madras, Bombay, Bengal, Bihar and Orissa, the Central Provinces, the Punjab and the United Provinces in the quinquennium 1930-35. The figures of the areas of the crops are taken from the Indian Agricultural Statistics, Vol. I for the year 1934-35.

The following table gives the percentage area in each region to the total in British India for each crop:—

(AVERAGE 1930-31 TO 1934-35)

Crop	Madras	Bombay	Bengal	Bihar & Orissa	C. P.	Punjab	U. P.	Rest
Rice	16·6	4·7	31·6	20·1	8·0	1·4	9·6	8·0
Wheat	0·1	10·4	0·6	4·7	13·4	35·7	31·0	4·1
Cholam & Kambu	21·6	39·6	—	0·5	12·9	12·1	13·2	0·1
All food crops	15·1	12·8	12·2	13·2	10·8	11·8	20·0	4·1
Linseed	0·2	5·9	5·6	29·0	41·9	1·3	11·9	4·2
Groundnut	71·3	24·0	—	—	3·8	—	0·9	0·0
All oil seeds	34·5	13·2	7·4	12·8	14·3	8·0	6·5	3·3
Sugar	6·6	2·3	9·2	10·8	0·8	15·0	52·5	2·8
Cotton	15·5	30·2	0·4	0·4	31·7	16·0	5·2	0·6
Jute	—	—	87·2	6·8	—	—	0·1	5·9
Fibres	13·6	25·3	13·2	1·4	26·4	13·3	5·4	1·4
All crops	15·9	14·0	11·7	12·2	11·3	[illegible]	[illegible]	[illegible]

The following table gives the location factors for the different crops for each province.

Province	All food	Oil-Seed	Sugarcane	Fibres
Madras	0·94	2·15	0·41	0·85
Bombay	0·92	0·94	0·16	1·81
Bengal	1·04	0·63	0·77	1·13
Bihar and Orissa	1·08	1·05	0·89	0·12
Central Provinces	0·95	1·27	0·07	2·45
Punjab	0·91	0·62	1·15	1·03
United Provinces	1·13	0·36	2·99	0·30
Rest of Br. India	1·00	0·80	0·69	0·34

Method I.—Arranging the provinces according to the ascending order of the location factor for each crop and aggregating the percentage of the area under the crop and the area under all crops we get the following results.

Food		Oilseeds		Sugarcane		Fibres	
1	2	1	2	1	2	1	2
11·8	12·9	6·5	17·9	0·8	11·3	1·4	12·2
24·6	26·9	14·5	30·8	3·1	25·3	0·8	30·1
39·7	42·8	21·9	42·5	9·7	41·2	8·2	34·2
50·5	54·1	25·2	46·6	12·5	45·3	21·8	50·1
54·6	58·2	38·4	60·6	21·7	57·0	35·1	63·0
66·8	69·9	51·2	72·8	32·5	69·2	48·3	74·7
80·0	82·1	65·5	84·1	47·5	82·1	73·6	88·7
100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

1. Percentage under all crops
2. Percentage under the crop

These sets of points for the four crops are plotted on the graph paper with the percentage area under the crop on the x axis and percentage area under all crops on the y axis. The greater the area of the loop the greater is the localisation. From the graph we can see that the four crops can be arranged in the following ascending order of localisation.

1. Food crop; (2) Oilseeds; (3) Fibres; (4) Sugarcane

1. Food crop		(2) Oilseeds		(3) Fibres		(4) Sugarcane	
Rice	0·285	Linseed	0·474			Sugarcane	0·367
Wheat	0·547	Groundnut	0·654	Cotton	0·397		
Cholam & Cumbu	0·329	All oil seeds	0·202	Jute	0·755		
All food	0·036			All fibres	0·293		

From the above table also we find (for the main items) that the total of food crops is least localised, and this is followed by all oil-seeds, all fibres and sugarcane in order. This fact can be very easily explained. In a predominantly agricultural country like India, every region should depend to a very large extent upon local production for at least food items. Oils come next in order after cereals among necessities of life and here also localisation must be very little. Other crops are commercial crops where the degree of localisation is likely to be higher. But if we go to the subdivision of crops we find localisation due to geographical and other factors. For example, wheat is localised in the Western part of Northern India and Central India; rice in the Gangetic plains of Bengal and Bihar and the deltaic regions of Madras; cholam and cumbu in the dry regions of Madras and Bombay, etc. Similarly linseed is localised in Bihar and Orissa and the Central Provinces, and groundnut in Madras and Bombay. The most highly localised crop in India is the jute of Bengal, and cotton is important in Bombay, the Central Provinces and Punjab.

Settlement Types of Bombay Karnatak*

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"Of all the phenomena involved in the satisfaction of essential human needs, habitation is to the highest degree geographical."
—*BRUNHES.*

Introduction.—Bombay Karnatak consists of the four Southern Districts of the Bombay Province. Culturally and linguistically it is a separate entity, with an area of eighteen thousand square miles and a population of thirty four lakhs.[1] From the geographical point of view, the country resolves itself into four regions:—(1) The Coastal tract of North Kanara; (2) The Sahyadri Hills; (3) The Transitional belt to the East of the Sahyadris; and (4) The Eastern plateau. It is predominantly an agricultural country and the population naturally varies with the type of land utilisation.

I. *Kanara Coast.*

This Western fringe of Karnatak is marked by a narrow coastal plain. It is characterised by parallel streams which drain the land to the Arabian sea, and by the transverse members of the Sahyadris which often reach the coast line and thus divide the plain into several minor parts. From the point of view of settlement types, features of faulting hold much interest. The coastline as well as the Sub-Sahyadry Hills exhibit faulted nature of topography: and thus there is a marked contrast between the plain and the adjoining hilly region.

Owing to good rainfall and soil, agricultural conditions are favourable. This has encouraged a fairly dense population all along the coast, the density varying from 200 to 300 persons per square mile. Most of it is rural as may be seen by the number of

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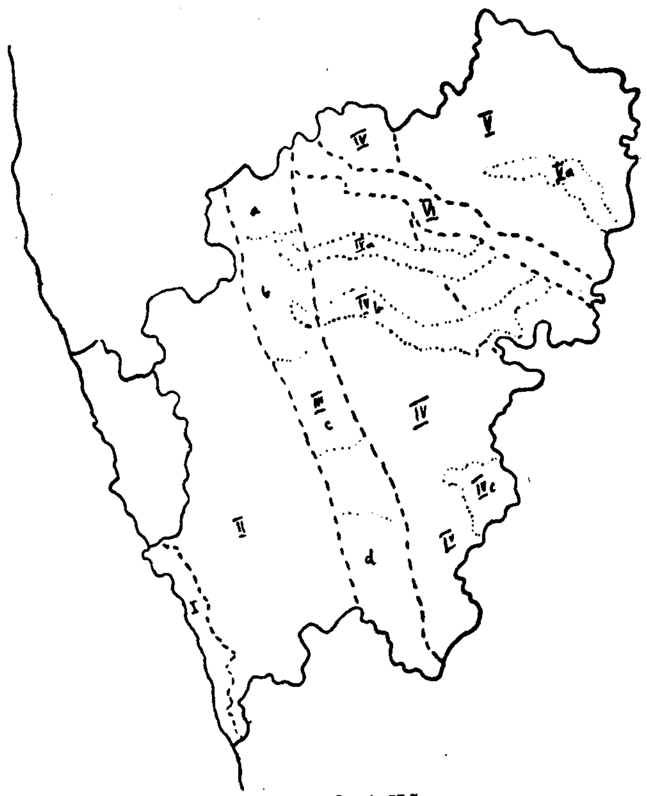
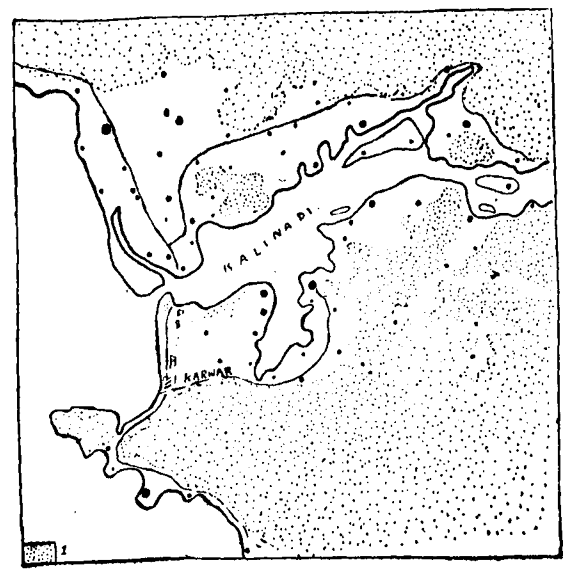
villages in each Taluka and the proportion between the rural and urban population therein.[2] The average village of the coastal plain is a small and dispersed settlement. In fact compact nature of habitation hardly exists except in some coastal towns.[3] Most of



Map 1. Scale 1:2M.
Geographical Regions and Distribution of Settlement Types.
I. Kanara Coast; II. The Sahyadries; III. Transitional Belt; IIIa. Chikodi and Hukeri; IIIb. Belgaum Tract; IIIc. Dharwar Hubli Region; IIId. Hangal Region; IV. The Black Cotton Soil Region; IVa. The Ghatprabha Spur; IVb. Malprabha Spur; IVc. Mundargi Tract; V. The Bijapur Plateau; Va. Don Valley; VI. The Krishna Valley.

these rural settlements adhere to valley sides and roads, or are situated on the sandy stretches along the coast, and, as is evident from the accompanying Map No. 2, the average rural settlement is so dispersed that in some parts of Northern Kanara it forms a continuous strip of dwellings connected by roads.

A typical rural settlement on the Kanara Coast consists of several houses and cottages which are dispersed in the field. In the construction of the buildings, influence of local conditions is evident. Generally the better type of buildings are of laterite stones (which improve in their resistance to weathering with age) and thatched or tiled roofs stretched out beyond the walls to form a verandah surrounding the house. But an average dwelling inhabited by the farmer is a wooden structure with laterite stone pillars, and a low but well-thatched roof and with an opening away from the west. Hay, weeds, and poorer types of timber, from the local forests, come in handy for this purpose.



Map 2. Karwar.

In the general *lay-out or plan* of the village, building construction seems to be guided mainly by consideration of vicinity to individual holdings, and hence the general dispersed pattern with hardly any focus of corporate living. In the larger villages, the interest of the village population gravitates round the police chowky, chavdi and post office. More recently the influence of motor bus traffic is in evidence on the road side villages with their linear pattern developed by the sudden opening up of a tea shop and an agent's stand which cater to the comfort of the travellers. In general therefore it may be said that the evolution of this dispersed pattern is due to the comparative ease in setting a dwelling almost anywhere on the plain and the fact that the nature of agricultural operation compels the cultivator to be in the field for a fairly long period during the season.

The distribution of these settlements and their *siting* have been influenced by several factors of which the following are the most prominent: — (a) vicinity of the cultivated land and roads; (b) supply of fresh water; (c) a sheltered and comparatively higher patch of land, that is not likely to remain waterlogged for long during the monsoons.

This may be illustrated by taking a section of the coast which has its extension along the Kalinadi banks. (Map). Here the preference to road and the navigable banks of the Kalinadi is evident. Away from the coast and in the interior, the habitations are smaller and much dispersed, and there is marked preference to the junction of the highland and plain.

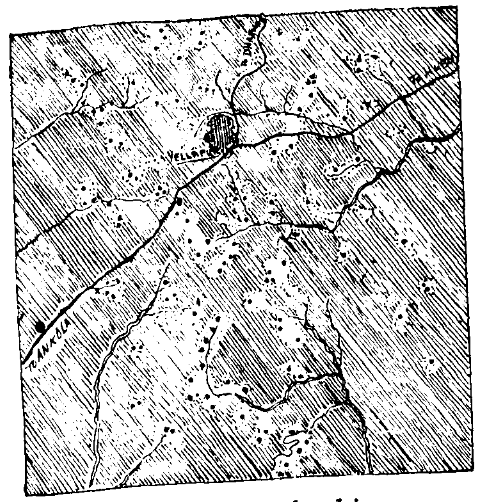
From the point of view of population an average rural settlement is a small unit with a population varying from 500–1000; a fact that deserves notice, in view of a fairly high density of population all along the Kanara Coast.[4]

Certain specific factors of human development have conferred some settlements a great benefit, and these therefore have grown into towns of a moderate size. Every river mouth is now marked by an urban settlement mainly due to their favourable siting as ports and defensive positions against attacks from the seas. Karwar, Kumta, Honawar and Bhatkal, were famous ports in the past, when sailing ships could be brought in the shallow river mouths.[5] With the development of steam navigation, this advantage has now disappeared and the ports can no longer be used for modern ships, but administrative centralisation as Taluka Headquarters, has nevertheless retained a part of their past prosperity.

II. *The Sahyadries.*

To the East of the Coastal plain, begin the smaller members of the Sahyadries, occasionally characterised by laterite flat tops, and beyond these lies the main chain of Sahyadries the major part of which is drained to the western sea by parallel streams, along with their tributaries with deeply entrenched valleys in this flank of the Sahyadries. To the East of the watershed begins a gradual slope where the valleys of the right flank open out to form a plain

land. Most of the region is under forests and is reserved by the Government: cultivation and consequently habitation, are restricted to flanks of the tributaries of rivers draining the plain. Most of these valley flats has been brought under cultivation. Good and constant water-supply and abundant leaf manure have created the famous Kanara Spice gardens.[6] Settlements therefore are naturally dispersed. (Map No. 3). In fact, houses, in the fashion of farmsteads, are dotted all along a valley, the exact site of each



Map 3. The Sahyadries.

house being determined by the junction of the flat valley floor and the neighbouring higher forested land. A village therefore may extend itself in a valley throughout its length, but it has no such central place as a market or Chavdi which characterises a nucleated village.[7] Here, each house, not each village, is a self-contained unit. Members of the house provide themselves with every requirement locally available or grown. The houses have mud walls, with an encircling verandah and thatched roofs. They are spacious and built for a fairly large joint family. A large kitchen, grain store, rice-husking utensils, boiling pots and materials for betelnut dressing, find a place in the same compound. So does the cattle-shed which is built on a higher level to allow the cattle an easy access to the forest and to prevent them from encroaching on the cultivated field. The cultivated field, particularly the patch under garden cultivation, and the compound of the homestead are fairly well-protected by fencing, against the attacks of wild beasts.

Contacts with the outer world are few and far between. The cultivator goes to a neighbouring town only when he has to sell his product such as betelnuts, or spices, or make purchases of articles, cloth, salt, etc., which cannot be produced at home.

The predominance of forested tracts and the nature of relief make these settlements thinly populated units. Population in any "village"—i.e., a group of settlements declared as a village for revenue purposes may have as few as twenty-five souls, but in no case does it exceed a thousand, unless it happens to be a roadside village of importance or one of those 'Gap' towns which control the trade routes between the coastal plain and the Eastern plateau.[8]

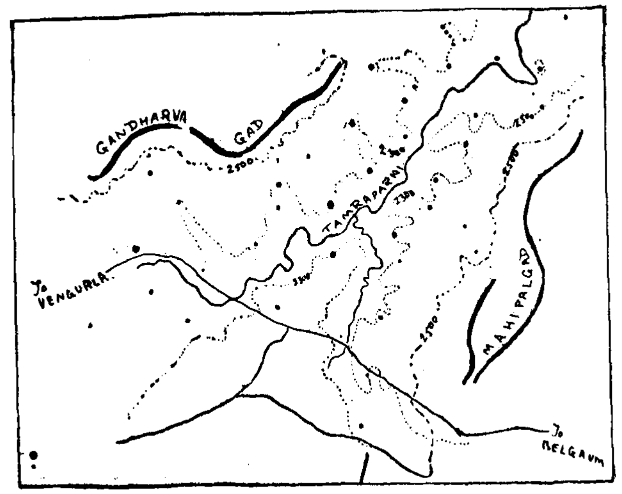
The site of these "Gap" towns is interesting: from North to South, Chandgad, Halyal, Yellapur, Sirsi are situated at those points where the Ghat roads meet and pass through a "bottleneck". Each of these is a commercial place with a population between three to six thousand, and depending upon the transit trade operated by carts and in recent times by buses.

A remarkable but nevertheless distressing feature of the hill settlements is the steady tendency to depopulation. Many of them are now in ruins. Prevalence of malaria and animal pests especially the damage done to crops by wild boar, are the two chief arguments put forward to explain it.[9]

III. *Transitional Tract.*

A belt of country about 20 to 25 miles wide east of the Sahyadries has transitional features both in topography and climate. Consequently it enjoys the advantages of the wet regions of the west and the dry tracts of the Eastern plateau. Fertile soil, moderate but steady rainfall, and irrigation, promote agriculture to an intensive stage. Commercially too the region is important because it brings in contact the regions of the west and the east. Density of population on this account is high; and there is also a high proportion of urban population owing to commercial advantages.

Like other aspects of geography in this region, the rural settlements show a transitional type. On *the basis of the size of settlements, appearance of dwellings, and the material used for building,* the following divisions may be usefully made:—(1) Chikodi and Hukeri Talukas (i A); (2) Belgaum tract; (3) Dharwar and Hubli Tract; (4) Hangal region.



Map 4. Transitional Belt.

1. *Chikodi and Hukeri Region.*—Agricultural population finds its maximum density in Chikodi and Hukeri talukas because of the intensive type of agriculture depending on well irrigation and rich trap soil. The settlements are compact units of habitation, fairly populous, and distributed at close intervals. On an average these villages have a population of 2000–4000 persons. Their prosperity is reflected by the large size and the generally well appointed nature of the dwellings. The tiled roof, (Rainfall 30-35") fairly large rooms, and mudwalls, are the commonest features within the village, and much prominence is given to grass barn and cattle sheds.

The villages are either *circular* or *linear* in their *plan.* This depends on the *nature of the Site.* This region of intensive agriculture is characterised by the contrasting zones of soil and land use. The low-lying areas are too precious to allow any unproductive use of the soil; on the other hand the higher ones cannot encourage settlement owing to distance from fertile fields and scarcity of water. The site of the village generally is either the junction of the plateau and black soil where water can be easily located, or the isolated rocky outcrops jutting out of the black soil. Villages situated on such rocky 'islands' have a compact and circular plan while those which seek the sides of a valley are almost linear in their pattern. Another interesting feature of these villages is the fortified house in the centre, usually belonging to the Inamdar of the village, reminiscent of the troublous times during the Adilshahi and Peshwa rule, when this rich region used to be a theatre of frequent campaigns.[10]

2. *The Belgaum tract.*—The stretch between Shankeswar and Belgaum is characterised by similar settlements, but of a smaller size with population averaging between 1000–2000 persons, the distinguishing feature of these settlements being the extensive use of laterite stone in constructions. The use of brushwood is very common. The villages are generally situated in the valley basin. Most of these are nucleated in pattern, and show a preference to river side, as can be seen by the villages in the Tamraparni basin. Towards the East however the villages grow in size and importance and they are not so closely placed.

3. *Dharwar Hubli Region.*—Villages are similar to those of the above region in their site, arrangement and appearance, except that laterite is replaced by mud walls.

4. *Hangal Region.*—There is a close resemblance between the villages of this region and those of Dharwar Hubli tract, as geographical conditions are similar. But tank irrigation is important in Hangal, and the siting of the villages is determined by the proximity of a tank and a higher ground near it. Most of the villages are situated on much higher ground but not far away from tanks. In general the villages except the market and road-side villages are small in size.

The following *common characteristics of the villages of the transitional belt may be noted*: (a) The tiled roof; (b) The smaller size of the village from the point of view of population;[11] (c) Defensive walls and moats around the large villages and towns which indicate the historical part played in this region.

Urban Settlements.—As may be seen from the map No. 4, this region is noted for its Urban settlements which owe their position and prosperity primarily to Commerce, although administrative centralisation and social amenities play quite an important role now. Many of them, in this part, were defensive positions. Such are, from North to South, the towns of Nipani, Shankeshwar, Belgaum, Shahpur, Dharwar, Hubli, Haveri, Byadgi and Ranebinnur, which are nodal points through which pass the old East and West routes and the modern North and South Trunk Road and Railway from Poona to Bangalore.

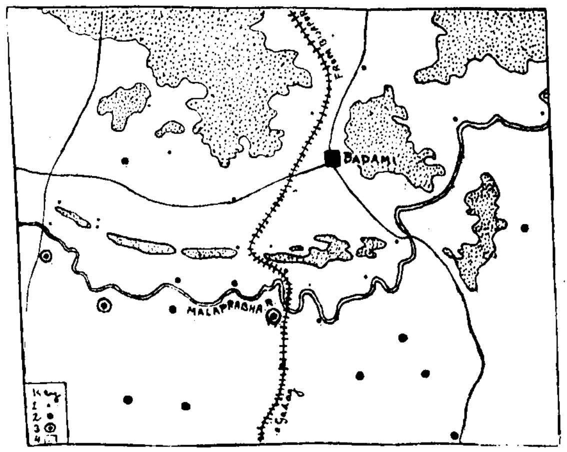
IV. *Settlements of the Eastern Plateau.*

A major part of Bombay Karnatak belongs to the plateau drained by the Krishna and its tributaries. From the point of view of settlements, geology and relief are important. Most of the Northern plateau belongs to trap rocks, but towards the south, rocks of the Kaladgi series introduce a variation in relief and quality of the soil. This has influenced relief, land utilization and settlement types.

1. *The Black Cotton Soil Region.*—This region includes the southern part of Belgaum and eastern part of Dharwar. The richness of the soil and the commercial prosperity of the region are reflected in rural settlements which are large compact groups with a population of three to five thousand.[12] These are, generally, widely spaced and nucleated units, in many cases with a surrounding wall and a watch tower inside. Two factors have influenced their site: availability of a comparatively infertile spot which could be used for the unproductive purpose of house building, and the supply of fresh water. The villages in this region therefore are nucleated round bare rock outcrops or around hillocks which stand out prominently in the plain and where there is a fresh water supply through wells or tanks. In this respect the tanks, which are mostly artificially created by placing a bund across a hollow stretch to keep rain water in storage, influence the site of the settlement to a great extent. Almost every village in this region is characterised by one or more tanks. Many villages naturally seek the banks of perennial streams which are evidently few in the region, while some prefer to adhere to non-perennial *nala* sides in order to get nearer to the water table. Further the nature of agricultural operations have influenced, at least to some extent, the compact pattern. The soil is rich and requires little attention; and the crops therefore do not require constant attention. A farmer can afford to undertake cultivation of fields distantly situated from his home. Heat and aridity are the two general features of the climate and these influence the *pattern of house construction.* In fact, the whole of the Eastern plateau conforms to this pattern. The houses rise on a slight eminence, with mud walls which may be sometimes three to four feet thick. Then there is the flat roof built on a support of brushwood, on which is heaped a uniform thickness of mud to make the interior cool and reasonably water-proof. Wood plays a remarkably insignificant part. It is used only for frames and doors. Windows there are generally none. Bathroom also is unimportant. The houses are built in one continuous row, on both the sides of the village roads,

so that the whole village appears as though bursting out of its allotted land, into the fertile fields surrounding it. A feature of agriculture is the "Gavthana," an open land specifically reserved for the harvesting operations of the community, which can be preserved, free from encroachment only by the force of custom and legislation. So great is the pressure of agriculture on the land owing to its natural fertility.

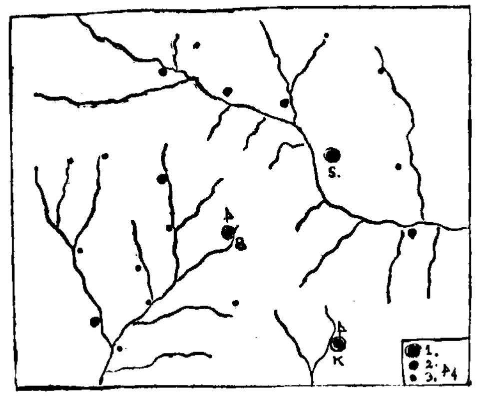
How quickly a change in the nature of soil effects a change in the type of settlements can be seen from a study of villages in the *Mundargi region,* where the ash grey soil yields but poor agricultural results.[12] The small villages with dirty-looking and neglected houses though similar in appearance offer a great contrast to those of the Eastern part of Gadag Taluka, only fifteen miles away from this region.[13]



Map 5. Malaprabha Spur and the Black Soil Region.

2. *Settlements of the Ghatprabha and Malaprabha Spurs.*—The Ghatprabha and Malaprabha spurs owing to their geological structure introduce a sudden change in the topography, land use and the settlements of this region. These residual ridges belonging to the Kaladgi Sandstone series, stand out prominently in the Black soil plain. Poor soil does not encourage agriculture and habitation. Consequently these are thinly populated belts of the plateau with a covering of Scrub and brushwood. Villages are few. They are very small in size. Houses are built out of locally available stone and brushwood. The flat roof of course persists. The smaller size, the building material, and the absence of prosperity, distinguish the

spurs settlement from those of the Black soil plain. A very interesting feature is the existence of many 'gap' villages that have played a prominent part in Maratha History, since the spurs offered the only obstruction to forces moving north and south of the Krishna. Jamkhindi, Mudhol, Manoli, Torgal, and Ramdurg are such fortified settlements. now the seats of the ruling chiefs of the Southern Maratha Country.[14].



Map 6. Villages of the Don Valley.

1. Market Villages with population over 2000.
2. Villages with population of 700 and over.
3. Villages with population less than 700.
4. Places of Pilgrimage.

Note.—The larger size of the Don Villages may be compared with that of the other streams. Bableshwar and Kakandkhi owe their importance to annual fairs. Preference to Valley sides is common to all settlements.

3. *Bijapur Plateau and the Don Valley.*—Although the general settlement type of the region has a resemblance to the Black soil type, the scarcity of rainfall and frequency of famines have influenced the economic development of the region. The contrast between the plateau tops having a thin covering of trap soil and the valleys which have deep black "regur" and are generally well supplied with water, is great.[15] This has influenced the site of the settlements.

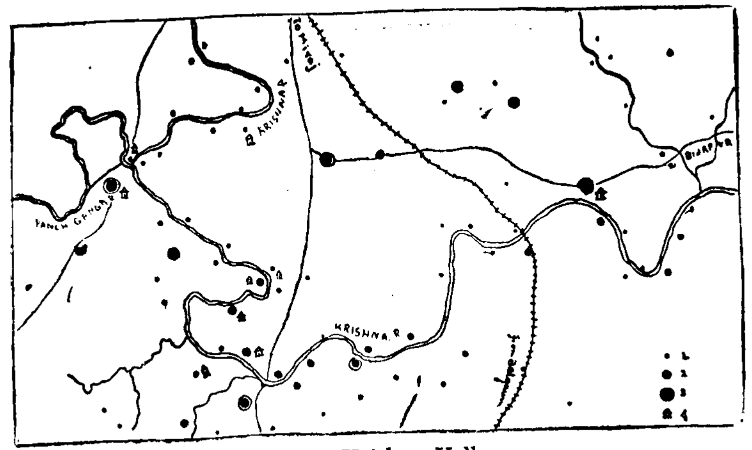
The region on the whole is thinly populated because of famines and the settlements are small and almost entirely confined to valleys where good cultivation is possible and for its habitation, the population seeks that spot, which is agriculturally a waste area and yet is in the neighbourhood of water supply. The Don valley in this respect shows the maximum development of such settlement types.[16]

The rich black soil of the Don Valley attracts population, and the valley is therefore dotted with a line of larger villages. The site of the village, again, depends on the outcrop of harder rock or an eminence covered with immature soil. Supply of fresh water from wells or tanks is an important factor in determining the site since the Don is a salt water stream.

The uplands in the immediate neighbourhood offer a strong contrast. These are the plateau tops where the trap soil does not get the chance to mature. Consequently, these form into rolling, almost treeless plains inhabited by wandering 'Lamanis' and shepherds who depend on sheep grazing. Settlements are very few indeed and they are of the poorest character both in the materials of the building and appearance.

4. *Riverine Settlements: The Krishna Valley.*—In the arid or semi-arid regions, existence of water makes all the difference. In Bombay Karnatak, supply of water becomes an increasingly important factor from West to East. For this reason, rivers introduce a great contrast in the settlements of the plateau. Riverine settlements along the Krishna and her major tributaries can be easily distinguished *by their size and pattern.*

The villages of the Krishna valley in particular stand out in prominent contrast to other settlements and on this account they have to be studied as a group. In Bombay Karnatak the Krishna valley *proper* has an average width of about four to six miles, i.e., the influence of the Krishna waters, directly and indirectly, can reach to this extent on both the banks. The black alluvial soil, though liable to severe erosion, is rich; and a variety of crops, irrigated and non-irrigated, can be grown. Its rich meadows too have evolved the famous 'Krishna' breed of bullocks. Population is naturally dense, and is dotted on both the banks of the river. The upper reaches of the Krishna (in Belgaum District) is characterised by large settlements, situated on slightly higher ground, less



Map 7. Krishna Valley.

1. Minor Settlements; 2. Major Settlements; 3. Market Villages; 4. Religions Centres.

liable to floods. A feature of interest is the siting of opposed settlements on the river which is evidently due to the seasonal suspension of communications across the river during the rains. The other point of interest is the growth of large villages, like Ankli and Manjri ,at those points where the river offers good fording.

Generally the villages of the upper reaches partake the character of the transitional belt in their pattern and house types with one additional feature of importance. The Krishna has been a sacred river of the Deccan throughout the historical period. A majority of the villages have become places of pilgrimage. Narsobawadi, Kurundwad, Kallol, Khidrapur, Yedur, Jugul, all well-known centres of pilgrimage are within easy reach of one another. Almost every village is adorned by a number of temples (of which the most important is that of the village deity) and often by the 'Ghats' where the devotees can bathe in the sacred stream or cross the river to another point. High productivity of the soil and religious sentiment are keeping up the prosperity of such villages.

This prosperity however does not uniformly hold true in the lower reaches of the Krishna in Bombay Karnatak. Although the site of the villages is determined by similar considerations, flat roofs and mudwalls make their appearance. The villages are situated far away from the main bed of the stream, because, here the river-bed is much wider, and what is more important, the surrounding plain gets flooded for miles away from the main stream. A typical village in the dry season, may therefore remain miles away from the main stream.

In the lower reaches, the river runs through a turbulent course through hills where the sandstone of Kaladgi series outcrops. Most of these parts is covered with scrub and consequently the region offers little economic support for the population. Villages are practically absent except at those points where the Krishna is crossed either by railway or ferry. Even Almatti, a railway station near Krishna Bridge has a small population in spite of its religious importance, which suggests that even villages, like ports, must have their "hinterland" on which depend their sustenance and prosperity.

A remarkable feature of the Krishna Valley is the total absence of urban agglomerations in spite of its high productivity. Major rivers, like the Ganges, in a developed region, have a tendency to promote towns, but in the case of the Krishna, relief and historical momentum seem to have prevented such development. Navigation, of course, except on a minor scale, is not possible, nor is the span so great as to encourage a settlement that would busy itself in porterage throughout the year, because it is easy to cross the river in the dry season.

Historically, on the other hand, commerce has favoured those points which have a nodal character. All urban settlements therefore are situated on plains where cart tracks could easily converge at a point in the past, and modern roads and railways have added to their former prosperity. There is therefore no stimulus to any riverside settlement to grow into an urban agglomeration.

(5) *Settlements of the Krishna Tributaries.*—They are very similar to those on the master stream although they have not the same degree of prosperity and importance.

The influence of Geographical factors in the evolution of settlement types in Bombay Karnatak may be well discerned from the foregoing discussion. Certain special features however deserve a closer notice:—

(a) The site of villages in drier parts of Bombay Karnatak is mainly determined by fresh water supply, although the influence of soil and unproductive patches must be taken into account.

(b) Although relief and communication do influence the pattern of a settlement, nature of agricultural operations and their influence cannot be left out of consideration where a field and the crop therein need frequent attention as in Konkan, where the tendency for the habitation is towards dispersion.The contrary is the case in the Black Cotton soil plain, where agricultural operations are few and simple and Nature does the major part of the work.

(c) The size of the settlement is much influenced by the economic productivity of its surroundings which may properly be called a "hinterland" of the settlement.

REFERENCE

1. Census of India Vol. VII part II table 1.

2. Taluka:

	Area in sq. miles.	No. of villages.	Total.
Karwar	281	61	64264; ppp
Ankola	355	88	38150;
Kumta	224	126	65832;
Honawar	292	94	64105;
Bhatakal	134	57	40760.

Total population of the Coastal Talukas; 273111;
Total population of settlements over 5000; 61753.

3. Settlement papers New Series No. CLXIX p. 8 (Honawar Tal).

4. E.g. Certain Villages of the Karwar Taluka:

Name.	Position.	Population (1931)
Majali	Roadside	4725
Chitakula	Roadside and River	5051
Chendiye	Roadside	2226
Kadra	Interior Riverside	347
Shirwad	Interior Roadside	733
Manjgini	Interior	33
Gopshitta	Interior Roadside	416
Bolshitta	Riverside	585

5. Kanara Gazetteer:

6. Spice Gardens of Sirsi: (Agri. Bulletin).

7. Settlement Papers. No. CCIX N.S. p. 1. (Sirs Taluka).

8. The following are typical villages:

Name.	Position.	Population.
Sirsi	"Gap" town	7109
Sonda	Roadside	352
Mogadde	Interior	60.

It is interesting to note that the Sirsi Taluka with an area of 511 sq. miles has a population of 3999 distributed in 242 villages,

9. Census Report 1921;

10. The role played by minor chieftains belonging to such villages is well illustrated in Khare's Aitihasik Lekh-Sangraha, a source book of Maratha History.

11. Typical villages of the transition belt;

Name.	Position.	Population.
Ankli	Road River	3769
Jatrat	Road	2334
Dastikop	Road	711
Turmari	River	1649
Narendra	Interior bazar	2027
Devar Hubli	Interior	756

12. Of the Black Cotton soil Region:

Name.	Position.	Population.
Hobal	Railway	3050
Lingdhal	Interior	1234
Kadadi	Interior	1113
Lakkundi	Bazar	2463
Tuppadakuratti	Interior	1098
Saswihalli	Interior	780

13. Mundari Region:

Name.	Position.	Population.
Dambal	Road Bazar	3211
Hesrur	River Road	749
Maktumpur	Road	226
Gumgol	River	169
Haitapur	Interior	296
Nagrhalli	Interior	320
Virapur	Road	196

14. Khare: Lekh Sangraha parts 10-11,

15. Simkins: Agricultural Geography of the Deccan Plateau.

16. Don Valley and Bijapur:

Name.	Position.	Population.
Dhabnyal	Don R.	882
Katnahalli	Don	909
Kannal	Interior	461
Hokkundi	Interior	276
Kannur	Bazaar	2874
Sarwad	Road; Don	3054
Tignibidri	Interior	513
Kalkavatgi	Interior	189
Ankalgi	Interior	694

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1. Bombay Gazatteers.

2. Buchanan: Kanara.

3. Statistical Atlas: 1924.

4. Village population figures supplied by the Assistant Director of Public Health; Belgaum.

5. Settlement Papers. Govt. of Bombay.

6. Maps of the Land Records Dept.

7. Maps of the Survey of India.

8. References to Public Health, Revenue. and Land Records, the authorities to whom the author is indebted for supplying the data.

Modern Aids to the Teaching of Geography in Indian Schools

HOW FILM CAN HELP

I

By

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There is a sad contrast in the development of international relationships to-day, which must give food for much reflection to the thinking man. On the one hand, scientific and industrial progress are making great strides. More and more raw materials are in demand. Greater and greater quantities of finished goods are manufactured, so that the volume of international trade has increased enormously. And international communications by land, sea and air, have kept pace with industrial development. The whole trend of the world's economic development is towards internationalism, revealing as it does the interdependence of the nations, the need for co-operation for their mutual welfare.

And yet in recent times, there are undeniable manifestations of a recrudescence among peoples of a narrow spirit of jealous nationalism which is hostile to international goodwilll and co-operation. This phenomenon is world-wide and while it is more overt in such countries as Germany, Italy and Japan, it is becoming increasingly evident throughout the world. So chaotic and unorganised is modern life that the reawakening of national genius instead of finding its inspiration in the greatest ideals of all nations which are international, finds them rather in jealousy and hatred of other peoples and greed and self-seeking in the pursuit of its own immediate interests.

This attitude must be fundamentally eradicated if we are to avoid in future the renewal of international conflicts with all the destruction, spiritual and material, which follows in their wake.

The need of creating a healthy public opinion imposes itself urgently upon society,—the need of a real "human" education

which will foster mutual goodwill and love of harmony which are the only sound foundations upon which civilisation can build.

In such a scheme of Education, Geography,—the science of the habitation of man and of his physical and psychical adjustment to his environment, claims an important and responsible position. A study of geography, if its real significance is appreciated, can form a valuable prelude to the duties and privileges of citizenship. It can train our faculties of sympathetic imagination, re-awaken our sympathies for the point of view of people in different environments. It can engender that outlook on life and civilisation which, if more commonly practised, may teach the fighting nations of to-day the art of collective living. Geography is thus at once liberalising and humanising.

It is sad therefore to see that there is very little response in India to attempts to modernise the teaching of Geography in order that it may accomplish its real object. This is due, no doubt, to some extent to the lack of its exponents in our country, but experience has shown us that the real handicap is that the bulk of the teaching community make little or no effort to enliven the teaching of the subject. A visit to any High School will vivdly endorse this contention. Here Geography is still regarded as "a mere compendium of names of bays, gulfs and towns" and an exposition of their importance. It is still treated as a general science dealing with natural phenomena of little human interest.

There is some evidence, however, that matters are taking a turn for the better. The hopes of us young students of geography are raised when educationalistists like Professor Amar Nath Jha, emphasise to the Indian public, "the need of taking the subject out of the valley where nothing meets the eyes but names and measurements and calculations" and bringing it up to the level of a "living subject" which dwells "on all sides of us and is of vital concern to us".

To awaken interest and impart valuable information in vivid form, we must realise the value of establishing some sort of contact between our pupils and the people of other countries. And for this, the most appropriate method at our disposal is the use of the film. The use of films in the teaching of geography is fully appreciated in America, and it is becoming increasingly popular in England and the rest of Europe.

In India, however, people who are of opinion that films have a place in the educational equipment of our schools are a naive minority. The general belief is that nothing but harm can come from film demonstrations, either moral harm or a shock to the mental growth. Even the teachers are generally reluctant to advocate them, and many are openly hostile to this proposal.

Such fears are however quite groundless. It is not for a moment suggested that the film should supplant the text-book and black-board lesson. It should supplement the present educational programme. The prestige of the teacher will be in no way impaired if he makes use of films just as he uses text books, photographs etc., in imparting information to his pupils.

At present the geography teacher is at a considerable disadvantage as he cannot present to his pupils the phenomena he is describing. Drawings, photographs, graphs and maps come to his aid, but it is beyond question that the film, obtained by direct photography, brings us much nearer the subject of our investigation. The still picture is quite adequate for an exposition of certain physical phenomena, but for illustrating a process, such as methods of irrigation, the course of rivers, the making of pottery, a moving picture is unquestionably much more useful.

Films showing life in countries far away, and those showing the conditions under which various economic products are obtained are much more convincing than descriptions, however able and detailed.

I have had occasion to witness such performances in a school in London, and both teachers and pupils were full of appreciation for this method of instruction. I also learnt on this occasion that if any film of geographical interest were showing at the local cinemas, arrangements can be made for parties of school children to attend the show at reduced rates. Further, in some cinemas, special educational film demonstrations are arranged on Saturday mornings for school children. Sometimes clubs are organised in connection with this scheme, and rambles, educational competitions etc., are organised. I see no reason why we in our country should not adopt similar methods. Copying is no crime.

There is a great responsibility with the teacher in this connection since he must acquaint himself with the nature of the film before suggesting a visit by the school-children. Many of the so-called Historical or Geographical films are arranged solely in the

interests of commerce, and reality is sacrificed in the interests of 'romance.' I do not suggest that a visit to Tarzan the Ape Man, can give a very adequate idea of the Congo Basin, since geographical features are arranged in astounding juxtaposition. Moreover the scenery in so many similar films is obviously artificial representing the more lurid efforts of the Hollywood studies, that from no point of view can they be considered as of educational value.

The films that are of real geographic value are those which give to the spectators a clear approximation to actual first-hand contact with the earth, the home of man, and so acquaint him with the details that can be inter-related by the teacher in ways that aggregate them with "Geography". An outstanding example of such a film is "Man of Aran", a film directed by Flaherty. It is a simple story of a few peasants, fisherfolk living in a small Irish village, but the film gives a real insight into their living, their houses, their agriculture and their industries.

A very valuable feature of the films is the widening of human sympathies. We tend to accept as commonplace the things of daily life, and we make our children "cram" dull statements about such topics as "fishing industry" of the Norwegian coast, or the "cotton Industry of Lancashire." It is not until we illustrate our lessons with films like Drifters, that the human species to whom we are referring really appear alive. Paul Rotha while describing his experience when he saw the film "Drifters" remarked, "It humbly brought to the screen the labour of the North Sea herring catching from such an approach that the ordinary person was made to realise, probably for the first time, that herring on his plate was no mere accepted thing but the result of other men's physical toil and possibly courage. It brought alive.... not just the routine of the catch but the whole drama of emotional values that underlay the task, interpreting in its stride the unconscious beauty of physical labour in the face of work done for livelihood. Moreover there was brought to the conception all the poetic qualities of ship, sea and weather." (Documentary Films. Paul Rotha, 1936).

Recently in England, the film called "The Drum," depicting military life of the North-Western Frontier tribes became very popular. Many teachers took advantage of the opportunity and brought home to the students the geographical structure of the land as shown in this film, barren mountains and no roads resulting in difficult transport and slow military movement. People had read about the hardships that the British have to face at the hands of the tribesmen owing to their tricky warfare and this film taught them how they take advantage of the phenomenon of the mountainous country that offers hiding places that no stranger can ever find out.

It is true that India will have to resort to foreign films as no such films as depict the habits of any foreign lands are produced here, but the increasing demand may tempt the Indian producers to change their point of view and produce films that are full both of pleasant stories and material that the teacher may use in his class. The system of showing films containing news from all parts of the world can also be a valuable asset to the Geography teacher and also can help to enlarge our general knowledge which at present is really in a deplorable state.

A number of experiments on the use of films in schools have been reported in European and American countries. They all establish that information conveyed by films is retained better than information conveyed by other methods. Many of the benefits of films are, however, of a subtle kind and cannot be easily tabulated. But the greatest benefit as we have already indicated, is that besides presenting facts, films give valuable experience that moulds "information" into "knowledge" and "life" itself.

A difficulty that may prejudice general adoption of the film as part of school work is an economic consideration. Parents may refuse to finance their children's visits to the cinema regularly, and of course, poverty may in some cases prevent this. Nevertheless, it is not difficult to adjust things to the circumstances. All the films can be had in miniature sizes and the school can acquire a good projector at a reasonable price. There are many second-hand machines on the market. Attempts should be made to prepare library series of films and projectors. The minor difficulties of erecting screens and darkening rooms can be overcome by ingenuity. Institutions without an electric supply can obtain adequate illumination by using motor car batteries or by hand-driven generators. These can be obtained literally "for a song" from garages or breaking up yards.

Public co-operation and help will, of course, simplify the teacher's task. What is really needed is a spirit of enterprise and practical enthusiasm.

There is little doubt that once a start is made, and the utility of films as an instrument of education is appreciated, intelligent endeavours on the part of the community will be forthcoming and within a few years, the film will perhaps be regarded as an essential part of class-work apparatus, and not a superfluous luxury.

A Visit to Kashmir

By

G. C. Kapur,

Panjab University Library, Lahore.

'If there is a paradise on earth, It is here, it is here, it is here'.—So sang Babar, the great Mogul emperor, in praise of this beautiful land long ago; and hundreds of eminent travellers who have journeyed through this renowned valley have testified to its glory of beauty.

With its multifarious flowers, myriad waters, bounteous orchards, shady chinars, dense forests, snowy peaks, plentiful fields and numerous lovely lakes, in the bosom of the Himalayas, Kashmir challenges many of the charms of Switzerland. Its wealth of game, rivers, plains, lofty steeps and permanent snows caters for a great variety of tastes. The hunter, the mountaineer, the lover of golf, tennis, polo, and humdrum city life find opportunity for the gratification of their interests much as the lovers of skating or fishing do. And above all the seeker after God meets with countless solitary abodes for undisturbed meditation.

There are several approaches to Kashmir, but all are equally arduous.

If you go via Rawalpindi, you have to cover up a distance of 200 miles on a difficult winding road, first rising up to a height of 8000 feet at Murree and then gradually running down to 2000 feet at Kohala. The suspension bridge at Kohala over the torrential river Jhelum amidst towering mountains, presents a beautiful scene. The other important places on this way are Domel and Baramulla. The second route lies through Jammu Tawi (via Banihal Cart Road) where the small towns of Udhampur and Kud are used by travellers generally halting for a night. The third approach is from Abbottabad via Mansehra and Garhi Habib-Ullah, the motor road joining at Domel. The first two roads are more frequented.

The journey through any of these routes is stiff and tiresome, but the visitor is amply rewarded "as he is slowly lifted up from the parched plains into regions of cool and bracing air".

Srinagar, the summer capital of the government, is a charming town. The seven bridges over the Jhelum and the beautiful shops over the Bund present a picturesque scene. The ornate house-boats, beautifully furnished and fitted with electric light, the smaller Dungas and the still lighter Shikaras are delightful for the holiday maker.

In the evening the visitors generally hire these small boats and go about the Dal Lake, 'eating, singing, and merry-making.' As the night approaches, a pleasant cool breeze begins to blow and the gay shikaras glide over the lovely rippling bosom of the Dal lake, reflecting the stars and moon and sky.

Should one happen to go to Srinagar in the month of August or upto the middle of September, the days would be comparatively hot and one could not move about much. However a visit to the Durga Nag temple and the great temple of Shankracharya (situated at a pretty steep height) in the early hours of the morning would be a pleasant outing. Or one may go round the Bund, where the cool morning breeze would be very refreshing.

Upto 10 a.m., in the morning, visitors generally move about in the main Bazar (Mira Kadal) which is a centre of great business activity. Thereafter they have to keep indoors.

Evenings are also pleasant at the Partap gardens where people throng in large numbers, sometimes listening to the sermons from a young Sadhu who is generally found there.

Sunday is generally a day of unusual activity. All roads lead to the gardens. Tongas, cars and shikaras carry visitors to the Nishat, the Naseem and the Shalimar Gardens. But the journey in the shikara, through the placid Dal water amidst lotus flowers is the pleasantest part of it all.

These "Imperial gardens—pleasure-haunts of the great Mogul kings—most beautiful with running water channels, playing fountains, stately chinars, splendid grass lawns, flowers of variegated hue and innumerable trees laden with fruits are truly reminiscent of the Imperial days, when the indulgent Jehangir and the lovely Nur Mahal dominated these beauty spots".

Then one may visit the Chashma Shahi or the Royal spring—a fountain of cold, crystal, gushing water. A beautiful garden surrounds it. The water is extremely refreshing and you may drink it to your fill.

Another place of interest at Srinagar is the exhibition ground where all the arts and crafts of Kashmir—silver ware, silk and shawl embroideries, carpets, *gubbas*, wollen goods, willow baskets, walnut carvings, papier mache articles and imitation stones are lavishly displayed by the competing merchants.

Other places to visit are, the state granaries—an ingenious scheme to protect the country against food famine—the Government Silk Factory, Sri Partap College and the Museum.

Gulmarg is situated at a distance of 28 miles from Srinagar at a height of about 8700 feet above the sea level. Several regular lorry and motor services, run by the various transport agencies, carry visitors upto Tanmarg, the Government sanatorium, at a very low fare in a short time.

From Tanmarg one may hire a pony or walk up a stiff climb of about 3 miles. Invalids may be carried in *dandies*.

As you enter Gulmarg a vast plain of green grass surrounded by lovely huts greets you. The brilliant sushine and the velvet grassy plain are particularly lovely. The long circular road affords a pleasant morning round. The more daring may hire ponies and take some miles of invigorating ride.

Khillenmarg is a still higher and a lovelier place and offers ideal opportunities for skating on snow in the months of December, January and February when Englishmen generally visit this place.

Al-pathar is a beautiful lake situated at a distance of about 10 miles from Gulmarg and makes a pleasant day's trip. Ferozepore Nalah and the Zairat are other famous places near Gulmarg.

The golf links and polo grounds are added charms for the sportsmen.

There is also a beautiful temple just near the Circular Road. One day during our stay there was an unusual stir around it, the Maharanee Sahiba having come to offer her prayers.

Pahalgam: Owing to the cheap and easy means of transport and the comparatively less costly arrangements for board and lodgings, coupled with the fact that Pahalgam presents an ideal sanatorium, a large number of visitors are attracted to this place every year. Mostly people take to tent life and a variety of tents suited to all pockets is available at the various dealers at almost all times. Furniture and even kerosene lamps may be had on hire. Fruits, milk, eggs and other eatables are quite cheap. Wheat flour, sugar and certain medicines sell at higher price.

On application to the State authorities, quite a large tract of land on one of the plateaux, is assigned for a single family at a nominal rent under the magnificent pine trees. Regular visitors take their own tents.

If you happen to visit Pahalgam near about Solono—the period of the official *yatra* to the sacred cave of Amar Nath, when thousands of pilgrims from the the remotest corners of India stay for two nights, as their first halt of the journey—there may be a scarcity of tents and other articles and a consequent rise in their hire prices for about a week.

After a morning walk on the Chandanwari or some other road bath in the cold emerald water of the river Liddar is very refreshing.

Pahalgam is a favourite holiday resort.

There are some hotels, a decent club, and a few private houses, where also the visitors may stay; but none of these is as neat, clean and sanitary as the tents.

Tent life at Pahalgam is fairly safe, though stray cases of theft are not uncommon.

From Pahalgam you may move up to the glacier valley of Sonemarg where there is a fine camping ground for visitors from mid-June to mid-September; or you may go to the sacred cave of Amar Nath situated at a height of about 14,000 feet.

Even the less adventurous go up to Chandanwari—a place eight miles from Pahalgam—the permanent snow-brige of wild natural beauty. The bleating of the sheep and the roaring of the Liddar present a great contrast to the impressive calm prevailing all round. There are a few sheds for the Sadhus and the pilgrims, a vast majority of whom pitch their own tents at the time of the official pilgrimage. No stores or provisions are available, but milk and butter are sold by neighbouring Gujars (milk sellers). The pilgrims take their own provisions.

The Dharam Arth Deptt. of the State—in charge of the *Yatra*—carries a large store of provisions, kangris, mattresses, blankets, tents, kerosene lamps, spare riding ponies and mules for the benefit of the poor and the Sadhus who travel to the cave in large numbers.

The state hospital under the charge of two competent medical officers and other staff moves with the pilgrimage. Some of the ministers, other state officials and a large contingent of police officers and constables are also present to look after the convenience of the pilgrims.

Special arrangements are made by the State for the transport of luggage and the hire of riding ponies. The rates are fixed and only licensed porters and *pony-walas* may be employed.

Almost every pilgrim keeps by him ready at hand a phial of Amritdhara, an ounce or two of brandy, almonds, walnuts, dried grapes and parched grams. Several scout camps render useful service to the pilgrims.

Horses, mules, porters, *dandies* and a large crowd of pilgrims on foot, headed by the "sacred chharri" the official emblem of the *Yatra*—the whole pageant moving at a slow pace present an impressive scene.

Nature too becomes indulgent towards the pilgrims; for, the weather at this time is usually calm, and often the sun is bright.

As the caravan leaves Chandanwari it passes through a steep ascent known as "Pissoo Ghati"—a difficult knee-breaking climb for about 2½ miles—and reaches a vast plain where the pilgrims stop for only a short time to refresh themselves with a cup of tea served hot by the rovers of Sri Partap College. Then the pilgrims move on, till about mid-day when they reach "Shish Nag", an exquisitely beautiful lake of ice cold water, where the more orthodox and the more sturdy enjoy a refreshing bath. The snow peaks of the distant hills gleaming in the bright unobstructed sun, were beautifully reflected in the quiet waters of the lake. The next halt of the pilgrimage was in a plain known as "Vio-Jan," a mile from it.

The sunset and the dawn witnessed from a little hillock near the lake, with the myriad-coloured rays of the sun spread over the neighbouring mountains, presented an unforgettable scene.

Early next morning the pilgrims resumed the journey, fully equipped with warm clothing.

Panch Tarni, which is next reached is a big camping ground about 3½ miles from the base of the sacred cave. The place is named after the 'Sangam' or sacred union of the rivers Amravati, Panjtarni and the laughing Krishen Ganga.

There is no vegetation here (except a small woody shrub, the juniper which is used as fodder and burns even when fresh-cut) and no habitation on these gaunt treeless hills except that of the nomadic Gujars, whose huts, though apparently not visible, are indicated by the presence of ponies, cows and buffaloes in the line of the distant snow-covered peaks.

As night drew on, the sky grew cloudy and it began to rain. Suddenly it changed and a severe storm set in. We clung to the ropes and anchors of the tent, lest it should be blown away.

The atmosphere calmed in about two hours, but it became terribly cold.

Early morning at about 4 a.m. the "Charri" procession followed by the more sturdy pilgrims started for the cave.

As I was unwell we could not be ready before 11 a.m. when practically every one had returned after the sacred "Darshan". As we started for the cave it again grew cloudy and began to drizzle. However we reached the cave safely, but soon after it thundered and rained hard. The small batch of Pujaris and the pilgrims about two scores in all who gathered round a fire lit in the cave were pent up in a dangerous situation.

Sometime after, the rain ceased and the sun stole out again with a welcome glow. It was a signal for return and instantly every one was on his feet. Here in this snow world of the cave, there were no trees, no shrubs, no patch of grass, no birds, no life. The cave stood lonely at the foot of a mighty cliff, wild, grand and imposing. One felt like being 'in awful presence of the Creator'.

"The silver whiteness of the Lingam was significant. To an unbelieving eye it was no more than a fountain or jet of water, which owing to the altitude and the cold within the cave—for the sun's rays do not reach the innermost recesses—appears as an icicle. Yet to the Hindus it is the very symbol of the Creator". No pigeons flew out upon us, but two little swallows restlessly moved out of the cave, apparently resenting the intrusion of the pilgrims in their secluded home.

The return journey was rendered more difficult owing to the blocking up of the narrow precipitous passage at several places.

We returned to Panch Tarni at about 2 p.m. A greater number of the pilgrims had already left for their return journey, but we stayed there with the official camp. Another night was passed of fatigue and of hunger (for we had no provisions of our own and the eatables sold there unwholesome).

Early next morning the great plain of Panch Tarni was instantly deserted and resumed its native loneliness. The sky was cloudy. It was pouring. The road had become more dangerous. Some pilgrims slipped and floundered upon its clayey surface, moving patiently foot by foot and with each movement walking became difficult on account of mud and rain. The poorer pilgrims, having insufficient warm things, shivered. The nervous and the old often would slip and roll. At long last, the caravan reached Chandanwari by the evening.

Starting early next morning the pilgrims reached Pahalgam before noon. Everybody heaved a sigh of relief. The victims of fever and pneumonia were safely conducted to the State Hospital. A shocking tragedy of the year was the death of a young Bengali Professor of Delhi University. The poor fellow was completely drenched and died before any medical aid could reach him. Thus the pilgrimage to the sacred cave of Amarnath is not without its risks and dangers.

Mutton. From Pahalgam visitors generally move down to Srinagar and quite a large number of them break their journey at Mutton, the headquarters of the Kashmiri Pandits, the 'Pandeys' who besiege every lorry as it reaches their stronghold. Are you a Kapur, a Khanna, a Seth, a Chopra, an Arora or what not? Are you from Lahore, Amritsar, Pathankote, Bengal, or Oudh etc.? With such queries the visitor is plied.

Some of them have built fine houses for the convenience of the pilgrims and ours had his own, where we stayed for about a week. The clear emerald water of the Mutton spring which falls in a big tank, invites bathing and swimming. The Pandits are extremely hospitable and provide all comforts to the pilgrims in expectation of "Dakshina", of course.

Martand Temple. At a distance of about two miles from Mutton and at a height of about 300 feet, are the famous ruins of the magnificent stone temple of Martand, which "notwithstanding all the zeal of the Mohammedan kings are living monuments of the early Hindu rulers". This sacred temple of the sun excavated under the guidance of Sir John Marshall and his worthy Kashmiri disciple Mr. Ram Chandra was originally built by the great Hindu king Ramaditya and is reminiscent of the ancient Kashmiri architecture. It is built on a beautiful site and commands one of the most extensive and finest views in Kashmir.

Ruins of other temples are found at Avantipura, Pattan and Pampur.

Avantipura lies half way between Srinagar and Islamabad. It was the capital of the famous king Awanti Varma, who built here two temples of Awanti Swamin and Awanti Sura and dedicated them to Vishnu and to Siva. "The temple of Siva is in all essentials a smaller version of Martand and much of its detail is better preserved."

Pattan. Here again are the ruins of the two great temples erected by Swakara Varman and his queen Sugunda. Architecture is of the same kind as at Martand. Carving appears fresh, as if executed recently.

Anantnag. This is a famous town, situated at a distance of about four miles from Mutton. It is named after the innumerable springs found there, some of which contain sulphur which cures many skin diseases. The town is very old and dirty. Wooden articles, toys, embroidered bed spreads and 'Gubbas' are manufactured here.

Aish Mukam. It is another place famous for the old Mahommadan shrine and monastery. It is the chief stage of the pilgrimage to Amarnath as it starts from Srinagar.

Shadipur. The city of the wedding, where the Jhelum and Sind rivers marry—is also famous for its old ruins and its charming camping ground under Chinar trees. Another place known for the hoary old chinars is *Bij Bihara.*

Achcha Bal. Seven miles from Mutton along the lonely canal path, by the great Martand temple and mostly among the smiling rice fields, lies the great garden of Achhabal with a Dak Bungalow, a small hotel and some private lodgings where visitors may stay. There is a lovely trout hatchery yielding cheap edible fishes.

Many stay here for a long time; and enjoy the Mogul gardens. Above them is a great "Rukh" (forest) of wild game where the Maharaja and other officials go for hunting.

Cookernag. About 20 miles from Achhabal and higher up is the famous *chashma* (spring) of *Cookernag.* There are small kacha huts, a Dak Bungalow and a large camping ground. The climate is very healthy and people stay there generally for a week or so. The provision supplies at Achhabal and Cookernag are inadequate, but fowls, eggs and fruits may be had conveniently.

Verinag. About fifty miles from Srinagar, at a height of about 6,100 feet is the famous octagonal blue-watered spring of Verinag surrounded by a large garden and a vast camping ground. Such is the humble birth of the mighty river Jhelum which is the very life of the whole of Kashmir and which runs mightier as it is nourished by its various tributaries before reaching the plains. Here, people would assemble and listen to religious discourses by some saint.

The Kashmir valley is so extensive and there are such a large number of places of interest in it, that one cannot see them all in a single visit. "The scenery is ever changing, now clear and suffused in brilliant sunlight, now the battle ground of monsoon storms, and now again streaked with soft fleecy vapour and bathed in haze and colour. No two days are alike, and each point of view discloses some new loveliness. Every outlook here is a picture. Infinitely varied in form and colour the Kashmir mountains are such as an artist might picture in his dreams."

There are several lakes round about Srinagar and one of the most beautiful is Manasbal, "where still sleeps the old ruined garden of Lalla Rukh—made famous in Moore's Poem, and rich with immense chinar trees—first brought from Persia by Nur Jahan, the consort of Jahangir."

Jammu and Kashmir is in area the largest of the Indian States; its population is mainly Mohammadan, the great majority however are illiterate peasants and artisans. The Hindus, though in a minority, keen upon education are the backbone of all Government services. In recent years the Mohammadans, too, have taken kindly to education and Government service. Political awakening there is now among the Moslems, with its communalistic train. In recent years many improvements have been effected in the civic and economic life of the people. Agriculture is the mainstay of the masses.

With an ever abundant supply of water, a rich alluvial soil and the fine climate of the valley, almost any crop will thrive here, but the Kashmiri's heart is set on rice of which he grows no less than 53 varieties. He possesses an inherited genius for its cultivation. The orchard and the garden claim his attention next. The women are industrious and sturdy, and render active help in the field and the garden. The husking of the rice is a pleasant respite with them. In every house there is a big pestle and mortar carved out of wood or stone. The women are also busy in drying vegetables for the winter. They milk the cows and prepare the butter and look after the ducks and hens. They are famous for their beauty but not for their cleanliness.

The Kashmiris themselves are given to incredible toil. They are unusually strong of body but are not reputed for personal courage. They are intelligent, deft of hands, and dowered with keen artistic taste, which is manifest in their world-famous productions of woven, embroidered, and carved goods.

The Kashmiri Pandits are well-known for acuteness and subtlety of mind, their intelligence and quickwittedness. On the whole they have a cultured look about them and a superior bearing.

Like all the people of the East, Kashmiris are fond of songs and festivals. They have great faith in saints and shrines whose protection they seek in all difficulties.

Important Hindu festivals are held at Khir Bhawani, Hari-Parbat, Dal Gate and Verinag, where the village swains and belles make their gay appearance in their best attire.

Another important festival is the Ruf, throughout the month of Ramzan. This is accompanied by songs and dances.

Kumbha Mela of Kailas

BY

SWAMI PRANAVANANDA,

(Of the Holy Kailas and Manasarovar).

In the year 1027 A.D. Pandit Somanath of Kashmir translated the Indian *"Kala Chakra Jyotish"* into Tibetan and introduced the *"Brihaspati* Cycle of Sixty Years", called "Prabhava", etc. (Rabyung in Tibetan). According to the Chinese system, this cycle of Sixty Years is divided into five Sub-cycles, namely (1) Fire, (2) Earth, (3) Iron, (4) Water, and (5) Tree, of twelve years each. The names of the twelve years are (1) Mouse, (2) Ox, (3) Tiger, (4) Hare, (5) Dragon, (6) Serpent, (7) Horse (8) Sheep, (9) Monkey, (10) Bird, (11) Dog, and (12) Hog. *Melas* or fairs are held during these twelve years in different places of Tibet. During the "Horse-year," which is called *Ta-lo* in Tibetan, a big fair is held at Kailas. Larger number of pilgrims from far off countries, like Burma, Siam Ceylon, Japan, China, Mongolia, Korea, and Southern Siberia and Russia visit the Holy Kailas and Mansarovar than during other years and do the *Parikramas* (circumambulations) to these places. The fair is held on the fourteenth and the full-moon day of *Vaisakh* (generally in the month of May) near Sershung on the south-western side of Mount Kailas. This full moonday is particularly sacred to the Buddhists all the world over, it being the day of Birth, Enlightenment and *Maha-Nirvana* of Lord Buddha.

There is a big-staff called *Tarbochhe* at Sershung. On the fourteenth day of the moon, the flag-staff is dug out, old flags removed, new flags of various colours are set up, and is half raised. On the full moon day the flag-staff is fully raised with elaborate ceremonials However the pilgrimage continues throught the year. The Tibetan year begins from the first moon of *Magha* of the Indian Calendar. The current year is the "Horse-year" and it has commenced from the 16th February 1942. The Indian name of this year is *Chitrabhanu.*

The *Kumbha Mela*, held at Hardwar, Allahabad, Ujjain and Nasik, which occurs once in twelve years, has nothing to do with the twelve-yearly fair of Kailas, which is held in the "Horse-year" of the Tibetan Sub-cycle of twelve years. Indians Confound the *Kumbha Mela* with the Tibetan "Horse-year" fair and call it and wrongly call it *Kailas-Kumbha Mela.* This confusion and wrong notion is simply due to the fact that both the *Kumbha Mela* and the 'Ta-lo' happen to be twelve-yearly fairs. During the "Horse year.", Hindu pilgrims from India also go to Kailas in larger numbers than in other years. According to the Tibetan *Puranas*, a round made to the Holy Kailas or Manasarovar during the *Talo* is considered as virtuous as thirteen rounds made during other years.

News and Notes

Owing to the war emergency, our difficulties have increased in all ways. In particular, we have to mention the difficulty of procuring paper and getting blocks made, both of which have told on the size of the Journal and the number of maps etc., that could be included. We ask for the indulgence of our subscribers.

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Owing to enemy action, it is possible that our foreign subscribers and exchangers may not have received some issues. In such cases we shall be glad to supply the missing copies on intimation.

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The Summer School of Geography, which used to be held every year in April–May, had to be given up this year for want of proper response, owing partly to scare and partly to anticipated difficulties of transport.

* * * *

The 12th Madras Geographical Conference, planned to be held in Vellore in May 1942 had to be postponed along with the Provincial Educational Conference, to September–October, owing to difficulty of getting accommodation. It is hoped that there will be no need for further postponement.

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The All India Educational Conference, which was proposad to be held at Madras in December next, has been arranged be held at Indore, as the South Indian Teachers' Union expressed its inability to run the same under present conditions.

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Against all this tale of negative record, it is heartening to find the determination everywhere to concentrate all efforts on the war and carry on the struggle for freedom to success, and the record of war production in India published in the pages of the Indian Information is simply astounding.

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Qualified young Indian geographers, along with others, are undergoing military training in the Officers' Training School at

Mhow and elsewhere, to take their place presumably as Lecturers in Geography in recruit schools.

* * * *

We congratulate Prof. M. B. Pithawalla, who has been awarded the Moos Gold Medal by the University of Bombay for the best thesis of scientific research for the year 1940-41.

The Moos Medal is an endowment of Rs. 10,000; and the Medal is a coveted prize offered annually to the best amongst the recipients of the highest degree in the Faculty of Science.

Select Contents from Periodicals

The Geographical Journal: October 1941.

Some Aspects of Japan. By E. H. de Bunsen.

The Geographical Journal: November–December 1941.

Half a Century of Population Trends in India. By Arthur Geddes.

Geography: December 1941.

The Patterns of Transhumance in Europe. By Elwyn Davies.

Notes on the Evolution of Switzerland. By H. J. Fleure.

Geography: March 1942.

Economic Development along the Yunnan-Burma Railway. By Yin-Tang Chang.

Cloud and Rain. By J. Fairgrieve.

Geographical Review: January 1942.

Rangoon: A Study in Urban Geography. By O. H. K. Spate and L. W. Trueblood.

Geographical Record: Recent Growth of Japanese Cities. Mineral Resources of the Philippine Islands.

Science and Culture: May 1942.

Physiographic Divisions of India, Burma & Ceylon. By Maneck B. Pithawalla.

Indian Information: March 1, 1942.

How Meteorology helps Agriculture.

Indian Clay Industry.

Indian Information: May 15, 1942.

The Railways of India: Their Growth and Influence on Industrial and National Development.

Reviews

Physiographic Divisions of India, Burma and Ceylon. By Prof. Maneck B. Pithawalla (Reprinted from *Science and Culture*, Vol. VII, pp. 533–543, 1941–42.)

Some years ago Mr. F. J. Richards, a retired Indian Civilian, contributed to *Geography* a very interesting paper on the 'Cultural Regions of India,' which was followed up by Dr. L. D. Stamp with one on 'the Natural Regions of India,' explaining the scheme adopted by him in his books and relating it to the Cultural Regions.

Dr. Pithawalla disputes the use of the term Natural Regions, and contends that the division of the country into Physiographic Regions is more useful and fruitful. As early as 1939, he presented to the Geography Section of the Indian Science Congress held at Lahore, a scheme of Physiographic Divisions of India, which was since published under the title—'The Need of Uniformity in the Physiographic Regions of India' (1939), and subsequently revised. (*Vide* J. M. G. A., Vol. XIV, No. 4, December 1940).

Since then the problem has drawn the attention of some geographers; and with the help of constructive criticisms and suggestions received, the scheme has been revived later and presented to the Benares Session of the Congress in 1941. A heated discussion ensued; and one of the critics, Dr. Kazi Ahmed subsequently prepared his own scheme (*Vide* 'Physiographic Divisions of India', I. G. J., Vol. XVI—No. 3, 1941).

In the article now under review Dr. Pithawalla criticises such a division in general terms as follows:—"Though their method is called geomorphological, they make no distinction between a major division and a minor section or a sub-section, and neither definite physiographic character nor natural boundaries and frontiers are indicated. No distinction is also made between a mere shore facies and the major province to which it really belongs. Moreover the factors of mineral wealth, soil and climate are altogether ignored with the result that the *physiographic* divisions so made are some kind of 'natural' or 'geographical' regions which appear to lack scientific basis."

He then presents a division, which is claimed as an improvement on the original scheme of 1939, revising the several sections

and sub-sections, "in the light of the suggestions made by the critics and of the new geomorphological data secured from research centres in India." The map has accordingly been redrawn, including in it Burma, Ceylon and other islands in the Bay of Bengal. Though there may be some difference of opinion with regard to details and the controversy may continue, there is no doubt that Dr. Pithawalla has laid the ground plan fairly well.

Science and National Reconstruction in India. By Kewal Motwani. (Indian Science Congress Association, Calcutta) 1942.

This is an address delivered before the Indian Science Congress, 29th session, at Baroda, January 6th, 1942; and has been published with a foreword by Prof. D. N. Wadia. Two years ago, the Indian Science Congress appointed a Sub-committee on Science and Social Relations to devote attention to the impact of Science on Indian Society; and it was at the invitation of the Congress that Dr. Motwani delivered this address, which in the words of Prof. Wadia "is an able and instructive exposition of the achievements of modern science and its contributions to the making of a new world, and of the synthesis of science with the national genius of India and its present day requirements. It contains many useful suggestions and is leavened by an indomitable faith in the destiny of our country." After pointing out the misfits and conflicts as a result of the impact of science and modern ideas in this ancient land, Dr. Motwani presents a vision of things to come with the help of science, which is at once robust and heartening.

Ruined Cities of Iraq. By Seton Lloyd. Oxford University Press. 1942. Price Rs. 2.

With the coming of British troops to Iraq, there has been a large demand for guide-books for the chief ancient cities of Iraq, as especially almost every published book of this kind has been out of print. The volume under review consequently satisfies a felt need as a general outline guide of the several principal Ruined Cities, though it cannot take the place of separate comprehensive handbooks for each individual site.

The places included in this volume are:—Bagdad, Babylon, Ctésiphon, Al' Ukhaidir Palace, Samarra, Hatra, Nineveh, Khorsabad, Bavian Aqueduct and Ur of the Chaldees. Regarding each place, the historical and topographical description closes up with a short account of the present day appearance and conditions. The chapter on Ur, dealing with the famous excavations of Sir Leonard Woolley, contains naturally a more detailed elucidation.

A sketch of Iraq's history, reprinted as the last chapter from 'Maps of Iraq with Notes for Visitors,' issued by the Government of Iraq, helps to give a right perspective in time through the ages regarding this ancient cradle of civilisation.

A map on the cover page locating the ruins dealt with, with numerous other maps and plans, a bibliography for each of the Ruins, a list of Bagdad's Museums with their description, location etc., are other useful features of this short handbook, which has been nicely got up.

The World and Northern Continents (Tamil). By A. N. Schwartz. Christian Literature Society for India, Madras. 1941. Price as. 8.

This is a text-book of Geography for Standard V of Tamil schools in Madras Presidency, prepared in accordance with the recent departmental syllabus in Geography for Elementary Schools. The matter is treated in a clear and simple way, and the language is suitable. Suggestive and stimulating questions and exercises appended to every lesson, and the numerous pictorial and map illustrations enhance the value of the book; while the clear bold print, glazed paper and fine get-up make it attractive to children.

Summer School for Geography Teachers: April 1939. (Bombay Geographical Association).

The Bombay Geographical Association conducted a Summer School for geography teachers in 1939; and the volume under review gives a full Report of the same, and includes 29 lectures on various aspects of Geography and Geography teaching, delivered at the course, thereby making it a useful volume of permanent value.

Books and Journals Received

World and Northern Continents: By A. N. Schwartz.
Ruined Cities of Iraq: By Seton Lloyd.
Physiographic Divisions of India, Burma and Ceylon: By M. B. Pithawalla.
Science and National Reconstruction in India: By Kewal Motwani.
Bombay Geographical Association Summer School: A Report.
The Geographical Journal: October and November–December 1941.
Geography: December 1941 and March 1942.
Indian Information: March 1 to May 15.
Brahma Vidya: (Adyar Library Bulletin): February and May 1942.
Kalaimagal: March to June 1942.
Journal of the Sind Historical Society: February 1942.
The South Indian Teacher: April and May 1942.
Journal of Indian History: December 1941.
The Indian Journal of Political Science: April–June 1942.
Nagari Pracharini Patrika: Vol. 46—Part 4.
Geographical Review: Index 1941 and January 1942.
The Educational Review: March 1942.
The Quarterly Journal of the Mythical Society: October 1941.

Correspondence

THE EDITOR,
Indian Geographical Journal,
Madras.

Dear Sir,

In the Jany-March issue of your journal you have reprinted the discussion on the Physiographic Divisions of India, which took place at the Benares Session of the Indian Science Congress, together with a letter from Dr. Pithawalla. I regret that Dr. Pithawalla should have so misconstrued an academic discussion. There is not a word of deprecation he eludes to. I have merely pointed out the mistakes and defects that occurred to me. There is no sweeping and groundless remark of the type he has himself made, but a detailed examination of the scheme, region by region, and, to make my criticism also constructive, I have suggested another classification. But he is not prepared to accept it as a constructive criticism. I think it is unnecessary to reply to what he has said. Readers have the material before them to form their own judgment.

Instead of defending his Physiographic Divisions from defects pointed out, or examining my own scheme, he goes out of the way to criticise the draftsmanship of the map attached to it for something which is unreal. He forgets that his own map also does not contain any marks of latitude or longitude and that it is still smaller in scale and less readable. By his enquiry why I have divided the Indus Valley into two portions he merely betrays his ignorance of the Geographical features of the area. The Panjab basin shrinks to a narrow outlet in the S. W. of the Punjab, West of Jaisalmer.* As regards his objection that I have not separated the Indus Delta, if he refers to the third paragraph of my XII Division, he will find that it is already portioned out as a sub region. Of course, it has not been given the same importance as the Gangetic Delta.

I never pretended to say that my scheme was final. It is a suggestion which is open to improvements. Further details can be worked out and many sub-divisions can be demarcated in each region.

In the discussion published, it has been pointed out that Dr. Pithawalla has given 44 Divisions, I have also given 35. I may say that Dr. Pithawalla's Divisions are as many as 44 plus 29, while mine are not quite 35 and they are easy to remember.

25—6—42.
Aligarh.

Yours sincerely,
(SD.) KAZI SAIEDUDDIN AHMAD.

*See Glennie, a co-relation between sub-soil water and Geological features. C.B.I. Pub. No. 14, 1935-36.

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