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CLIMATIC REGIONS OF WEST PAKISTAN

SECTION OF "GEOGRAPHY, GEOLOGY AND ANTHROPOLOGY"

THIRD PAKISTAN SCIENCE CONFERENCE 1951 DACCA

President : Dr. KAZI SAIED-UD-DIN AHMAD, M.A., Ph.D. (London)

PRESIDENTIAL ADDRESS

(Delivered on 12 January, 1951)

Mr. President, Ladies and Gentlemen :

Today we are meeting for the first time in a new section—"GEOGRAPHY, GEOLOGY & ANTHROPOLOGY" which has been created from this year. I feel greatly honoured to have been elected as its first President, and take this opportunity to express my gratitude to the members for the consideration they have shown me. We are also indebted to the Pakistan Association for the Advancement of Science for providing us a separate section for these important allied Sciences. It is hoped that this opportunity will be fully utilised by specialists in these Sciences and that they would assemble together in larger and larger numbers from year to year to contribute to the success of this Section. In our country there are immense possibilities for research in these Sciences.

Of the three, Geography occupies the central position. On the Physical side it is closely related to Geology, while on the human side it is connected with Anthropology. So far it is a subject for Post-Graduate studies only in the Universities of the Panjab and Sind. In the Universities of Dacca and Peshawar its teaching is limited to under-graduate courses. It is to be hoped that both these Universities will soon develop their Geography Departments to include Post Graduate classes.

Such an important subject as Geology has not received adequate attention in our Universities. Before the partition, the University of the Panjab had post-Graduate courses in Geology at the Maharaja College, Jammu; that College at present lies on the other side of the border. The University is now trying to make a beginning with under-graduate courses at Lahore. Dacca has also started under-graduates classes. Let us hope that Karachi and Peshawar will follow suit. The urgent need of locating our mineral resources and harnessing our underground water-supply in areas like Baluchistan cannot be properly met unless immediate suitable arrangements are made for the teaching of the subject at the different Universities. The Geological Survey of Pakistan is our great hope, but it is handicapped for want of the required suitable personnel. With

A local survey is being carried

the growth of schools of Geology we may look forward not only to meet the requirements of our own country, but even those of our Muslim neighbours, like Iran where the geological and climatic conditions are very much similar to those of our western uplands. Opportunities for training abroad are limited not only by the number of scholarships that may be offered, but also by the small number of our students that can be absorbed in the foreign Universities.

Anthropology exists only in the name of this section. There is absolutely no arrangement for teaching this subject at any stage in any Universities of Pakistan. Under the circumstances no research can be expected in this subject. The Government of Pakistan will be well-advised to encourage anthropological and social studies both in West and East Pakistan, which may be started with the co-operation of UNESCO.

With these few remarks I now pass on to my subject proper.

CLIMATIC REGIONS OF WEST PAKISTAN ✓

The climate of a region is one of the most important physical factors controlling not only the evolutionary process of the living beings but also their character and mode of existence. Mental and physical capacities, the cultural and social characteristics of man are all affected profoundly by the climate of his habitat. Climate has, therefore, been a subject of study from the very beginning of human consciousness.

Attempts at the classification of climates have been made over a long period. The earliest classifications have been made primarily on the basis of temperature on account of its great influence on plant and animal life. The temperature control of climatic zones was recognised by the early Greek philosophers

PERMENIDES AND ARISTOTLE

As terrestrial temperature depends mainly on insolation or incoming solar radiation, the first division of the earth into climatic zones was made on an astronomical basis by Permenides who lived about the middle of the 5th century B. C. He proposed 5 zones not very different from our present zones. Aristotle (born 384 B. C.) limited the Torrid zone by the Tropics and the north Temperate zone by the Arctic circle. These zones still hold the ground and provide the frame-work for several latter classifications.

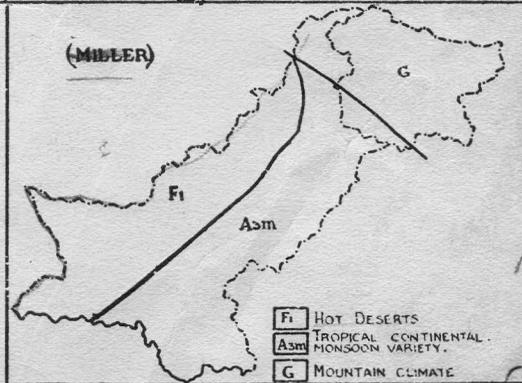
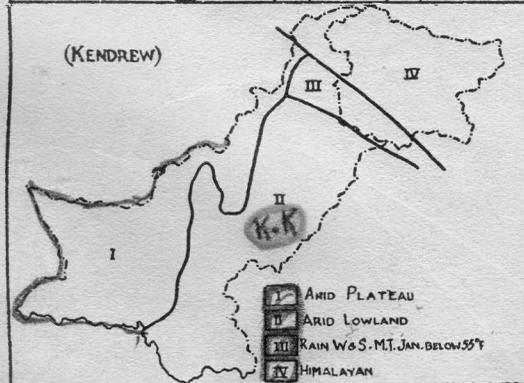
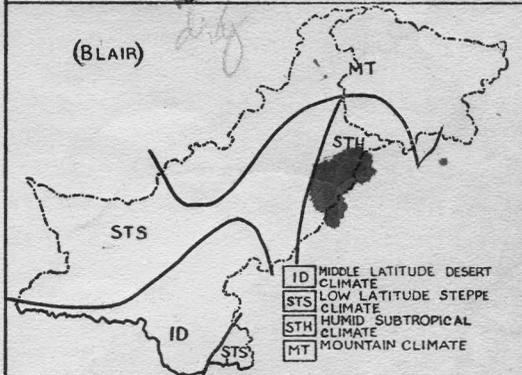
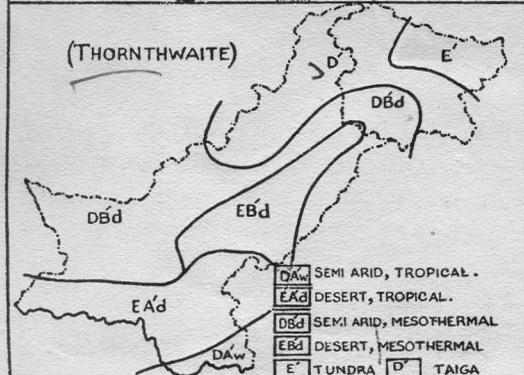
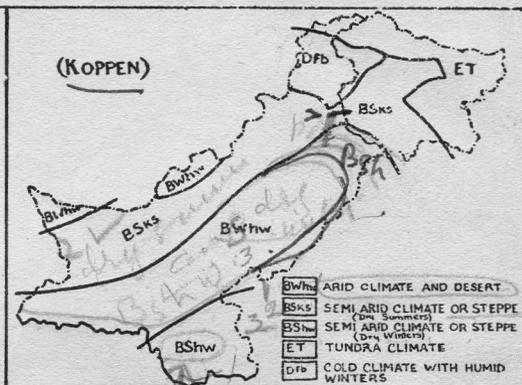
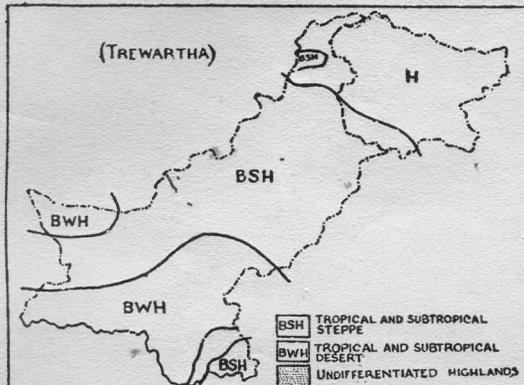
SUPAN ✓

Supan¹ has also divided the earth into belts on the basis of temperature. He chooses the mean annual isotherm of 68°F (20°C) for his hot belt and the isotherm of 50°F for the warmest month as the boundary between cold and temperate belts. He has suggested a division of the earth into 35 climatic provinces, on the basis of certain combinations of climatic elements. They have been enumerated in Bartholomeo's Atlas of Meteorology².

1. Grundzug der Physichen Erd Kunde, Leipzig 1896.
2. Vol. II Physical Atlas, plate 1.

CLIMATES OF WEST PAKISTAN

PLATE I



KOPPEN.

Koppen¹ of the University of Graz was the first person to give a comprehensive and one of the most important classifications of climates. He paid special attention to this problem during the 72 years of his learned career. His original classification was published in 1909, which was revised in 1918. This scheme was further modified in 1928, and subsequently in 1931. His final analysis appeared in 1936².

His scheme is primarily based on mean annual and mean monthly values of temperature and rainfall and their seasonal characteristics. He chose certain numerical values of temperature to determine the limits between the climatic types. These values were selected mainly in relation to their effect on vegetation. (He has taken into consideration not only the mean annual temperature and the total annual rainfall but also the temperatures of the warmest and coldest months and the season of maximum precipitation. He has worked out formulae based on the relationship of precipitation and temperature, or on their combined effects to determine the boundaries between dry and rainy climates, and desert and steppe climates. Separate formulae have been given when the rainfall is concentrated in summer or winter months.

Koppen recognises five climatic groups corresponding to Candolle's five important plant groups. These are symbolically expressed by the capital letters A to E. These groups are next divided into eleven climatic types or provinces based upon temperature and precipitation differences. A number of further sub-division are made to bring out a more detailed characterisation of the climates which are expressed by a third set of letters.³

In the map of the climates of the earth by Koppen, practically the whole of West Pakistan, excluding a small area in the extreme north falls under the group B, of dry climates. Under this five climatic types are found,

1. BShw. Low Latitude or Tropical semi-arid steppe climate with dry winter. The mean annual temperature is above 64.4°F. This includes most of our Sind Province excluding the north-eastern portion.
2. BWhw. Low Latitude, Tropical arid or desert climate, average annual temperature above 64.4°F and winters dry as in 1. This includes most of the Punjab, north-west Sind and eastern Baluchistan.

1. Grundriss der Klimakunde, Berlin 1931.

2. Das Geographischen system der Klimate 1936, Vol. I, Part C of the Handbuck der Klimatologi by Koppen-Geiger

3 These divisions are given in Appendix I.

3. BSks. Middle Latitude or cold semi-arid or steppe climate with dry summers. This includes southern and central Kashmir, most of N.-W. F. P. and the major portion of northern Baluchistan.
4. Dfb. Snow-forest climate, average temperature of coldest month below 26.6°F , warm summers average temperature for the warmest month above 50°F but under 71.6°F (22°C). It is characterised by frozen ground and snow cover of several months' duration, No dry season, humid winters. It includes the northern mountain area of N. W. F. P. (excluding northern Chitral) and the adjacent parts of Kashmir.
5. ET. It is Tundra climate, average temperature of the warmest month below 50°F but above 32°F (0°C). It extends over eastern and northern Kashmir including Ladakh, northern parts of Baltistan, Gilgit and northern Chitral.

Koppen's classification has been widely adopted on account of its simplicity and its due emphasis on the two most important factors of climate, though other aspects are completely ignored. Some people think that his boundary criteria are too rigid and, therefore, unsatisfactory. His boundaries in many parts do not coincide with vegetation zones or with the commonly accepted climatic regions.

THORNWAITE ✓

Another important classification of climates is that by Thornwaite. The importance of precipitation for vegetation depends not only on the amount but also on the extent of evaporation. Thornwaite studied the evaporation data from continental United States in 1931, to determine the relationship between Precipitation (P), Evaporation (E) and Temperature (T). He derived an empirical equation by which the difference between precipitation and evaporation could be determined from the monthly values of precipitation and temperature. Instead of employing simple temperature and precipitation values as limiting boundaries, these data were adjusted separately to secure figures which express precipitation effectiveness (P-E index) and temperature efficiency (T-E index) in promoting plant growth. These adjusted figures were then used in his classification of climates, first of America and later those of the earth. On the basis of P-E index five humidity types (A to E) and on the basis of T-E index six temperature efficiency types (A' to F') were recognised. Humidity types correspond to five characteristic vegetation types. In addition, the seasonal distribution of precipitation is represented by four types.¹

In Thornwaite's map, West Pakistan falls under six types:—

1. D A'w. Semi-arid Tropical, rainfall scanty in winter (abundant in summer),

vegetation, steppe. It covers the south-eastern portion of Sind.

2. D B'd. Semi-arid, Mesothermal. It includes the major part of northern Baluchistan, parts of the Punjab and adjacent Kashmir.
3. D'. Taiga. It includes most of N.-W. F. P., central and western Kashmir.
4. E A'd. Arid Tropical, Rainfall scanty at all seasons. Vegetation, desert. It includes southern Baluchistan and most of Sind.
5. E B'd. Arid, Mesothermal. Rainfall scanty in all seasons. Vegetation, desert. It includes central and south-west Punjab.
6. E' Tundra.

In a recent article,¹ Thornwaite, while retaining the same climatic types with the same meanings, has changed the basis for determination of boundaries in terms of the relationship between potential evaporation—transpiration and precipitation. A moisture index has been calculated to show the relationship between the need and availability of water. The climatic types are defined in terms of moisture index, while the sub-divisions are defined in terms of humidity or aridity indices.

Both the original and revised classifications of Thornwaite have their merits from the points of view emphasised therein. But even in these respects they are open to one important objection. In many parts, besides temperature and rainfall, percolation, outflowing and inflowing drainage and windiness are very important factors. For example, in the sub-montane western part of West Pakistan, an immense amount of water is suddenly brought by the hill torrents and, therefore, the rainfall of the area itself is no index to the availability of water. Moreover, Thornwaite's climatic types do not correctly correspond with the demarcated regions, as is also obvious on the map of West Pakistan. /

BLAIR ✓

Blair² has divided the climates of the world into five major divisions, based primarily on temperature differences and designated by names that are latitudinal in their implication. In contrast to Koppen's and Thornwaite's the letters used for designating the divisions provide a clue to their identity. Under the major divisions fourteen major types and six sub-types of climates are distinguished on the basis of temperature and precipitation differences. The boundaries of the climatic types in general correspond to vegetation zones and agricultural regions.³ In his map West Pakistan falls under four types.

1. Thornwaite—An approach towards a rational classification of Climates, Geog. Review, 1948.

2. Blair, Climatology, New York, 1942.

3. See Appendix 1.

1. *ID—Middle latitude desert climate.*—It is characterised by a large annual range of temperature due to hot summers and cold winters. Precipitation is deficient, without rain for long periods. Vegetation scattered thorny bushes and cacti. Some grazing, no crops except under irrigation. This region covers practically the whole of Sind (excluding Tharparkar) and the Makran Coast.

2. *STS—sub-Tropical Low-latitude Steppe climate.*—Semi-arid, evaporation exceeds precipitation; long dry, often rainless season; brief rainy period; mean annual temperature above 64°F, small annual ranges. Large daily ranges, especially in dry season; not entirely free from frost. Steppes occur as transition zones, more or less surrounding desert areas in all the continents. Vegetation: short grasses, thorny bushes, acacias. This type extends over Western Punjab and most of Baluchistan excluding the Makran Coast and the north-eastern mountainous areas and Tharparkar.

3. *STH—Humid sub-Tropical climate.*—Rainfall moderate to heavy with rain in all seasons, usually a maximum in summer, mean temperature of coldest month above 43°F, but below 65°F, nine to twelve months above 50°F, occasional freezing temperatures, growing season 220 days or more. Typical vegetation, broad-leaved evergreen palms, citrus fruits, sugarcane, cotton. This covers eastern part of the Punjab and the adjacent parts of Kashmir.

4. *MT—Mountain climates.*—It includes the northern mountain areas. Blair's classification is more broad-based than that of Koppen or Thornwaite and is, therefore, geographically more attractive. But the mountain areas have been unevenly treated.

TREWARTHA ✓

Trewartha's scheme of the classification of climates in its fundamental aspects follows Koppen's classification. Following Koppen, five main groups of climates are recognised (A to E). These groups are divided into 14 types and ten sub-type. Undifferentiated highlands form the sixth group H.¹

AUSTIN MILLER ✓

Austin Miller's² classification of the climates of the world recognises seven groups of climates (A-G) which are generally based on temperature. Five of these groups (A-E) are based on the horizontal or latitudinal distribution of temperature and are differentiated by the length of the hot, warm and cold seasons. The sixth group, F is based on aridity and the 7th group, G on altitude.

1. See Appendix I

2. Austin Miller—Climatology, London, 1949.

He divides these groups into eleven climatic types, six of which have also Monsoon varieties. These eleven types are based on the geographical position of different regions and the season of rainfall.¹

In Miller's classification West Pakistan falls under three types.

1. A 3m—Tropical continental. Monsoon variety. It includes practically the whole of the Indus basin together with the eastern parts of Baluchistan. Maximum rainfall occurs in summer from the inflowing monsoon, winter is characterised by partial or complete drought. Length of dry season varies according to local factors, especially the relation of relief to wind direction. It is abnormally hot in summer and usually abnormally cold in winter.

2. F 1—Hot deserts. It includes western parts of West Pakistan south of the Himalayas. Less than of 10" rain. No cold season, *i.e.*, no month below 43°F. Annual range of temperature less than 50°F.

3. Mountain climates. It includes the northern mountainous region, practically the whole of Kashmir and the adjacent parts of N.-W. F. P.—a great variety of contradictory types of dry burning heat on exposed slopes, of stifling heat in enclosed valleys, of bitter cold in the same valleys on wintry nights, of fog and sunshine, of torrential rain and great aridity.

Miller's classification, though it suffers from too much of generalisation which is to a certain extent inevitable in the presentation of climates on a world-wide basis, is the most geographical of all. He has taken into consideration not only the two important elements of temperature and rainfall and their seasonal variations but also the system of winds and the influence of land, water and relief.

Kendrew² has divided West Pakistan into four climatic regions; (1) Arid low-lands, including the whole of the Indus basin excluding the sub-montane strip, (2) Arid plateaus, including the western mountains and plateaus, (3) The northern sub-montane strip with rain in winter as well as summer. Mean January temperature below 55°F. and (4) The Himalayan region, including the mountains of N. W. F. P. and Kashmir.

This is obviously a very generalised division in which relief and rainfall are primary considerations.

CLIMATIC YEAR CONCEPT

While the above classifications represent attempts at dividing the world into areas where certain chosen climatic factors are expected to be found, Russell³, has laid emphasis on the climatic year. This concept recognises that every isohyetal line, isotherm or other climatic isarithm differs in position from one year to the next. It advocates the idea that any particular climate

1. See Appendix I.

2. Kendrew—*Climates of the Continents*, Oxford, 1941.

3. Russell—climatic years, *Geographical Review*, Vol. 24, 1934.

such as desert climate, expands in areal distribution during some years and contracts in others. He suggests that the continued recurrence of a year, say with desert climatic conditions, has greater significance in landscape than has any thermohyetal mean based on a long period of observation. It, therefore, follows that climatic mapping should be based on the frequency of such conditions as desert years, tropical Savanna year, humid year, steppe year. For this purpose, nuclear areas and boundary zones may be recognised, the former including those areas where particular conditions occur in unbroken succession. Nuclear desert, for example, may be considered as the area where desert years are experienced without any break.

This basis of treatment has its merits as being realistic and factual, both in space and time. It lays emphasis on nuclear conditions recognising the fundamental relationship between climate and landscape. It also takes into consideration the transitional belts which are so important and are absolutely neglected while drawing the boundaries of climatic regions. In a dry country like that of West Pakistan, the preparation of climatic maps on this basis may be of great use for its agricultural development. Mapping of the areas containing required nuclear conditions and the transition zones may also be very helpful in our future planning. An attempt may be usefully made to determine correlations between climatic year frequencies and agricultural distributions. ✓

TRI-LINEAR GRAPHS

The classifications of climates so far made are based on mean annual or monthly values of temperature and rainfall and possess all those defects from which mean values suffer. In an arid continental country like West Pakistan, where the elements of climate are liable to great fluctuations and variations, the mean annual values of temperature and rainfall are meaningless and the mean seasonal and monthly values are also not very helpful. Even the mean maxima and the mean minima of temperature and standard variability of rainfall do not give a correct picture. It is, therefore, desirable to get out of this old rut and lay greater emphasis on the factual analysis and presentation of climatic data. For this purpose I suggest the construction of Tri-Linear graphs. We may take an eleven-year cycle or a larger period, say 20 years. For this period the maxima and minima of temperature should be shown by three curves.

- (1) The first showing the actual lowest maximum temperature for each month, that has occurred at the station during the cycle.
- (2) The second showing the actual highest maximum for each month recorded during the cycle.
- (3) The third showing the mean monthly maximum temperature for the period.

Similarly three curves may be drawn for minima, for the (1) highest minimum, (2) lowest minimum and (3) mean minimum.

OIL AND SOAPS

These two products are of every day use. Multan was a secluded place and had to own civilization. So the preparation of oils and soaps is a speciality. Local scented oils have a good reputation, especially the rose oil, coriander oil and anwala oil. The making of tin flasks locally called "Kuppies" is a complementary industry as Multan oils are sent all over the Punjab. Similarly soaps of various kinds are made for local use, which are of better quality than most other Desi Soaps. They produce richer lather and can remove grease easily.

Cloth Printing is another industry but printing by dyes is better developed in villages rather than in the City proper. After Partition Chintz printing has been started on modern lines.

The above sketch shows that there are vast possibilities for industrial development in Multan. Given proper encouragement the place can grow into a great manufacturing centre, and so contribute to the prosperity of its inhabitants as well as to the wealth and welfare of the nation at large.

STRATEGICAL IMPORTANCE OF KASHMIR TO PAKISTAN

BY

KHALIL ULLAH KUREISHY

The peripheries of a state are real indices to its vigour or weakness. If one sticks to the old concept of the 'personality' of a state, border areas are the regions where traces of growth or decomposition are best manifest. No power can, therefore, ever afford to be indifferent towards its frontiers. So is the case with Pakistan.

The very fact that the area of Kashmir (84,471 sq. miles) is bigger than that of the biggest province of Pakistan, is quite significant. Strategic and political considerations are important still. The peripheric location of the territory, its hydrographic control on West Pakistan, the naturalness and invincibility of its defence lines, the contact which it enjoys with the big powers of Asia and its richness in men of quality, are factors which determine its very vital importance.

Kashmir is a zone of insuperable natural defences. It seems nature has taken extra-special care in fortifying the region by at least five massive mountainous defence lines fencing in three valleys which are floored with rivers and which act as *fosse*. The Jhelum, the Indus, and the Shyok are buttressed by the Pir Punjal, the Great Himalayas, the Zaskar, the Ladakh and the Karakoram ranges varying in altitude from fourteen to over twenty thousand feet above sea level. All along the length of the northern rampart of the sub-continent the Himalayas are not so distinctly divided into well marked ranges as they are here. Similarly nowhere do they attain such a width as they do here. The entire history of the sub-continent bears testimony to the impregnability and the invincibility of these barriers. All the countless hordes from Central Asia who came to the rich lands of the Indo-Gangetic plains followed the route from there *via* the Oxus to Afghanistan and thence to the sub-continent. Some of them are believed to have started from points far to the east of Samarkand. In early mediaeval times the Chinese pilgrims to India were also compelled to avoid the shorter route through Kashmir and to follow the much more circuitous way through Afghanistan. The utilisation of the Khyber and other passes in the western off-shoots of the Himalayas in the later period of history also throws ample light on the impenetrableness of the Kashmir maze of mountains and valleys.

Just as these mountain ranges are of positive value in safe-guarding the security of Pakistan from any attack on this side of the State, negatively they are equally dangerous in harbouring the enemy if they belong to any foreign power. Unlike the plain boundaries the mountain borders act as an 'iron Curtain'. Any manoeuvre on the other side of the border can be easily detected by our intelligence units in plain areas but on the contrary a lot of military activity can go on un-noticed and unhindered behind the 'screening' ranges. The annexation of Kashmir by any power other than Pakistan, therefore, means a strangulation of our State.

CONTACT WITH OTHER ASIAN POWERS

Paradoxical though it may seem it is quite credible that in spite of its immunity to an attack from outside the sub-continent, the territory of Kashmir does not suffer from isolation. On the other hand it is the meeting place of five powers of Asia viz. India, Pakistan, Afghanistan, China and Russia.

With India the boundary of Kashmir runs for a distance of about 250 miles. This numerical expression is, however, misleading as the region of contact is too hilly, having an altitude of more than 15,000 ft., to be considered as conducive to any inter-relations. Only a stretch of about 20 miles is really passable and that too with difficulty. The difficulties entailed in the construction of Kathua Road across the Ravi bear out this assertion. Even after all these troubles it serves only as a military road which is susceptible to an easy attack from Pakistan in case of War. There is no alternative line of communication and supply. The only link between India and Kashmir is like the stem of a tree which when once cut the whole tree with all its branches of campaign ramifying through Kashmir is doomed to suffer a magnificent fall. The cutting of this Indian life-line only means the entrapping of the entire forces inside Kashmir. Nor can it manage to escape that fatal 'psychological dislocation' which is a natural corollary to entrapment. In defending this trunk road the Indian armies can be easily put on the 'horns of a dilemma' as there are more than one approaches to the line-through the Doh Valley to Jasmargh, through the Degh Nulla to Samba and through the Sialkot-Jammu Tawi Road-all avoiding Indian territory.

All these approaches to the Kathua-Jammu-Srinagar road are more or less transverse signifying that the defenders of the road will have to fight parallel to their line of retreat which is a definite strategic and tactical disadvantage. The vulnerability of the road is further accentuated by the fact that any forces, stationed in the pocket to the north-west of the Beas outside Kashmir are not strategically well disposed as there is very little freedom of movement for these forces to move outside the pocket for defence purposes. These are the drawbacks which render the link between Kashmir and India

impracticable even for military operations. On any showing, it does no promise to become a commercial highway in near or distant future.

Whatever nominal contact India has with Kashmir is almost brought to nought owing to the peculiar disposition of the surface features of the latter region. Even a cursory glance at the configuration of Kashmir reveals that the natural orientation of the State is not towards India. It is away from India. The lines of least resistance-valleys etc.-not only predominantly but wholly run from east to west and nowhere from west to east. This orographic set up results in rendering the greater part of Indo-Kashmir frontier as inaccessible. Nevertheless, Kashmir is not altogether cut off from India in so far as it can feel the pulse of events in that country through whatever opening Sir Cyril Radcliffe has curiously provided by allocating the district of Gurdaspur to India.

The Tibet-Kashmir boundary is almost as long as that of Indo-Kashmir and is equally or even more prohibitive than the latter for purposes of any organised mass movement. The sparse population of Tibet, the irregularities of its terrain and above all the hostility of climatic conditions are all almost deterrant to any military movement from across this border.

The boundary along Sinkiang and Russian Turkistan though about 500 miles long is also not fit for military activities. The upper Shyok and the Hunza are the two transverse valleys on which depends the accessibility of Northern Kashmir from Chinese and Russian Turkistan respectively.¹ The valleys afford difficult access as they are not even snowed up owing to the too much dry climatic control.

The route from Srinagar through Zoji-La and Karakoram to Yarkand in Chinese Turkistan crosses no less than seven passes and forces its way onward in spite of the natural impediments, obstructed by landlips and rocks, diverted by unfordable rivers, swept by avalanches, exposed to the fierce sun in shadeless ravines and to biting gales on shelterless plateaus. Eastward from Srinagar the road runs *viz* Zoji-La to Leh in Ladakh for a distance of 252 miles. Zoji-La is at the top of the Valley of the Sind river which is a tributary of the Jhelum. As the lofty ranges in which it occurs are an effective climatic hydrographic and economic barrier a traveller through the pass comes across radically different scenic and environmental conditions on the two sides of the pass.

The route from Zojila to Leh proceeds to the Suru Valley towns of Dras and Kargil where proper bridges carry the road across the river. After Kargil the easterly route crosses the Indus at Kalatze where the river is ferried.

1. Lyde L.W., The Continent of Asia, p.370.
2. Neve, Picturesque Kashmir, p. 105.

Beyond this point the route lies in a west to east direction clinging mostly to the northern bank of the Indus Valley till it reaches Leh-the capital of Ladakh. It is an important town at the height of 11,500 ft. and is the meeting place of Caravans from Yarkand to the north, Lhasa to the east, Pakistan to the west (*via* the vale) and India to the south (by way of Kulu). The Central Asian Caravans arrive here in autumn when the Bazar becomes busy. 'Leh is to Yarkand road what Hong Kong is to the Far East.'¹ From here the route turns towards north with many zigzags in it. Along this difficult-rearh it crosses the mountainous obstacles at two mentionable passes-the Kardongla and the Sasirla till it utilises the tributaries of the Upper Shyok and ultimately reaches the Karakoram pass which is as high as 18,290 ft. Further north-ward beyond the Karakoram the slippery track leads into Chinese Turkistan...

Thomas Holdich has given a picturesque description of the track in these words²- "Mile upon mile a white thread of a road stretches across the stone-strewn plains, bordered by the bones of the innumerable victims to the long fatigue of a burdensome and ill fed existence-the ghastly debris of former caravans. It is perhaps the ugliest track to call a trade route in the whole wide world. Not a tree not a shrub exists, not even the cold dead beauty which a snow-sheet imparts to highland scenery, for there is not great snowfall in the elevated spaces which back the Himalayas and their offshoots."

The hostility of the environment, the severity of climate, the rarity of the atmosphere at high altitudes, the difficulty of terrains, the thinness of population in the neighbouring countries of Chinese Turkistan and Tibet, all combine to make the route very difficult, for the passing of large bodies of troops.³ Nevertheless, it is one of the northern gates of Pakistan through Kashmir which has been kept at least half open by the indomitable perseverance of what may be described as trade. Recently its importance has much increased as the developments in Tibet and the effective hold of Turkistan by Red China have now amply demonstrated the truth of the words of Wendell Wilkie - "Sinkiang is one of the areas in the world, where politics and geography combine to make a kind of amalgam full of meaning to those who are curious about what is going to happen to the world."

The route from Abbottabad north-ward through Kunhar Valley-via Chilas to Gilgit is capable of serving as a strong link between Pakistan and Russia and China through Kashmir. The Babusar Pass at the border of N.W.F.P. and Kashmir is 13,690 ft., above sea level and does not afford much difficulty in transit. The river Indus is fordable at Chilas, and at Gilgit the

1. Featherstone B. K. An unexplored Pass, p. 208.

2. Gates of India, pp 3 and t by ruo nas Holdich.

3. It should not be concluded from this statement that the pass is impracticable for small armies. A Mangol army tried to traverse the northern most section of the pass with the idea of conquering Tibet but it was destroyed in the way. Similarly in the year 1543. an attempt was made to conquer Ladakh.

impracticable even for military operations. On any showing, it does not promise to become a commercial highway in near or distant future.

Whatever nominal contact India has with Kashmir is almost brought to naught owing to the peculiar disposition of the surface features of the latter region. Even a cursory glance at the configuration of Kashmir reveals that the natural orientation of the State is not towards India. It is away from India. The lines of least resistance-valleys etc.-not only predominantly but wholly run from east to west and nowhere from west to east. This orographic set up results in rendering the greater part of Indo-Kashmir frontier as inaccessible. Nevertheless, Kashmir is not altogether cut off from India in so far as it can feel the pulse of events in that country through whatever opening Sir Cyril Raddiffe has curiously provided by allocating the district of Gurdaspur to India.

The Tibet-Kashmir boundary is almost as long as that of Indo-Kashmir and is equally or even more prohibitive than the latter for purposes of any organised mass movement. The sparse population of Tibet, the irregularities of its terrain and above all the hostility of climatic conditions are all almost deterrent to any military movement from across this border.

The boundary along Sinkiang and Russian Turkistan though about 500 miles long is also not fit for military activities. The upper Shyok and the Hunza are the two transverse valleys on which depends the accessibility of Northern Kashmir from Chinese and Russian Turkistan respectively. The valleys afford difficult access as they are not even snowed up owing to the too much dry climatic control.

The route from Srinagar through Zojila and Karakoram to Yarkand in Chinese Turkistan crosses no less than seven passes and forces its way onward in spite of the natural impediments, obstructed by landlips and rocks, diverted by unfordable rivers, swept by avalanches, exposed to the fierce sun in shadeless ravines and to biting gales on shelterless plateaus. Eastward from Srinagar the road runs *viz* Zoji-La to Leh in Ladakh for a distance of 252 miles. Zoji-La is at the top of the Valley of the Sind river which is a tributary of the Jhelum. As the lofty ranges in which it occurs are an effective climatic hydrographic and economic barrier a traveller through the pass comes across radically different scenic and environmental conditions on the two sides of the pass.

The route from Zojila to Leh proceeds to the Suru Valley towns of Dras and Kargil where proper bridges carry the road across the river. After Kargil the easterly route crosses the Indus at Kalatze where the river is ferried.

1. Lyde L.W., The Continent of Asia, p.370.
2. Neve, Picturesque Kashmir, p. 105.

route bifurcates into two branches-one following the Gilgit Valley reaches Gilgit Agency and the other leads upto Russian Turkistan through the Hunza. For obvious reasons the route is, upto now, not fully explored and properly utilised: In future too it may not be quite important from purely military point of view but at the same time it is destined to play a significant role in fostering better political relations between Pakistan and U.S.S.R., by making the territorial contact between the two powers more effective.

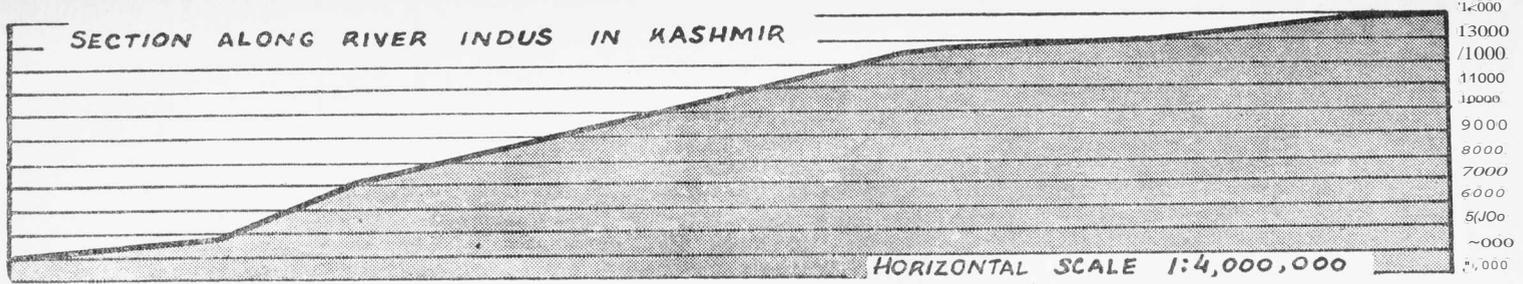
The long superattenuated limb of Afghan territory known as the Wakhan peninsula, which is at once place only 8 miles broad, lies in the north-west of Kashmir. It is too narrow to afford a real contact between Kashmir and Afghanistan and is too mountainous to be effectively garrisoned by the latter power.. It can easily be sliced off at a time of stress. It was the creation of British policy to avoid a direct clash between the 19th century Imperialist Russia and British India. It still serves the purpose of avoiding the border clashes between Russia and Pakistan but does not stand in the way of furtherance of the mutual political interests of the two powers, as it just prevents a direct contact between them. The area of Pamir Loop or Taghdambash where the territories of Russia, China, Afghanistan and Kashmir come close to one another merits special consideration. The longitudinal mountains of Bolar or Sarikol run from north to south making a natural divide between Sinkiang and Russian Turkistan. In their southerly reaches they make a favourable detour towards the west before actually reaching the Kashmir border. It is this turning to the west which creates the loop and makes possible for the aforesaid powers to mutually receive and radiate political impulses.

TIES WITH PAKISTAN

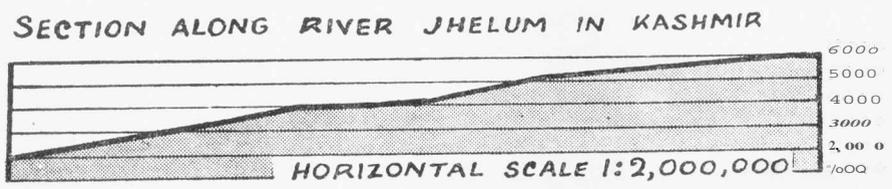
The length of Pak-Kashmir border-350 miles-is not much more than in other cases but it is here that real geographical, economic and ethnographic relationships exist. The innumerable enclaves and exclaves particularly along the N.W.F.P.-Kashmir border manifest the real bending of the two regions. The bends in the boundary are so dovetailed that the two regions seem to have been merged into one inseparable entity.

The orientation of Kashmir is towards Pakistan. The rivers of Kashmir-Indus, Jhelum and Chenab through which flows the life blood of the state-all flow towards Pakistan. Normally rivers are important arteries of commerce and trade but they are particularly so here owing to the ruggedness of surface in Kashmir, where other means of communication are only a few. To a 'mesopotamic' state like Pakistan the sources of the rivers and the upper reaches of the rivers are matters of very great concern and as such Kashmir deserves our fullest attention. It is here, that suitable sites for constructing canal headworks are located. It is here that the rivers can be tamed to control floods by constructing dams across them and it is also here that potential

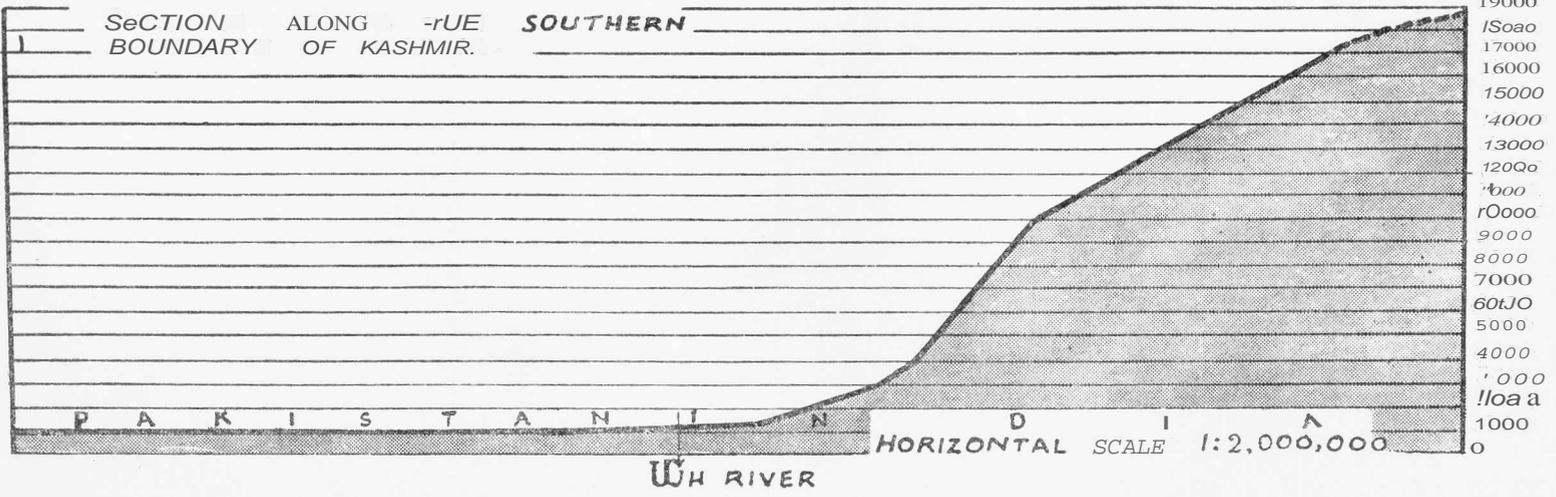
I



II



III



hydro-electric sources lie. If such areas belong to any power inimical to our interests even a change in the course of rivers is not beyond the scope of modern technical perfection!

The means of communications of Kashmir also open towards Pakistan. The Sialkot-Jammu Road which extends as Banihal road further inward, the Gujrat-Bhimbar Road, the Jhelum-Mirpur Road, the Jhelum Valley-Route and the Abbottabad-Mansehra-Muzaffarabad road are all links between Pakistan and Kashmir which are too well known to be discussed at greater length here. Suffice it to say that even the artistic impulses for which Kashmir is so much reputed came to it from Iran through these routes particularly through the Jhelum Valley route during the reign of Zain-ul-Abidin.

The economics of Pakistan and Kashmir are so interlinked that their separation through any artificial political alignment is highly unimaginable. Kashmir is deficient in food stuffs. Owing to the ruggedness of terrain and aridity of climate over a vast area, only 4.9% of the total land is under plough. This has resulted in a careful utilisation of every square inch of useful land. In the absence of comprehensive statistics, the intelligent device of 'floating farms' on rivers and lakes with a view to enlarging the expanse of cultivable land, is a sure testimony to the acute shortage of arable land in Kashmir. Naturally, then, Kashmir is dependent upon Pakistan for the supply of the net annual import of about ~ lakh maunds of grains and pulses. Given the requisite amount of food, Kashmir can easily concentrate on horticulture and floriculture which are much more paying than other agricultural pursuits.

The forests of Kashmir which cover an area of about 10,274 sq. miles and which account for about one third to one half of the total revenue of the State can best be utilised for the mutual benefit of Kashmir and Pakistan only if the logs of wood are flown down the rivers opening into this country. The maintenance of Jhelum and Wazirabad as great markets of Kashmir wood will vouchsafe the annual income of more than one crore of rupees to Kashmir people and at the same time will meet the requirements of Pakistan in timber, bamboo and willow ash. The availability of soft wood, fir trees and wood pulp will brighten the chances of establishing paper manufacturing industry in West Pakistan.

1. The diversion of the waters of the Chenab is comparatively easier. Two subsequent streams belonging to the Chenab and Ravi system respectively in their natural process of cutting backwards into their common water-heds, have come sufficiently close to each other to the south of Bhadarwah in Udhampur. The construction of a dam across the Chenab near Dod and the tunneling of the distance between the sources of the above said subsequent streams, can accomplish the task of diverting the water of the Chenab into Ravi which meanders in the plains of India before entering Pakistan. A Press communique issued by the Govt. of Pakistan on August 17, 1951, expressed that India has already a project in view which would divert part of the supplies of the Chenab into Indian territory.

The tourist industry which is one of the major sources of income to the Kashmir people and which earns an annual revenue of about Rs. 60 lakhs for the State Government is the gift of Kashmir's contiguity with Pakistan.

In return for what Pakistan can do in order to guarantee a better economy to Kashmir, she can help the former in more than one way. The conservation of vegetable cover on the Siwaliks which mostly belong to Kashmir will be of very substantial help to Pakistan in checking soil erosion and in controlling floods. The Hydro-electric power generated at Muzaffarabad, Jammu and Mohra may be extended to ease the shortage of power in West Pakistan. The Mangla Headworks which in the circumstance of a foreign power possessing Kashmir is dangerously exposed, will be safe in our hands and the supply of irrigation water to 4,00,000 acres of land in the northern parts of Chej Doab growing excellent crops of wheat and American cotton will be ensured. The huge deposits of a strategic mineral like bauxite in Jammu will be a valuable asset to a country like ours which does not possess enough minerals to spend and to spare.

SOME OTHER CONSIDERATIONS

However strange it may sound but the fact remains that Kashmir which is the hotbed of conflicts today has been a region of enduring peace and tranquility through the ages. This stability and security are mirrored in the high civilisational, cultural, and artistic attainments of Kashmiris. This fact brings into eminence the possibility of constructing an arsenal here as a part of the long range development schemes. The construction of arsenals by Russia to the east of the Urals signifies that such plants are to be erected in the safer regions which are shrouded with top level secrecy on all sides. Much of the Kashmir territory is safe and sheltered but Ladhakhistan is safest. The very absence of walled villages in this part of Kashmir reflects the degree of safety and security of the region. Again, the necessity of establishing a joint Air Force, Naval and Military training centre, focusses one's thoughts at Dal which is the best inland centre for the purpose throughout south-eastern Asia. The scenic beauty and the bracing climate are simply invigorating.

Fantastic and farcical though the cry of Pakhtoonistan is, its tempo has considerably been synchronising with the ups and downs of the changing Kashmir situations. This gives us a clue to the understanding of the nature of the problem. The hold of Pakistan on Kashmir will eliminate the impact of foreign influence on Kabul radio and it will automatically cease parroting His Master's Voice. The unfounded cry will, thus, die its natural death.

In the final analysis comes the most important source of strength of the region *i.e.*, man power. Kashmir, according to the 1941, census is inhabited

by 40,21,616 persons out of which 32,00,000 (about 77.11%) are Muslims, the remaining being mostly Hindus (22.89%). The two religious groups have for long been quite distinct from each other. Their differences are not, however, based on any racial dissimilarities. They are the outcome of a long history of about a century of iron rule by the Hindu minority after the purchase of the territory of Kashmir by Gulab Singh in 1846, for a paltry sum of Rs. 7,500,000 looted from the Lahore Treasury.¹

This protracted period of a tyrannical Dogra rule marked with a policy of sustained exploitation of the Muslims resulted in a stratification of the society into distinct classes of the exploiter and the exploited with all the venom and bitterness that it could entail. Mr. Wingate in his preliminary report of Settlement Operations in Kashmir wrote:

"The revenue system is such that whether the Kashmir cultivator works much or little, he is left with barely enough to get along until next harvest. He is a machine to produce *shali* (unhusked rice) for a very large and mostly idle city population. The secret of the cheap *shali* is because if the price were allowed to rise to its proper level the whole body of Pandits would compel the palace to yield to their demands".

"The Muhammadan cultivator is compelled to grow *shali*, and in many years to part with it below its proper market rate, that the city may be content. If the harvest is too little for both, the city must be supplied and is supplied with any force that may be necessary and cultivator and his children must go without".

The social discrimination and the consequent hatred of Muslims against Hindu Raj have made an overwhelming majority of the population look to Pakistan² where their co-religionists and their very blood relations are masters of their own destinies under a flourishing democracy.

Kashmir is a northerly and north-easterly continuation of the ethnographic region of Pakistan, with Muslim preponderance everywhere including

1 "Of this Gulab paid £ 400,000 (which he had raised mainly by plundering and murdering British subjects in British territory. While professing the most grovelling loyalty and sincerest friendship for the English, he sent down from Kashmir a native contingent to fight on the side of Sher Singh against them in Chilianwala Campaign, of 1849.... Speaking afterwards of Gulab Singh the Governor General used these words: "He is the 1st scoundrel that ever drew breath, a scoundrel from a kingdom down to a halfpenny". Lee J.F., Imperial Military Geography, p. 57.

2 J. Fitzgerald Lee wrote in Imperial Military Geography on p. 58: "When the hurricane bursts over Central Asia the new Republics—all Muhammadans, to a man will endeavour to see to it that their brother Mussalmans in Kashmir are liberated..." The prophecy came out to be true in Oct. 1947, in a slightly different way when the Muslims of the adjoining Pakistan territory came to the rescue of their oppressed brothers.

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Jammu, like a tongue of plains penetrating into mountains-a frequent occurrence in nature. The similarity of cultural landscape on both sides of the Pak-Kashmir border, the heroic display of bravery of the people during the course of the present liberation movement, and the leanings of Kashmiris towards Pakistan are all important considerations from a military standpoint.

It is not merely the number but also the quality of people which counts. "In intellect the Kashmiris are perhaps the superior of the natives of India". The artistic skill and excellent craftsmanship of Kashmiris is the outcome of a superb genius. In them are combined the qualities of mind and body. Kashmir has produced the embodiments of physical perfection like Gama, the wrestler, and intellectual giants like Allama Iqbal, the philosopher-poet of international fame. The sway of Iqbalian philosophy of life over Pakistani intelligentsia is complete which means that we already owe a lot to Kashmir. It will be a source of added strength to us-numerical as well as intellectual-when we enjoy that oneness with Kashmiris which is the ultimate aim of all strategy.

NEED FOR THE DEVELOPMENT OF CHITTAGONG HILL TRACTS

BY

NAFIS AHMAD AND A. I. H. RIZVI

Eastern Pakistan mainly consists of alluvial plains. The Chittagong Hill Tracts along with the adjoining area of the Chittagong district, is the only part of the province which has a hilly upland surface. The absence of hills in the rest of the province lends significance to the potentialities of the Hill Tracts in several directions *e.g.* agriculture, forests, minerals, industry and power development.

The Hill Tracts district lies between 21° 25' and 23° 45' N. Lat. and 91° 45' and 92° 5' E. long.

The area is bounded on the north by the State of Tripura, on the west by the district of Chittagong, on the east by a similar belt of hilly country, called respectively the Arakan Hill Tracts and the Lushai Hills; the province of Arakan in Burma covers the southern corner.

Physically, the area may be divided into four main river valleys—namely, the Feni, Karnafuli, Sangu and Matamuhari rivers and their tributaries. Almost parallel chains of hills traverse the district from north to south with a north-west to south-east trend. Well defined longitudinal valleys are formed by the Sangu and the Matamuhari, while the Karnafuli and the Feni flow transversely across the main lines of the hills. Several large tributaries of the Karnafuli which join it almost at right angles to its course, also form longitudinal valleys conforming to the main trend of the hills. The hills range between a few hundred to a little over 4,000 feet in height. The highest point is Keokradang 4,034 ft. lying on the eastern margin of the district. Other prominent elevations are Rakhmoin Tong (3,017 ft.) and Polytai (2,857 ft.).

Geological information about the region is scanty and there has been lack of a systematic investigation in the years preceding partition. But it is generally believed that the geological formations resemble those of the Arakan Yoma and consist chiefly of sandstones belonging to the lower Eocene of the Tertiary Age.

The area of the district is 5,007 sq. miles but the population was only 247,053 in 1941, giving a density of 50 persons to the square mile. Much

increase has not taken place in recent years. This scarcity of numbers presents an interesting disparity with the general demographic picture in Eastern Pakistan. With an area of 54, 115 square miles, the province's population is approximately 46 million. Excluding the Hill Tracts, therefore, the density rises to nearly 980 per square mile. Several districts have densities higher than 1200 and in small tracts densities over 1500 are common. There are also areas with densities exceeding 3000. Thus Eastern Pakistan is amongst the most densely populated areas of the world.

The Chittagong Hill Tracts have remained so hI in the back waters as regards economic development. There is only one town with a population of over 10,000, not a mile of railways, no metalled roads, no factory, industry and no power station. The population is mainly organised in tribal groups and the backbone of the economy is primitive agriculture and haphazard collection of forest produce. Much of the area remains remote and isolated and the general benefits of civilized life are non-existent.

FUTURE POSSIBILITIES

But the Hill Tracts may be said to be Eastern Pakistan's land of promise. If the crude, primitive, and shifting cultivation called 'jhum' is replaced by settled cultivation and the problem of soil erosion is met by terracing: the hill sides which are extremely fertile, some of the plain's growing population can possibly be absorbed in the thinly populated areas. What is needed is a scientific approach and a planned effort firstly, to make the Hill Tracts an agriculturally useful area. The valuable forest resources also need proper exploitation.

An extensive geological survey of the region is also necessary before an estimate of its mineral wealth could be made. It is believed that deposits of lignite ranging from moderate to poor quality exist. Limestone, petroleum, iron and iron oxides and other useful minerals may also be found.

Development of Water Power :- Many rivers of the Chittagong Hill Tracts like the Feni, Karnafuli, Sangu and Matamuhari and some of the tributaries of the Karnafuli flow with considerable volume of water throughout the year. Except during the rainy season when water level is much increased, the rivers carry to the sea more or less constant volume of water. There are numerous waterfalls and rapids- specially in the upper courses of these rivers. These conditions seem to be favourable for the development of water power projects. On the lines of the Karnafuli project, other schemes may be planned. The availability of cheap power might lead to the industrial development of certain areas of the district apart from larger benefit to the province as a whole.

A Plan of Development :-In view of the above consideration it seems necessary that firstly, an assessment of the natural resources of the Hill Tracts should be made as then alone can a development plan be drawn up. But planning is not merely a matter of personnel and ideas but resources and their full appraisal and intelligent direction. It also involves the necessary sanction and authority to support systematic programmes of development. Therefore, the creation of a Hill Tracts Planning Authority sponsored by government would be essential.

The accompanying plan of regional Survey envisages the tackling of a programme of development primarily on a long term basis. But the various steps suggested can be fitted in into a time scale of shorter duration and a considerable amount of preliminary, reconnaissance and survey work can be started immediately to lead to an overall implementation of a plan of development based on the basic information thus furnished.

A SCHEME OF THE REGIONAL SURVEY OF THE CHITTAGONG HILL TRACTS

A PRELUDE TO PLANNING

1. *Geographical Background* :-

- (a) Surface and relief (to be studied with the help of available topographic sheets, *11'*, *1"*, *6"*): Though these sheets are out of date with respect to some minor details, yet they are of much use for a preliminary study of the area. Sections should be drawn across several areas to study topographic profiles. Visits to a number of selected areas and stations will be necessary to have a concrete and vivid picture of existing conditions.
- (b) Drainage and Drainage Pattern: A detailed study of all the important rivers and their main tributaries is necessary with regard to the following considerations :- (i) Sources. (ii) Supply of water during different parts of the year. (iii) water falls and rapids, if there are any and the possibilities of citing dams and projects and their use for the generation of electricity. (iv) Navigability-possibilities of development of inland transport. (v) Expansion of agriculture in the narrow valleys and on the slopes by terracing-availabilities of surface and ground water.
- (c) Climate: Collection of all available data and establishment of a number of new observation stations. (i) Temperature; Mean monthly temperature of the selected stations, diurnal and annual ranges of temperature. Influence of elevation on temperature, rainfall and other local factors. (ii) Distribution of rainfall. In-

fluence of relief on the distribution of rainfall. Failures of rain, if any, and seasonal variation thereof and their effect on agriculture. (Changes in weather conditions are to be studied with special reference to the seasonal distribution of rainfall and all generalizations to be based on the study of sufficiently large number of stations). (iii) *Wind*: Direction and velocity of wind at the surface and at 1000, and 3000 feet above sea level (average for all months of the year). Influence of summer monsoon on the direction and velocity of winds. Storms, their time and duration, tracks and wind velocities and their influence on settlements and agriculture. Influence of topography and vegetation on winds and on storms through afforestation.

2. *Geology*:

A detailed survey of the geology of the area and the resultant rock formations-their relationship with existing geomorphological features :-

Mineral Resources:

- (a) Present position: (i) Location, e.g. of coal, iron oxide and other useful minerals and non-ferrous deposits e.g. sands and gravel etc. (ii) Types and qualities of minerals already-exploited. (iii) Factors determining accessibility, geological and economic. Facilities of transport and power. (iv) Local consumption and export..
- (b) Possibilities of future developments. (i) Location of new deposits of coal, iron, petroleum, and limestone, and sandstone etc. (ii) Estimation of reserves. (iii) Problems of exploitation and transport. (iv) The possibility of an increase in the local consumption of minerals through industrialisation based on the increased exploitation of the available resources. (v) Influence of the development of power on mineral exploitation.

3. *Soils* :

Study of the soils of the area-preparation of a generalised soil map. Classification of soils etc.

4. *Vegetation*:

A survey of the plant life of the area-specially from the economic point of view.

Forest resources (i) Kinds of trees and their possible economic uses. (ii) Chances of improving on nature by cross breeding of different strains or by producing other species which grow faster and have higher resistance to insects and to disease and adaptability to climate. (iii) Experiments with plantation such as tea, Cinchona, teak, Mahogany etc. and their future possibilities. (iv)

Exploitation of the possibilities of the various forest products and their becoming an element in the development of the area for the establishment of cottage industries and future industrialisation e.g. match factories, paper mills, lumbering and sawing etc. (v) Relationship between forests and soil erosion.

5. *Animals :*

A survey of animal life of the area: Existing uses of animal transport and the utilisation of animal wealth (elephant capture, sale of ivory, big game, insects, reptiles etc.

6. *Human Patterns :*

- (a) present population-geographical distribution, density, pattern (types and sizes of communities) nature of rural population (tribes, tribal communities and their social and economic organisation). Villages and towns-Religious groups.
- (b) Other demographic features: (i) Composition by sex, age and family. (ii) Population increase, influx and movement (including influence of migration in pre-war years, war time and post-war periods) and estimates of future population. (iii) occupied population ; especially distinguishing male, female and juvenile employment.. (iv) Types of skill, adaptability of labour and the significance of changes of war-time employment in certain parts. (v) Inter-regional movement of labour during war years and post-war and post-partition periods.

• *Agriculture:*

- (a) Physical background (climate, weather, soil-types and fertility).
- (b) Present land utilisation, agricultural production-home consumption and export of agricultural produce if any.
- (c) Problem of soil erosion.
- (d) Form of land tenure and land ownership.
- (e) Possibilities of increase in the cultivable area and in yield per acre of crops. Possibilities of future technological developments in agriculture.

Cottage Industries.

- (a) Types and location-chief raw materials and finished products.
- (b) Utilisation and marketing.
- (c) Future possibilities of development.

9. *Communication and Transport:*

- (a) Present position-(Metalled and unmetalled roads, hill tracks and navigable rivers).
- (b) Possibilities of roads, rail, river, ropeway and air transport.

10. *Immigration and Settlement:*

- (a) Possibilities of immigration and settlement in suitable areas.
- (b) Establishment of new townships and settlements.
- (c) Citing of sanitoriums and health and holiday resorts.

11. *Influence of Power Development on:*

- (a) Large scale industry.
- (b) Cottage industries.
- (c) Transport.
- (d) Settlement.

DISTRIBUTION OF FORESTS IN SIND

BY

MOHAMAD IBRAHIM U. MUNSHEY B.sc., A. I. K C.,

S.ind. Forest Servke

The nature of vegetation and its distribution is mainly governed by the climatic factors. Sind is included in the arid zones of the world. For its climate, therefore, there could not be any thing but the vegetation of the scrub thorny type with stunted growth. But local variation, mainly on account of nature of the soil and availability of water other than rain, have caused appreciable change, resulting in growth of thick vegetation in the nature of forests.

Area of Sind, excluding the state of Khairpur "Mil's" is 47,164 sq. miles. The whole of the province can be divided mainly into three physical regions namely (1) The Desert locally known as 'Thal' (2) The Indus Valley locally known as 'Pako' and (3) The Hills, locally known as 'Mae'. To this may be added, a narrow strip of the Coastal Region. The Desert and the Hills comprise about 2/5 of the area of the province and they constitute the true arid regions of the province. (Refer Map).

THE DESERT

The desert is the south western part of the Great Indian Desert and is some 10,000 sq. miles in extent. It consists largely of sand hills which vary from small dunes to hills 30 to 400 feet high and lie parallel in the general SW to NE direction of prevailing winds. The sand hills are separated by valleys varying in breadth from one mile to a few hundred yards. The sand hills overlie old Indus alluvium. At places, they overlie parent rock of the type found in Nagarparkar. At places, continuous backing-in of the rain water, which carries calcium bicarbonate dissolved from tiny sea shells blown on the desert by the Monsoon Winds, results in formation of hard pans, down below 100 to 300 ft.. Sometimes, the pans are shallow enough to result in formation of ponds during the Rainy season. The Rainfall averages to 10" yearly.

The population density is 15 to 30 persons per sq. mile. The main occupation is cattle rearing. The desert cattle locally known as 'hari' is one of the best dual-purpose animals in Indo-Pakistan sub-continent. Sind Desert Camel is unparalleled in the world, being fast, hardy and docile. For food,

Ba fri (pennisetmn typhoideum} chester beans (Cyamopsis psoraliodes) and Mung (Phaseo-lus munga) are raised on rains. The grass and vegetation continue to be sufficient for the graziers in the middle of winter season after which most of the population migrates to the valley.

The natural vegetation reaching any standard of a forest is confined to areas where shallow ponds appear or where, in the valleys either the sand is shallow or parent Indus alluvium is visible. Where man has not set his hand to destroy tree growth or cultivation, forests in true sense of the word do exist.

Such areas, are however small and widely scattered. They are not under the management of the Forest Department. Predominant trees that compose such forests are the Kandi (*Prosopis speigera*) the Rohero (*Tecoma undulata*), the Babri (*Acacia jacquemontii*), the Khumbat (*Acacia senegal*), and the Khaboor (*Salvadora oleoides*). The vegetation along side the ponds is predominant in Khajji (*Phoenix dactylifera*). With these a variety of other tree species also occur and they are Nim (*Azadirachta indica*), Liar (*Cordia rothii*). The growth is, often so thick as to conceal herds of wild life which is mainly the black buck and the common nilgai deer. The four horned antelope (Chinkara) is also found in these areas.

The sand hills are not totally barren. They do bear vegetation of stunted type predominant in shrubs throughout the year and grass during and after the rains. The most common shrubs are Thuhar (*Euphorbia terrifolia*), Booh (*Aerva tomentosa*), Phog (*Calligonum polygonoides*), Ak (*Callotropis proserpa*), Kirir (*Capparis aphylla*), Dhilusil (*Cassia obtusa*), Lorari (*Lycium barbarum*), Pharr (*Pluchea lanceolata*), arid Beri (*Zizyphus nummularis*). The common grasses are Thari (*Agrostis micrantha*), Chhabhar (*Chloris virgata*) Kabah (*Cynodon dactylon*), Gandhar (*Elymus flagellifera*), Dhukar (*Heleochelea dura*) and Gamol (*Panicum antidetabile*).

THE HILLS

The region of hills is the southernmost formation of the Sulairan and Khirthar Ranges. This region occupies about 10,000 sq. miles.

It consists largely of limestone formations rich in marine fossils. The Ranges lie mainly in north to south direction. The highest peak is near village Baran at the head of the sea of the Baran River. The altitude there is 3662 ft. above sea level. The Rainfall in this region varies from 10-15" yearly.

The population is thin and mostly consists of the various tribes of Baluchis. Their main occupation is goat and sheep rearing. Agriculture depends on rain water and is confined to the valleys between the hills and on the foot slopes of the hills. The Rain water is collected in terraces by Bunding

at the foot of the hills on gentle slopes. The higher slope above the cultivated fields are used as pasture ground, > for goats and sheep. The main crops are the same as in the desert. During the rains and till the middle of winter, the goat breeders stay on hills, rearing goats and raising crops. In the middle or end of winter and beginning of hot weather, they migrate down in the Indus valley, because the pockets of water in the hills and beds of seasonal nullah get dry and the grass on the hills gets scanty.

The natural vegetation reaching any standard of a forest is confined to banks and beds of hill torrents and valleys between the hill ranges. The main flora varies but little from the desert flora. Main species that are found in this region are Babul (*Acacia arabica*), Kandi (*Prosopis spicigera*), Khumbat (*Acacia senegal*), Khaonr (*Acacia farnasiana*), Dhaonr (*Acacia modesta*), various species of Ber (*Zizyphus* spp.) and Rohero (*Teccoma undulata*). The conspicuous species of this region is Kahoo (*Olea cuspidata*).

The hills are rich in shrubs and herbs which are reputed to be of medicinal and economical value. It is said that Baluchi housewife finds every thing needed at home from the hills. The soap for washing cloth is obtained from leaves of certain herbs. A variety of other herbs is used as antidote for a snake bite and scorpion sting. Yet, there are many more herbs used for medicine in skin diseases and as febrifuge and for variety of other uses. This aspect of the vegetation of the hills yet remains to be explored and studied. The prominent shrubs and herbs of this region are :- (1) Kadero (*Alhagi camelorum*). (2) Reho (*Bergia aestivalis*). (3) Dramah (*Fagoniactica*). (4) Gangethi (*Grewia pepulifolia*).

The vegetation in hills has been destroyed considerably by the goat grazers. There are very few patches bearing thick growth of trees worth naming as forests.

THE INDUS VALLEY

The region of the valley of Indus is the most fertile region of the province. It is comprised of the Indus' alluvium. The right bank alluvium is older in formation than the left bank as is evident from the fact that sites of pre-historic old towns of MO'an-jo-Daro (misnamed as I"lohanjo Daro) and Kahoo-jo-Daro and the old historic towns of Sehwan and Thatt. are all situated on the right bank..

The Indus passes approximately through the axis of this region dividing it into 2 unequal halves-the right bank is narrower and stretches towards the hills. The left bank is broader and stretches towards the desert.. It is cut up by natural depressions in the form of old river beds and the lakes, which were also old bends of the mighty river. The most prominent and oldest of the river beds is the Eastern Nara which was once a river, then a bye-river, then

inundation canal and now it is one of the perennial canals of the Sukker Barrage system. The prominent among the lakes are (1) Manchur, (2) Kinjhir, (3) Sonahri, (4) Makhi.

The artificial land features in the valley mostly consist of its canals most of which are still seasonal and at the mercy of rise of water in the river. They are what are known as inundation canals. The Sukker Barrage canals command but less than half of the valley region of the province. This zone extends from Rohri to Hyderabad on the left bank and Sukker to Sehwan on the right bank. The rest of the province is irrigated by seasonal inundation canals taking off direct from the river. The Kotri Barrage under construction, will further assure water supply in the region below Kotri on the right bank and below Hyderabad on the left bank. This will increase the area under Barrage systems in Sind to a little more than half the area of whole of the valley. The tract in the north of Sukker and Rohri on both banks and between Sehwan and Kotri on right bank will even then remain under inundation system, completely at the mercy of rise of water in the river.

The Indus valley region slopes out away from the river on both the banks. The river runs on a ridge. This considerably facilitates flowing of the inundation canals and carrying river water out into the interior for cultivation. On account of this feature of the ground, the valley is always liable to be flooded in vast stretches, away from the river. When there are rains in the Indus catchment the water in the river rises considerably and the water level assumed dangerous heights. But this danger has now been averted by construction of earth bunds along both the banks of the river. These bunds are 12 miles to 25 miles apart from the bank to bank and extend from North to South on both the sides.

The river meanders and changes its course within the strip of the land between the two river protection bunds. Considerable erosion of banks and accretion of new alluvium on the opposite bank occurs year after year with the annual rise and fall of water in the river. Hence of the tract between the bunds is therefore known as Kacho or Daryakhurdi as against Pachoice the land outside river protection bunds on both banks.

During the peak season of rise of water in the river, which is known as Abkalani season, if there are normal rains in the Indus catchment most of the Kacho tract, nearly 75% of it, gets flooded and submerged under water. On an average 5'-6' delta of water is received by the submerged part of the tract. These floods resulting in supply of extra water to the land, coupled with the erosion and accretion activity of the river has a great bearing on growth and rearing of forests in Sind. Most of the rich forests of Sind are confined to this tract. Indeed, they are rich in production of fire wood and charcoal.

The land in the Kacho tract is either occupied by the river and its byes, lakes, forests or cultivation. The land being a new alluvium is very fertile. Before the British took up scientific management of natural forests in this tract, considerable amount of land was cleared for cultivation of Selabi wheat or gram or awarded as Jagirs to big personalities for services done to the rulers. Thus, forests do not occupy a continuous stretch all over the Kacho tract. Only about a third of this tract is occupied by the reserved or private owners of forests.

Upper Sind above the 26th parallel has different climate from the lower Sind. It is characterised by the extremes of climate. The summers are hot. Temperature at many places reaches 120° F during July and August. Hot winds locally known as "Look" blow during the day while during the night either hot winds continue or the atmosphere gets closed. Winters achieve the other extreme temperature at good many places mercury falls below the freezing point. Frost is of a common occurrence.

The Kacho tract in this region bears forests rich in Kandi (*Prosopis spicigera*). The climax type forest of this area are the forests predominant in Kandi but having Lai (*Tamarix dioeca* and *troupii*) as an understory. They are very rich in grasses mainly Dabh (*Eragrostis cynosuroides*), Chabbar (*Chloria virgata*), Kabh (*Cynodon dactylon*). Fires are a common occurrence in this forest during the hot weather.

The newly formed alluvium if formed out of fine silt or clay is invaded by Rank grass (*Sacharum spontaneum*) which grows so thick that no other tree grows in it. Whatever young seedlings spring up during the season, within the grass, get killed when any fire occurs during the hot weather. However in course of ecological succession, with rising of the ground, the site becomes unsuitable to the growth of Rank which give place to Kandi and Lai.

The newly formed alluvium from the loam deposit, creates conditions of growth of mixed forests with Lai (*Tamarix dioeca* and *troupii*) as its main species. Sometimes Bahan (*Populus euphratica*) gains ground to produce pure popular patches which subsequently yield soft wood timber. Sar grass (*Sacharum Munja*) also appears mixed on such sites. In addition a carpet of variety of annual herbs and shrubs springs up with the recession of water from such areas. Such mixed forests also, in course of time, with the rise of the ground level give place to more hardy tree, the Kandi, when the forest reaches its climax type.

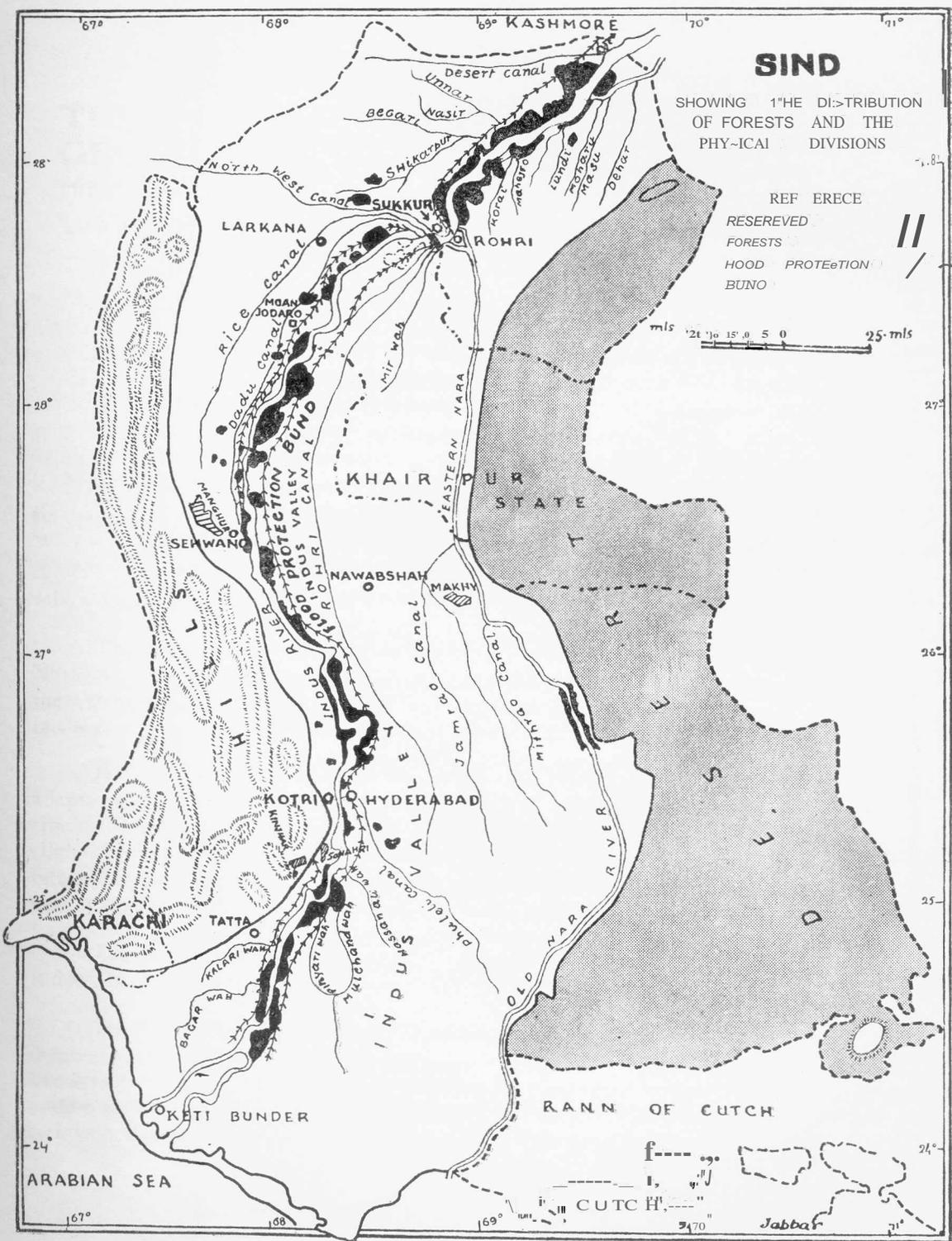
Below the 26th parallel, the climatic conditions are not very severe. This is due to its proximity to the sea. Temperature during summer rarely reaches 120° F. Nights are generally cool and breezy. Winters are mild. Frosts are only occasional. The strip of kacho below this parallel bears the most productive and beautiful forests of Sil'd. They are the climax type Babul

(*Acacia arabica*) forests. Pure Babul forests occupy large areas and are characterised by absence of undergrowth of any grass. Only annual herbs grow in a carpet immediately after the recession of the flood water. The succession in newly formed alluvium and the abandoned river beds is the same as described above under the forests of the upper Sind.

Certain scattered patches of land have been declared as reserved forests outside the river protection bunds, in the pako portion of the valley region. Except a few that are on the right bank, such forest areas have no arrangements for supply of water to them. The few ones that are on the right bank below Sehwan, receive water from hill torrents, and bear good growth of Babul. In the rest, the soil has degenerated into Kalar and bears nothing but Khabhar (*Salvadora Oboides*), Jar (*Salvadora persica*), Kirir (*Capparis aphylla*) and shrubs like Akk (*Calatropis gygantia*) and Lani (*Salsala foetida*). Such areas now being taken up for converting them into irrigated forest plantations wherever water could be had from the Irrigation Department. Sind has an ambitious plan in hand to create 50,000 acres of such plantations in Sukkar Barrage Zone and another 1,50,000 acres in Kotri Barrage Zone. Small sized irrigated plantations started in 1939 and continued thereafter, exist in every forest division, most prominent of them being near Larkana in Upper Sind and Hyderabad in Lower Sind. Local timber producing trees like Mulberry (*MOTUS Alba*), Talhi (*Dalbergia sissoo*) Nim (a *Azadirachta indica*) and Sirinh (*Albizzia lebeck*) are in these plantations on canal water irrigation. Some of the exotics mostly from Bharat, including Teak (*Tectona grandis*) are also under trial.

THE COASTAL REGIONS

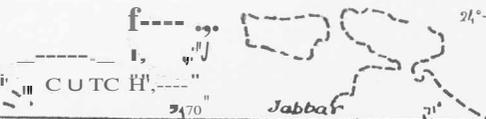
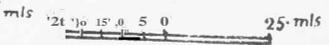
The coastal region bears natural vegetation of the mangrove type. The vegetation in this region has not yet been studied. Patches round about Karachi coast show potentialities for economical working and fuel production. It is hoped this region will get due attention from the Government soon.



SIND

SHOWING THE DISTRIBUTION OF FORESTS AND THE PHYSICAL DIVISIONS

- REF ERECE
- RESERVED FORESTS
 - FLOOD PROTECTION
 - BUND



ARABIAN SEA

RANN OF CUTCH

KHAIRPUR STATE

KARACHI

KOTRIO HYDERABAD

LARKANA

SUKKUR

ROHRI

KASHMIRE

ARABIAN SEA

North West Canal

LARKANA

MOAH JODARO

Rice Canal

Dadul Canal

SEHWANO

INDUS RIVER

FLOOD PROTECTION BUND

INDUS RIVER

SUKKUR

ROHRI

MOAH JODARO

SEHWANO

KHAIRPUR STATE

INDUS RIVER

ROHRI

MOAH JODARO

SEHWANO

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ROH

THE COMPARATIVE AGRICULTURAL GEOGRAPHY OF BARBARY (FRENCH NORTH AFRICA) AND THE PUNJAB (P) WITH SPECIAL REFERENCE TO THEIR COMMON PROBLEMS

BY

MAQBOOL AHMAD BHATTY, M.A., Ph.D. (EDIN),

(Collected from July HMO).

CLIMATE

With dimoat-e we come to what has always been recognised as the most fundamental factor in agriculture. Despite their contrasted seasonal regimes, West Punjab and Barbary show a "Comparable variability and deficiency of rainfall combined with extremes of temperature, conditions which are, as a rule, associated with a semi-pastoral life or irrigational agriculture.

Two maps of Barbary and Punjab (P) showing indices of aridity to Martonne illustrate the close parallel between the two regions in the range of these indices. Attention to the salient features of this distribution was drawn in the earlier articles (Ildy 1950).

Human life in the major part of these two regions has since long been adapted to a semi-arid or arid habitat and one has to comprehend the facts of Climate in order to understand it. So intimate indeed is the relation between Climate and man that the extensive development of irrigation has produced an interesting chain of social reactions and changes which present a fascinating field of enquiry.

The study of climate thus assumes a special importance; constituting, as it does, the background for these far reaching human developments.

The development of irrigation on a large scale does not minimise the dominating role of climate with regard to agriculture. The effects of good at bad seasons are still reflected in the total agricultural production. The ultimate source of irrigation water is once again the climate as also of the most serious problems of irrigation-floods and erosion.

BARBARY

In the simplest terms Barbary belongs to the transition zone in which the seasonal alternance of marine westerlies and the continental trade winds produce respectively a mild wet winter and a hot dry Summer. This does not take into consideration the influence of air masses whose line of discontinuity give rise to frontal disturbances which are responsible for most of the rainfall. The great complexity of relief is yet another factor which produces considerable variations of climatic conditions over short distance and hence those striking changes in the agricultural landscape one observes in travelling over the region.

Tunisia, Algeria and eastern Morocco form a continuous zone facing the Mediterranean in which the general alignment of relief is from east to west. Consequently most climatic gradations take place in a north-south direction. Western Morocco differs from the rest of Barbary being sheltered both from the Mediterranean and the Sahara by high mountain ranges and in that it owes many of its climatic features to the influence of the Atlantic. This influence has very often been exaggerated because Queney has recently established the climatic unity of Barbary! by proving that the climate of the region as a whole is determined by the circulation of the atmosphere between heights of 10,000 and 13,000 ft. where it is not influenced very much by relief. Furthermore, the essential features of the whole region such as the seasonal distribution of rainfall and of temperature are everywhere similar.

PRESSURE AND GENERAL CIRCULATION

The ideal simplicity of the Mediterranean regime of climate does not explain the considerable divergence of weather from the seasonal "normals", nor does it account for the great variations from year to year. The position of the following air masses as well as the nature of contacts between them determine the weather conditions in Barbary at any given time:

1. The cold polar air mass.
2. The two anti-cyclonic masses covering respectively the Eurasian continent (continental air mass, disappearing in summer) and the North Atlantic (commonly referred to as the Azores High maritime).
3. The masses of tropical air which flow between the two anti-cyclonic air masses.²

1. P. Queney "Types de sempo en Afrique du Nord et au Sahara Septentrional" 'Travaux ed l'Institut de Meteorologie, fasc 3, Alger., 1943.

2. G. Bidault et J. Debrache "Climatologie" IL 'Encyclopedia Coloniale et Maritime. "Maroc", Paris 11145. p. 151.

Multan	M	68.0	72.8	83.9	95.3	104.8	106.6	102.4	98.9	98.7	94.4	82.9	71.7	90.1
	N	42.0	46.8	57.2	67.5	77.4	84.8	85.5	82.9	77.7	63.7	50.9	43.4	65.0
	R	0.37	0.38	0.40	0.27	0.33	0.55	2.01	1.82	0.54	0.08	0.06	0.24	7.05
Montgomery	M	68.1	72.5	83.8	95.7	105.4	107.8	102.9	100.1	99.3	95.0	83.4	72.0	90.5
	N	41.7	46.4	56.0	66.6	76.9	83.5	83.7	81.7	75.9	63.5	51.6	43.1	64.2
	R	0.46	0.50	0.42	0.34	0.36	0.98	2.42	2.90	1.27	0.08	0.05	0.26	10.04
Lyalpur	M	67.1	71.3	81.6	92.9	102.4	106.0	101.5	98.0	98.1	93.2	82.2	70.7	88.7
	N	39.9	45.1	53.6	63.9	73.9	81.7	82.7	80.5	75.2	62.4	49.1	42.2	62.5
	R	0.40	0.57	0.56	0.47	0.43	1.22	2.86	3.58	1.49	0.12	0.11	0.25	12.06
Lahore	M	68.0	72.1	82.6	94.5	103.7	105.9	99.6	97.0	97.3	94.0	82.9	72.3	89.2
	N	40.1	44.5	53.2	63.2	72.2	79.0	80.1	78.7	73.1	59.8	47.3	40.6	61.0
	R	1.04	0.97	0.79	0.57	0.59	1.64	5.45	5.15	2.20	0.24	0.10	0.47	19.21
Sialkot	M	65.6	69.4	80.1	92.4	102.2	105.0	97.4	94.2	94.6	91.4	80.6	69.4	86.9
	N	42.2	45.5	54.2	64.7	74.3	80.3	79.6	78.2	73.8	62.1	49.1	42.2	62.2
	R	1.96	1.67	1.51	1.00	0.99	2.39	8.35	9.30	3.43	0.34	0.17	0.72	31.83
Khushab	M	67.7	71.3	81.3	92.9	103.7	106.6	102.2	99.8	98.6	93.6	82.8	71.7	89.5
	N	40.7	46.0	55.8	66.7	76.3	82.3	82.4	81.1	76.1	63.4	49.8	41.5	63.5
	R	0.69	0.92	1.04	0.91	0.76	1.41	3.90	3.51	1.38	0.15	0.08	0.43	15.18
Srinagar	M	41.0	44.1	56.9	66.8	77.0	85.4	87.8	86.6	83.5	73.8	62.5	48.2	67.8
	N	27.3	29.5	37.0	44.6	50.9	57.3	64.3	63.4	53.5	40.6	30.9	27.6	43.9
	R	2.90	2.84	3.61	3.65	2.38	1.40	2.33	2.42	1.53	1.17	0.44	1.32	25.99
Drosh	M	45.7	49.0	58.1	68.9	81.5	91.9	96.7	95.2	88.0	76.7	64.1	50.5	72.2
	N	31.4	33.6	40.4	48.4	59.0	68.5	73.5	72.6	64.4	53.2	43.6	35.6	52.0
	R	1.37	1.55	3.73	4.08	1.91	0.65	0.60	0.65	0.69	1.27	0.34	1.20	18.04
Parachinar	M	49.8	51.8	59.8	68.7	79.5	87.7	87.1	84.7	81.2	74.2	64.7	54.8	79.3
	N	28.6	31.3	38.6	46.9	55.6	63.7	66.4	64.8	51.6	48.7	39.3	32.5	47.9
	R	2.03	2.63	4.34	4.03	2.31	2.00	3.52	3.70	2.11	1.95	0.40	1.23	29.25

Read M for Maximum,

N for Minimum,

R for Rainfall.

APPENDIX III—Continued

Province		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	annual
Fort Sandeman	M	59.7	59.3	69.9	80.3	90.5	99.2	99.3	96.9	92.7	82.6	71.4	59.9	79.7
	N	30.6	35.4	44.8	54.5	63.9	72.9	75.1	73.3	66.2	52.8	41.1	33.4	53.7
	R	0.72	1.06	1.38	0.94	0.91	0.64	2.14	1.90	0.32	0.10	0.13	0.57	10.83
Leh	M	29.4	33.0	44.2	55.4	63.7	71.3	76.4	75.9	69.7	58.3	46.8	35.3	54.9
	N	8.0	10.3	12.0	30.3	37.1	44.3	50.3	49.7	41.8	30.6	20.4	12.7	29.7
	R	0.38	0.31	0.28	0.23	0.22	0.18	0.47	0.59	0.27	0.10	0.04	0.19	3.26
Skardu	M	33.5	38.2	50.3	62.8	72.6	81.3	87.6	87.3	78.5	66.3	53.5	40.6	62.7
	N	16.4	19.2	32.4	42.4	49.4	56.1	61.8	61.5	53.3	40.7	28.5	21.8	40.3
	R	0.88	0.69	1.02	0.97	0.79	0.24	0.39	0.34	0.40	0.14	0.06	0.38	6.30
Gilgit	M	46.3	52.5	62.4	72.2	82.3	91.3	95.6	93.5	85.2	73.7	62.2	49.9	72.2
	N	32.0	36.9	45.1	52.7	59.4	66.3	71.7	71.0	63.0	52.2	41.3	33.8	52.1
	R	0.25	0.26	0.80	0.96	0.80	0.37	0.39	0.55	0.40	0.24	0.05	0.11	5.18
Quetta	M	50.2	53.6	63.6	74.0	83.8	91.6	94.0	92.2	86.2	75.7	65.4	55.5	73.8
	N	27.6	30.8	38.3	45.8	51.9	58.7	65.0	61.6	49.7	38.9	32.1	28.5	44.1
	R	1.94	1.98	1.74	0.98	0.39	0.17	0.46	0.33	0.04	0.12	0.28	1.01	9.44
Kalat	M	49.7	52.8	61.8	71.7	81.8	89.9	92.1	90.0	83.0	73.4	64.1	54.4	72.1
	N	...	...	...	...	...	...	...	...	...	...	...	...	...
	R	1.31	1.39	1.05	0.56	0.20	0.19	0.60	0.33	0.09	0.09	0.23	0.94	6.98
Panjgur	M	62.9	68.0	78.1	88.5	97.9	103.2	103.3	100.9	95.7	87.2	75.9	66.5	85.7
	N	38.6	42.5	50.2	59.2	68.2	74.6	76.3	73.2	65.0	55.4	45.6	39.8	57.4
	R	0.88	0.96	0.60	0.39	0.11	0.12	0.79	0.34	0.04	0.01	0.05	0.57	4.81

Nokhandi	M	65·4	71·8	77·1	90·7	103·9	110·1	109·4	106·2	101·5	93·3	79·8	70·2	89·9
	N	38·3	47·0	51·8	63·1	74·5	81·8	83·6	81·1	70·9	60·1	49·7	43·4	62·1
	R	0·89	0·40	0·12	0·35	0·02	0·0	0·0	0·0	0·0	0·0	0·03	0·14	1·95
Sibi	M	70·1	75·7	86·0	97·7	109·2	112·7	107·8	104·9	104·0	97·6	86·4	74·9	93·9
	N	42·0	49·7	59·4	70·1	81·3	87·5	87·2	85·3	78·9	65·5	53·1	45·5	67·1
	R	0·44	0·87	0·32	0·11	0·14	0·30	1·40	0·58	0·13	0·0	0·02	0·30	4·61
D. I. Khan	M	68·0	71·6	81·8	92·6	103·5	107·8	103·3	100·5	99·4	93·3	81·9	71·5	89·6
	N	40·3	44·9	55·0	65·2	74·7	81·5	82·7	81·2	75·6	61·7	48·7	41·2	62·7
	R	0·45	0·67	0·96	0·69	0·39	0·61	2·29	1·90	0·63	0·11	0·15	0·24	9·09
Bannu	M	65·5	68·6	78·0	88·4	99·8	106·1	103·1	100·0	97·9	90·6	80·2	70·1	87·3
	N	39·9	45·2	52·9	62·1	71·5	79·7	82·5	80·3	73·7	61·9	49·9	42·0	61·8
	R	0·52	1·18	1·58	0·98	0·61	0·91	2·21	1·89	0·63	0·04	0·16	0·40	11·11
Peshawar	M	63·0	66·2	74·8	85·2	97·0	105·0	102·5	98·2	95·0	87·8	76·8	66·7	85·0
	N	40·4	44·0	52·4	60·5	70·4	77·2	80·2	78·9	71·8	60·5	48·9	40·9	60·5
	R	1·44	1·53	2·44	1·76	0·77	0·31	1·26	2·03	0·81	0·23	0·31	0·67	13·56
Rawalpindi	M	62·3	65·2	75·1	86·2	97·7	103·5	97·8	93·7	93·4	88·6	77·7	66·8	84·0
	N	37·9	41·7	50·4	59·3	68·7	75·9	77·1	75·5	69·3	57·0	44·4	37·8	57·9
	R	2·49	2·48	2·67	1·92	1·25	2·31	8·07	9·17	3·89	0·60	0·28	1·24	36·37
Jammu	M	65·1	68·6	78·9	90·0	99·9	102·5	95·4	91·8	91·9	88·1	78·0	68·0	84·9
	N	47·8	51·2	59·3	68·9	78·2	82·5	79·3	77·7	75·1	67·2	56·2	49·1	66·0
	R	2·29	2·43	2·03	1·29	0·93	2·80	12·79	11·75	3·51	0·76	0·28	1·24	42·1
Murree	M	45·2	46·7	55·6	65·3	75·1	80·7	76·2	73·2	72·3	67·6	59·5	50·7	64·0
	N	30·7	31·1	37·8	46·9	55·6	60·5	58·9	57·4	54·8	49·3	41·0	34·9	46·6
	R	3·79	4·31	4·81	4·13	2·62	3·98	12·40	13·81	5·42	1·56	0·73	1·80	59·36

Read M for Maximum,

N for Minimum

R for Rainfall.

THREE YEARS OF FORESTRY IN PAKISTAN

BY

S. A. A. ANVERY P. Ft. S.

Director,

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The importance of forests for the correct overall economy of a country cannot be gainsaid in these days of scientific appreciation of natural resources. Experts have also agreed that for the balanced economy of an agricultural country at least 20 to 25 per cent of its area should be under forests. As against these admitted facts let us now have a general bird's eye view of our forest wealth in Pakistan and its outstanding problems as we have been facing them during the last three years of Pakistan.

2. *Our heritage.*—As with most other resources, our heritage with respect to forests at the time of carving Pakistan out of the Indo-Pakistan Sub-continent was extremely meagre and generally of very poor type. The proportion of areas declared as “forests” in each Province to its total area has been as follows :—

N.W.F.P.	...	about 4 %
Punjab	...	about 3·2 %
Baluchistan	...	about 4 %
Sind	...	about 2·7 %
East Bengal	...	about 14 %

3. Alarmingly small as it is, it does not yet show the real situation which is generally much worse. Areas declared legally as “Forests” are not necessarily those which carry a tree crop (or any crop for that matter) on them. In some places such as Baluchistan there are vast areas without even a blade of grass which are classed as “Forest”. This desperate position is as serious as it is alarming. The East Pakistan situation appears to be much easier at first sight but the exploitation and utilization of forests and forest products have been so behind hand in that area that the comparative abundance of forest area has remained ineffective.

4. Apart from area considerations, our other difficulties were (a) extremely low yield of timber of all types and uses from the so-called “forests” of our share, (b) undependable water supply to some of our oldest and best plantations such as Changa Manga, (c) very great lack of trained personnel in every cadre and (d) unprecedented increase in poor and lower-middle class population with heavy demands on firewood and small sized timber for huts and hutment on one hand and on land and water resources for resettlement on the other.

5. *Our needs.*—In view of the above, our needs in respect of forests, ultimate and immediate, can be summarised as follows :—

- (i) To increase the total area under forests in Pakistan with a view to bring it as near the optimum limit as possible so that correct relationship amongst different factors such as agriculture and water and soil conservation ; demands of industries, defence, railways, P.W.D. and the public and the supply of raw material ; and the severity of climate and increase of desert conditions and the moderating influences of forest may ultimately be attained.
- (ii) For immediate purpose to (a) train proper personnel (b) organize the administration (c) protect all existing forests (d) guarantee the absolute minimum of firewood supply to the country (e) obtain maximum sustained yield of timber for as many uses as possible (f) increase forests areas by transfer and control of private or Civil forests and by plantation planned for each new irrigation project (g) arrange correct exploitation of undeveloped areas (h) Institute research in forestry and forest products (i) lay down correct forest policy, educate the people in this respect and generally to secure recognition of the importance of Forests to Pakistan.

6. *Our Struggle.*—It has been a very uphill task throughout the last three years of our existence to marshal all the facts and to regiment our efforts to achieve some measure of success. Soon after the establishment of Pakistan, the First Senior Forest Officers' Conference was called in November 1947 to put the house in order and to have a preliminary discussion on immediate and urgent problems in the field. This was followed by the second Senior Officers' Conference held at Upper Topa in early May 1948 which covered a wide field but still confined itself mainly to administrative problem. In March 1949 two Senior Forest Officers went as our delegates to the South East Asia Forest Conference held at Mysore (India) where one of our delegates was elected Senior Vice-President of the Conference. In early July 1949 met the all-Pakistan Forestry Conference in Karachi at Ministerial level under the chairmanship of Hon'ble Mr. Abdus Sattar Pirzada, Minister of Food and Agriculture, Government of Pakistan. This was attended by the Hon'ble Ministers Incharge of Forests from all the Provinces and States as well as the heads of the Provincial and States Forest Departments. This Conference made a very comprehensive survey of practically all the aspects of forestry in the country and laid down dynamic and progressive forest policy for Pakistan. The proceedings of the Conference have been published and its recommendation are generally being acted upon.

7. Soon after this Conference the Inspector General of Forests, left for Helsinki (Finland) to attend the Third World Forestry Conference as Pakistan's delegate and did very valuable work there on many sub-committees. In early May 1950 the Third Senior Forest Officers' Conference met at Upper Topa to review the work so far done and to lay down plans and directives for future. This

Conference was opened by the H. M. Food and Agriculture, Government of Pakistan, and attended by all heads of the Provincial and State Forest Departments. In addition to the Conferences, smaller surveys, planned to collect informations on many aspects of the problems, and a Screening Committee was also set up in the beginning to gauge correctly the supply and demand position of timber firewood and charcoal.

8. *Our achievements.*—“Forests” and forestry problems are essentially “long term” problems and it is never possible to show spectacular results even in a decade or so. It requires patient, selfless, hard work for years on and before any tangible results are achieved in forestry. The harm done by an unscientific and unsympathetic forest policy and practice, too, is slow to be perceived and is admitted by the people only when it is too far advanced to be corrected easily or quickly. Mostly it becomes quite impossible to stop the rot by the time the public conscience is aroused. All the same our achievement in the domain of forestry during the last three years have not been altogether minor. The first need was to start a centre for training of personnel for higher technical jobs in the Province and States and a forest college was established against very heavy odds almost simultaneously with partition. The difficulties seemed unsurmountable to begin with, but the institution has grown from strength to strength and had already had two annual convocations both addressed by the Hon’ble Minister. This year we are having scholars from overseas also and, God willing, we hope to make it soon a great Seat of Learning for Forestry Science for the entire Middle East as well as for the Southern and Northern African Countries. Side by side with the College, a Forest Research Institute has also been started since August 1948 where we have facilities for research in Forest Entomology, Forest Botany, Forest Utilization and Wood Working, and soon will have two more sections added to it, namely, Silviculture and Chemistry. Special work on Medicinal plants survey has also been started and a party has toured the forests of Gilgit and Baluchistan. During the last three years we have already trained over 20 officers and over 60 Forest Rangers. On the Research side we have prepared two pamphlets (one on Pakistan timbers and the other on Medicinal plants of Pakistan) in addition to attending to many hundreds of urgent enquiries.

9. On the publicity front, in addition to pamphlets, articles, extension lectures and radio talks by a large number of our officers, we organised two outstanding items during the period under review. I refer to the Magnificent Forest Stall in the famous Karachi Exhibition which ran for about three months in the cold weather of 1949-50 ; and the celebration of Tree Planting Days as the “National Days” throughout Pakistan. This proved an unqualified success and thanks to unstinted co-operation from all sides, more than 10 million plants were planted in this drive during the last two years. Another innovation which has been attempted during the last two years both in Sind and Punjab is to sow vast areas of difficult approach from the air with the help of aeroplanes. It is reported to be successful and we hope to expand our activities in this direction.

Arrangements have been more or less completed to bring out a Scientific Journal concerning Forests and Forest Products. We have also established contacts with most of the allied Scientific Organizations at home and abroad.

10. Apart from education, research publicity and advice, the great achievement of past years has been to evolve a progressive Forest Policy for Pakistan which has been approved by all the Provinces and which, when put into practice, will guarantee correct forestry in the country. The Provinces have also made great progress in protecting the existing forests and increasing them by new plantation schemes. In the Punjab more than 50 thousand acres have been earmarked for new plantations and another one lac and fifty thousand acres of civil ranks have been declared as Reserved Forests. In Sind about a lac and fifty thousand acres have been earmarked for plantation in the Lower Sind Barrage Scheme. Similar schemes have been advanced in, and partly approved by N.W.F.P., Baluchistan and East Bengal. Provinces have also started to revise all working plans and to make local surveys of possibilities of different forest products. A scheme of progressive exploitation of the famous Chittagong Hill Tract Forests has been approved and increasingly huge quantities of timber etc., are expected to be available from that source in years to come. Given sympathetic attitude of the Government intelligent interest and co-operation of the people and hard and selfless work by the foresters of the country, one can safely hope that our progress towards our ultimate aim as detailed in para. 5 above will continue to be unhampered in years to come.

“HUMAN FACTOR IN PAKISTAN'S AGRICULTURE”.

BY

A. T. OMAR, M.A. (Hons.)

It is no exaggeration to say that efficient agriculture depends on the qualities of “the man behind the plough” more than on anything else. A study of rural conditions in Pakistan leads to the conclusion that far more depends upon the human factor than is commonly supposed. Defects in character can and will nullify the richest gifts of Nature, while what may appear to be insuperable difficulties are apt to disappear before the sustained application of human energy, sagacity and knowledge.

As things stand at present the ordinary cultivator of Pakistan must be acknowledged to be inferior in point of agrarian intelligence, enterprize and capacity for labour to the European or American farmer. Though he is recognised by competent observers as a good husbandman and possesses tolerably good health, works diligently and shows dogged, almost religious perseverance, he is ignorant, conservative and extremely poor. For these handicaps he is not alone to blame; rather he is a victim of circumstances. Lack of education explains his ignorance which sustains his conservatism and strong attachment to the primitive art of cultivation. He is slow to learn and realize the necessity and economic advantages of scientific methods of agriculture, and as a consequence suffers from inefficiency of management and inevitable poverty.

His greatest need is not mere literacy but real education capable of changing his entire outlook on life and agriculture as business. He must shake off his inertia and helpless contentment in poverty and should be educated to desire and strive for an improvement in his material conditions. Leaving fate to take care of itself, he should adopt the principle of effort and enterprize and derive the best he is capable of from land. Along with such an education, the introduction of medical and public health services should help him to maintain better health and work longer and harder with better results.

It has been well said that indigence, illiteracy and conservatism form the cardinal traits of the average Pakistan cultivator. His inefficiency, however, is not innate or rooted in the nature of things and is therefore capable of being remedied. He is bowed down with the heavy and weary weight of many burdens and handicaps, and the wonder is that like a blind fatalist he still continues to carry on the struggle for existence and is not altogether extinct.

The average cultivator of Pakistan is generally lazy, pessimistic, easy-going and miserably poor. He is lacking in originality and initiative and is too much wedded to traditional methods and practices, many of which are wasteful and unscientific. Also, he is steeped up to the lips in prejudices and superstitions, which in their totality are a serious drag on his economic progress.

The dead-weight of his inertia, apathy and conservatism is an obstacle in the way of every reform proposed for alleviating his condition. According to F. L. Brayne, "The villager refuses even to contemplate uplift. He has no time or energy for anything but winning bread and the continuance of the species". By his insanitary habits of living, he draws upon himself much avoidable physical suffering, with its attendant evils of low vitality and incapacity for persistent and sternuous labour, and a sombre outlook on life. He is ignorant, improvident and reckless, a combination of qualities which make him an easy prey to any one desirous of exploiting his weaknesses. He is too prone to waste his substance and energy in needless litigation and too fond of locking up his capital in jewellery and trinkets instead of devoting it to such forms of personal expenditure as would increase his efficiency, or employing it in more remunerative investment. He generally spends far beyond his means on marriages and other ceremonies and thus walks with open eyes into the money-lender's parlour from which he is rarely able to get out.

He shows an insufficient appreciation of the truth that Providence is wont to save only by human means, and a tendency to rely too much on Fate or some other external agency, and too little on personal endeavour for curing every evil which he may be suffering from and for which he is generally inclined to blame Fate or Providence rather than himself. His philosophy of life is similar to that of a blind fatalist.

A systematic study of agricultural conditions in Pakistan clearly shows that all the evils are real evils, and a direct frontal attack must be made on them. 'Take care of his environment and the cultivator will take care of himself'—is a good enough maxim, but a better is: 'Improve at once both worker and environment, so that each may help the other'. The only way of changing the psychology and the social and personal habits of the peasant is to educate him. It is obvious that so long as ignorance and illiteracy prevail in our villages, all talk about rural progress is futile. The absence of widespread literacy and of a suitable system of rural education is largely responsible for many of the evils we deplore.

Illiteracy aggravates indebtedness, promotes improvidence and extravagance, impedes the progress of improved agriculture and, what is more serious than anything else, prevents that mass awakening without which no reform can be permanent. For, the problem of rural uplift cannot be solved unless the farmer himself desires his own improvement and can think and act for himself.

The present system of education must be remodelled so as to suit it to the requirements of the rural masses, and in preparing text-books and laying down curricula, the Education Department must absorb the result of the labours of, and work in consultation with other departments whose servants are brought into close contact with the village-folk in the course of their duties. The advice of the Agricultural and Co-operative Departments of the various Provinces must be sought and followed in this important matter. The education imparted in the rural schools must be such as will promote interest in and love for agriculture and rural economy in general and should cease to deserve the criticism which is often made against it that it creates a bias in the mind of the rural scholar against his ancestral occupation and makes him soft-handed and unfit for agricultural work.

The present tendency of attaching a spurious value to mere literacy, which makes a person think that he is in quite a different class from his unlettered fellowmen, and fires him with the insensate ambition of driving a quill rather than a plough must be destroyed by taking special pains to inculcate the "dignity of labour" and also by making education universal and compulsory.

Co-operative Education Societies such as those in the Punjab offer a hopeful means of securing attendance at school. The benefits of education should be extended to both the sexes and it should not be considered necessary to hold up women's education till there is a sufficient number of lady teachers. Spread of literacy among women is indispensable for the spread of lasting literacy among the young. Nature-study of plant and animal life, school gardens and farms, text-books dealing with rural subjects, manual training, education with special reference to local subsidiary industries, physical and scout training and lessons in first aid would be some of the items in a comprehensive scheme of rural education.

The educational system so devised must be largely controlled by the farmer himself and must employ efficient and well-paid teachers imbued with the spirit of service and possessing the "country-sense". Not the least important work connected with the spread of education in rural areas, is the production of good books by translations from foreign languages or otherwise. Insufficient attention has been paid to this all-important matter as yet.

A proper scheme of adult education is also necessary in order to increase the all-round efficiency of the farmer and in order that the present generation should be in a position to take advantage of modern developments in agriculture. Adult education is also important as tending to prevent the too frequent relapse into illiteracy of the young villager as soon as he leaves school. It should also include women within its scope as it is most important to improve their ideas so that they should not act as clogs in the wheel of progress. The movement for adult education is at present practically confined to East Bengal and the Punjab. Though it is mainly a matter for non-official activity, the Government should assist it whole-heartedly, especially by financial support

to co-operative societies and other organizations engaged in the spread of literacy amongst the village-folk.

Special machinery is needed for carrying literacy and general enlightenment to grown-up people and should include such things as night schools, continuation classes, libraries and reading-rooms, magic lantern and films, etc. The cinema specially has great uses as an educative agency. So has the radio. The possibilities of broadcasting in the rural areas as a means of village uplift are being studied at present by the Government and experiments have already been made in a few districts.

The cinema brings in new wants and fresh incentives to exertion, and as a vehicle for carrying enlightenment to the untutored mind of the villager it is far more effective than the mere written or spoken word. Much of adult education must depend on such agencies as these rather than on formal instruction in regular schools.

A supreme effort is needed to dismantle the "village-slums" and replace them by decent and clean dwellings. Like courtesy, cleanliness costs nothing. Rural co-operative housing societies financed or otherwise helped by the Government should be started on a huge scale. The Government may not only grant loans directly but may also help by guaranteeing the interest and redemption of loans made by special fiscal institutions started for the purpose.

The improvement of the average cultivator consists essentially in replacing the various mistaken, stupefying and pauperizing ideas which hold him down at present, by new, daring and inspiring ones. Anything therefore that fosters the contact of the village with the outside world and brings it within the orbit of more progressive influences emanating from the town should be welcome. The villages are no longer landlocked and isolated as of old, but much till remains to be done in the way of cheap and easy transit by more and better roads and railroads.

At this stage, reference may also be made to the post-office as a civilizing agency. The part which the post-office can play in the life of a people will obviously depend on the extent to which literacy prevails. The provision of postal facilities, however, itself stimulates the desire for literacy and helps sustain literacy once attained. The post-office may also help in propaganda work by putting up interesting bulletins prepared specially for the instruction and amusement of the cultivating class. Postal Savings Banks tend to promote thrift among the cultivators, and coupled with the cash certificates system, make investment of small rural savings possible. A minor advantage of the post-office lies in its serving as an agency for the distribution of seeds and cheap quinine in villages. Wireless and broadcasting too have immense possibilities and will add to rural amenities and bring about an undreamt of change in the life of the cultivators.

In order to improve the cultivator physically and mentally, continuous and intensive propaganda, through official and other public servants as well as through non-official agencies, is necessary and much care is needed in selecting the right type of men for propaganda work. Knowledge of rural conditions, energy, tact, imagination and genuine sympathy with the villager and his difficulties are essential qualifications.

There should be permanent agricultural museums established in every city and large town and also in a centrally situated village in a village group which has a local organization to promote the interests of agriculture. Such museums should maintain books and pamphlets giving descriptions of the latest agricultural practices, tools and machinery. They should also give demonstrations and hold annual agricultural exhibitions. This might with advantage be done in connection with local festivities by the co-operative effort of the farmers and with the encouragement and support of the Government.

No description of the educational methods and schemes for the spread of literacy amongst the rural masses, especially the cultivating class, can be complete unless special reference is made to the modern system of "basic training", which suits admirably the peculiar conditions in which the peasants are generally placed. This system includes various handicrafts like spinning and weaving, clay modelling, paper cutting, soft toy making, leather work, wood-carving, drawing, carpet making and a host of similar domestic industries which the cultivator can profitably take up as subsidiary work. Schools with this new system of rural education should be opened in large villages and special care should be taken to employ "basic-trained" teachers. Basic education will prove of invaluable importance as it would enable the prospective farmers to take up subsidiary industries along with farming. For such a scheme to prove successful on a large scale, the Provincial Governments would be well advised to appoint a committee of the leading economists and educationists to investigate into the scope of the scheme and the proper methods of its application.

THE CHANGING MAP OF ASIA--A POLITICAL GEOGRAPHY

EDITED BY

W. G. EAST AND O.H.K. SPATE

(Methuen and Co. Ltd., London)

“A spectre is haunting Europe—the spectre of communism.” This sentence occurs in the Communist Manifesto written in 1848. Since then the rapid and spectacular changes in the political and economic structure of the world have affected Asia also. Asia has been brought into focus by the happenings of far reaching importance during and after World War II. Its aversiveness to change has yielded place to a real urge for progress. The impact of the West, the internal relations and their adjustments, the conflict between Russian and Western ideologies and other local and regional forces have resulted in the present political and economic instability of Asia.

Asia has now become a great social laboratory where ideas, ideologies and ‘isms’ are being tested by millions of people. The dynamic force of nationalism and self-determination has shaken colonialism to its roots in the continent. The territories where still the non-Asian powers hold sway are only a few and they too are moving fast on their way to emancipation. The spectre of communism which is haunting Asia is a matter of redeeming importance to Asian and foreign powers alike. This has made Asia occupy more and more space in the printing world as the authors are fully conscious of the ever increasing significance of the vast spaces and the teeming millions of Asia.

“The Changing Map of Asia”, which is a dispassionate study of Asia, its problems and its political geography, has come out as a logical sequence of the changes which Asia has seen. The book is really a symposium on political geography of Asia and has been edited by W.G. East and O.H.K. Spate of London University. The contributors belong to a select group of Geographers who are specialists in their own line. Although the title of the book is not very strikingly new, it does give us a hint that the writers have caught the swift flowing current of changes in the cold print.

Asia has been divided into six broad realms which seem to be modification of the divisions of Asia by Cressey. The realms are (1) South-west Asia (2) India and Pakistan (3) South-east Asia (4) Far East (5) Soviet Asia (6) High Asia, and these are covered by Walter Fagg, O.H.K. Spate, Charles Fisher, H. Wood, W.G. East and R. Rawson respectively.

Although the book is strikingly devoid of any contribution from any Asian author, every writer has qualified himself as almost the most suitable person to write on the subject chosen by him. The readings of the authors have been very wide and they have selected salient and most important facts and have strung them with a readable style. They have put forward facts and have actually refrained from taking sides.

The maps and diagrams which are 34 in number (on the fly cover the number given is 33) help the reader in understanding the text. It contains 30 information tables and the statistics utilised are as up-to-date as they possibly could be. The fig. 2 under the caption "The Expansion and Regression of European Territorial Powers in Asia" is illustrative of the changes in the policies of the West towards the East. Some of sub-headings especially "Revolt of the Clerks" just smack of Miss Katherine Mayo.

The article on South-west Asia gives a clear picture of the stage on which the Middle Eastern political drama is enacted. Oily Politics and the 59th member of U.N.O. find good spaces but the map of Palestine instead of making the boundary changes very clear all the more confuses the reader. The reader misses the real picture of the Middle East—picture of contrasts and confusion.

Perhaps O. H. K. Spate is the most suitable of them all for writing on India and Pakistan which he has dealt with a masterful but occasionally a partial pen. Although one agrees that "East Pakistan is notoriously unmilitary", one cannot see eye to eye with the author when he says about Kashmir that "Perhaps the fairest solution would be a partition allotting the Hindu South-east to India."

"India" has been used for the two new Dominions, which, according to Spate, "have still so much in common." This tendency among the Western authors to use "India" as a geographical expression for 'Indo-Pakistan sub-continent', has neither geographical nor any political justification in it. The fig. 16 *i.e.* the map showing 'India in the Indian Ocean' seems to be an improvement on the 'Map to illustrate the position of India in the Indian Ocean' by K. M. Panikkar.

The maps of South-east Asia has undergone a complete change because of the birth of the Indonesian Republic, where people have risen to welcome the rising sun. This has been graphically detailed by Fisher in 'South-east Asia'.

The account of China is rather unhappy as there is hardly any mention of the changes brought about by the defeat of K. M. T. Government by the Communists, who are faced with the serious task of economic construction. Korea finds its proper place in the book, while Wood, like Haushofar, sees Japan as a nation with two faces, one of which turned towards Asia where it started expanding with good co-efficient of expansion in the past.

The boundaries of Soviet Asia have changed. In the Land of Socialism, we find that it is not only the face of the regions, territories and towns that is changing

but the villages are changing and the smallest square on the economic map is changing. The article 'Soviet Asia' is an attempt to write its geography anew.

Tibet, Sinkiang and Mongolia are finding their places in the sun and Rawson in 'High Asia' gives an interesting account of these dry regions. After reading the chapter, one fully realizes the significance of the words of late Wendell Wilkie—"Sinkiang is one of the areas in the world, where politics and geography combine to make a kind of explosive amalgam full of meaning to those who are curious about what is going to happen to the world."

The authors are curious about what is going to happen in Asia and they are successful in making us believe that there is enough explosive power in Asia to blow the lid off the world again.

K. K. AND F. R. K.

CONSTITUTION OF THE PAKISTAN GEOGRAPHICAL ASSOCIATION

General

1. The name of the Association shall be "THE PAKISTAN GEOGRAPHICAL ASSOCIATION."
2. The Headquarters of the Association shall be located at Lahore.

Aims and Objects.

3. The objects of the Association shall be :
 - (a) to organise and encourage activities for the promotion of the Science of Geography on a national scale for the benefit of the country and of humanity in general. Such activities to include the holding of conferences and symposia, the encouragement and publication of research work, the organisation of excursions and tours, and all other activities that may further the interests of Geography.
 - (b) to effect the liaison of Pakistan's Geographical workers and other interested in the propagation of this Science as well as with foreign national and international bodies.
 - (c) to co-ordinate the activities of local and provincial geographical societies in the interest of national welfare and objectives.
 - (d) to protect and promote the interests of the Geographers of Pakistan, to seek and secure public and Government support for their researches and nation-building endeavours.
 - (e) to propagate the Science of Geography in its varied aspects among the masses of the country, through its publication, lectures and other activities.

4. The Association shall seek collaboration with the parent scientific body of Pakistan – the Pakistan Association for the advancement of Science and make all contributions it can towards the realization of its objectives.

Membership.

5. There shall be three categories of the individual members of the Association :

- (a) *Fellows*.—They will be elected on the basis of outstanding contributions to the Science of Geography. Their nomination will have to be approved by the Central Executive Committee. The Fellowship of the Association will be an honour awarded to both Pakistanis and non-Pakistanis. No more than twenty-five fellows will be on the roll at one time. Fellows will hold seats of honour at the Association meetings.

- (b) *Ordinary Members.*—Any person interested in the Science of Geography shall be entitled to become a member provided that he pays his dues and abides by the constitution. They will pay a subscription of Rs. 10/- per annum.
- (c) *Student Members.*—All students of Geography as well as any others interested in Geography shall be eligible for membership on paying an annual fee of Rs. 3/-.

All the three categories of members shall be entitled to receive the 'PAKISTAN GEOGRAPHICAL REVIEW' and will be admitted to the meetings, symposia etc. of the Association. They will all have voting rights except students.

6. In addition, schools, colleges and other institutions shall be able to become 'INSTITUTIONAL MEMBER' on payment of Rs. 15/- per annum. They will be entitled to be represented at the general meetings of the Association by a representative chosen by them.

7. The official year for membership will come from the 1st of January to the 31st of December and those becoming members between these dates shall pay the dues for the entire year.

8. Membership will lapse if dues are not paid within three months by the 31st of the year in which the subscription falls due.

9. The office-holders of the Association will normally be elected from among the Fellows and Ordinary Members. The student Members and Institutional Members may, however, be represented on the Executive Committee.

Office-Holders.

10: The administration of the Association shall be entrusted to a central executive body consisting of.

- (a) A President to be elected every three years. (eligible for re-election).
- (b) Three Vice-Presidents to be elected every year. There shall be at least one Vice-President from each of the 2 parts of Pakistan.
- (c) A Secretary to be elected every three years.
- (d) A Treasurer elected every three years. This office may be combined with that of the Secretary.
- (e) Six members to be elected every year, of whom at least one shall be an Institutional Member and one may be a Student Member.

The President and Secretary to belong to the same place.

11. For purposes of making decisions, the quorum of the Executive Council will consist of four persons.

The office-holder shall be elected by ballot, meeting to be held within two months of the commencement of a year.

Branches.

12. Branches of the Association may be established in all the leading cities of Pakistan, especially those that are the seats of Universities. Each shall have a President and a Secretary and additional office-holders according to the strength of members.

13. A part of the sum received as subscriptions from a branch may be allocated to it for local expenses.

14. The Activities of various branches will be subject to the policy and guidance of the central executive.

Meetings, Conferences etc.,

15. The Executive Council shall meet at least once a year to draw up programme of activities and to review progress.

16. In case of a tie on voting on any question, the President shall have a casting vote.

17. The President shall preside over the general meetings of the Association. In his absence one of the Vice-Presidents shall occupy the Chair. The same shall hold true about lectures etc.

18. The Association will be officially represented every year at Pakistan Science Conference. If financially feasible, the Association will also send representatives to the Congresses of the International Geographical Union as well as to any other international meetings of Geographers.

19. To discuss important national questions in which Geographers can make a contribution, the Association will hold symposia or Conferences from time to time.

Publications.

20. The Association shall publish a Geographical Periodical.

21. From time to time Proceedings of Conferences or Special Publications may also be brought out.

Amendment of the Constitution.

22. The amendment of the constitution shall be possible only by a two-thirds majority of the members at the annual general meeting.