

PAKISTAN GEOGRAPHICAL REVIEW

DATA ENTERED

6368

Geograph



* 6 3 6 8 *

PU-Lahore

6368



Volume 23

...

Number 1

January 1968



EDITORIAL BOARD

K. U. KURESHY, *Editor*

IQTIDAR H. ZAIDI, *Associate Editor*

Advisory Board

KAZI S. AHMAD, University of the Panjab

NAFIS AHMAD, University of Dacca

M. ASHRAF KHAN DURRANI, University of Peshawar

Corresponding Editors

R. O. BUCHANAN, London, United Kingdom

SIRRI ERINC, University of Istanbul, Turkey

PRESTON E. JAMES, Syracuse University, U.S.A.

CARL TROLL, University of Bonn, West Germany

CHAUNCY D. HARRIS, University of Chicago, U.S.A.

OSKAR H. K. SPATE, Australian National University, Australia

Editorial Assistant

MUHAMMAD JAMIL BHATTY

Pakistan Geographical Review

Vol. 23, No. 1

January, 1968

CONTENTS

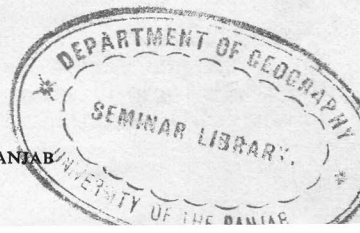
Determinants of Metropolitan Growth and Development in an Urbanised Society	AMJAD A. B. RIZVI	1
✓ Climates of West Pakistan According to Thornthwaites' System of Classification of Climates	NASRULLAH KHAN	12
The Pattern of Retail and Wholesale Trade in Lahore	M. MUSHTAQ	37
News and Notes		54
Book Reviews		57

6368 ✓

*The editors assume no responsibility for
statements and opinions expressed by authors.*

P.C. = R.

EDITORIAL AND BUSINESS OFFICES
DEPARTMENT OF GEOGRAPHY, UNIVERSITY OF THE PUNJAB
NEW CAMPUS, LAHORE.



Pakistan Geographical Review

Volume 23

January, 1968

Number 1

DETERMINANTS OF METROPOLITAN GROWTH AND DEVELOPMENT IN AN URBANISED SOCIETY

AMJAD A. B. RIZVI

DID first spurts of economic development intensify the urbanization process or first spurts of urbanization intensify the economic development process? Did technology push or lure a peasant to the city or the city was a causative habitat to the development of technology? Was one the cause of the other or both the determinants and consequences of each other?

It has become fashionable to pose and discuss such questions rather than provide answers. Efforts to provide answers are obsessed with segmental viewpoints. Economists, geographers and sociologists look into these questions from separate angles. These separate approaches do not lead us far; their synthesis is important for correct understanding of the urbanization phenomenon which should be studied *per se*. Notwithstanding the methodological difficulties involved in such a treatment¹, the treatment along with its methodological difficulties may carry meanings that are concealed in, say, a uni-dimensional economic treatment without such disabilities.

★ Under the strength of this assumption, this paper examines the determinants of metropolitan growth and development. It has a built-in bias of the possibilistic school which states that man is the ultimate deterministic agent, a theme that can be construed as a hypothesis of this paper. It is, among others, the inherent power of man's inventiveness and his innovational ability that underlies the growth and development of metropolitan areas.

¹For example, Doxiadis said that 33,554,431 variables are involved in the study of economic, social, political, technological and cultural phenomena. See, C. A. Doxiadis, "Human Settlements: Challenge and Response." *Ekistics*, Vol. 23, No. 135 (February 1967), p. 68.

* MR. RIZVI is Lecturer in City and Regional Planning, West Pakistan University of Engg. and Tech., Lahore, presently on study leave at the Universities of Wash, British Columbia, California (Berkeley). He is grateful to Dr. George Schultz and Ferry Schneider of the Faculty of Architecture and Urban Planning, the University of Washington (Seattle) for the benefit of discussion.

Lest it be confused, let it be stated that it is not the intention here to go into the "genesis" of urbanization process; the theme is "growth". Although factors relevant to origin should—and would—provide meaningful frame of reference for the kind of discussion being followed, it is kept in mind that traditional urbanization, rural-urban migration and causes thereof are now part of history. However useful, they are not adequately helpful for explaining growth of metropolitan areas in a purely urbanized society like that of the United States where more than two-thirds of the population lives in giant metropolises.²

Perloff like others talks of "growth" in volume and welfare terms.³ Volume has an absolute connotation depending on forces that affect the cost of production in an economy. Welfare aspect of growth is the translation of volume into non-economic terms. "Development" represents a transformation of physical, social and economic state of a society toward higher direction as expressed in the values of growth indicators.

No finer distinction of these terms is intended here. As consequences of metropolitan determinants, products of growth and development may be of same nature; increased goods and services, a sprawled physical environment, a complex communication networks, and a developed brain power of the community.

A metropolis has many qualitative perspectives. Blumenfeld saw it as a final product of the evolution of cities⁴. Borchert treated it as a major collector, processor and distributor of economic goods.⁵ Lampard noted its growth as a part of the cultural process⁶. Gras thought in terms of a focus of local trade⁷. Dickinson had it as an outstanding centre of human affairs⁸. National censuses looked into it as a statistical assemblage of people. In short there are as many definitions as there are the number of disciplines and definers. An integrated definition should be designed by combining the above attributes. Here, it would not be helpful, even if possible to define it in terms of a distinct boundary; statistical and phenomenological aspects

²Benjamin Chinitz (ed), *City and Suburbs* (Englewood Cliffs, N. J.; Prentice-Hall Inc., 1964), p. 3.

³H. S. Perloff *et. al.*, *Regions Resources and Economic Growth* (Baltimore: Resources for the Future Inc., 1964), pp. 55-56.

⁴Hans Blumenfeld, "The Modern Metropolis", *Scientific American* (September 1965), p. 64.

⁵J. R. Borchert, "American Metropolitan Evolution", *Geographical Review*, Vol. 47 (1967), pp. 302-303.

⁶E. E. Lampard, "The History of Cities in the Economically Advanced Areas," in J. Friedmann and W. Alonso (ed), *Regional Development and Planning: A Reader* (Cambridge: The M.I.T Press, 1964), p. 325.

⁷N. S. B. Gras, *An Introduction to Economic History* (New York: Harper & Bros., 1922), p. 186.

⁸R. E. Dickinson, *City Region and Regionalism* (London: Kegan Paul & Co. 1947), p. 13.

are crucial. National censuses are helpful in former aspects and Mackenzie helps in later aspects :

The metropolitan (or city) region thus considered is primarily a functional entity. Geographically it extends as far as the city exerts a dominant influence. It is essentially an extended pattern of local community life based upon motor transportation . . . The basic elements of its pattern are centers, routes and rims. The metropolitan region represents a constellation of cities, the interrelations of which are characterised by dominance and subordination.⁹

Thus seen, a metropolitan region consists of a central city and a coalescing strings of suburbs and satellite towns. It is a big human organization, an abode of highly skilled and educated people. "It is qualitatively different", posits an optimist, "from the city as it has been known throughout history, and is contrary to prediction of its approaching transformation into metropolis".¹⁰

ECONOMIC GROWTH AND DEVELOPMENT OF
METROPOLITAN REGIONS IN AN URBANIZED NATION

Urban

Metropolitan growth is a universal phenomenon. Its intensity is directly related to the economic development of a larger national entity of which it is a part. Hierarchically, it lies between the traditional city and what Gottmann called "megalopolis"¹¹. Higher up the scale is what Doxiadis claimed the "ecumenopolis"¹², the universal city toward which we are heading. If what is predicted is valid, then metropolis is not on top, as was traditionally so, but in the middle of settlement hierarchy ; higher up there are bigger agglomerations. Metropolitan phenomenon in this sense can be looked upon as a process in a society where city suburb, city-city and inter-regional migrations have replaced the traditional rural-urban migration.

What is the nature of this process in the urbanized United States? Two-thirds of its population lived in 212 census-classified metropolitan areas in 1960. These areas accounted for eighty-four per cent of the nation's population increase during 1950-1960. For metropolitan areas in this period, the growth was 23.6 per cent compared to seven per cent for the remainder of the country. Again in the past two decades, metropolitan areas increased by fifty-five per cent in population compared to eleven per cent for the rest of the United States. It is estimated that by 1980, three-fourths instead of the present two-thirds of the country's population would be

⁹R. D. Mackenzie, *The Metropolitan Community*, (New York : McGraw Hill Co., 1933), p. 70.

¹⁰A point made about megalopolis equally relevant. See, C. Nagashima, "Megalopolis in Japan," *Ekistics*, Vol. 24, No. 140 (July 1967), p. 6.

¹¹Jean Gottmann, *Megalopolis* (New York : Twentieth Century Fund, 1960).

¹²C. A. Doxiadis, *Ecumenopolis—Towards a Universal Settlement* (Athens : Doxiadis Associates, 1963, Mimeographed), p. 1.

living in such areas¹³. These areas range in size from 50,000 to more than 5,000,000. In terms of socio-geographical contiguity, the New York Metropolitan Region alone is spread over an area of 6,914 square miles, has a population of sixteen million and provides seven million jobs.¹⁴

In short, the United States' urbanization is unique in the sense that increasing number of people are getting concentrated in its metropolitan habitat. This new habitat pulsates with paradoxes : affluence and adversity, interaction and anonymity, aversion and attraction¹⁵, growth and decay, competition and adjustment, beauty and ugliness, mobility and spatial disability. Its convenience is liked : its cost is abhorred. How to maximise metropolitan convenience and minimise its cost is the basic concern of those concerned with its destiny. Continuous urban challenges elicit continuous innovational response¹⁶. That is how a metropolitan region sustains itself. The following discussion attempts to reduce the bluntness of this answer.

In many cases, factors that gave an initial push to the traditional city into metropolitan status still underlie its progress. Thus, it inherited initial advantages which enabled it to strengthen its competitive position. Having reached metropolitan status, the community designed its own palliative for growth. Hypothetically, the extent of this growth has been proportional to the nature of intellectual and scientific fervour. But identification of major determinants is basic to the appreciation of this claim.

HISTORICAL DETERMINANTS

Chinitz claimed that any metropolitan area at any stage of its development begins with the accumulated strengths and weaknesses of its history.¹⁷ Borchert also held that the end of each epoch gave initial advantage for growth.¹⁸ Same was Dickinson's idea : "The structure of modern metropolitan economy has been superposed upon the pattern of distribution of cities and towns which existed long before the modern era."¹⁹ This has been the history of not only continental metropolises but also of cities the world over.²⁰

¹³Data in this paragraph have been extracted from : Advisory Commission on Inter-Governmental Relations, *Metropolitan America : Challenge to Federalism* (Washington, D. C. : U. S. Government Printing Office 1966), p. V.

¹⁴E. M. Hoover and R. Vernon, *Anatomy of a Metropolis* (Cambridge : Harvard University Press, 1959), p. 3.

¹⁵Jean Gottmann and R. A. Harper (ed), *Metropolis on the Move* (New York : John Wiley & Sons, Inc., 1967), pp. 4-5.

¹⁶W. R. Thompson, *A Preface to Urban Economics* (Baltimore : Resources for the Future Inc., 1966), p. 18.

¹⁷Chinitz, *op. cit.* footnote 2, p. 17.

¹⁸Borchert, *op. cit.*, footnote 5, p. 327.

¹⁹Dickinson, *op. cit.* footnote 8, p. 17.

²⁰H. M. Mayer and C. F. Kohn (ed), "Rise and Growth of Cities," *Readings in Urban Geography* (Chicago : Chicago University Press, 1959), pp. 57-58.

However, it may also be argued that history has only been an indirect stimulus. The brain cells of a metropolitan community "today" have innovated a different economic and technological structures in defiance of history. Feudal power and wealth no longer prevails in the modern community as it did in medieval Europe where "the basis for the economy of the town is not persons employed in producing goods and services for export but power and wealth".²¹ A metropolitan community has been a revolt against the orthodox and an excitement for the new. This quickened the pace of development.

GEOGRAPHICAL DETERMINANTS

In geographical thought, environmental deterministic theme has almost been taken over by cultural possibilistic theme.²² Although environmental logic has been weakened once man's innovation has had a hold on nature, it still appeals to many.²³ Their illustrative generalizations are convincing, as for example Mackenzie's hold that there is metropolitan concentration in the deep water rim of the United States,²⁴ a claim valid for other countries too.

Such deterministic arguments as for example big metropolises owe their growth because they were sited on a meander, a lakeside, a scenic hill or rapid only lure new students to the subject of geography. For except for a few amenity-oriented cities²⁵, growth is not determined by site but by situation²⁶ with respect to the tributary areas they serve and in the case of port cities the hinterland they command²⁷. Space relationship not the ground plan or lakeside²⁸ is basic to city's viability. True, a flat site promotes metropolitan efficiency by reducing street and service cost, but that is not the primary reason why one would shift from a hilly city to a flat one.

On the other hand, central place adherents and location theorists would say that the metropolitan growth is inversely proportional to the cost of spatial friction. Thus favourable areas are those from where richest resources can be tapped

²¹Hans Blumenfeld, "The Economic Base of Metropolis," *Journal of The American Institute of Planners*, Vol. XXI, Fall 1955, p. 117.

²²H. M. Mayer, "Geography and Urbanism" in Mayer and Kohn (ed), *op. cit.* footnote 20, p. 7.

²³E. G. Taylor, *Urban Geography* (London: Methuen & Co. Ltd. 1958), p. 3.

²⁴Mackenzie, *op. cit.* footnote 9, p. 20.

²⁵E. L. Ullman, "Amenity as a Factor in Urban Growth," *Geographical Review*, Vol. 54 (1964), pp. 117-132.

²⁶"Site" is the terrain on which the settlement begins; "Situation" is the condition over much wider area around the settlement. R. E. Dickinson, "The Scope of Urban Geography" in Mayer and Kohn, *op. cit.* footnote 20, p. 12.

²⁷F. W. Morgan, "Hinterlands" *ibid.*, p. 376.

²⁸Some attribute a city's growth to the attractiveness of lakes; names of big city stimulators attracted by the lake is given. A stronger case can be made that except for occasional trip or old age, they would have not come had resources and investment climate been absent. See, J.W. Alexander, *An Economic Base Study of Madison*. (Madison University of Wisconsin, 1963), p. 81 (footnote).

with the lowest transportation cost. Reduction of this cost alters marketing practices and this according to Ullman makes smaller centre smaller and bigger centre bigger.²⁹

Also agglomeration, nodality and access are used in terms of region's position in overall spatial framework. They connote its relative advantages and disadvantages with respect to input output and space friction. Given these advantages activities agglomerate. Agglomeration economies coincide with high population concentration and institutional organization. Perloff held that the tremendous growth of our metropolitan centres can be explained in large part in terms of agglomeration economies.³⁰

Geographical factors are significant. But how significant they are in the United States? It is interesting to regress with the help of Thompson's hypothesis: "In this Age of Research and Development . . . suppose automation reduces the weight of the labour factor industrial location and . . . suppose differentials in capital supply to be only of minor importance, as the giant enterprise, omnipresent, creates a national capital market, entrepreneurship could then become the critical locational factor."³¹ This is a hypothesis not too far fetched to be relevant to a society under study. Supposing it to be true, industrial location and metropolitan growth depend on entrepreneurial ability bunching in time and space, so that Los Angeles might be selected not because it has sunshine but because it has sunshine "also". Thus, the twin cities of Saint Paul-Minneapolis can grow not because of lakes and meadows as claimed³² but in spite of them. Christaller said that saying a city is due to a river is tantamount to saying that if there were no rivers there would be no cities.³³

SOCIAL DETERMINANTS

So complex is the social change that "our ability to chart it has lagged seriously behind our ability to measure economic change,"³⁴ Metropolitan social change also suffers from this difficulty of measurement. Some generalizations are of accepted validity and are presented.

Immigrants to metropolitan areas are age and sex selective (15-30 years, males). This is so because the base of the population pyramid of smaller areas is wider than of

²⁹E. L. Ullman, "Theory of Location for Cities," in Mayer and Kohn (ed), *op. cit.* footnote 20 p. 207.

³⁰Perloff, *op. cit.* footnote 3, p. 82.

³¹Thompson, *op. cit.*, footnote 16, p. 58.

³²*Selecting Policies for Metropolitan Growth* (St. Paul-Minneapolis : The Joint Program, January 1967), p. 7.

³³Ullman, *op. cit.*, footnote 20, p. 205.

³⁴Raymond A. Bauer, *Social Indicators* (Cambridge : M. I. T. Press, 1966), p. XIV.

bigger areas. The resulting young productive youths of small areas are lured by the lights of big areas³⁵. These big metropolitan areas have a relatively high proportion of middle aged persons with high productivity. This concentration of productive youths and mature inhabitants is kept intact by a variety of goods, services and facilities suited to changing tastes. The areas provide skill-imparting, wage-increasing avenues and mobility that foster middle class morality. This, according to socially inclined urbanists, spurts growth.

Of equal importance is the fact that the bigger the city the more self-contained and secure it is because it offers more and a range of services to its inhabitants³⁶. It has been found, for example, that there has been a negative change in manufacturing employment and rapid growth in service employment in 1954-58 in metropolitan areas³⁷. Therefore, the notion 'why not live in the city' instead of 'why live in the city' subsumes the vital reason of its sustenance and growth. In fact so telling is the socio-cultural factor that a new cultural-genetic classification of cities has recently been advanced³⁸ as a valid substitute for economic-functional classification.

It should also be noted in passing that the lure of big cities is maintained by the novelty of things, ideas and values. And city intellectuals and innovators are the main agents in this task.

POLITICAL DETERMINANTS



In a centralised economy, growth can be curtailed in metropolitan areas as is done in Russia³⁹ so that the self-generating momentum for growth is concealed. In a decentralized democratic set up, the more numerical size strengthens the electoral power so that this power itself sustains and enhances the metropolitan status. The political strength based on numerical size attracts federal grants which revive faltering economies and enhances growth. Stevenson sees, for example, in increasing federal-city relation more promise for urban improvement than ever before⁴⁰. In fact in a democratic set up, growth results from political decisions rather than from the application of a theory of metropolitan growth⁴¹.

Such artificial means as annexation, county consolidation, amalgamation and

³⁵A. A. B. Rizvi, "Urbanization Trends in British Columbia (Canada)", *Pakistan Geographical Review*, Vol. 24, No. 2 (1967), p. 22.

³⁶E. Ullman, "Nature of Cities Reconsidered", *Papers and Proceedings of the Regional Science Association*, Vol. 9 (1962), p. 10.

³⁷J. R. Mayer, J. F. Kain, M. Wohl, *The Urban Transportation Problems* (Cambridge: Harvard University Press, 1965), p. 25.

³⁸L. Holzner, E. J. Domisse and J. E. Mueller, "Toward a Theory of Cultural-Genetic Classification", *Annals, Association of American Geographers*, Vol. 57 (1967), pp. 367-81.

³⁹Blumenfeld, *op. cit.*, footnote 4, p. 68.

⁴⁰Stevenson, *Daily* (University of Washington, October 6, 1967).

⁴¹Borchert, *op. cit.*, footnote 5, p. 301.

municipal federation are significant causative factors underlying the increase of territorial, demographic and electoral size. In bigger areas, voluntary bodies abound and they participate in myriads of activities the public agencies are too small or inadequate to handle. More often than not, few politically powerful or otherwise dynamic private individuals have so big a say in city actions⁴² that in the final analysis its destiny is shaped by such actions.

ECONOMIC DETERMINANTS

Economic factors appear telling when location theorists combine it with technological and space variables. The centripetal and centrifugal forces underlying rural-urban migration still hold for inter-city migrations except that the pull of big cities has become more pronounced than the push of small towns due to favourable competitive position of the former. On the other hand, the centrifugal forces generated from "within" the metropolis have broadened the spectrum of locational alternatives⁴³. The multiplication of external diseconomies in the centre encouraged the use of peripheral location. The accompanying labour force shifted to workplaces. Thus the most accessible zone develops twice as fast as the one beyond⁴⁴, a leap frogging effect in the metropolitan spatial growth. Every physical unit—the factory, the house, the street and the school—has to be built on the scale of a machine. This means the spatial growth of the city six-eight times bigger than where man is the measure.

Location theorists hold that decreasing dependence of manufacturing on raw materials and increasing specialization, proliferated the inter-linked processing industries. Since they are inter-dependent, they must locate in close proximity and share the advantages of a big area. They enhance and stabilise metropolitan economy not only because they are export or basic industries but also are diversified enough to average out cyclical fluctuations resulting from changed demand and price pattern in the region that buys their products⁴⁵. Increasing diversification is an innovational act to defend the economy from adverse effects of external factors.

Traditional growth stages theory gets frequent reference in urban growth studies. Close examiners find that it is not adequately helpful in the context of American scene⁴⁶, for above all, it is too oversimplified to let one extract the critical

⁴²L. D. Mann, "Studies in Community Decision Making", *Journal of the American Institute of Planners*, Vol. 30, No. 1 (1964), p. 59.

⁴³A. R. Pred, "The Inter-metropolitan Location of American Manufacturing", *Annals, Association of American Geographers*, Vol. 54, (1964), p. 70.

⁴⁴R. Vernon, *Metropolis* (1985) (Cambridge; Harvard University Press, 1960).

⁴⁵W. Isard, *Method of Regional Analysis, An Introduction to Regional Science* (New York : M. I. T. Press & John Wiley & Co.), 1960, p. 183.

⁴⁶Both the theory and criticisms are summarized in : D. C. North, "Location Theory and Regional Economic Growth," in Friedmann and Alonso (ed), *op. cit.*, footnote 6, pp. 248-255.

factors. Among other simplified versions of stage sequence, the one of Thompson is the most telling of the situation. His sequential steps are: export specialization, export complex, economic maturation, regional metropolis and the stage of technical professional virtuosity⁴⁷. Thus, as an urban economy moves up it broadens its dominant industry, replaces export of goods, envelops contiguous communities, exports services and ultimately achieves national eminence in some specialised functions: for example, Miami in recreation, New York in business and commerce, Detroit in automobile and Seattle in aircraft. This is observably correct *albeit* makes a regional economy dependent on exogenous factor exerting pressure on its innovational ability.

Inherent in this type of logic is the economic base construct which states that a region lives not by its own washing but by what it sells outside⁴⁸. The export-service ratio is used as a multiplier used for prediction purposes. The theory has been heavily criticised as an explainer of growth on the ground that it is a short term concept too oversimplified to explain the growth of large regions⁴⁹. In terms of growth causation, it is not so much the regional exports as services that are the key factors⁵⁰. This is borne out by the fact that basic-non basic ratio decreases with size and strength of the community. Thus the fact that service industries are the lasting strengths of metropolitan communities is the hold of many, such as Tiebout⁵¹ and the most trenchant critic of the theory, Blumenfeld⁵².

It is the belief of this writer that since, as is the findings of many, the export service ratio of big metropolitan areas stand at around 1:1, the opportunity cost of moving resources between export and residentiary industries becomes almost zero. This demonstrates a built-in tendency in metropolitan areas to maintain an equilibrium and defend their economy against long-term growth disabilities.

TECHNOLOGICAL DETERMINANTS

If what Lampard said time, economy and effort reduction through specialization⁵³ and what Haig said reduction of space friction determined urban growth⁵⁴, then

⁴⁷Thompson, *op. cit.* footnote 16, pp. 15-16.

⁴⁸Literature on economic base abound, but the most relevant for the purpose is: R. Andrews, "The Mechanics of Urban Economic Base, Historical Development of the Base Concept," *Land Economics*, Vol. 29 (August 1953), pp. 161-167.

⁴⁹C. M. Tiebout, "Exports and Regional Economic Growth" in Friedmann and Alonso, *op. cit.*, footnote 6, pp. 255-260.

⁵⁰Blumenfeld, *op. cit.* footnote 4, p. 131.

⁵¹Tiebout, *op. cit.*, footnote 49.

⁵²Blumenfeld, *op. cit.*, footnote 4.

⁵³Lampard, *op. cit.*, footnote 6, p. 328.

⁵⁴R. M. Haig. "Major Economic Factors in Metropolitan Growth and Arrangement", *Regional Plan of New York and its Environs* (New York, 1927). p. 21.

a case can be made that both specialization and reduced friction were facilitated by production and mechanised transportation, the agent of industrial revolution. Literature on this subject is vast, but in the present context it is well to cite that both Mackenzie⁵⁵ and more recently Borchert⁵⁶ found American metropolitan development as epochal corresponding to and following the development of technology of transportation. The role of this factor was in fact greater than the space devoted to it here suggests.

INNOVATIONAL DETERMINANTS

Innovation and inventiveness are related to the size of the city. Innovators bunch in time and space and create an atmosphere that attracts more of their kind that share the protest against the old and excitement of the new. Thompson showed that fifty-seven per cent of the Standard Metropolitan Areas' residents received ninety per cent of patents grants in sixteen patent clauses⁵⁷. 'Metropolitan status help stabilise the supply of innovational resources necessary to economic growth and development.

Many evidences can be cited in support of Thompson's thesis: Pittsburg's first post war recession was followed by its resurgence due to intellectual stocktaking and innovational ability. Its economic base was shifted from steel to diverse industry and culture. Detroit's pre-war decline was revived the same way. New York study demonstrates that giant metropolises grow by serving an entrepreneurial-innovational not a caretaker's function⁵⁸. Industries in big areas are planned ventures; they are never depleted of competition watchers. Any expected risk is immediately taken care of by private inventiveness.

Equally important in the maintenance of growth is the possibility of substitution⁵⁹. Blumenfeld noticed that when gold petered out catastrophe was averted by local enterprise substituting for erstwhile goldmine⁶⁰, "The larger the community, the greater the possibility of substitution for declining industries"⁶¹. There is, therefore, an inherent tendency in metropolitan areas to avoid risk to growth.

⁵⁵Mackenzie, *op. cit.*, footnote 9, pp. 1-8.

⁵⁶Borchert, *op. cit.*, footnote 5, pp. 301-332.

⁵⁷W. R. Thompson, "Locational Differences in Inventive Efforts and their Determinants", *Rate and Growth of Inventive Activity, Economic and Social Factors*. (Princeton: Princeton University Press, 1962), p. 259.

⁵⁸Vernon, *op. cit.*, footnote 14.

⁵⁹H. Barnet and C. Morse, *Scarcity and Growth* (Ballmore: Resources for the Future Inc., 1965).

⁶⁰Blumenfeld, *op. cit.*, footnote 4, pp. 130-131.

⁶¹*Ibid.*

Growth watchers do not exaggerate when they emphasise the importance of innovational factors to metropolitan growth. Chintz said that "the tradition of risk bearing or entrepreneurial function is of potent influence in metropolitan areas".⁶² Thompson argued that "entrepreneurship-inventiveness, promotional artistry, organizational genius, venturesomeness lies at the very heart of industrial development (and)...the new gods are efficiency, stability and industrial statesmanship".⁶³ Therefore, the need for a high degree of educational avenues has always been felt. In fact, Haig warned thirty years ago : "The possible future change will depend largely upon the possibilities of increased intelligence, of better education"⁶⁴. Weber proposed creation of intelligence centres to bring morality to urban affairs"⁶⁵. Borchert favoured need for effort to make metropolitan areas more adaptable to change with the help of information-education system⁶⁶. In short, increasing efforts are being made to enhance innovational ability which is at the heart of metropolitan development. Educational and innovational developments show that factors that retard development would be of diminishing rather than of increasing importance with passage of time.

CONCLUSION

There is no "single" reason behind metropolitan development ; causes are multiple and inter-dependent. The arguments presented should not be construed as suggesting anything to the contrary they have, however, the bias of the possibilistic school. What is held is that whereas there are many determinants of urbanization, once a community or an urban region reaches a threshold size in an urbanized society, it develops its own innovational and inventive resources which shield it against growth disabilities. Thus richness brings richness, success breeds success and growth stimulates growth. Faltering metropolitan economy may suggest innovational lag or over-inventiveness rather than a bleak future. If this is so, can metropolitan vitality be maintained by keeping tabs on the rate and type of innovation ? The paper has not resolved this question : it has tentatively expressed it for planning agencies to examine.

⁶²B. Chintz, "Contrasts in Agglomeration: New York and Pittsburg. *American Economic Review*, (May 1961), pp. 284-85.

⁶³Thompson, *op. cit.*, footnote 16, p. 44.

⁶⁴Haig, *op. cit.*, footnote 54, p. 59.

⁶⁵M. M. Weber, "The Role of Intelligence Systems in Urban Systems," *Planning Journal of the American Institute of Planners*, Vol. 31, No. 4 (November 1964), p. 289.

⁶⁶Borchert, *op. cit.*, footnote 5, p. 331.

CLIMATES OF WEST PAKISTAN ACCORDING TO THORNTHWAITES' SYSTEM OF CLASSIFICATION OF CLIMATES*

NASRULLAH KHAN*

THE objective of this study is to estimate water need, water surplus and water deficiency in West Pakistan and also to present an analysis of the climates of the province after Thornthwaite. It is well known that the amount of precipitation in West Pakistan is not only inadequate but is also highly variable from year to year. Its distribution in time and over the area is such as to render most parts of the province dry during most of the year when water is most needed by the plants. Artificial Irrigation, therefore, plays a very important role in the agricultural development of the province. It is, therefore, very necessary to estimate the water need during various seasons of the year.

This study shows the areas of water deficiency where irrigation is required and the amounts of water needed during various times of the year.

In order to evaluate and estimate the water-need in West Pakistan Thornthwaite's system of classification of climates³ has been adopted. Although according to Thornthwaite himself his new system of classification of climate is very complicated and lacks mathematical elegance, but still it has proved to be very helpful for a scientific analysis of the climates of a region or place because its application gives us approximate values of potential evapotranspiration, actual evapotranspiration, water surplus and water deficiency. Moreover the climatological elements used therein are only temperature and precipitation whose records are available even in the developing countries of the world. Therefore, the evaluation of water need in various parts of the world or for the whole of the world is possible. While in order to evaluate or work out potential evapotranspiration according to other formulae climatological data of more weather elements are required; it is important to note that such data are not available in the developing countries of the world.

*This paper is a part of my M.A. thesis *Climates of West Pakistan and their Relationship with Crop pattern* (Lahore : University of the Panjab, 1966). I am thankful to all those who have shared their knowledge and experience with me in the preparation of this paper. I am particularly thankful to Professor K.S. Ahmad, former Head of the Department of Geography for encouragement, criticism and useful suggestions. The thesis was prepared under Dr. I.H. Zaidi's guidance and I must acknowledge that his encouraging attitude, able guidance and criticism have been of great help in the preparation of the thesis as well as this paper.

1. C.W. Thornthwaite, "An Approach Toward a Rational Classification of Climate" *Geographical Review*, Vol. 38, (pp. 50—94 1948).

2. *Idem*, the Climates of North America According to a New Classification, *Geographical Review*, Vol. 21 (1931).

3. Thornthwaite, *op. cit.* footnote 1, p. 1.

★MR. NASRULLAH is Lecturer in Geography, University of the Panjab, Lahore.

The climatic elements, for example, potential evapotranspiration, water deficiency, water surplus, moisture ratio and run off worked out with the application of Thornthwaite's new system of classification of climates, can be very helpful in the problems of agroclimatology and agricultural practices. Among these can be enumerated the studies of the regimes of drought, soil erosion by water or wind, planning of irrigation schemes and agricultural operations, and comparative and special agroclimatological studies.

There are other formulas devised by agronomists to work out the water need or potential evapotranspiration but the meteorological data required for the application of those formulae are not available for a sufficient period. Moreover the number of weather stations providing all types of information is very limited in West Pakistan.

Keeping in view the problems mentioned above, Thornthwaite's system of classification of climates has been adopted because of great utility in general planning. Moreover this is the best system of classification of climates so far devised as it is independent of the vegetation zones; whereas all other systems owe much to phytogeography and the studies and descriptions of the phyto-geographical regions. So much so that the climatic regions based on phyto-geographical studies are in fact vegetation regions.

PRECIPITATION










West Pakistan is an extra-tropical country lying just north of the tropic of Cancer. It is well protected from the influence of the cold polar air masses of the Siberian origin by the Great Himalayas.

During summer the region is under the influence of monsoon winds, but as it lies along the extreme western margin of the subcontinent and the Asian Monsoon Region; most of it receives very scanty precipitation during the season of monsoon rainfall. Moreover, because of high thermal efficiency during summer the small amount of precipitation that comes to the ground is not very effective.

During winter the province is under the influence of westerlies and they like the monsoons reach here after covering long distances from the Mediterranean sea and Persian Gulf. Resultantly they lose much of their moisture before reaching West Pakistan and the amount of precipitation in winter is also very small.

Now, as in summer the province is under the influence of the south east monsoons, the cis-Indus parts of the province by virtue of their location receive more rainfall than the western half of the province. While during winter the western half of the province by virtue of its high elevation and location receives more rainfall than the eastern parts of the province.

WEST PAKISTAN NORMAL ANNUAL PRECIPITATION

KEY	CENTIMETER
	>150
	100-150
	80-100
	50-80
	25-50
	15-25
	10-15
	5-10
	< 5

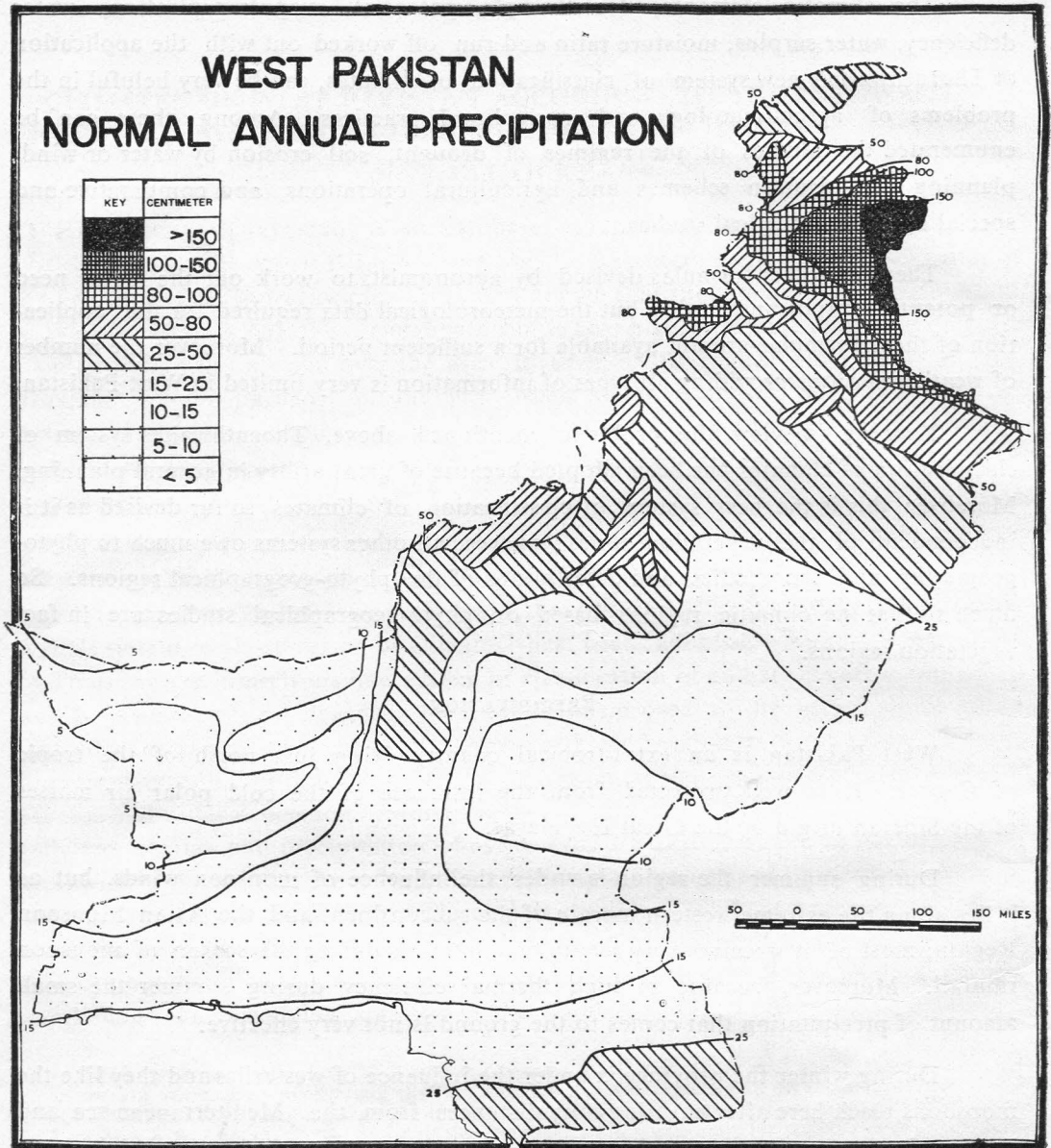


FIGURE 1

Figure 1 shows the distribution of normal annual precipitation in West Pakistan. The amount of precipitation decreases with increase in distance away from the Pir Panjal Range and the Himalayas. It varies from 100 centimeters in the north east along the foot of the Pir Panjal Range in Sialkot to less than ten centimeters in Jacobabad and then increases again to twenty-five centimeters in the southern parts of Hyderabad division along the Arabian seacoast. The amount of precipitation

is small in the most of the plain area of the province except the extreme north eastern part. Moreover the variability of precipitation is very great. The variability of rainfall increases as one moves towards the driest part of the country⁵ and the percentage of variability ranges from 50 in the heart of the arid region to 30 in the Central Punjab.⁶

POTENTIAL EVAPOTRANSPIRATION⁷

West Pakistan lies just north of the tropic of cancer and the plains and plateaus of the country are extremely hot in summer and are not as cold as central and southern China in winter because it is well protected from the influence of polar air masses of Siberian origin by the Great wall of Himalayas. Thermal efficiency is, therefore, very great.

Latitude for latitude normal annual potential evapotranspiration is greater in southern West Pakistan than in such regions as come under the influence of polar air masses in winter *e.g.*, southern Mississippi plain, central and southern China.

Moreover aridity and greater continentality enhance the rate of evaporation and resultantly potential evapotranspiration is very great.

The isopleths of potential evapotranspiration follow approximately the course of isotherms (Fig. 2). Resultantly they run parallel to the Kirthar and the Suleman ranges near their foot hills, but in the open plains they assume an almost east-west direction characteristic of isotherms.

The south eastern part of West Pakistan which is part of the Thar desert of the sub-continent, experiences the greatest normal annual potential evapotranspiration⁸. Here the maximum is experienced around Hyderabad and it amounts to 160 centimeters per annum. This region of maximum potential evapotranspiration extends in an oval shape with east-west extension in Hyderabad division. The highest values of potential evapotranspiration are result partly of the great desiccating influence of the Thar desert in summer and partly of the marine influence of the Arabian sea which keeps the temperature higher in winter. Broadly speaking there are only two regions of greatest potential evapotranspiration with their centres over

⁴*Idem* S. Ahmad, *A Geography of Pakistan* (Karachi : Oxford University Press, 1964), pp. 37-40.

⁵Agriculture of the Punjab (Ph.D. thesis, University of London, 1939.)

⁶S. *Idem* & Mubashir L. Khan, "Variation of moisture types and their bearing on soil erosion in West Pakistan", *Pakistan Geographical Review* Vol. 14, No. 1 (1959), pp. 1-13.

⁷Potential or possible evapotranspiration is that amount of water which would evaporate from the soils surface and transpire from vegetation cover if the water were available in optimum quantity. The optimum amount of water is that which is retained by the soil solely by capillary force after the saturation point has been reached.

⁸Nasrullah Khan, *Climates of West Pakistan and their Relationship with Crop pattern*, (M.A. Thesis, University of the Panjab, Lahore 1966).

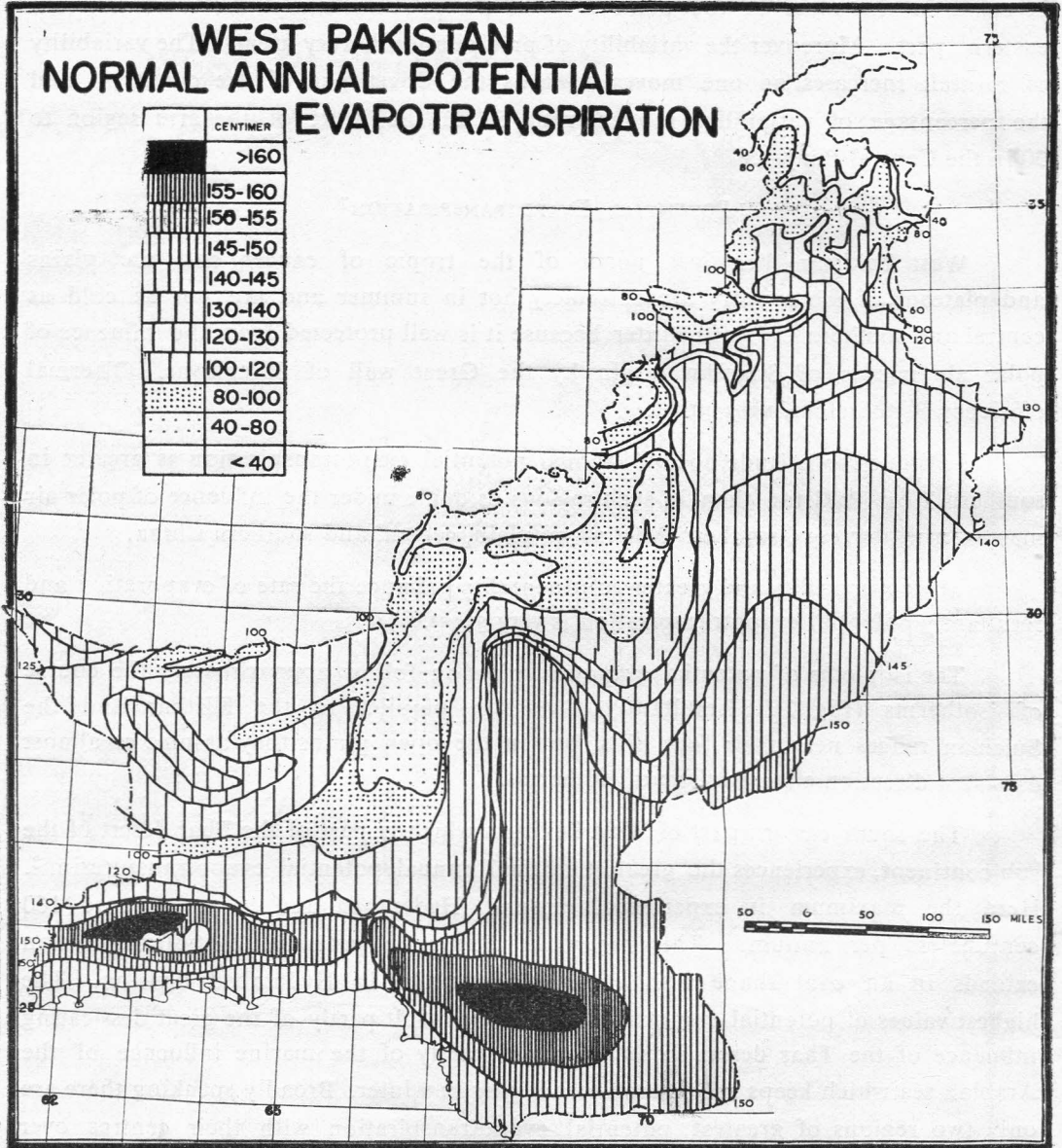


FIGURE 2

Hyderabad and Turbat and both extend northward; the former into the upper Indus Basin and eastward into the Thar desert; the latter into Hamun-i-Mashkhel depression across the central Makran range and further into the Seistan desert of Afghanistan. The former is the largest and the driest region of the subcontinent with a normal annual potential evapotranspiration of 130 centimeters. It has northward extension into Sibi re-entrant and three outliers; Bannu, Kohat and Peshawar.

Potential evapotranspiration or water need increases southwestward with gradual decrease in precipitation and therefore with deterioration of the conditions of aridity till the high mountains on the west are reached.

The regions with lowest potential evapotranspiration are the northern mountain ranges, and their continuation towards southwest in the Koh-i-Safed, Waziristan Hills, The Toba Kakar Range, and the central Brouhi range. Here potential evapotranspiration is low because of greater elevation of the mountain ranges and hence of low temperature efficiency is experienced there.

Another region of low potential evapotranspiration is the Murree Hills, This narrow strip of land with potential evapotranspiration as low as sixty centimeters extends in north south direction along the western bank of the Jhelum.

In the marine type of climate along the Arabian sea potential evapotranspiration increases with increase in distance from the sea until the marine type of climate comes to an end. To the north of this, gradual decrease in potential evapotranspiration is experienced again.

MARCH OF POTENTIAL EVAPOTRANSPIRATION

March of potential evapotranspiration follows a uniform pattern all over the country. Potential evapotranspiration is highest in the months of June and July and then it decreases gradually till the lowest, which is experienced in January, is reached. It ranges from nineteen centimeter for each of the two summer months of June and July to three or four centimeters for January in the marine type of climate along the Arabian sea.

Figures 3 and 4 show that potential evapotranspiration in the months of June and July is over twenty-one centimeters in the plains, while for January it is even less than one inch in the plains except in the marine type of climate where it is more than three centimeters. (Fig. 5)

Figure 6 (showing the potential evapotranspiration for six summer months of the year) depicts that potential evapotranspiration is over 120 centimeters in Sibi re-entrant for the six summer months of the year. In the plains it is every where over 110 centimeters during this season. Over the high northern mountain ranges it is less than forty centimeters and over the central Brouhi and The Toba Kakar ranges it is about sixty centimeters for the summer season of the year.

During winter potential evapotranspiration is very small and forms about seventeen per cent to nineteen per cent of the normal annual potential evapotranspiration in the continental parts of the country.

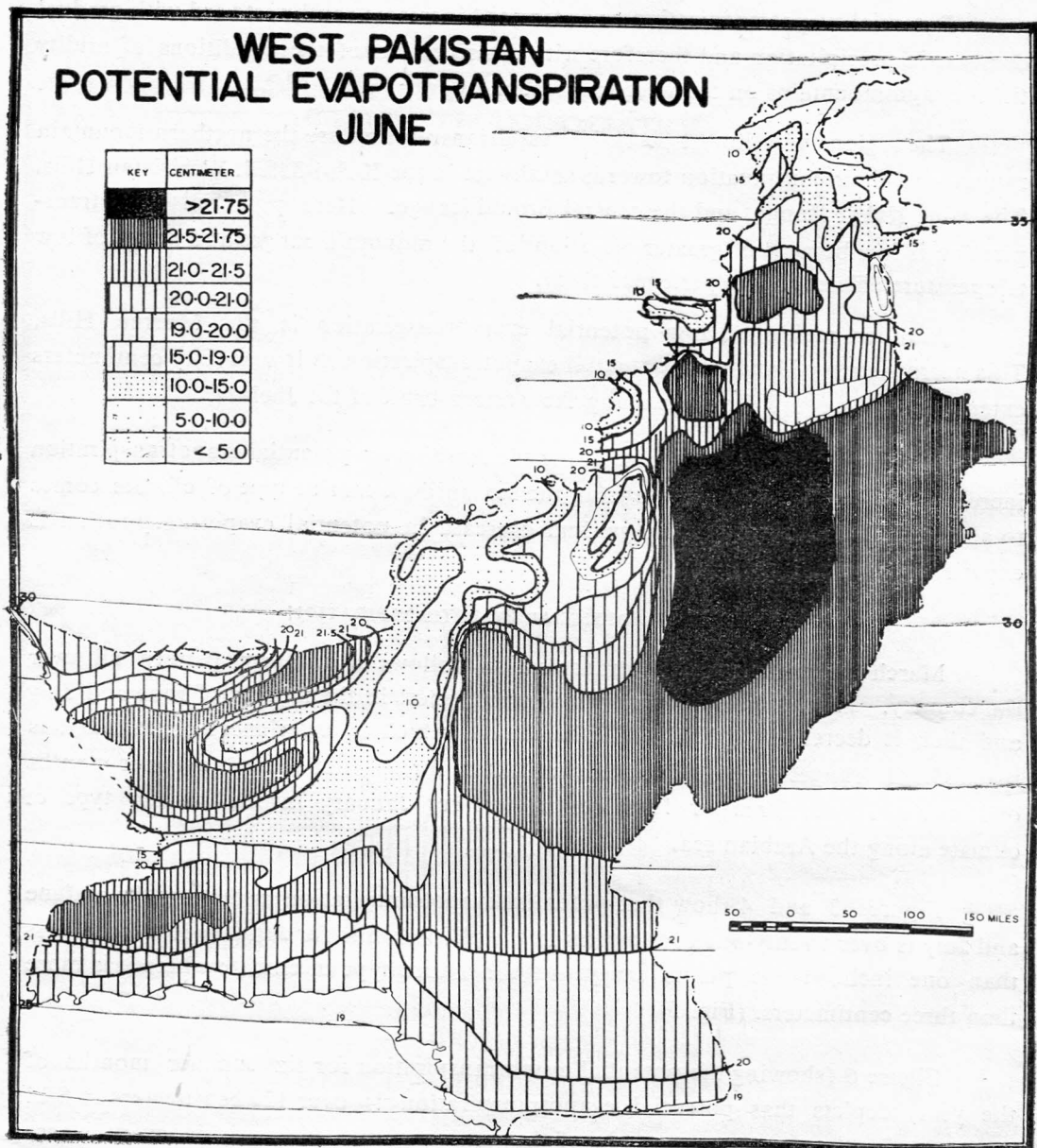










FIGURE 3

As Figure 7 shows it varies from twenty centimeters along the foot of the mountains to twenty five and thirty centimeters in the open plains. Whereas in the marine type of climate along the Arabian sea the oceanic influence is so dominant in winter that potential evapotranspiration is as high as thirty two centimeters.

WEST PAKISTAN POTENTIAL EVAPOTRANSPIRATION JULY

KEY	CENTIMETER
	>22
	21-22
	20-21
	19-20
	15-19
	12-15
	5-12
	< 5

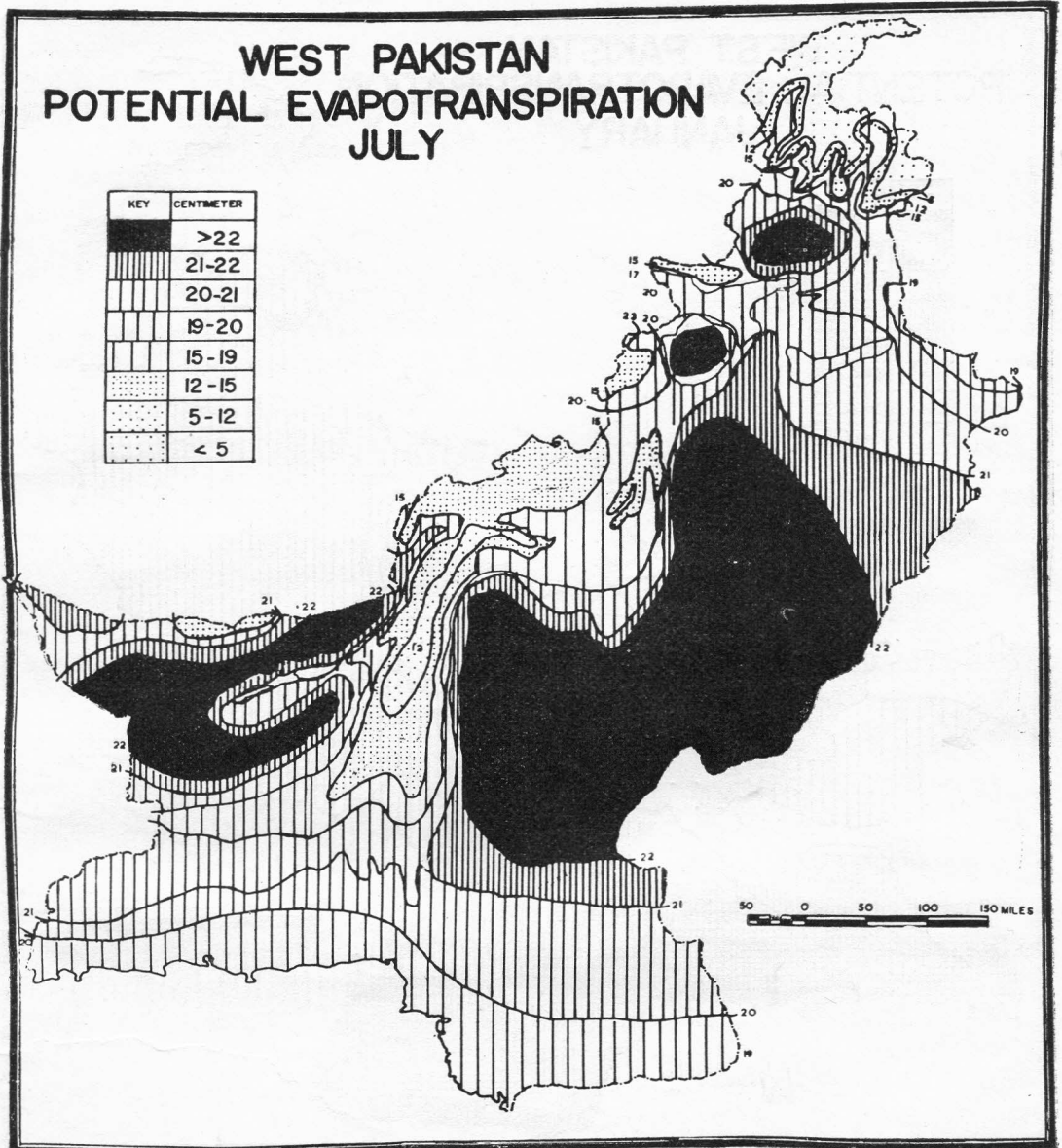










FIGURE 4

The march of potential evapotranspiration is affected by and related with the monsoon rains. Such parts as have sufficient precipitation in July experience the potential evapotranspiration maxima in June, while others which receive little precipitation in July have the potential evapotranspiration maxima in the same month⁹.

⁹Nasrullah Khan, *op. cit.*, footnote 8.

WEST PAKISTAN POTENTIAL EVAPOTRANSPIRATION JANUARY

KEY	CENTIMETER
	> 3
	1.5-3
	1.25-1.5
	1.00-1.25
	0.75-1.00
	0.50-0.75
	0.1-0.50
	< 0.1

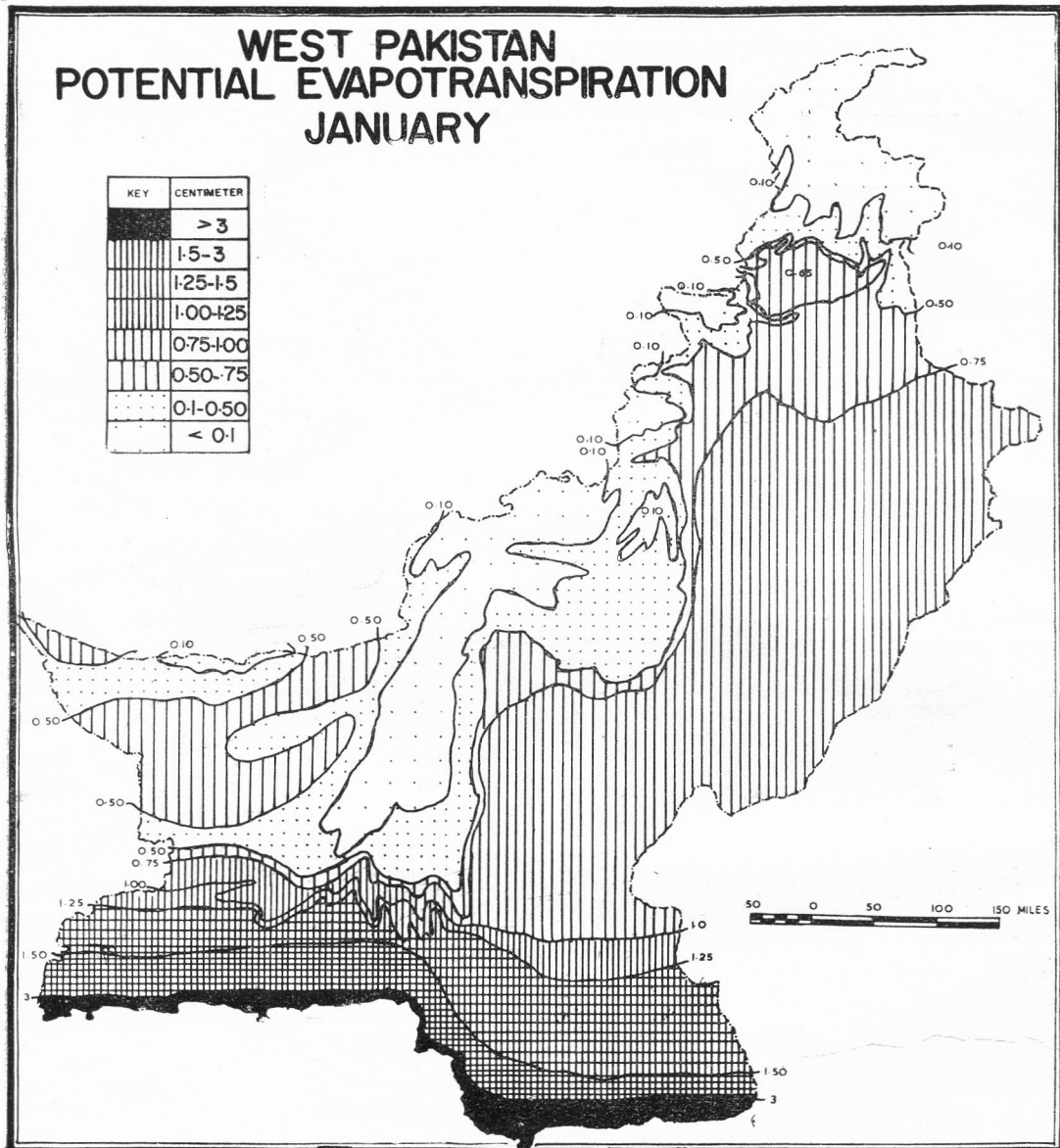











FIGURE 5

It is all because of greater cloudiness, higher relative humidity, more precipitation and greater actual evapotranspiration, because of the availability of water, that potential evapotranspiration is reduced to some extent. Although evapotranspiration and precipitation are two independent climatological elements, the former being function of temperature is affected by relative humidity of the atmosphere and actual evapotranspiration which result in cooling. It has been observed that in arid climate potential evapotranspiration is greater because of little actual

WEST PAKISTAN POTENTIAL EVAPOTRANSPIRATION APR.-SEPT.

KEY	CENTIMETER
	> 120
	118-120
	115-118
	110-115
	100-110
	60-100
	50-60
	15-50
	< 15

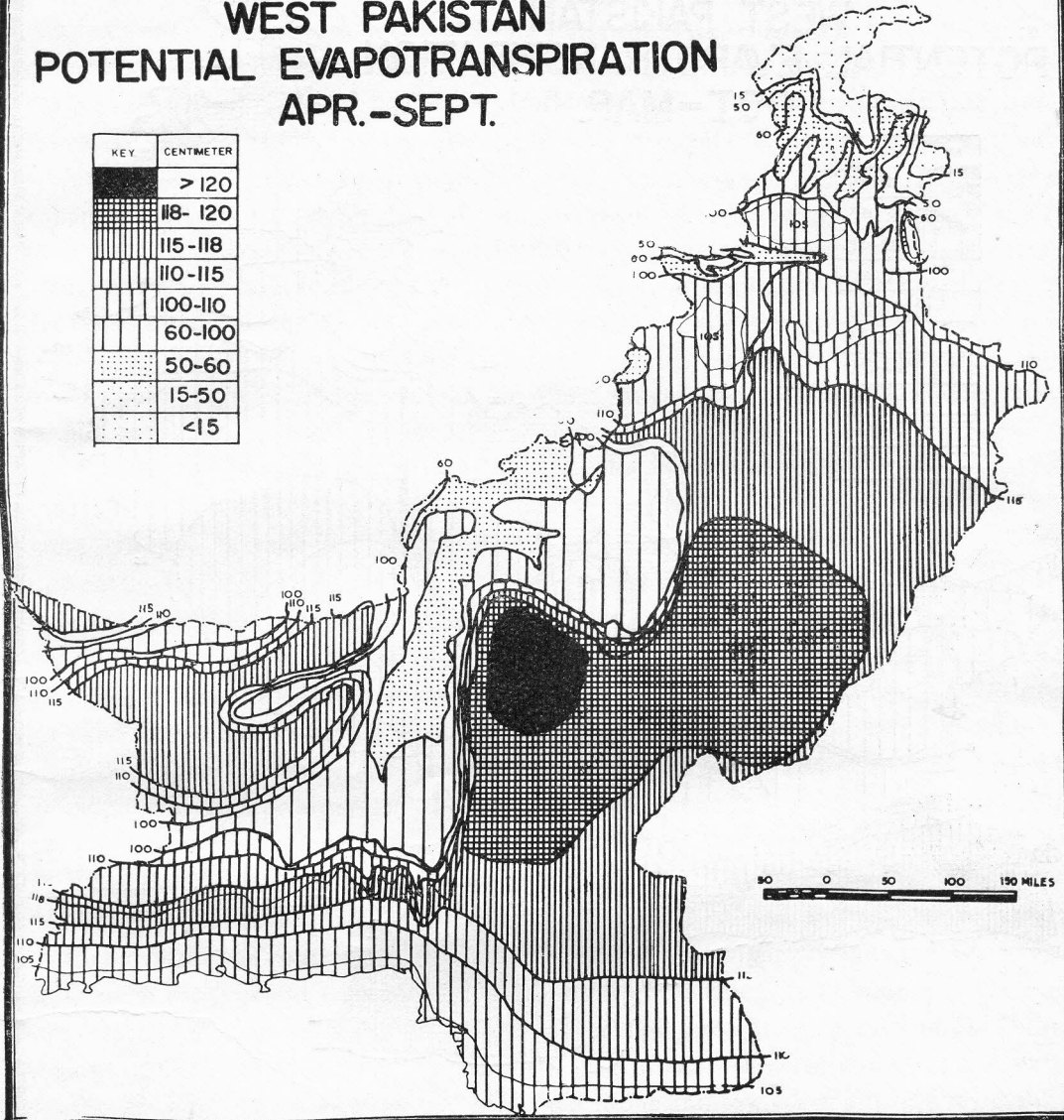












FIGURE 6

evapotranspiration which would otherwise have some cooling effect. For example Sialkot, Jhelum and Rawalpindi receive copious rainfall in the month of July and therefore have the potential evapotranspiration maxima in the month of June when the amount of rainfall is less. Whereas such weather stations as receive little rainfall in the month of July, for example Jacobabad, Sukkur, Sibi, Multan, Nokkundi and Bahawalpur experience the potential evapotranspiration maxima in the same month. One of the most interesting features of this season, as the comparison of Figures 3 and

WEST PAKISTAN POTENTIAL EVAPOTRANSPIRATION OCT.-MAR.

KEY	CENTIMETER
	> 45
	42-45
	40-42
	32-40
	25-32
	20-25
	10-20
	10-18
	5-10
	< 5

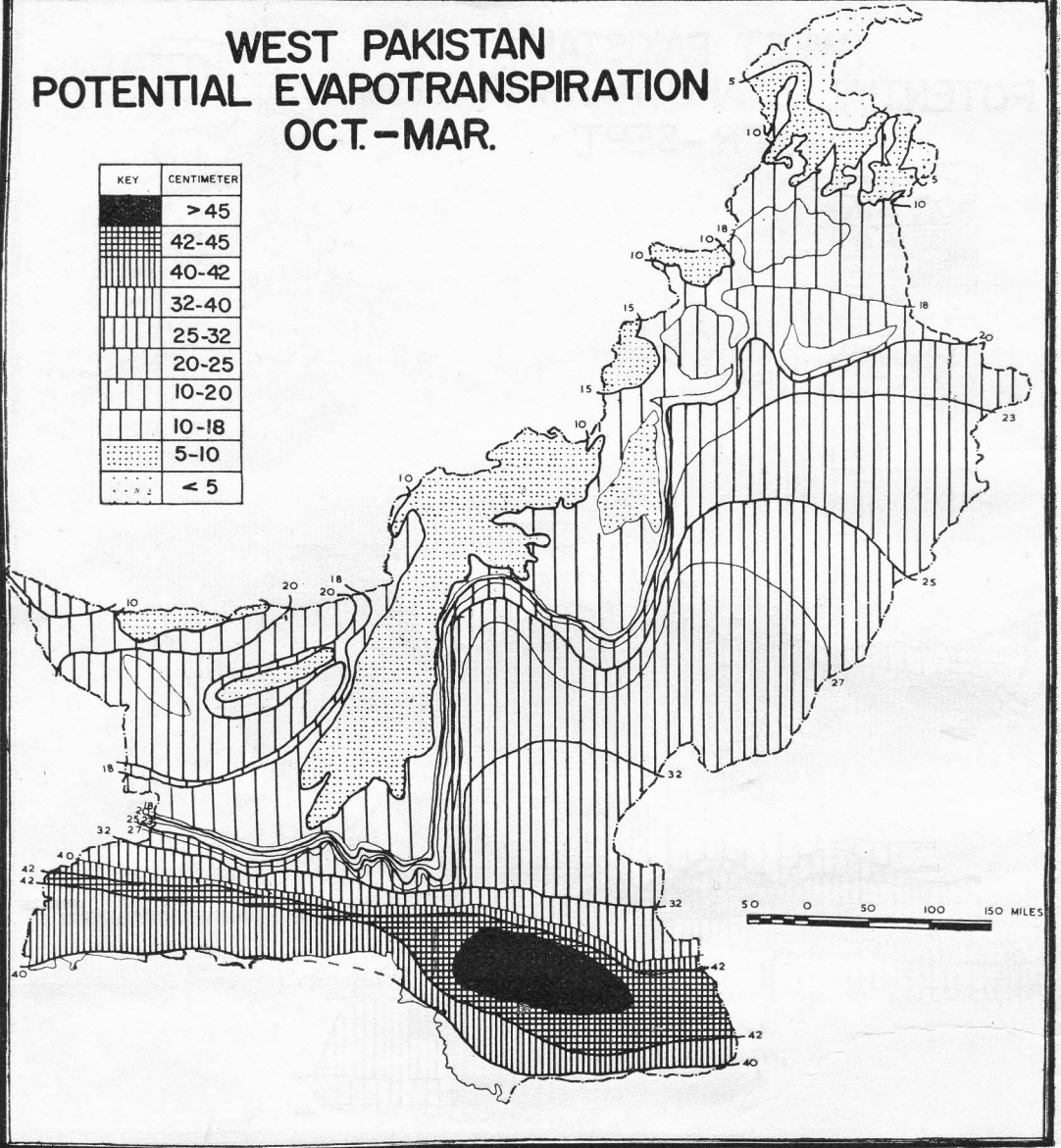


FIGURE 7









4 shows, is the intensification, expansion and westward march of the region of maximum potential evapotranspiration during the months of June and July. In the month of June the region of maximum potential evapotranspiration lies over the Thal and the adjacent parts of Multan, Dera Ghazi Khan and Dera Ismail Khan. While in the month of July it has moved away to the southwest expanding over a larger area. This phenomenon is closely related with and depends upon the onset of the monsoons.

WATER SURPLUS AND WATER DEFICIENCY¹⁰

In order to assess the water deficiency and the water surplus in West Pakistan a comparison of the Figure 1 (showing normal annual precipitation) with Figure 2 (showing normal annual potential evapotranspiration) will give a clear picture of the both. Potential evapotranspiration as compared with precipitation is almost every where, with a few exceptions, very great. The arid and semi-arid parts of the province experience water deficiency throughout the year. Only the humid regions like the Murree hills and the Koh-i-Safed which receive abundant precipitation experience water surplus. Areas south of latitude 31°N, where precipitation is very small and potential evapotranspiration is also very great, are the regions of greatest water deficiency. Here it varies from 140 centimeters in continental parts to 130 centimeters in the coastal regions. Over the high mountain ranges, where although precipitation is not much in amount, the water deficiency is small because of low potential evapotranspiration due to greater elevation. In the high northern mountain ranges of the country although precipitation varies only from fifty to eighty centimeters, but it is more effective because of low thermal efficiency and resultantly low evapotranspiration rate. So much so that thermal efficiency is not capable of melting the snow that falls and its end result is the perpetual cover of ice and snow. Figure 8 shows the distribution of normal annual water deficiency in West Pakistan. Values of water deficiency rise sharply and abruptly away from the Pir Panjal Range, the Murree hills and the western and south western mountains, in the plain areas. The normal annual isopleth of forty centimeters water deficiency hugs along the Pakistan-Azad Kashmir boundary in the north-east and then further north passes south of Rawalpindi. The Murree hills is the only part of the country which suffers no water deficiency at all and the climate of the region is of perhumid type. Another region of low water deficiency is the Koh-i-Safed surrounded by the isopleth of normal annual water deficiency of fifteen centimeters. Here precipitation is comparatively evenly distributed through the year but water surplus occurs during the first four months of the year when potential evapotranspiration is small and precipitation is greater. The other regions of low water deficiency are the northern and northwestern mountainous parts of the country where because of high elevations and low thermal efficiency even a moderate amount of precipitation is adequate and more effective than it is in the plain areas. In the northern mountainous part it is every where below forty centimeters and in higher part it is still smaller. Further to the south-west high mountain ranges of the Toba Kakar, the Central Brauhi and the Suleman (over 5,500 ft) have a water deficiency of about sixty centimeter.

¹⁰Values of water surplus and water deficiency may be regarded as a simple budget showing income and outgo ; precipitation being treated as income and potential evapotranspiration as outgo and moisture retained by the soil as reserved that may be drawn up for use when need arises.

WEST PAKISTAN NORMAL ANNUAL WATER DEFICIENCY

KEY	CENTIMETER
	> 140
	130-140
	100-130
	80-100
	60-80
	40-60
	0-40
	< 0-10

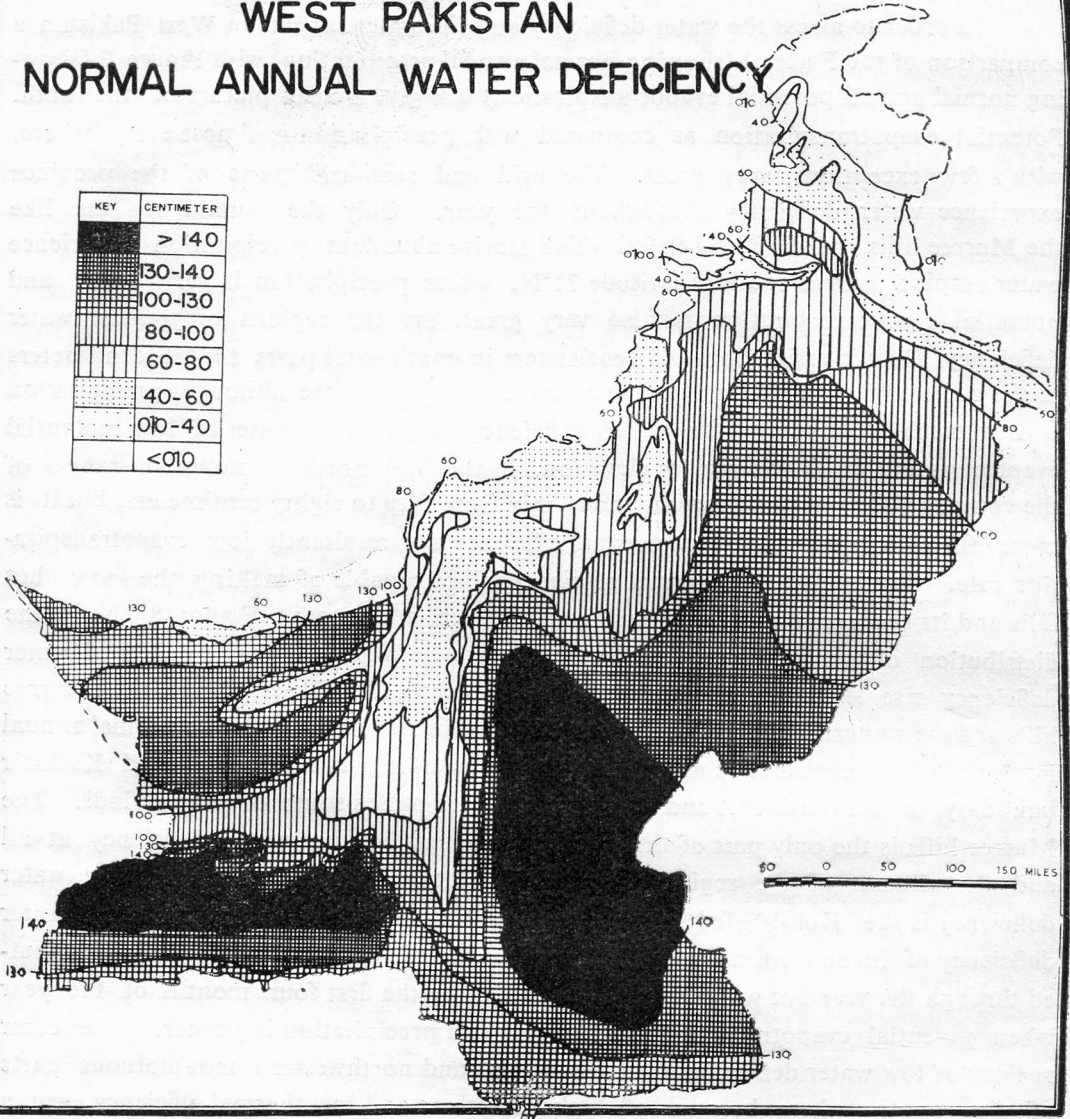









FIGURE 8

Away from the mountains water deficiency rises abruptly in the Indus Plain and the mountain-girt plains of the Peshawar, Kohat and Bannu. The region of greatest water deficiency lies in the former province of Sind and the south western Punjab. Here water deficiency in the most of the area is as great as 140 centimeters and is nowhere less than 100 centimeters. Another region of greatest water deficiency lies in trans-Indus part of the province in the Hamun-i-Mashkhel depression. Here

WEST PAKISTAN NORMAL ANNUAL WATER SURPLUS

KEY	CENTIMETER
	> 100
	50-100
	25-50
	5-25
	3-5
	0.0-3
	0.00

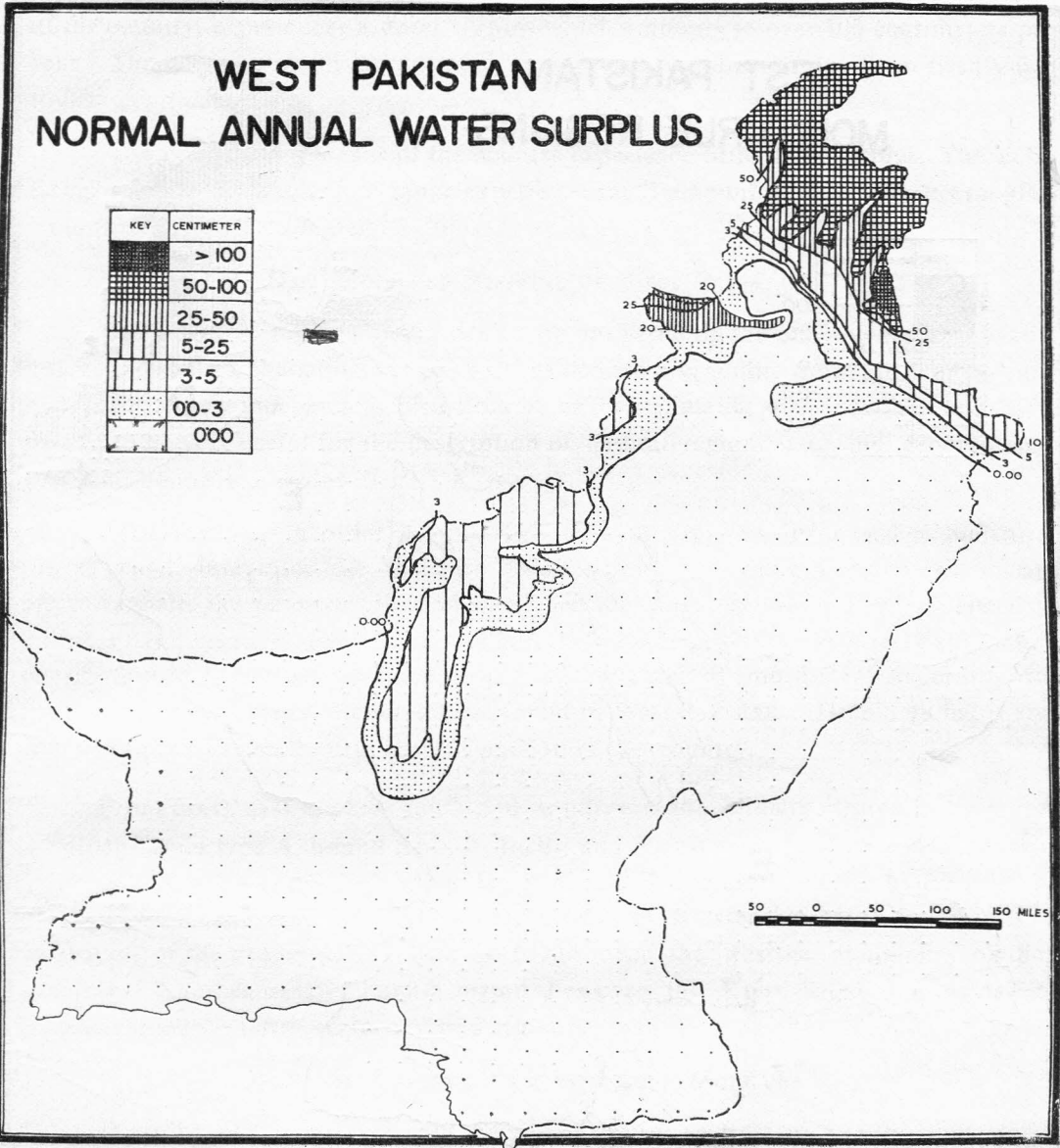








FIGURE 9

water deficiency is about 130 centimeters and decreases on all sides as elevation increases. Here the values of water deficiency are so great because of scanty precipitation which does not exceed even five centimeters per annum. Over the central Makran range water deficiency is about 100 centimeters but south of it the values of water deficiency rise again to over 140 centimeters.

WEST PAKISTAN MOISTURUE REGIONS

LEGEND	MOISTURE INDEX
	PERHUMID 100
	HUMID 20
	MOIST SUB-HUMID 0
	DRY SUB-HUMID -20
	SEMIARID -40
	ARID

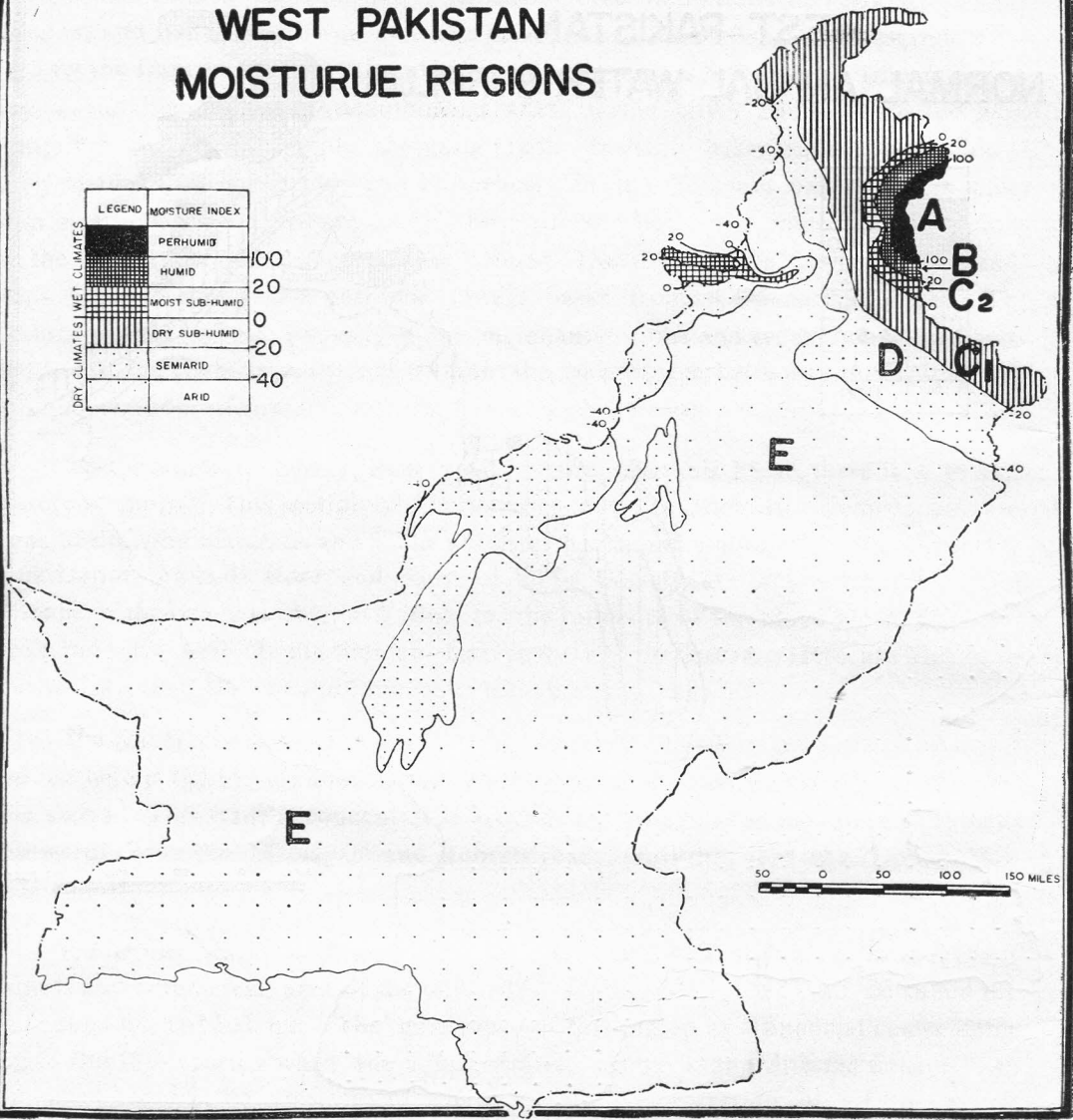


FIGURE 10

The distribution of normal annual water surplus has been shown in Figure 9. No part of the country experiences water surplus throughout the year¹¹. Some mountainous parts of the province, however, do experience water surplus in winter when the water need is less. The Murree hills, the most humid part

¹¹Nasrullah Khan, *op. cit.*, footnote 8, page 15.

of the country, experiences a water surplus which amounts to over 100 centimeters per year. The northern mountainous region has a water surplus ranging from twenty-five to fifty centimeters.

The plains and plateaus of the country experience little water surplus. The Toba Kakar and the Central Brauhi range experience small amount of water surplus ranging from three to five centimeters.

THE MOISTURE REGIONS OF WEST PAKISTAN

The moisture regions herein dealt with are based on the effectiveness of precipitation. Therefore the moisture regions thus defined are, unlike those of Koppen and others, absolutely independent of factors other than climatic, *e.g.*, edaphic and have proved to be very useful for the description of natural regions and the geographical problems connected therewith.

Thornthwaite, in order to establish moisture regions, proposed a moisture index, which integrates the moisture balance into one value and weighs, on an arbitrary scale, the water surplus and water deficiency against water need¹². The dry climates have negative moisture indices and the humid, positive. Figure 10 shows the distribution of climatic types based on the effectiveness of moisture. According to this definition all types of climates are found in West Pakistan. Humid climates are confined only to a small north eastern portion of the country.

From north east towards south and southwest the climate degrades by steps from per humid type A, humid types B₄, B₃, B₂, and B₁ over the Murree hills, through moist sub-humid C₂, dry sub-humid C₁, semi-arid D and arid E in the plateaus and plains of West Pakistan. The arid type E is the most extensive being found in the most parts of the province. D type is found over the western mountains of the province. Another isolated humid region lies over the Koh-i-Safed and is smaller in extent than the north eastern humid region.

SEASONAL VARIATION OF EFFECTIVE MOISTURE

Moisture index expresses only the magnitude of aridity or humidity, and does not distinguish continuously wet climates from those which are wet but with a dry season and *vice versa*. In order to express the seasonal variation of effective moisture, Thornthwaite, takes into consideration the magnitude of the index of aridity in wet climates A, B and C₂ and the index of humidity in dry climates C₁, D and E. Because it must be known whether a climate is wet or dry throughout the year or dry or wet season, alternate with each other during the

¹²The index of aridity and humidity have been worked out by dividing the percentage of water deficiency and water surplus by water need, respectively.

course of a year in a particular region or place. It is very important to know if a dry season occurs in a wet climate and *vice versa*. Its magnitude should also be studied. In a wet climate water deficiency may be non-existent, small, moderate or very large and the reverse may be true of a dry climate. The symbols w and w_2 are used to express a moderate and large water surplus in summer respectively. When the water surplus occurs in winter the corresponding symbols employed are s and s_2 . When the march of potential evapotranspiration and precipitation through the year is approximately parallel to each other, there will be little seasonal variation of moisture and the climate will be either wet or dry throughout the year. In such cases the symbols r and d are used for climate with little or no water deficiency and with little or no water surplus respectively. The symbols s , s_2 , w and w_2 refer to seasons of water deficiency in wet climates and to seasons of water surplus in dry climates respectively. The symbols, in spite of having been defined differently, have the same meaning in both arid and wet climates¹³.

Figure 11 shows the seasonal variation of effective moisture in West Pakistan. Here in spite of the fact that the amount of summer precipitation is twice or even more than twice the winter precipitation, the water surplus occurs in winter when thermal efficiency is low and the effectiveness of precipitation is more. Rawalpindi serves as a good example where precipitation in summer is twice as much as in winter, but the water surplus occurs in winter. Rawalpindi, therefore, falls in the climatic type s_2 ($C_1 A' s_2 a$). In the plains winter precipitation is too small and s type does not occur. Therefore the whole of the Indus plain and the Baluchistan plateau falls in the sub type d .

The climatic types s and s_2 occur in mountainous areas where because of favourable location precipitation is more in winter and due to higher elevation potential evapotranspiration is small. The areas which come under these sub types include the Toba Kakar Range, the central Brauhi range, the Koh-i-Safaid, the western parts of Waziristan hills and northern mountains of the province. The sub type ' r ' is found in the north eastern parts of Rawalpindi and eastern parts of Hazara district. The sub types w and w_2 are not found anywhere in the country.

In Köppen's *Handbuch der Klimatologie*¹⁴ the moist sub-humid and dry sub-humid types of climates have been shown under the climatic type C_w which means that the climate is temperate dry with precipitation in summer which apparently seems to be the case as the amount of precipitation in summer is even more than twice that for the winter months whereas according to Thornthwaite's system summer in this region is the period of water deficiency. Rawalpindi serves as a good example which according to Thornthwaite's system comes under the climatic type C_2

¹³Thornthwaite, *op. cit.*, footnote.

¹⁴W. Köppen and R. Geiger, *Handbuch der Klimatologie* (Berlin : 1936).

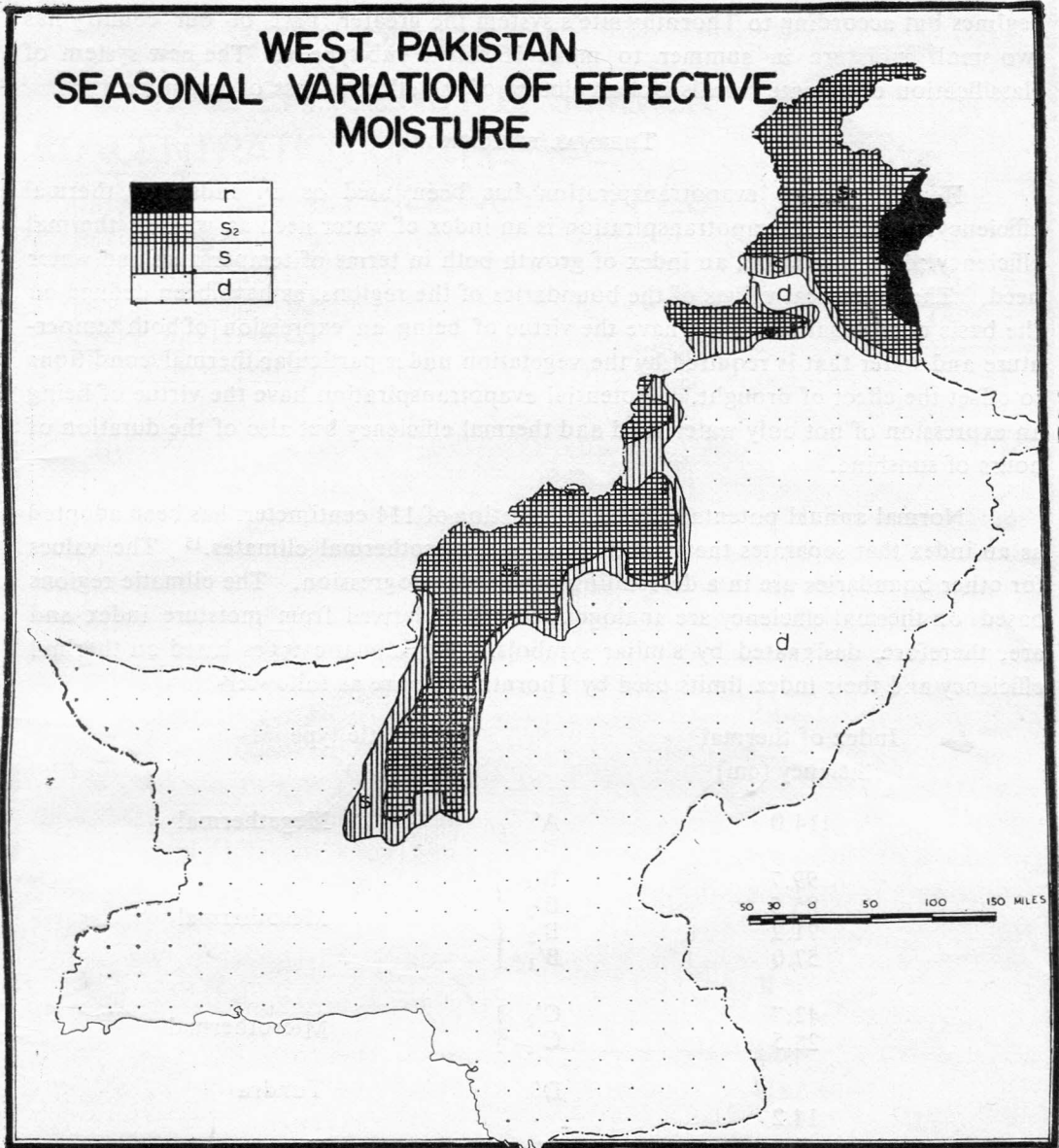


FIGURE 11

Where r and d are used for climates with little or no water deficiency. s , s_2 refer to seasons of water deficiency in wet climates, w , w_2 to seasons of water surplus in dry climates.

$A' s_2 a'$ while according to Köppen it has Cw type of climate which is just the reverse. Here in summer although precipitation is greater in amount than in winter but as thermal efficiency is greater in summer the rainfall in this season is less effective than it is in winter when thermal efficiency is low. Apparently both the wet and dry climates of our country have two distinct and well marked precipitation

regimes but according to Thornthwaite's system the greater part of our country has too small moisture in summer to make it fall in sub-type *w*. The new system of classification of climate reveals a clear picture of the effectiveness of moisture.

THERMAL EFFICIENCY

Here potential evapotranspiration has been used as an index of thermal efficiency. Potential evapotranspiration is an index of water need as well as thermal efficiency; it is, therefore, an index of growth both in terms of temperature and water need. The numerical values of the boundaries of the regions, as have been defined on the basis of thermal efficiency, have the virtue of being an expression of both temperature and water that is required by the vegetation under particular thermal conditions to offset the effect of drought. Potential evapotranspiration have the virtue of being an expression of not only water need and thermal efficiency but also of the duration of hours of sunshine.

Normal annual potential evapotranspiration of 114 centimeters has been adopted as an index that separates the megathermal and mesothermal climates.¹⁵ The values for other boundaries are in a descending geometric progression. The climatic regions based on thermal efficiency are analogous to those derived from moisture index and are, therefore, designated by similar symbols. The climatic types based on thermal efficiency and their index limits used by Thornthwaite are as follows:¹⁶

Index of thermal efficiency (cm)		Climatic type
114.0	A'	Megathermal
99.7	B' ₄	Mesothermal
85.5	B' ₃	
71.2	B' ₂	
57.0	B' ₁	
42.7	C' ₂	Microthermal
28.5	C' ₁	
14.2	D'	Tundra
	F'	Frost

The climatic types B' and C' have been further subdivided like humid and sub-humid climates into subtypes B'₁, B'₂, B'₃, B'₄, C'₁, and C'₂, respectively.

¹⁵Normal annual potential evapotranspiration of 114.0 centimeters has been adopted as the minimum critical limit for megathermal climates because a station located on the equator and with a mean monthly temperature of 23°C for each month and little variation in day length would have normal potential evapotranspiration of 114.00 centimeter.

¹⁶Thornthwaite, *op. cit.*, footnote 1, p. 1.

WEST PAKISTAN THERMAL EFFICIENCY & SUMMER CONCENTRATION OF THERMAL EFFICIENCY TYPES

WATER NEED	THERMAL EFFICIENCY TYPE	LEGEND	S.C. T.E.	S.C. T.E. TYPE
71.2	B ₁		61.6	b ₁
85.5	B ₂		56.3	b ₂
99.7	B ₃		51.9	b ₃
114	B ₄		48	b ₄
>114	MEGA THERMAL A		<48	a

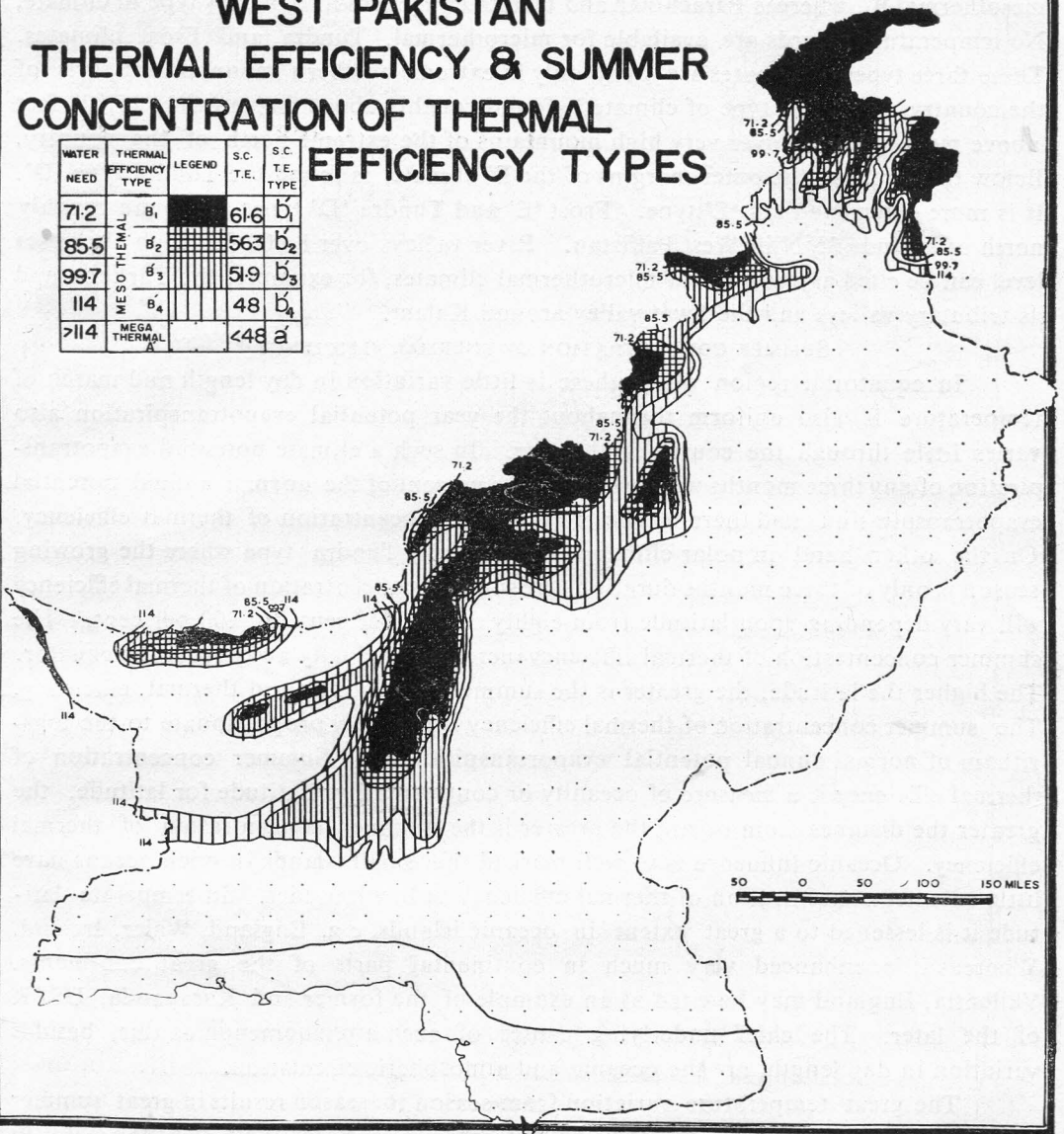


FIGURE 12

THERMAL REGION IN WEST PAKISTAN

Thermal regions have been shown in Figure. 12. Megathermal¹⁷ (A') climate is most extensive and is found in the plains and plateaus of the country. Along the outer margins of the megathermal climate are found the mesothermal climates

¹⁷The megathermal climate of West Pakistan is entirely different from that of equatorial megathermal climate. Here the low thermal efficiency during, shorter winter days is compensated by longer summer days of more sunshine. This results in a summer concentration of Thermal efficiency which is, unlike in equatorial regions, a characteristic feature of extra tropical land.

confined only to mountains upto 8,000 feet high. Murree and Kalat experience mesothermal B₁, whereas Parachinar and Quetta enjoy Mesothermal B₂ type of climate. No temperature records are available for microthermal, Tundra, and Frost climates. These three types of climates are found only in extreme northern mountainous parts of the country. Frost (E') type of climate is found roughly above the snowline 15,000 feet above mean sea level over very high mountains of the extreme north of the country. Below this limit on the outer margins of the E' climate, is found the Tundra type 'D'. It is more extensive than 'E' type. Frost 'E' and Tundra 'D' types are found roughly north of latitude 35°N in West Pakistan. River valleys over 8,000 feet high above sea level can be cited as examples of microthermal climates, for example, the Yarkoon and its tributary valleys and the Swat valley around Kalam.

SUMMER CONCENTRATION OF THERMAL EFFICIENCY¹⁸

In equatorial region where there is little variation in day length and march of temperature is also uniform throughout the year potential evapotranspiration also varies little through the course of the year. In such a climate potential evapotranspiration of any three months will be twenty-five percent of the normal annual potential evapotranspiration and there will be no summer concentration of thermal efficiency. On the other hand in polar climates, for example, Tundra type where the growing season is only of three months duration, the summer concentration of thermal efficiency will vary depending upon latitude from eighty eight per cent to 100 per cent. The summer concentration of thermal efficiency increases gradually away from the equator. The higher the latitude, the greater is the summer concentration of thermal efficiency. The summer concentration of thermal efficiency is inversely proportionate to the logarithm of normal annual potential evapotranspiration.¹⁹ Summer concentration of thermal efficiency is a measure of oceanicity or continentality. Latitude for latitude, the greater the distance from ocean, the greater is the summer concentration of thermal efficiency. Oceanic influence is so well marked that small islands in open oceans have little summer concentration of thermal efficiency in low latitudes. In temperate latitude it is lessened to a great extent in oceanic islands, e.g. England, Wales, Ireland. Whereas it is enhanced very much in continental parts of the great continents. Vallentia, England may be cited as an example of the former and Karaganda, USSR of the later. The chief underlying causes of such a phenomenon as this, besides variation in day length, are the oceanic and atmospheric circulation.

The great temperature variation from season to season results in great summer concentration of thermal efficiency in the interior parts of West Pakistan. But in the coastal belt as shown in Figure 12 in the marine type of climate where Arabian sea exercises an ameliorating effect, summer concentration is less and the climatic type EA' da' is found. Whereas further to the north away from the sea summer concentration of thermal efficiency increases and in the extreme northern parts of the Murree hills the climatic type B, B'₁ rb'₁ is experienced. In West Pakistan large

¹⁸Summer concentration of thermal efficiency is that part of potential evapotranspiration which is concentrated in the three hottest months of the summer.

¹⁹Thornthwaite, *op. cit.*, footnote 1, p. 1.

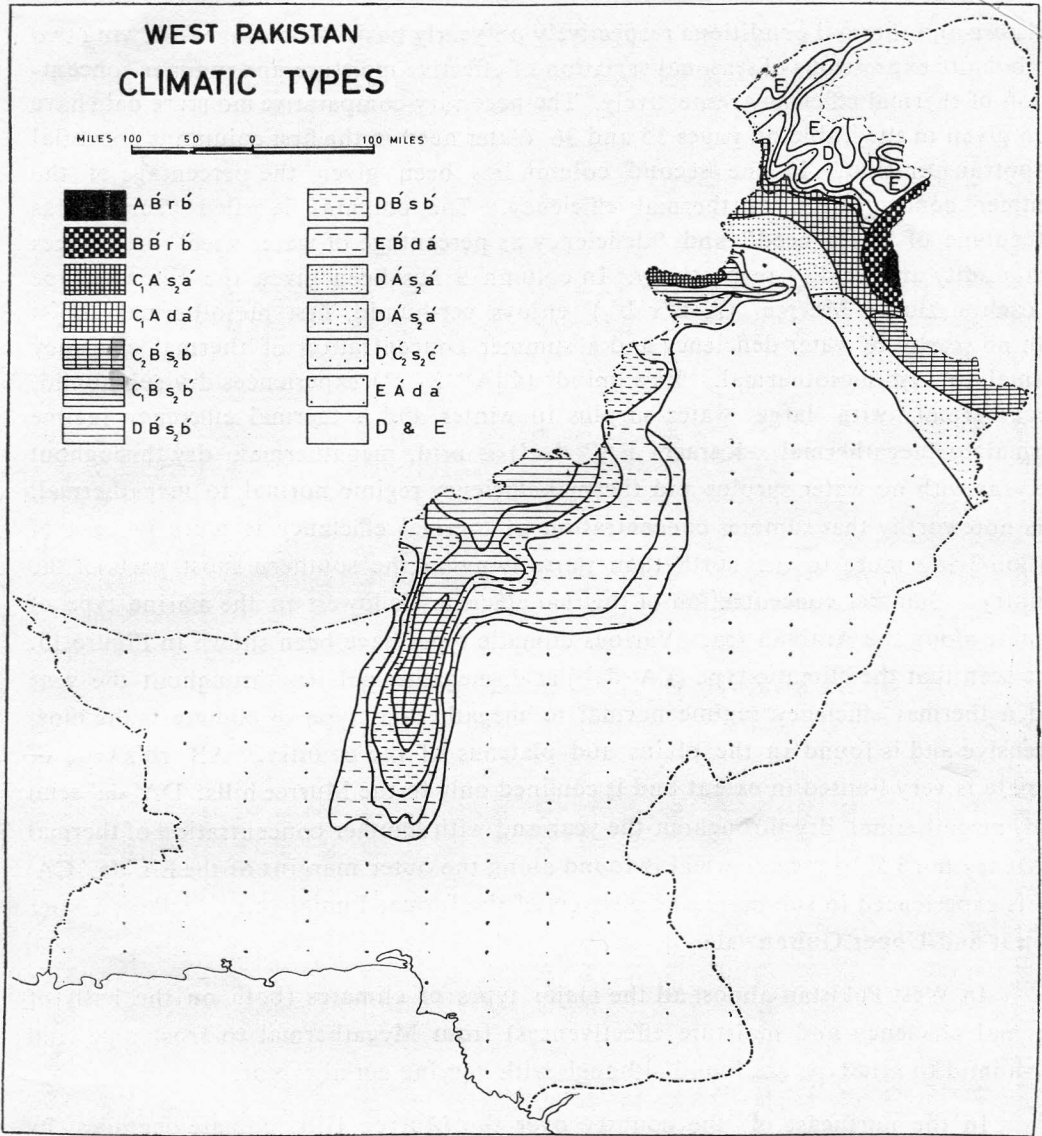


FIGURE 12

temperature variation results in many types of summer concentration of thermal efficiency. Most extensive among these is 'a' type. Various 'b' types are confined only to mountainous parts of the country. C₁ and C₂ are confined only to high mountainous valleys of the north. Type 'd' is confined only to those mountains which are below 15,000 feet above sea level. These subtypes have been shown in Figure 12.

THE CLIMATIC TYPES

Four symbols have been employed by Thornthwaite²⁰ for the description of the climate of a place or region. The first two, as has, previously, been stated, describe the

²⁰Thornthwaite, *op. cit.* footnote 1'

moisture and thermal conditions respectively on yearly basis. The other following two symbols are expressions of seasonal variation of effective moisture and summer concentration of thermal efficiency respectively. The necessary comparative moisture data have been given in the Table on pages 35 and 36. Water need in the first column is potential evapotranspiration. In the second column has been given the percentage of the summer concentration of thermal efficiency. The columns labelled "surplus as percentage of water need" and "deficiency as percentage of water need" are indices of humidity and aridity respectively. In column 9 has been given the climatic type of each station. Murree (A B' r b'₁) enjoys per-humid, first mesothermal, moist with no season of water deficiency and a summer concentration of thermal efficiency normal to first mesothermal. Rawalpindi (C₁A' S₂ á') experiences dry sub-humid, megathermal, with large water surplus in winter and a thermal efficiency regime normal to megathermal. Karachi EA' d á') is arid, megathermal, dry throughout the year with no water surplus and thermal efficiency regime normal to megathermal. It is noteworthy that summer concentration of thermal efficiency is more in case of station lying more to the north than those lying in the southern most parts of the country. Summer concentration of thermal efficiency is lowest in the marine type of climate along the Arabian sea. Various climatic types have been shown in Figure 13. It is seen that the climatic type (EA' da') arid, megathermal, dry throughout the year and a thermal efficiency regime normal to megathermal type of climate is the most extensive and is found in the plains and plateaus of the country. AB' rb', type of climate is very limited in extent and is confined only to the Murree hills. DA' da' semi arid, megathermal, dry throughout the year and with summer concentration of thermal efficiency normal to megathermal is found along the outer margins of the EA' da.' CA' da' is experienced in sub-montaine districts of the former Punjab, e.g., Sialkot, Upper Gujrat and Upper Gujranwala.

In West Pakistan almost all the major types of climates (both on the basis of thermal efficiency and moisture effectiveness) from Megathermal to frost type and per-humid to arid type are found although with varying aerial extent.

In the northeast of the country over the Murree Hills climate degrades by steps from per-humid to semi-arid and arid in the plains and plateaus of the country.²¹ This deterioration of climate is more abrupt and sudden in the north eastern parts of the country as compared with the other parts of province where change from one type of climate to other is very gradual and almost imperceptible. On the basis of thermal efficiency the climatic conditions deteriorate but very slowly and gradually in the south and the growing season becomes short as one moves to northern parts of the province and the climate degrades by steps abruptly from megathermal through mesothermal, microthermal to Tundra and frost types over the high mountain ranges.

²¹Nasrullah Khan, *op. cit.*, footnote 8.

TABLE 1 COMPARATIVE MOISTURE DATA
(in centimeters)

Station	Water need	Summer need%	Precipitation	Water surplus	Water deficiency	Surplus% of need	Deficiency % of need	Moisture Index	Climatic type
	1	2	3	4	5	6	7	8	9
✓ Murree	62.12	65.52	164.01	104.80	0.00	168.70	0.00	168.70	AB ₁ r b ₁
Kakul	88.09	55.44	120.32	41.53	9.30	39.00	10.56	87.96	B ₁ B ₃ r b ₁
Parachinar	77.25	59.23	85.80	23.95	15.40	31.00	19.90	19.02	C ₂ B ₂ S ₂ b ₂
Chaman	104.24	50.58	23.37	5.20	86.08	4.98	82.58	-44.56	EB ₄ s ₂ b ₄
Quetta	75.34	60.05	24.36	3.59	54.58	4.76	72.44	-38.70	DB ₂ s ₂ b ₂
Kalat	66.39	63.60	23.32	3.83	43.49	5.78	65.51	-33.53	DB ₂ s ₂ b ₁
Hindubagh	83.76	56.89	26.36	3.70	59.14	3.16	70.60	-38.66	DB ₁ s ₂ b ₁
✓ Rawalpindi	119.31	46.68	96.01	8.28	31.49	6.93	26.39	-8.90	C ₁ A' s ₂ a'
✓ Jhelum	128.92	44.46	89.05	1.04	40.91	30.38	31.73	-18.23	C ₁ A' da'
✓ Sialkot	131.36	43.91	78.13	6.28	47.45	4.78	36.12	-16.89	C ₁ A' da'
Cherat	94.44	53.43	76.66	18.00	35.81	19.05	37.92	-3.69	C ₁ B ₃ s ₂ b ₃
Drosh	91.99	54.15	65.91	29.78	54.52	32.37	59.26	-39.84	D B ₃ s b ₃
Wana	92.13	54.15	33.88	2.03	60.26	2.20	65.40	-37.04	D A' s ₂ a'
Risalpur	122.94	45.82	60.60	10.00	72.34	8.13	58.84	-27.17	D A' s ₂ a'
✓ Lahore	137.28	42.63	49.02	0.00	<u>88.26</u>	0.00	64.29	-38.57	D A' d a'
Karachi	143.27		22.13	0.00	125.14	0.00	84.97	-38.57	D A' d a'
Jiwani	142.69	41.52	14.88	0.00	127.81	0.00	89.57	-53.74	E A' d a'
Pasni	141.49	41.76	14.76	0.00	126.73	0.00	89.57	-53.74	E A' d a'
Ormara	144.71	41.12	14.83	0.00	129.88	0.00	89.75	-53.85	E A' d a'
Badin	155.63	39.01	23.62	0.00	132.88	0.00	84.82	-50.89	E A' d a'

TABLE 1 (continued)

Station	Water need	Summer need%	Precipitation	Water surplus	Water deficiency	Surplus% of need	Deficiency % of need	Moisture Index	Climatic type
	1	2	3	4	5	6	7	8	9
Hyderabad	160.96	38.04	15.46	0.00	145.50	0.00	90.39	-54.23	E A' d a'
Chhor	151.24	38.89	16.15	0.00	135.09	0.00	89.32	-53.59	E A' d a'
Turbat	160.35	38.16	15.60	0.00	144.75	0.00	92.27	-54.16	E A' d a'
Peshawar	123.62	45.60	33.12	0.00	90.50	0.00	73.21	-43.92	E A' d a'
✓Khushab	138.98	42.28	38.79	0.00	100.23	0.00	72.11	-43.27	E A' d a'
D. I. Khan	139.08	42.26	41.90	0.00	97.19	0.00	69.88	-41.93	E A' d a'
✓Sahiwal	140.20	41.66	26.11	0.00	114.09	0.00	81.37	-48.43	E A' d a'
✓Multan	145.52	40.95	16.31	0.00	129.21	0.00	88.79	-53.27	E A' d a'
✓Bahawalpur	142.66	41.53	14.19	0.00	128.47	0.00	90.05	-54.03	E A' d a'
Fortabbas	148.11	40.34	19.60	0.00	128.51	0.00	86.76	-52.06	E A' d a'
Reti	145.46	40.97	10.52	0.00	134.94	0.00	92.77	-55.66	E A' d a'
Padidan	146.70	40.72	13.94	0.00	132.76	0.00	90.50	-54.29	E A' d a'
Sibi	149.51	40.18	14.27	0.00	135.24	0.00	90.45	-54.27	E A' d a'
Jacobabad	150.59	39.96	8.84	0.00	141.70	0.00	94.09	-56.46	E A' d a'
Sukkur	150.81	39.92	9.02	0.00	141.79	0.00	94.02	-56.41	E A' d a'
Dalbandin	115.94	47.51	8.41	0.00	107.53	0.00	92.75	-55.65	E A' d a'
Pangoor	114.33	47.91	12.22	0.00	102.11	0.00	89.31	-58.83	E A' d a'
Nushki	127.08	44.86	12.67	0.00	114.44	0.00	90.05	-53.72	E A' d a'
Bela	150.97	43.88	19.48	0.00	131.49	0.00	87.09	-52.26	E A' d a'
Loralai	90.41	54.70	54.43	0.00	65.28	0.00	72.98	-43.32	E B ₃ ' d a ₃ '
Miranshah	112.75	48.32	35.65	0.00	77.10	0.00	68.38	-41.03	E B ₄ ' d ₄ b ₄ '

Source : The data for the preparation of the maps were obtained from the Central Meteorological Department, Karachi. The normals of the temperature and precipitation used herein are for the three preceding decades (1931-1960).

THE PATTERN OF RETAIL AND WHOLESALE TRADE IN LAHORE*

M. MUSHTAQ

A successful business area requires good contact with the public and is highly sensitive to its location. The old part of this city houses about fifteen per cent of the total population and therefore has a good amount of retail and wholesale trade. Moreover this part, being the traditional centre of trade, has maintained its business concentration and dominates over rest of the city and the wide region around it as a result of inertia. The old city offers a central position for retail and wholesale trade. It is, therefore, a very important business region of the city of Lahore both in size and multiplicity. This might be termed as the central Business District of Lahore. It lies within the old part and around the Circular Road. The Circular Road is further joined by the Urdu Bazar, Anarkali, Brandreth and Landa Bazar roads. These roads themselves are very important business thoroughfares of the city. The business area extends further from these roads to the Beadon, Hall, Macleod, Temple and Upper Mall roads. In the outer zone the business concentration decreases and the shopping area here supply only the day-to-day needs of the people.

Therefore according to the nature, extent and importance of business the following business districts may be recognised in the city of Lahore (Fig. 1). 1) The Major Shopping Area, 2) District Shopping Areas, 3) Local Shopping areas; 4) Specialised Shopping areas, 5) Wholesale Markets, and 6) Retail and Mixed Markets.

THE MAJOR SHOPPING AREA

This area comprises the Anarkali area, the Upper Mall - Hall - Beadon roads and Macleod road area. All the three areas differ from each other in appearance, variety and magnitude of business. Therefore it would be useful to consider each area in detail to bring out its differential character.

The Anarkali shopping area is a large area consisting of the Urdu Bazar, Paise Akhbar bazar, Ganpat and Anarkali roads. Kachehri road and Nilagumbad Chowk including Bank Square each of these bazars has different kinds of businesses. Some of the bazars have more or less specialised trading and dominate the whole of the city in that special aspect as is the case of the Urdu bazar and the Nilagumbad Chowk. The Anarkali area has nearly 1,700 shops out of which the Anarkali bazar has 415 shops. The Urdu bazar has only 114 shops whereas the rest of the shops are situated on other

*This paper is a chapter from my Doctoral thesis *Lahore : A Geographical Study* (London: University of London, 1965).

*DR. MUSHTAQ was formerly Lecturer in Geography, University of the Panjab, Lahore.

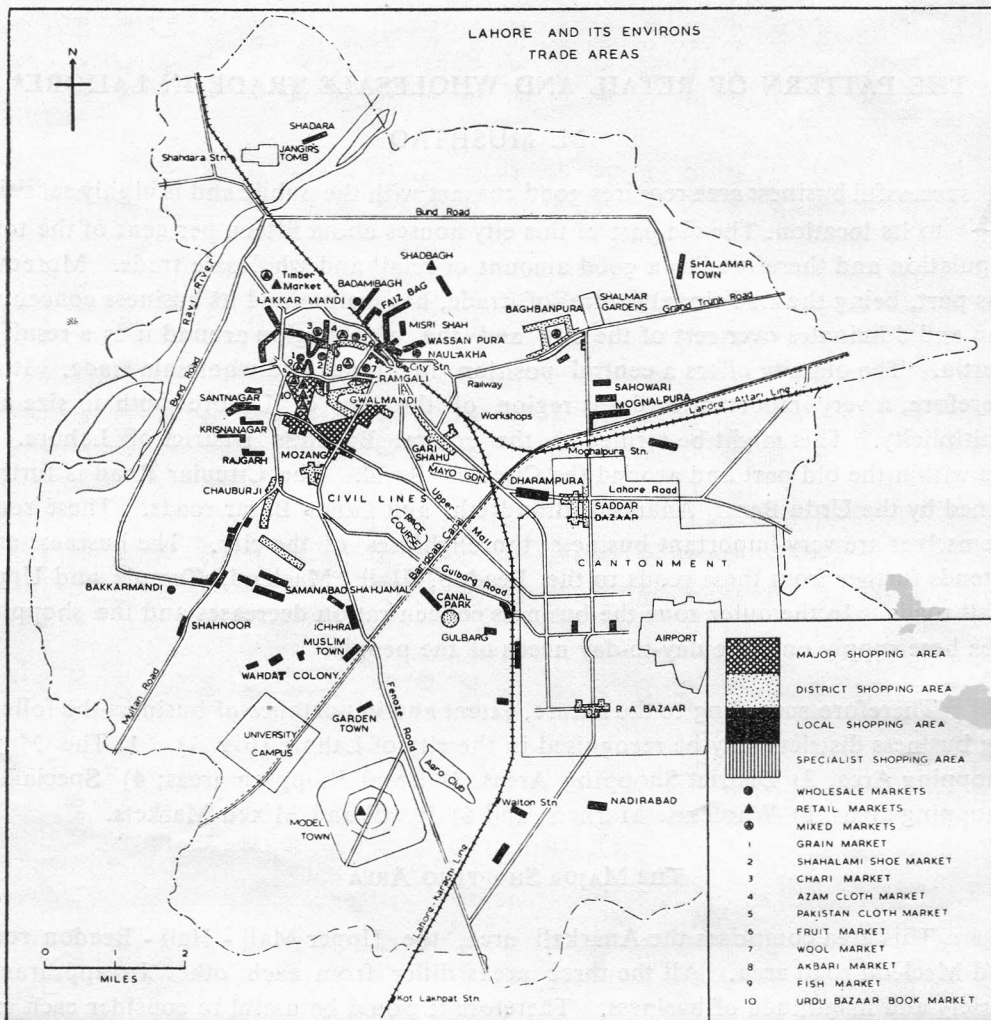


FIGURE 1

roads and in bazars like Khanam and Bano bazar, which are shop 'enclaves' beside the main Anarkali bazar¹. The Urdu bazar and Ganpat road are the city's main book and stationery markets. These shops deal in books of all kinds from Primary to University level. This bazar has no other business with the exception of a few vendors who have stalls on small '*rehries*'² moving along the roadside and a few wooden '*khokhas*'³ may be noticed. They generally belong to tobacconists. At the far end of the Urdu Bazar and in Changar Mohalla road there are some grocery shops. The Urdu bazar is throughout a book and stationery area. The southern

¹Personal survey.

²A wheeled stall.

³Covered wooden stall.

Refer

FIG 28

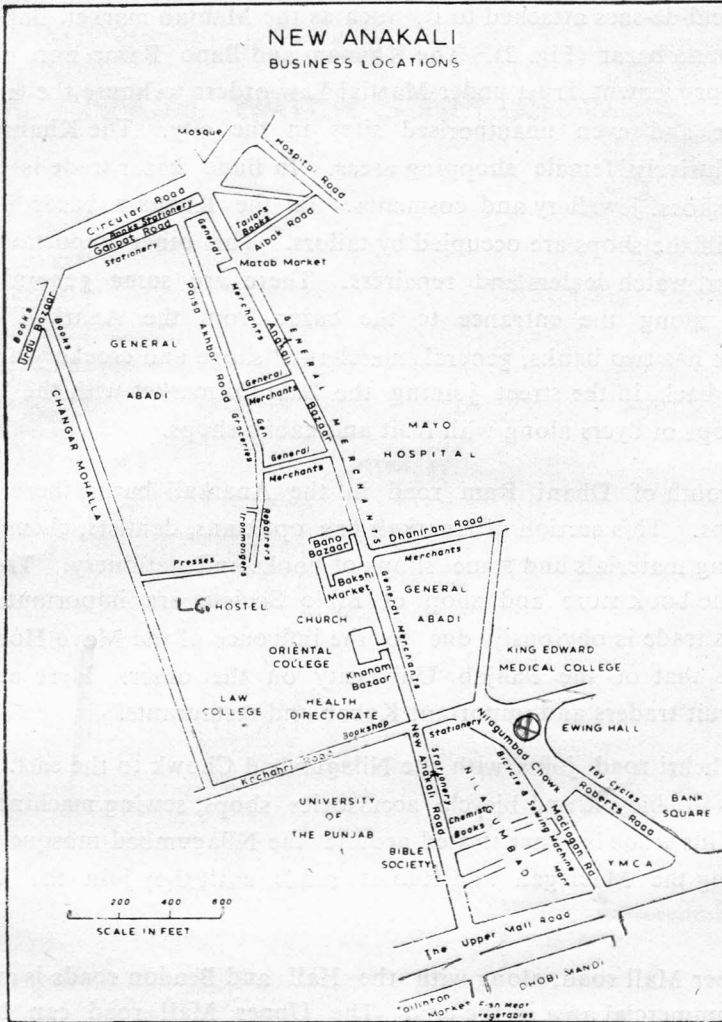


FIGURE 2

side of the Circular Road and Ganpat Road have trade in paper and stationery. The Paisa Akhbar bazar, at the back of the Anarkali bazar, has paper merchants and book-binding shops, which gives place to grocery. Further south at the back of the Law College are shops of repairers, ironmongers and small printers. The origin and concentration of this trade here is obviously due to the establishment of several educational institutions and offices in the Anarkali region of Lahore.

Contiguous with the old city lies the main Anarkali bazar (Fig. 2), which is the richest retail bazar of Lahore, both in variety and quality of goods. The whole bazar has colourful and decorated shops. Most of the shops have show windows in which the articles of trade are displayed. The biggest of all the stores is the Bombay cloth house, the only store which has two-floor business in the city.

The Anarkali bazar is a general merchants' place. The main Anarkali bazar also has small cul-de-sacs attached to it, such as the Mahtab market, Bakhshi market, Khanam and Bano bazar (Fig. 2). The Khanam and Bano Bazar were established in 1953 by the Improvement Trust under Martial Law orders to house the traders possessing unsuitable and even unauthorised sites in the city. The Khanam and Bano bazars are exclusively female shopping areas. In Bano bazar trade is carried on in costly textiles, shoes, jewellery and cosmetics. In the Khanam bazar on the other hand, nearly half the shops are occupied by tailors. The other important merchants are the jewellers, watch dealers and repairers. There are some general merchants' shops situated along the entrance to the bazar from the Anarkali bazar. The Bakhshi market has two banks, general merchants' shops and crockery and glassware shops. At the back, in the street joining the Bakhshi market with the Bano bazar, are situated shops of dyers along with fruit and kabab shops.

To the south of Dhani Ram road in the Anarkali bazar, there is a greater mixture of shops. This section of Anarkali has opticians, dentists, chemists, doctors, shops of drawing materials and some shops of books and stationery. The University Book Depot, the book store and shop of Bible Society are important ones. The presence of this trade is obviously due to the influence of the Mayo Hospital on the one hand and that of the Panjab University on the other. Here are also some tobacconists, fruit traders and important Kabab and restaurants.

The Kachehri road joins with the Nilagumbad Chowk to the east. The major land use here is the bicycle and bicycle accessories shops, sewing machines and baby-cycle shops. This trade is concentrated around the Nilagumbad mosque and extends southwards along the Maclagan and Roberts roads, until they join the Upper Mall roads.

The Upper Mall road, along with the Hall and Beadon roads is an important business and commercial area of the city. The Upper Mall road can be called the financial quarter of Lahore. The emergence of this region as a financial centre dates back to the 19th century when the administrative centre along with the treasury was established here by the government. The present concentration of all the major financial institutions here may be attributed to the suitable location of the region, since almost all the important centres of administration, education, trade and commerce are situated within easy reach of this area.

The business concentrations are found between the Museum and Maclagan road to the west and between the Macleod Road and Charing Cross to the east. The Tollinton market is situated opposite to the Directorate of Education, Lahore Region. It mainly deals in food stuffs, like vegetables, meat, fish and poultry. The section of the Upper Mall road facing Dhobi Mandi, between the Old Anarkali road

and the Maclagan road, is occupied by general merchants, chemists and tailors. The other side of the road has restaurants.

Opposite to the High Courts are situated the mansion which is three to four storeys high. The ground floors are occupied by general merchants whereas the upper storeys are occupied by the offices of insurance companies, commercial firms and lawyers. Similarly the length of the road, between the Fane road and the Charing Cross, has shops of general merchants, chemists, photographers, dry cleaners, automobile stores and show-rooms, restaurants and bank. The upper storeys are occupied by the offices of trading firms, commissions agents and others. There is also a bar where wines are served, but only to those who possess drinking licences. Opposite to the bar is the newly built three storied Indus Hotel. The Feroze Sons book store, the West Pakistan Industrial Development Corporation's showroom and shops displaying electrical goods for domestic use and almost all the automobile stores and show-rooms are situated here.

The concentration of this kind of business here is due to the fact that a great deal of space is available for parking and showrooms which such a business demands. At the same time economically and socially higher status areas, like the Civil Lines and Gulberg, upon which this business depends, are contiguous to the Upper Mall road.

Hall road, more or less an extension of the Upper Mall, is a special business area for electronics, gramophones and accessories. There are also a few automobile, especially auto-rickshaw, repairing workshops, electricians and teastalls.

The Beadon road on the other hand is a different kind of business street. There are grocers, fruit and vegetable sellers, milk and meat shops along with general merchants. There are several itinerant vendors in this area. Here are also several shops of chemists, *hakeems* and doctors. The presence of these people on this road is clearly due to the fact that a large section of the high class population in the Civil Lines and Gulberg come to this place for medical service and odd shopping in their cars. The parking facilities are available near at hand on the Mall.

The Macleod road again has a different kind of business. There are several furniture shops and repair shops for electrical goods like dynamos, electrical motors, fans etc. At the same time there are more than half of the city's cinemas situated on or around this road. The concentration of cinemas on this road is due to the densely populated area to the north and the high class residential area to the south. The Royal Park is an important centre of film distributors. The Lakshmi Chowk buildings have offices of firms in their first floors. The ground floors have general merchants and laundrers. The upper storeys are residences. The section of Macleod road

between Qila Gujar Singh and the Railway Police Lines is occupied by petty traders, sewing machines and bicycle repair shops and hotels.

In short the major shopping area covers a large area with a wide variety of business from grocery to automobiles. In other words the varied modern services, essential for customers, are provided here.

Automobile showrooms, repair and service garages, electrical stores and repair services for different appliances, laundries, dry cleaners, cafes and restaurants, insurance companies and advisers are found concentrated in this area. Also the lawyers, accountants, commercial firms, agents, places of recreation like clubs and cinemas, and modern shops have given a considerable importance to this area. Here are blended many of the activities of Lahore. The area is wide and open. It provides parking facilities for those prosperous people who come for shopping in their cars and are the city's fashionable customers.

DISTRICT SHOPPING AREAS

These may be considered as the areas with a wider range of shopping, not only for the localities in which they are situated, but also to a large extent, for the surrounding localities. The district shopping region provides, every day needs, a few specialised and professional services and also special shopping facilities like jewellery etc. Therefore such a shopping area naturally will exert its influence over the population of a large area. The main shopping districts of this category are found in the old city and in the localities of Gwalmandi and Ramgali. These areas can be divided into three groups: 1) central district shopping area which is confined to the old part of the city, 2) the shopping area situated in the intermediate zone in the localities of Gwalmandi and Ramgali, and 3) the suburban shopping districts like Baghbanpura, Mozang, Sadar Bazar, Gulberg and Samanabad-Chauburji area (Fig. 1).

The central shopping district of the old city of Lahore runs through the Delhi Gate to the Delhi Gate Bazar. It further extends to Chowk Wazir Khan. After Chowk Wazir Khan the bazar branches into two streets called Mochi bazar and Kashmiri bazar. The Kashmiri bazar further extends to the Kasera bazar and reaches the Shahalmi Gate to join the Circular Road. Towards the north this region is joined by Masti Gate bazar and Lange Mandi.

Lange Mandi further joins the Barud Khana bazar, then to Hira Mandi and Taxali Gate bazar. This is the city's most important trading centre and can be termed the trade 'crescent' of the old city. It is largely a retail trade area. The Delhi Gate, between the Circular road and the gate, has shops of fruit, restaurants

and large stores of pottery and crockery. The rest of the road sides are occupied by cloth shops and a large number of vendors sitting along the service road, who sell various textile goods and vegetable. This is called the Delhi Gate new market.

After crossing the Delhi Gate is the Delhi Gate bazar which extends up to Chowk Wazir Khan. The Gate-side portion of this bazar being opposite to Akbari Mandi, is dominated by grocers, but the Wazir Khan Chowk side length of the bazar has mainly textile merchants and general traders. It is a narrow bazar, not more than twenty feet in width, with buildings three or four storeys high. This narrow road is further reduced by wooden extensions which are generally laden with merchandise. As a result more than a quarter of the shop area extends in fact into the street, and instead of show-cases of the Western style the commodities are displayed on *tharas*⁴ for the customers. In grocers' shops especially one finds tins and bags of commodities arranged on these extensions rising symmetrically and gradually into the shop. Only shoe shops and cloth shops are spacious enough to allow a customer to go inside to inspect goods of his choice. Some general merchants have counters where one or, at the most, two customers can stand to be served by the trader. There are numerous vendors as well who carry on their trade on hand driven *rehries* and several other carry their goods on their shoulders, especially textile hawkers etc.

At the end of the Delhi Gate bazar there is a massive arch through which entrance is gained to Wazir Khan's Chowk. The north-eastern side of the Chowk is occupied by the mosque of Wazir Khan and Kotwali Chowk. The Kotwali Chowk is joined by Kashmiri and Mochi bazars. The Wazir Khan's Chowk has small shops dealing in clothes. There are several petty traders and itinerant vendors trading in cut pieces. The mosque lies at a higher level than the bazar. The seat of the mosque is raised on arches making 'cave' like cells opening towards the Chowk. They are occupied by traders. There are a mixture of general merchants, sweet meat and fruit sellers.

After Wazir Khan's Chowk starts the Kashmiri bazar which extends westwards beside Sunehri (golden) mosque to join the Shahalmi bazar. The Kashmiri bazar has general merchants, shoes and leather goods merchants, dealers in caps, chemists and hakeems. The bazar, is though equally narrow, bounded on both sides by tall building, but there is less congestion in this area. The shops look better than the overcrowded ones in the Delhi Gate bazar, though the special feature of '*tharas*' is by no means absent. In this whole bazar one does not find any shop dealing in groceries and other food products. The Kashmiri bazar in fact is well-

⁴. The extensions in front of shops are called *tharas*, in some cases they are masonry platforms or terraces.

known for its religious book stores, local shoes⁵ and *miniari*⁶. This character of business continues until the Kashmiri bazar crosses the Shahalmi bazar to join the Masti Gate bazar.

The meeting place of the Kashmiri and Shahalmi bazars is, in fact, the most important shopping centre of the city for its various kinds of trades, as will be explained later. The Shahalmi bazar, as has been already explained, is a newly built market of the city. The average height of the buildings is sixty feet which shows that the area has a uniform sky-line of four storied buildings. There is one exception in this case and that is the general market which is covered by single storied shops.

The Shahalmi bazar has traders shops and offices of agencies and firms. All the shops in the general market have general merchants. The rest of the bazar is occupied by various kinds of shops. Most of them are agencies, electrical goods, chemists, textile shops and shops selling leather and leather products. The first floors are occupied, in most cases, by accountants and advisers, whereas the other floors are generally residential. The northern end of the bazar has some important crockery shops whereas the southern end has pottery shops. There are also several vendors who sell cigarettes and fruit, etc.

The other important shopping district lies in the localities of Ramgali and Gwalmandi. It is delimited by the Railway, Dil Mohammad, Fleming, Chamberlain and Nisbet roads. The Circular Road facing these localities is also important, for its retail trade in several fields along its length between the Brandreth road junction and Bhati Gate (Fig. 1).

This area seems to have been influenced by three factors. They are the hospitals to the northeast, the foundry and iron and steel manufacturing to the south and the Royal Park, a film distributors centre and several cinemas to the south-west. These three forces have brought into being the concentration of different kinds of business in each contiguous area.

The hospital side of the area, mostly along the Hospital Road and the northern end of the Railway Road, has several shops of chemists and doctors with their clinics. Here are situated some of the biggest medical stores of the city. The Minar Masjid has several shops underneath it. Most of them are occupied by chemists. Some of the medical stores here are of wholesale dealers. Obviously dominance of this trade in this part is due to the influence of hospital.

On the other hand the south-western side of Gwalmandi i.e, the Nisbet road near the Lakshmi Chowk has several shops of laundrers, dry cleaners, photographers,

⁵They resemble pump shoes.

⁶A *miniari* trader is one who sells sewing, knitting and embroidery materials.

tea and kabab shops and small restaurants. All this business activity is due to the nearness of cinemas which draw a large number of people and also due to the nearness of the Civil Lines.

The third area lies around Chowk Dalgaran i.e. the Dil Mohammad, Railway and Brandreth roads junction. Here lies the centre of foundries and iron and steel manufacturing. There are several ironmonger's and machinery-spares shops.

The rest of the bazars of this district have grocers, green grocers and general merchants. The Railway road has some of the important *Dwakhanas* (Local Medical Stores). Opposite to the Islamia College is the famous establishment of Taj Company, the publishers and printers of the Holy Quran, other religious books and fine arts. This company was established here due to the Islamia College which was a very important centre of education for the Muslims before partition of the Punjab. On the whole the bazars inside these localities have local trade. A concentration of general merchants and grocers is found towards the road ends whereas the milk, meat, tailors and green-grocers shops are generally found in the middle regions of the bazars.

The other important shopping areas of this class are in Baghbanpura, Garhi Shahu, Mozang, Chauburji, Samanabad, Sadar Bazar and Gulberg Central market. All of them have a mixture of general merchants, grocers, chemists, milk, meat and vegetable sellers etc. All are situated in the centre of large areas from which people come for shopping. The trade in grocery and food stuffs is dominating in these areas although there are a large number of general merchants shops also.

LOCAL SHOPPING AND SPECIAL TRADE AREAS

The local shopping areas generally serve only small localities like a mohalla. The main feature of such an area is that the shops do not exist in a row but are scattered in the area in small groups or singly. A group of shops often having one or two grocery shops, a milk shop, a vegetable shop, a barber's shop and one or at the most two general merchants' shops have been observed in almost all the local shopping areas in the city. The shopping areas in the suburban localities, say villages, differ from those of the mohallas in the city. Rural shops generally stock everything, from grocery to general merchandise. No shops dealing in things like meat or milk have been observed in these localities. At the same time there are hardly more than two or three shops in each suburban rural locality. All these local shopping areas serve their localities as is shown by the map (Fig. 1).

As has been seen a greater part of the city is covered by retail trade. Beside this there are some trade areas which due to their special characteristics differ from the general retail areas. Their trade does not depend on the city's population alone

as they also serve a much wider area. These areas are the Brandreth Road, Landa, Kasera, Suha and Bansanwala bazars (Fig. 1). All of these streets, more or less from one end to the other have the same kind of trade with the exception of Landa Bazar.

The Brandreth Road is predominantly a hardware business street of Lahore. It draws a large number of buyers from the country side. The hardware trade starts from Chowk Dalgaran, the intersection of the Railway and Brandreth roads. The Chowk is surrounded by shops dealing in foundry and other iron and steel manufactures. This road throughout its length, i.e. between the Chowk and the Circular road, has 295 shops. Almost all of them, with the exception of one or two shops dealing in electrical goods, are busy in hardware trade. The streets transverse to this road, in the Ramgali locality, have general business of food and other allied articles.

The other area of special trade is the Landa bazar, linking the railway station to the Delhi Gate. The main Landa bazar road branches into two while approaching the railway station. The eastern branch is occupied by dealers in cosmetics. A large number of customers who visit this shopping area come from the railway station. The end of this street has a number of fruit shops and cheap hotels. The second branch is the main ironmongers' area of the city trading in nails, nuts and handmade pans. The end of this road is also occupied by fruit and food shops. The main Landa bazar is occupied by secondhand goods shops which deal in secondhand goods like men's suits, frocks, military uniforms, shoes and other leather goods.

There are two areas which are totally different from Landa bazar's speciality. The first one is a small street connecting Landa bazar with Sultan Muhammad's serai and the second one lies further to the north. The street is wholly occupied by shops which deal in new steel chests, suitcases and large trunks. The second area is iron and steel market of the city where building materials like iron rods, plates, angleirons, etc. are sold. The serai has some motor spare parts, shops and vehicle repairing garages. The Landa bazar area has over a thousand shops, out of which the Landa main bazar has 477 shops⁷.

Bansanwala bazar, which is situated opposite to the Shahalami Gate is another special trade area. It is called Bansanwala bazar due to the fact that it is the sole bamboo market of the city. The main use of bamboo is to make bedstead frames, ladders and sticks for various uses. Along with bamboo other bedstead materials, like strings and ropes for weaving, are also sold in these shops. There are also some

⁷ The number of shops have been enumerated by the author.

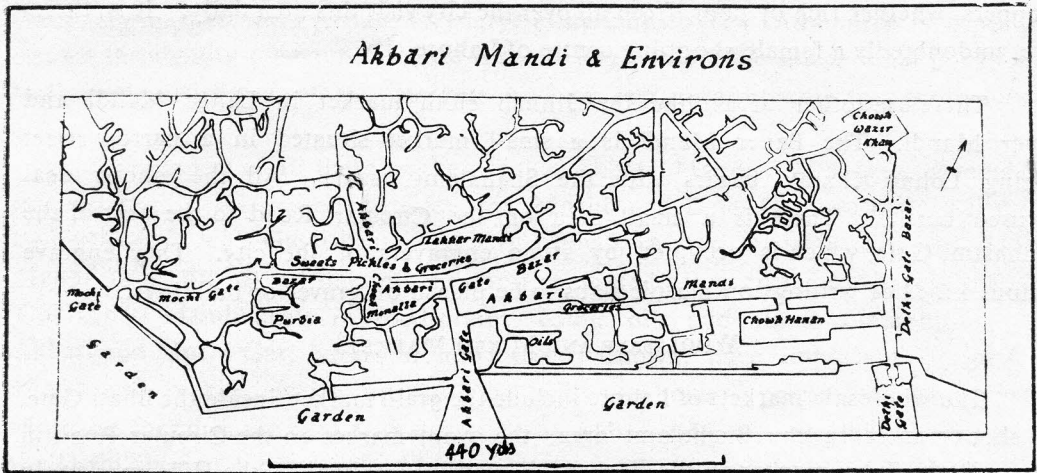


FIGURE 3

shops of common salt dealers who are the main distributors of salt. The Bansanwala bazar has only eighty shops which on the average are ten by twelve feet. Almost three quarters of the bamboo are stacked outside the shops. Another area for special shopping is the Kasera bazar which occupies the junction between the Shahalami and Kashmiri bazars (Fig. 3). The main speciality of the area is its utensils for domestic use; but a small street, which joins with the Kashmiri bazar to the north, has some shops dealing in hardware and *miniari*. The whole area is well-known for its utensil mart. Kasera bazar has a total of 387 shops. The shops are very small and full of goods, utilising door space and quite a good amount is placed in front of the shops along the street.

Opposite to the Kasera bazar, across the Shahalami road, is situated the Suha bazar of Lahore (Fig. 3). Its trade is in jewellery and embroidery goods like gold and silver threads called Tilla and Zari. The main street which connects Shahalami bazar with Said Mitha in the centre of the old city, is the main jewellery area. There are small shops with small show cases displaying ornaments occupying the shops' fronts. The business on the whole is retail here.

At the back to the north, is a narrow street occupied by dealers in materials for embroidery and finished embroidery work. A transverse street joining the gold and Tilla bazar, is an important shoe market, especially for female shoppers. The gold bazar further to the west, after the junction of Masti Gate bazar, has an important area engaged in the 'cut-piece' textile trade, called Totianwala Bazar.

This area has 217 shops. No other trade exists at all, due to the lack of space. It is the most congested part of the old city. This area of the city, along with Kasera bazar and other business pockets, is very important. A large number of female

shoppers, whether rich or poor, from all over the city visit this area daily. It is, therefore, undoubtedly a female shopping centre of Lahore city.

There are other areas like the Jinnah cloth market in Lange Mandi and Paper Mandi. The Paper Mandi is a small market situated in a narrow street joining Lohari-Kharak bazars with the Shahalami bazar. All the shops deal in used bottles. There is a small area on the Circular Road to the west of the Shahalami Gate, which is occupied by stone engravers of the city. They engrave various kinds of writings on marble slabs to be placed on graves or buildings.

WHOLESALE AND MIXED MARKETS

The wholesale markets of Lahore include the grain market, inside the Bhati Gate, the shoe market in the Shahalami area, the wool market on the Circular Road in Ramgali, the Sabzi market on the Barkat Ali road in Gwalmandi, the Hide market in Naulakha on the Grand Trunk road, the Fruit market near the Ikmoria railway bridge, the Lakkar (fuelwood) Mandi in Badamibagh and Bakkar Mandi (sheep, goats and cattle) on the Band Road near Babu Sabu village. All of these markets, except the last two, cover small areas in relation to the task they perform. These wholesale markets receive and deliver large quantities of goods, which produce a large flow of traffic of all kinds. Therefore it is essential for a wholesale market to have a site with very suitable approaches. From this point of view most of the wholesale markets have more or less suitable sites with the exception of the grain market inside the Bhati Gate and the Sabzi Mandi, on the Barkat Ali road. These two markets cause very large traffic concentration on adjoining roads. The Bakkar Mandi, the Hide market and Lakkar mandi are situated away from the congested parts of the city and, therefore, produce no traffic problem. All these markets have small numbers of stores though they serve the whole city.

The mixed markets are engaged in both wholesale as well as retail trade. They are the Akbari Mandi, *Churi* Mandi, the Azam cloth market, Pakistan cloth market, fish market, the book and stationery market in the Urdu bazar, the timber market and the *Ghass* (fodder) Mandi. The business in these markets is retail as well as wholesale. The general practice is that shopkeepers, who buy always in bulk, are charged wholesale prices and the rest of the customers pay retail prices. It is in fact difficult to understand the pattern of trade in these markets from the point of view of western practice. In western markets the difference in wholesale prices is only ten to fifteen per cent. At the same time the cost generally depends upon the quantity of commodities bought.

Every mixed market has its sphere of influence⁸. The *Churi* and book and

⁸Based on personal enquiries.

stationery markets seem to have very large hinterlands. The Urdu bazar is especially known throughout the country, since it meets large orders for educational books and stationery. The rest of the markets are, in fact, local because they serve the city only.

The biggest of all these markets is the Akbari Mandi. The area covered by this market is the region between the Mochi and Delhi Gates in the old city. It includes the Mochi Gate bazar, Akbari Chowk, Akbari Gate bazar, and Akbari Mandi (Fig. 4). It is one of the most congested places in the old part of the city. The Akbari Mandi deals in food-grains, edible oils and allied commodities. The Akbari and Mochi Gate bazars around Akbari Chowk, have important business in sweets and pickles, which are sold generally at wholesale prices, whereas the retail shops are found in the adjoining streets. The Akbari Mandi, a straight street joining the Delhi Gate and Akbari Gate bazars, is occupied by grocers. The whole street is occupied by shops on both sides almost packed with commodities. Every shop seems to have everything. Goods like flour, wheat, maiz, rice, *gur* (brown sugar), pulses, soaps, nuts and dried fruit are the important commodities of Akbari Mandi shops, which show that Akbari Mandi is totally a grocery market.

The Chowk Haman differs from Akbari Mandi. It is surrounded on all sides by wide and fairly high sheds packed with sacks full of commodities of trade. This place, in fact, is a sort of warehouse. Here the stores belong to commission agents who act as brokers. Akbari Mandi has 475 shops⁹. The Chowk is noted for its traffic congestion. Here one finds bullock carts loaded like trucks, *rehras* drawn by sturdy labourers and also porters carrying loaded sacks on their heads and shoulders. This mixture of several kinds of means of transport creates confusion of the highest order.

The timber market on the Ravi road is the newly constructed market by the Improvement Trust. There are more than three hundred spacious shops as timber needs plenty of open space for storing. Timber, generally in logs, comes by trains to Badamibagh railway station and from there it is further transported by means of bullock cart to the timber market. The trade here is retail as well as wholesale.

Similarly Ghass Mandi in Baghbanpura and the Fish market on the Circular road, are also mixed markets. Their retail business is much more important than the wholesale, but still a large number of petty traders buy at wholesale cost and sell in different parts of the city. This is particularly the case at Ghass Mandi. Shopkeepers buy cart or truck loads and stack the goods in their shops. They further mince the fodder into fine pieces for sale. Such shops are found all over the city area, especially around the periphery of the old city. All the suburbs are also important for milk cattle, except the newly developed localities and the Civil Lines. But in the case of fish there are only a few shops in different parts of the city. This

⁹Personal survey.

is, obviously, due to the perishable nature of fish as it rots quickly in the absence of the means of preservation.

The above description brings to light the existing pattern of trade in the city of Lahore. There are concentrations of different commodity trades in different areas and it shows a distinct segregation of areas in the city. This perhaps, is the result of a very strong hold of traditionalism in the society, such as *caste* and class, which had no affinity towards blending or mixing of different kinds of trade activities. This division is very distinct in the old part of the city, whereas the outer areas show the modern tendency of amalgamation. This pattern is common in all the Indo-Pakistan sub-continent, especially in the northern cities, which have existed through the same periods of history and culture. Professional activities led to concentrations and segregation of areas. In other words, the trade pattern of Lahore is the indigenous pattern with its roots deep in history. To summarise, there is, "The main bazar, called 'Chowk' or Chauk in Northern India (sub-continent), which is not quite equivalent to the central business district of an American city. It is crowded with numberless small retail shops which deal in foods or cloth, hardware, jewellery and other consumers' goods. Groups of competing merchants tend to occupy a particular section. Thus, there is a bazar for grain merchants, and perhaps another for green-grocers. There is a street where brassware is sold and another for pottery. Another street is inhabited by goldsmiths, or silversmiths and so forth". And as far as the outer regions are concerned "Retail business establishments may extend a mile or two along the main arteries of traffic, and subsidiary bazars are usually developed especially in the cities and large towns".¹⁰ All these trade characteristics clearly exist in the city of Lahore.

The central part *i.e.* the old city, like all the cities of the world, is dominating in both retail and wholesale business. The total number of shops in the city is 31,286¹¹ excluding 3008 vendors,¹² out of which the old city possesses 19,413 shops which is 61.98 per cent of the total for the city.

The following table shows this position of the old city in the wholesale, mixed and specialised business based on shop strength :—

TABLE 1—SHOP STRENGTH OF VARIOUS KINDS OF BUSINESSES

Business	Total No. of Shops.	No. of Shops in old city	% of the total
Wholesale	365	165	45.2
Mixed	1,670	1,306	1.12
Specialised	1,406	604	42.85

SOURCE : FROM DIRECTORATE OF TOWN PLANNING DEPARTMENT, LAHORE

¹⁰ R. Turner (ed): *India's Urban Future*. (Berkeley: University of California Press 1962), pp. 59-60.

¹¹ Data given by the Directorate of Town Planning Department., Lahore.

¹² Licenced Hawkers or Peddlars.

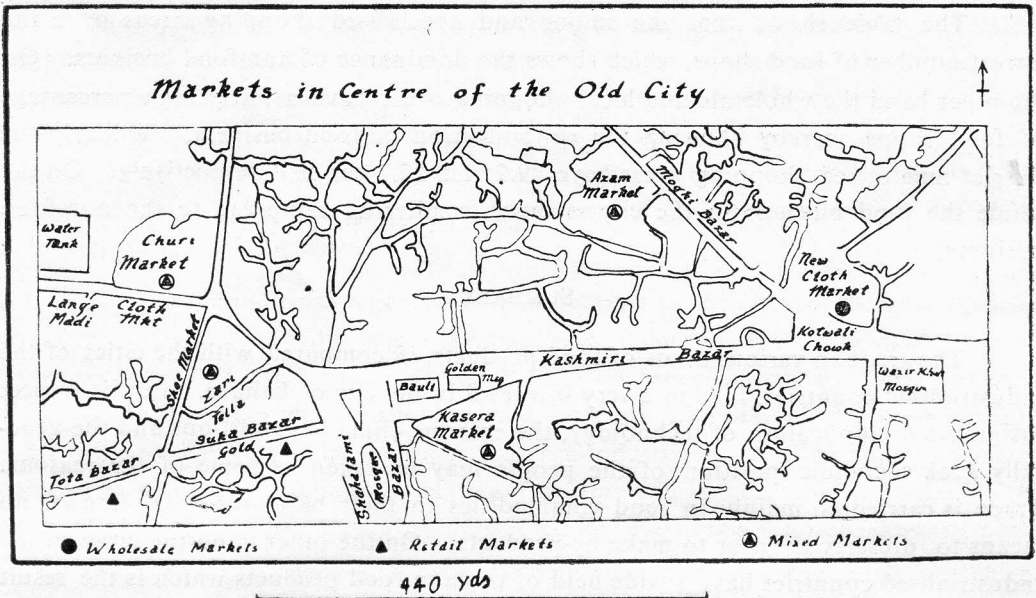


FIGURE 4

The table shows the business concentration in the old part of the city. The area of concentration is found in the southern and south-western section of the city (Figs. 3 and 4). This part of the city is undoubtedly the Central Business District of Lahore, because, if the wholesale and mixed business areas are considered together the percentage becomes 73.1 which is nearly three quarters of this category of trade of the city as a whole. The rest of the business is found around the Circular Road, along the thoroughfares of the localities of Anarkali, Gwalmandi and Ramgali, arranged like the spokes of a wheel. The concentration of wholesale, mixed and specialised trade outside the old city is 54.4, 18.88 and 57.15 per cent respectively. If on the other hand these thoroughfares are considered as extensions of Central Business District, then the business concentration becomes very high.

Further study of each shopping area, on the basis of food and non-food shops, brings out some facts (Table 2)

TABLE 2—DISTRIBUTION OF FOOD AND NON-FOOD SHOPS BY SHOPPING AREAS.

Area	Total No. of shops	No. of Food shops	%	No. of Non-Food shops	%
Major Shopping Area	2,562	353	13.8	2,209	86.2
District Shopping Area	8,989	2,688	29.9	6,301	70.1
Local Shopping Area	15,791	6,296	39.9	9,495	60.1
Specialised Shopping Area	1,406	141	11.03	1,265	89.97
Wholesale Shopping Area	365	190	51.6	175	48.4
Mixed Shopping Area	2,173	555	25.9	1,618	74.3
Total	31,286	10,223	32.7	21,063	67.3

SOURCE : AS FOR TABLE 1.

The table shows that the major and specialised shopping areas have the lowest number of food shops, which shows the dominance of non-food business. On the other hand the wholesale and local shopping areas have a fairly high percentage of food shops thereby showing the concentration of food business. Similarly the district and mixed shopping areas have 29.9 and 25.7 per cent respectively. On the whole the food business in the city is much smaller as compared to the non-food business.

SUMMARY

The trade in various kinds of food products, if compared with the cities of the industrialised countries, falls to a very low level in the city of Lahore. In this respect insignificant application of technology, the extreme climatic conditions and the generally weak economic position of the people may be taken as some of the reasons. Trade is carried on mainly in food commodities in their basic form, as there are no means to preserve them or to make by-products. On the other hand the cities of the industrialised countries have a wide field of trade in food products which is the result of available facilities for preservation and processing. Taking the example of meat it is not only sold fresh but also in various preserved forms and in the form of several kinds of by-products like sausages. In Lahore, on the other hand, meat is supplied fresh from the slaughter house daily. There are absolutely no means to preserve it and by-products are not available at all. Furthermore consumption of meat is low as almost everybody in the city is unable to buy meat daily due to poverty. There are a large number of poor people who eat meat only once a year at the Id-ul-Azha (festival of sacrifices) and otherwise live on vegetables and pulses.

Similar is the case of dairy products. Fresh milk is supplied daily by the Milkmen. There is hardly any co-operated effort to preserve and distribute it in an organised way as is done in the Western cities. The large trade based on dairy by-products like cheese, butter, cream etc. Also there is a very small trade in Lahore in ready-made garments. On the other hand the city has 1386 tailoring shops to serve the population.¹³ This state of affairs exists in almost all the fields of trade.

The above examples show that the existing conditions in the city of Lahore are conducive to individual trade (small shop keepers) pattern. Such a pattern may be due to factors like the low level of technical development, lack of public companies and weak economy of the people. These factors discourage capital formation and therefore there is the absence of 'organization' in almost every field of urban activity, especially trade. The weak economic position of the traders is clear from the existing trade conditions. The shops are small. There are limited storage facilities and the

¹³ Figure is based on the information from the Directorate, Town Planning Department, Lahore.

much needed capital to store commodities of trade is not available. Therefore "most retail merchants in the city function on a small scale with little stock and minimum of overheads. Many ply their trade in booths or minuscule shops that they rent in the market place, while not a few, particularly vendors, simply spread a mat on the ground in the market and set their goods thereon"¹⁴. The merchants deal in limited quantity of goods which delimit market and also prove a barrier to capital formation.

The above conditions represent a vivid contrast to the cities of the industrialised countries, where company organizations have achieved their highest standard. Corporative way of organization is found in every aspect of urban activities in these cities and on the other hand Lahore, and almost all the cities in the Indo-Pakistan sub-continent, shows all the conditions of pre-industrial city. There are organized companies and firms of builders, electrical repairers and laundrers in the cities of the West, but in Lahore these works are performed by individuals. Some signs of combined organizations are emerging with the increasing industrialisation in the country. Shops or stores like 'Fair price' shops have been established recently in several localities of the city by the manufacturing companies. These shops are supplied goods directly from the depots of the manufacturing concerns. Companies like Bata shoe company, Servis shoe company and some textile manufacturers so far have established such shops or agencies. The rest of the fields in trade show individual activities and therefore possess all the vices of an unorganized society.¹⁵

In short this shows that the organization of urban life is still in its pre-industrial stage in the city of Lahore. Therefore in such environments the growth of combines of the type found in Western cities may prove a matter for the distant future. This is because the purchasing power of the people, on the average; is very low due to which there is limited scope for business expansion. The shopkeeper usually possesses inadequate storage facilities and his customers, who like him exist from hand to mouth, purchase minute quantities of food and other items on a daily basis.¹⁶ This shows that the lack of capital is the main reason for the absence of corporations. As a matter of fact such circumstances and environments, where people are with limited means and needs, encourage individual characteristics of business and therefore the existing pre-industrial conditions may continue for an indefinite period. On the whole the study shows the 'concentrations' of trade, a vital function in the city of Lahore.

¹⁴A. Sjoberg, *The Pre-industrial City: Past and Present* (New York: Glencoe Free Press, 1960), p. 201.

¹⁵ That means absence of standardisation like prices and qualities.

¹⁶Sjoberg, *op. cit.*, footnote 14, p. 201

NEWS AND NOTES

ABSTRACTS OF GEOGRAPHY THESES COMPLETED IN WEST PAKISTAN UNIVERSITIES IN 1967

BASES OF RELATIONS OF PAKISTAN WITH SOUTHEAST ASIAN COUNTRIES

Jamshaid Alam Qureshi

(M.A., UNIVERSITY OF THE PANJAB, LAHORE)

The objectives of this study have been developed on the assumption that there are possibilities for enhancing the cooperation between Pakistan and Southeast Asian Countries. The aims of the thesis may be stated as :

- 1) to identify the bases which promise cooperation, and
- 2) to assess the potentialities of those bases for establishing and furthering the interstate cooperation and coordination.

Identification of the bases has been made by sorting out the items of mutual interest. Religious, economic, cultural, political and strategic aspects of the Southeast Asian Countries have been employed as the measures of mutual interests. Their importance as tools of interstate cooperation has been assessed by analysing the historical background, complementarity of economic and technical resources, the distributional patterns of religious communities and their locational significance in relation to the political and military strategies of world powers. A brief survey of the means of communication and transportation has also been made.

It is essential to stress upon the importance of the religious factor between the Muslim countries, because Pakistan feels herself to be spiritually bound, in the unbreakable ties of Islamic brotherhood. But she was disappointed when Malaysia's response with regard to the Pakistan-India war of 1965 was found to be lacking in the sense of Islamic Brotherhood, mutual respect and friendly relations. However, Pakistan's relations with Indonesia are excellent.

The especial facilities for the Buddhist minority in Pakistan, and the interest of Buddhist community itself, provides a good base for mutual cooperation with other Southeast Asian neighbours.

The bases of economic relations have been found to be relatively weak under the present circumstances. The prediction of its future trend is also difficult because of somewhat homogeneous contemporary economies of the states in the area under study. In the cultural field, the existing cultural pacts with some countries and their causes were assessed in order to identify probable lines for furthering cooperation.

In the field of politics, Pakistan's role in the independence movement and on the vital political issues of Southeast Asian countries have been examined. SEATO binds Pakistan, Philippines and Thailand into a common tie of political friendship and mutual alliance. An attempt has been made to evaluate the significance of SEATO for the purposes of said cooperation.

Strategic cooperation has its unique significance, particularly for the developing nations. For the purposes of the defence of East Pakistan and to insure balance of power in the Eastern Indian Ocean, the importance of Burma, Malaysia and Indonesia have been pointed out.

Means of Communication and Transportation have been considered to be unsatisfactory under the present set up. It is because of the western shipping companies and air lines which command the dominating position. National services in the area, for the transportation facilities are either completely lacking or are scanty.

CHANGING PATTERN OF SPATIAL
CORRESPONDENCE BETWEEN FOOD
AND POPULATION IN WEST PAKISTAN—A
QUANTITATIVE-CARTOGRAPHIC
ANALYSIS

Shamima Asghar

(M.A., UNIVERSITY OF THE PANJAB, LAHORE)

The objectives of this study are:

- 1) To examine the distributional pattern of each of the two phenomena: food and population,
- 2) To show the way in which the degree of association between food and population varies spatially, and
- 3) To test the applicability of Robinson's method of measuring the correspondence between two uneven surfaces.

Wheat has been chosen as an index to food.

For the first purpose the two distributions have been mapped with the help of dots. The dot maps are finally converted into isarithmic maps for the achievement of the second objective. The maps showing the production of wheat have been directly transferred into isarithmic maps, whereas the population map had first to be converted into population potentials and then isopotential lines were drawn.

With the help of the method used by Robinson, a regular grid was placed over the isarithmic maps of the two distributions and on the basis of the values interpolated for each intersection the coefficient of correlation was measured and the regression line was drawn. The results obtained from the regression line and scatter diagram have been mapped with the help of isarithmic lines. For further refinement they are converted into coropleth maps.

The distribution maps reveal that the two phenomena bear a close relationship. But the final maps of correspondence show that the degree of correspondence is unevenly distributed. It varies from place to place and also temporally. It is found that the relationship was very strong in 1941, but it decreased in 1951 and the pattern of relationships in 1961 becomes sufficiently weak due to the impact of industrial development and expansion of urbanism.

GEOGRAPHICAL MORPHOLOGY OF
PUNJABI CULTURE

Salim Akhtar

(M.A., UNIVERSITY OF THE PANJAB, LAHORE)

This study is concerned with the geographical morphology of Punjabi Culture. The objectives of this thesis have been developed along the theme that there are identifiable spatial variation in the formal and functional intensity of Punjabi Culture.

The aims of the study are;

- 1) To locate the hearth of the Punjabi Culture.
- 2) To identify the areas in terms of the intensity of the form and function of Punjabi Culture and thus:
- 3) To develop a geographic framework for the study of cultures in a more systematic and comprehensive manner.

The criteria taken for this study are 1) Language, 2) the distribution of ethnic Punjabis and 3) Food habits. Among these the language is considered to be the most important.

The study leads to the establishment of the following themes:

- 1) Culture hearth: The locale or the place of origin of the Punjabi Culture.
- 2) Culture Core: Where the Punjabi Culture has attained maximum strength regarding its form and function.
- 3) Culture Domain and Culture Sphere: The outlying areas of the Punjabi Culture dominated by characteristic features of it but with markedly less intensity, complexity and uniformity where regional peculiarities are clearly evident. The *sphere* is the zone of the outer influence and peripheral reculturation, in the words of Meinin "Wherein only certain elements or resident minorities exist as alien feature in still a viable local culture", have been studied.

- 4) Demographic Front: The principal focus of population movement from Punjab.
- 5) Inter-culture links: Passage ways of influence of other culture on Punjabi Culture.

In this manner the Punjabi Culture clearly demonstrates gradation in its spatial pattern.

ORIGIN AND GROWTH OF POTTERY INDUSTRY IN GUJRAT DISTRICT

Seyeda Tasneem

(M.A., UNIVERSITY OF THE PANJAB, LAHORE)

The objective of this thesis is twofold;

- 1) To examine the hearth and passage ways through which the Pottery Industry came into the district and the geographical factors which are responsible for the development of this industry in the district.
- 2) The stage of its development and the impact on the economy of the district and some bases will be fixed in accordance with the employment value and total production.

The investigation has been mainly directed towards tracing the changes brought about by historical processes and the different phases through which the pottery industry has been passing right from the proto-historic era, down to the present time.

The basic thing is: what culture and countries have influenced the pottery here in Gujrat, and in what condition they came here?

Some psychological relationship has been developed and other significant functions have been identified, in order to sort out the hearth of the pottery industry.

The study has been divided into five chapters, each dealing with different facts, starting from Indus Valley Civilization:

The procedure in the chapters is somewhat like this:

First of all the history of the pottery, then the influence from other countries and the factors of the shifting of the industry and pathways. Then the growth of the industry within the district and its impact on the overall economy.

DEVELOPMENT OF FACTORY INDUSTRY IN LAHORE AND ITS GEOGRAPHICAL ANALYSIS

Fehmeeda Mirza

(M.A., UNIVERSITY OF THE PANJAB, LAHORE)

The present study focuses on the growth and development of factory industry in Lahore with special reference to their spatial pattern. It has been attempted to trace the progress since independence (1947) and to discover relationship of locations of factory industry with the various cultural and physical factors operating in the city. Certain areas have large concentration of industrial establishments. To know the relative importance of these areas two maps have been prepared: 1) showing size and structure of the individual factories and 2) magnitude of industries in various areas. It is interesting to observe that, generally, the large scale concerns tend to be forming their own zones of concentration. To know the magnitude of industrial establishment in these zones the criteria of total production and total labour force have been employed. Value added by manufacturing could be another criterion, but this kind of data is not available.

The relative importance of each industry and its progress has been discussed in detail. The industries are classified according to their kind of production, e.g. Engineering industry which includes metal products, electric machinery and appliances and all sort of machines and machine tools, textile industry, food industry, paper industry etc.

It has been concluded that the growth of industry in Lahore has been remarkably rapid. As the result of this impressive rate of growth in factories there has been a significant increase in the production of almost all the consumers goods and also in some capital goods. This phenomenal growth is chiefly due to government policies e.g. creation of industrial areas such as Kot Lakhpat, Kallahpul-Multan Road, etc. Some areas are specialized in certain type of industries, e.g. metal products, and all sort of machinery are concentrated in Badami Bagh, transport machinery in Mughalpura and printing press near the old Walled city of Lahore.

BOOK REVIEWS

A Systematic Political Geography. Harm J. de Blij, John Wiley & Sons Inc., New York, London, Sydney (1957), vii+618 pp, maps, photographs, tables, Index, \$9.95.

How to make his course more effective? is a question which a teacher must keep constantly asking to himself. The answer may vary from one level of education to another and also from culture to culture. The teacher must not be concerned with communicative effectiveness alone but it is necessary for him to also see that his approach is stimulating. For the university level senior student it is particularly important to develop his critical faculty and a familiarity with the basic scholarly literature in his chosen field. But since the scholarly literature in the field may be widely scattered or may be written in a language other than that known to the students, it is only useful to collect them in a reading text so that the accessibility of the students to the basic literature is assured.

Professor de Blij has given due consideration to all such problems and has endeavoured to give us an extremely useful text book on Political Geography. The book is untraditional in approach as well as in contents. In approach it is untraditional not because it is systematically organized but because it emphasises on such aspects of state system as have never before been elaborately discussed by geographers, such as unitary and federal state-systems. From the standpoint of contents the book is untraditional because it includes an adequate number of original articles by several scholars dove-tailed with the various chapters. The original text of each of these chapters is lucidly written and is thought-provoking.

The book under review focuses on 'State' as a politico-geographical phenomenon. The politico-territorial processes that are operative in a state and are of major consequences, in terms of her internal functioning and external relationships, have been chosen for discussion. The first chapter, seeking to clarify the concept of a nation state, deals with the rise of the nation and the growth of the state. To illustrate his idea the author selects Eidt's article "Aboriginal Chibcha Settlement in Colombia". The thesis revolves

around the importance of central places and the process of accretion in the history of a nation state. In the following chapters (which are eighteen) Professor de Blij successfully carries his theme by discussing about various elements of a state and the concepts and approaches involved. The selection of the illustrative articles (produced in full) seems to be carefully done. Rather we ought to thank the author for drawing our attention to some of the scholarly works useful in political geography, which otherwise many of us might have missed. For example Eidt's article mentioned above and Keller's article on institutional barriers to economic development. Relevance of these articles and many others in this book may be a moot question and some scholars may have their own preferences, but every one will agree that the work is herculean and useful.

The logic of excluding from full-fledged discussions 1) the development of political geography and its various approaches, 2) the hierarchy of administrative areas, 3) the circulatory system, and 4) electoral geography is however not very clear. The inclusion of John Brushe's article on religious communities in India to illustrate the idea of boundaries and buffer zones in Chapter IX seems to be farfetched. The lack of illustrative articles relating to Chapter X, on "The concept of the Territorial Sea" and XVII, on "Colonialism and Resurgent Nationalism", is conspicuous though justifiable. Similarly, a larger number of examples that have been drawn from African scene can be explained in the light of the fact that the author possesses an intimate knowledge of that continent, but it does create a special bias.

However, despite these questions that can be raised in connection with Professor de Blij's book, in the opinion of this reviewer this is a better book on political geography for senior students. The book provides a wide coverage of the concepts and materials that stem from the body of scholarly literature which have accumulated through time particularly from Ratzel onward. The list of references at the end of each chapter is extremely valuable. Maps and photographs are finely produced and, as illustrative tools, do their job superbly. Professor de Blij must be congratulated.

University of the Panjab

IQTIDAR H. ZAIDI.

The Indus Rivers: A Study of the Effects of Partition. Aloys A. Michel. Yale University Press, New Haven and Londn (1967) xxvii+595 pp Maps, Tables, Bibliography, Index and Appendices. \$ 12.50

Professor Michel's book on the Indus Basin, first of its kind, offers a very comprehensive study of the Indus Basin (a north-west and western part) of the Pakindian subcontinent in a lucid manner. Many books, general and scholarly, have been written on the Pakindian subcontinent but none on the Indus Basin as a whole.

It was during the British administration that a proper attention was given to the development of this basin and consequently the Indus Basin became, by the time of the partition of subcontinent, one of the highly canalized areas of the world. There appeared the world's greatest water diversion schemes providing for irrigation-agriculture. The basin was contemplated to be developed as a whole. The development, however, was piecemeal spreading over a hundred years. Presently the basin has in operation the largest reservoirs of the world. No one could think that irrigation projects (uni-purpose and multipurpose) of such a great magnitude would come to play a vital role not only in the development of agricultural economy of the area but also in the international politics.

What were the motives behind this huge development of the Indus Basin? When developed, why was not the unity of irrigation system maintained at the time of partition? How did the partition of the Indus Basin (mostly inhabited by the muslims) affect the agricultural set up of the area? Did partition give birth to the Indus Water Dispute or had it existed before? Who was responsible for the deterioration of the situation with regard to the effective implementation of the International Law : Pakistan, India or the World Bank? and Why? Is it a sale of rivers? Now that an agreement (The Indus Waters Treaty) has been reached how best can the resources be developed for the future? Should the people of Pakistan practice intensive or

extensive agriculture within the limits of available water resources? How best the underground water resources can be developed? These are the questions which are generally raised by those interested in the water problems of West Pakistan.

In the book under review the author has successfully answered these questions. The book has been divided into ten chapters. A review of these chapters would indicate the kind of coverage that is offered. The opening chapter discusses the legacy of partition and the scope of studies on the Indus Basin and this is followed by a review of physical and hydrographical features of the Indus Basin. Then come chapters on Canal and Colonies, the Indus Waters Dispute before Partition, Partition, the Indus Waters Dispute from Partition to Treaty, Implementing the Treaty, Reorganizing to Develop the Indus Basin, The Groundwater Programs, and Prospects for Future Development. Of these there are six chapters which warrant our special attention.

Chapter 4 gives a succinct account of the way the Indus Water dispute developed into a critical international issue, which before partition was just a problem between the two provinces of Panjab and Sind. The logic and principles of Partition has been discussed in chapter 5. The author deals with a period that may be characterized as of favourable and unfavourable circumstances suspicion, threat and counter-threat, claim and counterclaim in the Pakindian subcontinent. A very comprehensive and absorbing account of the pre-partition and Partition days developments have been presented. The author, while concluding avoids giving his own opinion and quotes Redcliff's letter who still believes "it was an Award, not a judgment".

This is a clear indication of Redcliff's deliberate attempt to make Pakistan's agricultural economy vulnerable. Maps 4 and 5 showing Sikh-Muslim ratio in Panjab give an impression as if the real fight over the division of India (particularly of Panjab) was between Sikhs and Muslims. This is not true. An overall Muslim-Hindu ratio map of the subcontinent would have been more revealing. The author's assumption that 'the existence of the Bhakra Dam at the time of Partition would have made Partition more difficult', seems to be sound indeed.

Chapter 6 quite extensively discusses the immediate effects of Partition and subsequent development of Water Dispute in the subcontinent, which took thirteen years to be settled. There may be many questions with regard to the impartiality of the presentation of facts in the chapter. One major point that can be raised here is the omission of the fact that the World Bank, before offering its good offices on the recommendation of Mr. Lilienthal to solve this dispute, had already prejudiced and complicated the issue by investing millions of dollars in the construction of the Bhakra Dam. Consequently the Bank efforts had to be directed to the idea of the acceptance by Pakistan of the Indian claim over the three eastern rivers of the Indus system. The Bank introduced its own plan in 1954 dividing the rivers physically, which was disappointing for Pakistan. All factors, political and geographical, were generated to work against Pakistan however strong legally and morally her case might have been.

Chapter 9 presents a fascinating survey of the groundwater programs. The author lucidly discusses the battle against nature to prevent the loss of irrigated land by water logging and salinity. The author devotes many

pages comparing Revelle Mission Report with Harza Studies which offer various measures for the development of agriculture. Professor Mischel rightly favours the Revelle ideas for the development of agriculture in West Pakistan. An interesting thing is that the author is in favour of putting limit on the acreage of irrigated agriculture. This idea is hard to espouse, particularly in the light of the expected increased and regular water supply and the laws that may be framed in the light of new situation.

In short this well-documented, excellently written and well illustrated book presents an objective study in historical and economic geography. The volume is a major contribution to the studies on Indus Basin. But it is hoped that the subsequent edition would be written after going through other scholarly works on the emergence of Pakistan.

Professor Mischel's contribution is to be welcomed and applauded. He has given us a definitive work which fills a gap and opens new avenues for researches on the Indus Basin. The maps are illustrative and bibliography is very rich.

MUHAMMAD JAMIL

University of the Panjab.

PAKISTAN GEOGRAPHICAL REVIEW was instituted in 1949 replacing Punjab Geographical Review which was started in 1942. The object of this publication is to further dissemination and exchange of scholarly knowledge. Its volumes contain research articles on various topical and regional themes of Geography with particular reference to Pakistan. The Review is published half-yearly in January and July.

Submit all manuscripts and publications for Review to the Editor, Pakistan Geographical Review, Department of Geography, University of the Panjab, Lahore.

Address all communications regarding subscriptions and purchase of the back numbers to the Manager, Pakistan Geographical Review, Department of Geography, University of the Panjab, Lahore.

SUBSCRIPTION

Annual Rs. 10.00 / \$ 3.90 £ 1.
Single Copy Rs. 5.00 / \$ 1.50 10s.

BACK NUMBERS

Volumes 1 and 3 Not available
Volumes 2 to 13 Rs. 5.00 / \$ 2.00 or 15s each volume
Volumes 14 to 19 Rs. 8.00 / \$ 2.00 or 15s each volume
Volume 11, Number 2, 1956 contains index from volumes 1 to 10,
Volume 17, Number 2, 1962 contains index from volume 11.