(5) Spatial diffusion of agricultural innovations - An empirical analysis by Ram Bahadur Mandal - all published in Vol. II; (6) A critical Review of central place study in India by B. K. Sinha, (7) The geography of music by Sister Violita A. C. and finally (8) Approaches towards a geography of health - A Synoptic view by R. L. Singh, Rana P. B. Singh and B. P. Singh - all published in Vol. III. The special feature of each of the abovementioned articles though needs to be mentioned here, has been shelved off for want of space.

It is very difficult to understand however, why some articles, not withstanding their quality, are included in these volumes. Their titles and contents do not conform with the purpose and scope of books. Articles like 'Geography in Kalidasa's works', 'Geomorphology of Drainage Basins in Palamau Upland' and many others fall under this category.

All in all, the editors deserve all the compliments for bringing out these works which throw enough light on the recent trends and concepts in geography.

D. M. W.

Urban Settlements in Eastern India

Baleshwar Thakur

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The study aims at bringing out the changing nature of urban patterns, with a view to making generalizations about trends in developing countries, especially India. It also tests the hypothesis that uniformity of spacing of urban places decreases over time.

Two quantative measures, nearest neighbour analysis and entropy have been employed by the author to assess whether the emerging pattern of urbanization in Eastern India has resulted in uniform, random or clustered development.

In the evolution of urban patterns, the works of location theorists like Von Thunen, Weber and Christaller have made fundamental contributions, being pioneers in the model building methodology in Geography. Particularly the works of Christaller and Losch have provided the framework for the reorganization of a uniform, random and clustered component in the distribution of urban places, while at the same time developing the concept of equilibrium in urban patterns. Christaller's work generally has stimulated considerable interest in pattern analysis.

In the first three chapters, Thakur discusses how the basic inadequacies of the earlier static models led to the adoption of the systems approach in analysing urban pattern. The application of the systems approach has been rather slow in Geography, this might be attributed partly to the complexity of systems analysis itself, and partly due to the lack of comparative time series data. In pattern analysis,the various concepts like open and closed systems,stability-instability, different types of equilibrium associated with different growth patterns, along with the concept of 'entropy' and its application to non-physical open systems frequently encountered in geography are discussed. Particular attention is drawn to the fact that the interpretation of entropy is not quite the same in case of urban systems which in the course of their development tend towards organization. So maximum entropy in the case of the present study (unlike the second law of thermodynamics) is associated with order and organization in the system. The validity of this apriori assumption needs to be questioned, when settlements have shown equal propensity towards both the random and regular pattern over

time. Otherwise, the concept of entropy appears useful in assessing the impact of successive elements of change on the energy distribution of a system. Energy outputs in the case of urban systems, arise necessarily from demand of consumers and are balanced by the outputs of the system, i. e. the goods and services supplied to consumers.

The auther furthor continues that urban studies involving time must necessarily differentiate between old and new settlements, as their genesis, evolution and their process producing urban place organization is distinct in each area, and urban patterns emerge differently under cross cultural patterns. As in the case of the frontier settlements of U. S. A., Australia and New Zealand, the urban system evolved as a part of the settling process, while in a non-frontier situation, the settlement process was completed much before the urban system emerged.

Before the author focuses attention on the study area itself, a detailed account of the methodological implications of both, the nearest neighbour, its later modifications and the entropy concept have been provided. In addition, the experiences of other researchers have been cited with the express purpose of revealing the comparative aspects of the various methods used. The major inadequacies in the application of the nearest neighbour method that Thakur has outlined in his comparative account of the merits and demerits of both the approaches have not clearly surfaced from his own study. This diminishes greatly the value of the contention that the entropy method is superior to the nearest neighbour approach. The size of the area in the case of the nearest neighbour method is known to influence R-values similarly, the calculated value of entropy is susceptable to change, depending upon the size of the quadrat which is subjectively determined.

In conclusion, the important inferences from the study reveal that irrespective of geographical setting and time, the more dynamic systems, due to the influence of external factors and stimuli (industry transportation etc.) are liable to frequent changes and the functioning energy gradients are likely to show a persistence of randomness, as is evident from the Calcutta region in the lower Ganga plain. On the other hand, the steady state equilibrium (uniform pattern) found in the Bihar plain, Utkal coastal plain and Chotanagpur and Orissa highland region is due to the relative constancy in energy input and approximate balance of inputs and outputs. At this stage, Thakur rightly points out that a more rigorous investigation needs to be undertaken to determine the nature of the relationship between non-economic and economic factors in changing urban patterns.

The author further observes that the concept of complementary and competitive processes is important in the development of either uniform or random components in urban patterns. He attributes the increase in the uniform component in all the areas of the study region (exeept the Lower Ganga plain) to the competitive forces operating in the area, which essentially lead to centres being located at a maximum distance from its nearest neighbour. In contrast to the above area, the origin of complementary processes in the Lower Ganga plain (Calcutta metropolitan region) have given rise to agglomerative tendencies giving rise to a random pattern. Another important development is the centre-periphery dichotomy, the core being the Calcutta region, while the rest of the area forms the peripheral part. The hypotheses that uniformity of spacing decreases over time is confined only to the core area.

Thakur deserves much credit for applying a new technique for analysing changing trends in urban settlment patterns. Yet, this increasing technique orientedness, particularly among Indian geographers needs to be questioned. More so, when the techniques applied have not evolved in response to situation prevailing in the regions of applications.

J. N. D.