INTRODUCTION

Geomorphology is the study of physical features of the earth or the arrangement and form of the earth's crust and of the relationship between these structures beneath. The term is sometimes regarded as being synonymous with the older term 'physiography'. It was through geology that the geomorphology had its birth, a century after the early geomorphological work of the engineers. Early geologists like de Saussure, at the end of the eighteenth century, had doubt about the stability of earth beneath us, as they looked as fossil shells on Alpine summits. But the flood could explain everything and Voltaire came to rescue of the old beliefs. However, geological evidence of geomorphological evolution accumulated with the progress in the earth sciences. The noteworthy beginning of geomorphology may be counted from the year of publication of the 'Huttonian' "Theory of the Earth" in 1788. But the pioneering effort of the American geologists in the mid-nineteenth century to explore the mid-west was the real beginning of process of geomorphology, that brought forth some of the basic concepts like base level, drainage basin system, slope and equilibrium in fluvial systems. W.M. Davis, who was basically a climatologist, known as keen observer and great systematizer, presented a simplified model of reality and come out, with idea of "geographical cycle" known as 'Cycle of Erosion'. In fact, his contribution towards accumulator of data was practically nil, but his whole theory was produced on the observations of Powell and Gilbert, whom he quotes extensively in his essays of "Geophysical Cycles" and "The Peneplain". Davis has been criticised principally on two scores; Firstly, for his assumption of a long period of quiescence in earth's history producing a
prolonged tectonic stability long enough to let the cycle run its full courses to suit his model and secondly, for the neglect of processes. On both these counts one would find Davis intellectually alive. He made allowance for interruptions in the 'normal' cycle as much as for existence of cyclic evolution in other climatic regions like glacial and arid, and thus recognised the existence of cyclic geomorphic evolution in climates, different from what he termed 'normal'. His approach deductive and historical, was not far different from one of Darwin. All explanations lie in history and in order to know and understand the present, one has to know the past.

Later, the interference of other natural scientists paved way towards modern geomorphology. Penck was one of them, who at the end of nineteenth century, began his palaeogeographical reconstructions of the quaternary glaciation of the Alps. Using for this purpose a method of dating the moraines by the mode and extent of their alteration; his results are still valid. The methodology of geomorphology is thus founded on analysis of processes (dynamic geomorphology). The study of correlative deposits and dating techniques that are becoming more and more refined; enable us really to reconstruct the evolution of the landscape instead of imagining it. A more radical way of looking at Davisian contribution would be to credit him with an erosional sequence, parallel to the stratigraphic sequence of the geologists. The erosional sequence, succession of planation surfaces and denudation chronology unfold the erosional history in the same way as the stratigraphic sequence unfolds the geological history. Davisian geomorphology is largely erosional and the subject remains so to this date. The balance of geomorphic processes between erosion and deposition is more in favour of the former, since while erosion, the more dominant process, is universal the deposition is restricted to a few specific zones.
Recently, drainage basins have been recognised as an ideal unit in terms of open system and introduction of system theory and detailed study of processes which shape the form have new chapter in geomorphological researches, the riddle of geomorphological problem as to whether an individual process is competent enough, evolves its own characteristics landforms, or geological structure is the most dominant controlling factor in the evolution of landforms or each climatic type produces its own characteristics assemblage of landforms or slopes undergo parallel retreat and maintain their maximum slope angles, or they undergo progressive change of decline characterised by back and down wasting and flattening processes is yet to be resolved because of individualistic approach and lack of integrated approach which Gardiner (1982) was aptly brought to the floor. The successful integration between empirically identified relationship and process - related explanations is as yet incomplete, and is hindered by an incomplete and spatially uneven availability of data and observations (Gardiner, 1982 a). Geomorphology is basically a science of observations where identification and interpretation play important role but the use of quantitative and statistical methodology can not be ignored. "Quantitative and statistical methods offer no substitute for original thought about the problems, but they provide a valuable method of guiding the thought and reasoning into profitable channels and in assessing its validity" (King C.A.M. 1966).

Geomorphological research in India, in initial stage, was dominated by the Davisian model of landscape analysis, and the contributors were basically geologists, namely, Heron, Wadia, Dun, West, Auden, S.C. Chatterjee and Arogyaswami. Later on, H.L. Chibber, S.P. Chatterjee, S.C. Bose, R.P. Singh, E. Ahmed, K.R. Dixit and Savindra Singh have added remarkable
progress in this field. Of late, the foundation of Indian Institute of Geomorphology (IGI) is counted real privileges towards advancement of geomorphological studies in India. Apart from the above, introduction of satellite imageries and aerial photographs and digital image processing systems which itself developed into a new theory provide unique capability to the earth scientists to explore, recognise and accumulate global data and results within a very little time. Space Research Centre, Ahmedabad, Dehra Dun, NRSA at Hyderabad and other State Remote Sensing Centres are the notable Institutes of India.

The Author is very much confident that his present work may be one of the fruitful additions among other geomorphological studies made in India till date. 'Western Rewa Upland' which is selected for dissertation, is a part of Rewa Plateau. The aim to select this particular region for the geomorphological study is its varied topographic characteristics and scarcity of water which is the very common problem, recognised almost throughout the region.

The author has attempted both qualitative and quantitative approaches and applied various hypotheses to find out the results through correlative analysis. Horton's and Strahler's concepts have been applied particularly in the basinal and network analysis. Drainage basin, is an ideal geomorphic unit and set a fine example of open system and its development in harmony with its controlling factors its systematic and orderly. It grows with march of time according to the law of allometric growth, wherein there is a proportionate growth in its different components i.e. basin area, basin length, perimeters etc. (Pandey, R.S. 1983). There are definite relationship
between the number of stream segments and order of basin (negative exponential function model); between mean lengths of stream segments and orders (positive exponential function model); between basin length and basin perimeter (positive relationship) between basin area and basin perimeter (positive); between basin area and basin length (negative) etc. The bifurcation ratios are mainly related to geological structure, climatic conditions, vegetation, topography, basin shape and basin area etc.

The present work has been passed through the following stages.

* Reference books and journals have been studied in detail to get conceptual and analytical knowledge of the geomorphological researches.

* The geological information and data have been collected from the Geological Survey of India and other data viz. climate, vegetation and soils have been collected and compiled from State Government publications of M.P. and also from NATMO maps.

* The morphometric variables have been derived from topographical sheets of Survey of India (Toposheets no. 63 $\frac{D}{14}$, $\frac{D}{15}$, $\frac{D}{16}$, $\frac{H}{1}$, $\frac{H}{2}$, $\frac{H}{4}$, $\frac{H}{5}$, $\frac{H}{6}$, $\frac{H}{7}$, $\frac{H}{8}$, $\frac{H}{11}$) through various appropriate techniques.
The selected 10 sample basins have been traced out from topographical sheets of 1:50,000 scale for network analysis, following all the blue and black lines (streams). The perimeter of each basin has been demarcated with the help of divides which have been determined on the basis of contour map, spot-height and the orientation of drainage lines. The perimeter, basin length and basin area have been derived from shape analysis of these basins.

Grid method has been used to compute drainage density, drainage texture, stream frequency, average slope, absolute reliefs, relative reliefs and dissection indices.

Strahler's stream segment method has been adopted to determine the hierarchical ordering of drainage network of 10 sample basins. For determining the linear aspects of basin, number of stream segments of each order has been counted. Length of all stream segments of each order of each basin has been measured with the help of opisometer. The mean and cumulative mean lengths have been tabulated. The areas of segments of each order have been measured with the help of digital planimeter. The valley lengths, channel lengths and the air lengths have been measured with help of opisometer.

Different variables viz. drainage density, drainage texture, stream frequency, average slope, absolute reliefs, relative reliefs and dissection index, derived from topographical sheets
have been grouped and classified into different categories, using open class intervals.

* Intensive field trips have been made for field checking and collection of data regarding various geomorphological landforms and several photographs have been taken for the various nature of typical morphological features.

* Field trips have been made separately during wet and dry seasons to identify the interaction of the fluvial processes and their erosional and depositional behaviour of channels.

* Simple statistical methods have been used to measure central tendencies, dispersions and correlations. Regression equations and regression lines have been used to study linear relationships between the different variables.

* Morphometric variables, which have been used, are graphically analysed and interpreted through frequency polygons, frequency histograms and cumulative percentage frequency curves. Isopleth maps have also been prepared to study the spatial variation of drainage density, drainage texture, stream frequency, average slope, relative reliefs, dissection index etc.

* Altimetric frequency histograms, area-height curves, percentage hypsometric curves and profiles have been drawn to study the regional characteristics of the study region.
The present thesis is spread over in seven Chapters. The first chapter deals with the physical background i.e. location, geology, climate, vegetation and soils of the region. The second chapter deals with the physiographic regions, drainage processes and landforms of the study region. The chapter third is devoted to the network analysis, i.e. stream ordering, stream numbers, bifurcation ratios, law of stream numbers, stream lengths, basin area, allometric growth, geometric properties of open links and geometry of shape of close links. The fourth chapter discusses spatial analysis of drainage density, drainage texture and stream frequency. The chapter fifth deals with the relief analysis that includes the analysis of slope, relative relief, absolute relief and dissection index. The sixth chapter deals with the correlation analysis of different variables and conclusions and suggestions are provided in the last chapter.