

GEOMORPHOLOGY MEDLEY

Précis de Géomorphologie

Par M. Derruau. Quatrième édition. Pp. 415 + 61 planches. (Paris: Masson et Cie., 1965.) 45 francs.

Principes et Méthodes de la Géomorphologie

Par J. Tricart. Pp. 496. (Paris: Masson et Cie., 1965.) 84 francs.

Techniques in Geomorphology

By C. A. M. King. Pp. ix + 342. (London: Edward Arnold (Publishers), Ltd., 1966.) 40s. net.

THE name of a science is no doubt best understood as what scientists working in the field do; but it is notorious that "geomorphology" in its roots lends itself to an amorphous spread that spills over into a number of orthodox sciences, and not all geomorphologists speak the same language. Tricart and King are scarcely in direct line of descent from Derruau, or quite in harmony with one another.

Derruau's book, in its fourth and much revised edition, accepts geomorphology to be in essence physical geology. With only slight changes in balance it might well be recommended as an introductory text for would-be geologists. It begins with problems of crustal tectonics, including discussion of isostasy, continental drift, cratonic and geosynclinal contrasts, and orogenic cycles, as a basis for detailed study of the growth of landforms—although in doing so it assumes a knowledge of Earth structure that perhaps is too much to expect in junior students. Nearly half the book is very thoroughly descriptive, with some analysis, of the processes of erosion, particularized in chapters on the work of rain and rivers (Davis a little obtrusive), ice, wind, and the sea. An attractive feature of the description is the way in which kinds of landforms are correlated with the variable interaction of agents, when climate controls process. The influence of rock-foundation on relief is dealt with in a section that combines the elements of petrology with primary igneous forms, basins of sedimentation and classes of sediments, metamorphism, and tectonic structure; and the author does not overlook the significance of geological history, revealed in stratigraphy, in an understanding of the evolution of landscape. The many illustrations are orthodox but excellent in relevance and quality; and altogether the book is impressively attractive and readable, if not quite what a geologist would be prepared to call geomorphology.

Tricart, not always unemotional in his dialectic—he is bitterly critical of the malign influence exerted by the inductive speculations of W. M. Davis—defines the unexceptionable central concern of geomorphology as the study of the relief of the Earth's surface; but in doing so he relates geomorphology so closely to other disciplines that he takes over from them topics that normally would interest pedologists, hydrologists, sedimentologists, and even botanists. He writes as a practising geologist who takes for granted the foundations of physical geology on which a growing geomorphology rests. The relief of the Earth's surface includes relief in past times, and palaeo-geomorphology embraces stratigraphical correlation, including correlation esoteric in palynological, tephrological, and geochronological techniques.

This said, Tricart is more concerned with principle and method than with fields to be covered, his central theme being the need for system and order in the organization and explanation of what the geomorphologist observes. System, however, while acceptably justified by argument on what ought to be done, tends to be imposed and formal. This is notably so in a "taxonomic" classification of the units of geomorphological study into eight grades of magnitude from continents and oceans to yardangs and joint-partings and mineral decay, and in a gradation of events (secular orogenies, catastrophic landslips) in segments of a time-scale ranging from geological eras to

hours or minutes. He lays much emphasis on the uses of maps and aerial photographs, and on ways of constructing maps so as to increase their usefulness and content of information, and map drawing is formalized in an exhaustive array of symbols to cover almost all possible kinds of landform elements. Statistics and morphometry are given a place as new techniques, but the treatment is slight.

Tricart is stimulating, not to say provocative, in his polemics. He builds a framework into which geomorphology may be put. He brings his own kind of order to what has hitherto been a certain waywardness in method. He rightly directs attention to the need for discipline in geomorphological practice and theory. And he summarizes methods appropriate to a variety of geomorphological problems. It is disappointing that in his analysis of actual examples and in the use of illustrations he does not always reach the measure of his intention or discriminate finely enough between the important and the relatively trivial, and that in specifying the bounds and contacts of geomorphology he follows trails beyond its limits and blurs its field by making it accretory and diffuse.

King's book, although covering part of the same ground, is far more modest in both manner and content. In the result it is far more instructive and substantial. Its bias is towards a geomorphology that on the one hand does not lean unduly on a limited physical geology, and on the other avoids plunging too deeply into geophysics and stratigraphy and petrology. It brings out the relationship of structure and process with great clarity, constantly doing so by reference to appropriate examples that give reality to theoretical interpretation. Geomorphology emerges as a tracing of the evolution of the existing landscape through the integrative correlation of a great variety of landforms, although the main objective of the book is neither to define the science nor to provide a conspectus summary of its range. At the same time, King is fully aware of the diverse approaches which geomorphologists may follow, and her exposition offers instances of most of them as they are revealed in real examples.

The central purpose of the book, however, is to discuss techniques, from field surveying to the use of models. An early chapter stresses the importance of direct observation of form and character in the analysis of landscape, and of observation supplemented by the skilled use of maps and aerial photographs, by the need commonly met for a refined contouring, and by excavating and sampling. A succeeding chapter similarly stresses observation and experiment in the study of geomorphological processes—river flow and river transport, nivation and glaciation, periglacial and permafrost features, mass movement in avalanches and landslips, wind transport, and wave and tidal action. Discussion of the ways in which models may throw light on the correlation of theory with observation and experiment includes critical comment on the propriety of applying results from conceptual and scale models to processes in nature, and very full descriptions of actual models and their advantages and limitations. A chapter on cartographic and morphometric analysis as a systematization of a multitude of landform elements, and sediment analysis as a guide to erosion and transport, leads to an assessment of the value and significance of statistics in geomorphology and of the validity of geomorphological conclusions based on statistical pointers.

Parts of King's book are a little uneven in being unusually elementary or unusually specialist; and some of the examples quoted need more rigorous treatment than they are given. But to cavil at this page or that would be ungracious, when the bringing together of so much information and guidance, simply and directly put, offers nothing but good to the young student as much as to the professional geomorphologist.

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