

Book Reviews

Lehrbuch der tektonischen Geologie. K. Metz. 2nd Revised Edition. Enke Verlag, Stuttgart, 1967, 357 pp., 231 illus., D.M.60.00.

Ten years after the first edition, an enlarged second edition appeared of the well-known book of K. Metz on structural geology. It has expanded from 294 to 356 pp., the number of illustrations increased from 188 to 231, the price from 46 to 60 D.M. All in all it is a necessary and reasonable increase in size and price after 10 years of vigorous developments in our knowledge of geomechanics and geodynamics.

Metz' textbook has found a good market amongst the German-speaking geologists of central Europe and beyond. This well earned success is based on its concise and clear treatment of structural petrology, or petrofabrics (part I, 184 pp.), as well as that of the structural evolution of the earth's crust, or geodynamics (part II, 114 pp.). An appendix of 31 pp. discusses problems of applied geology. The book has a well selected bibliography in which not only the german literature, but also the English and French languages are well represented (8 pp.). A subject index of 10 pp. concludes the volume.

Metz writes an easily readable German, which is also of importance for those, who do not use the German language as their native tongue. This quality of readability for foreigners is likewise encountered in the geological textbook by the late Holmes (1965), which has, however, a different scope.

This quality is unfortunately lacking in the books written by one of the founders of petrofabrics, B. Sander. This might be one of the reasons why Metz' textbook fills (with its first part) a distinct need among hard-rock geology-students in central Europe.

A second quality is its treatment (in the second part) of the structural evolution of the earth's crust. It is in this field that great advances have been made in the past decades, advances which have generally been published in American and English journals, which are not widely available in Europe.

Metz introduces these new concepts against the background of the various ideas on tectogenesis which originated for the greater part in Europe (Stille, Argand, Kober, Wegener, Cloos, Haarmann, Sonder, Ampferer, Kraus, van Bemmelen and others). Moreover, Metz discusses at some length the undation theory on the evolution of the earth's crust, thus starting in German literature a critical discussion of this concept; Holmes (1965) likewise introduced this theory in English literature.

In relation with Metz' discussion of the undation theory the reviewer wants to make some remarks. The rapid increase of the number of diagnostic facts and the corresponding evolution of the geodynamic concepts are the cause that Metz, in some points, does not represent the latest state of the undation theory. For instance, the reviewer considers the continental Mohorovičić-discontinuity no longer as a phase-transition between gabbro and eclogite, but as a chemical boundary between the sialic continental crust and the underlying ("simatic") upper mantle.

Secondly, Metz questions the fundamental thesis of the undation theory that all geodynamic processes result from gravitationally created

stressfields. However, what other forces would be available? All disturbances of the rheological equilibrium, being either physicochemical or thermal in origin, are in fact gravitational deviations from the hydrostatic equilibrium. This thesis is sustained, for instance, by Ramberg (1967).

Thirdly, Metz remarks correctly that it would be rather senseless to make a distinction between primary and secondary tectogenesis, when one considers the geodynamics of the deeper structural levels (Stockwerke). But indeed, this distinction is not made by the undation theory. The undations, with their primary- and secondary tectogenetic effects, are near-surface phenomena (see also Van Bemmelen, 1967, table II, p.87). In deeper structural levels only mass-circuits can be distinguished, the potential energy of which has a gravitational character.

In conclusion, it can be said that the second edition of Metz' textbook has the same qualities of its predecessor and that it is up to date, so that it can be recommended to students and teachers in hard rock geology and general geology.

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REFERENCES

- Holmes, A., 1965. Principles of Physical Geology, 2nd ed. Ronald, New York, N.Y., 1288 pp.
Ramberg, H., 1967. Gravity, Deformation, and the Earth's Crust, as Studied by Centrifuged Models. Acad. Press, London, New York, N.Y., 214 pp.
Van Bemmelen, R.W., 1967. The importance of the geonomic dimensions for geo-dynamic concepts. *Earth-Sci. Rev.*, 3: 79-110.

Gravity, Deformation and the Earth's Crust, as Studied by Centrifuged Models. H. Ramberg. Acad. Press, London and New York, N.Y., 1967, 214 pp., 125 illus., £2.17.6.

There is a real need in the science of tectonophysics for a book which analyses the role of gravity in tectonic deformations. The concept of "gravity tectonics" has for a long time and with increasing emphasis been advanced by many geologists. However, their approaches to this idea were generally rather intuitive, so that quite often, they were misunderstood by other earth-scientists. The cause of the hesitancy to accept the mechanical model of gravity tectonics as a general basis for the explanation of geodynamic processes, was the lack of a well-thought-out theoretical analysis and mathematical formulation.

Now Ramberg's book is a valuable attempt to fill up this gap.

According to the Preface, this book might be of use "to seasoned earth-scientists as well as to those who are struggling to reach that stage". The reviewer can support this recommendation, although - in his opinion - the theoretical analysis is rather too short and the many mathematical formulas (138) in the book are often incomprehensible because their derivation is not given. One has to go back to the author's original papers for a more complete mathematical treatment. As this being the case, the question arises,