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LITTERATUR.

ALFRED HETTNER: *Die Oberflächenformen des Festlandes*. Verlag B. G. Teubner 250 pp. Leipzig u. Berlin 1921.

The book before us, which is by Mr A. Hettner, the well-known Professor of Geography at the University of Heidelberg and editor of "Geographische Zeitschrift", is no text-book, but rather a discussion of the functions, position, method etc. of modern geomorphology. It presupposes a searching knowledge of the subject treated, and is, as the Preface says, not intended for new beginners, but is even unsuitable for them, inasmuch as theories and conceptions are criticized in a way that demands a sure power of discrimination for their appreciation.

The work in question is directed against W. M. Davis and his "School", and their method is declared in the very Preface itself to be "verfehlt". Further on in the book Davis gets a dig whenever an opportunity presents itself, but it is not until towards the close that the author's bitterness gets such full play that in nearly every page of the book there are such sentences as "Davis tritt mit der ganzen Naivität des Amerikaners in die Welt, der meint, dass die Weltgeschichte erst mit Amerika und ihm beginne", and "das Gebäude (Davis) wird einstürzen" and so on. As is well known, Davis has won many followers in Germany, especially after he became what is called an "exchange professor" at the University of Berlin in the year 1908. This aroused annoyance on the part of many people, because the old German school was partly thrown into the shade and also because Davis' "system", as it is called, is not considered to satisfy the full demands of strict science. It is extremely valuable that the man who is perhaps Davis' foremost opponent should now put forward his criticism in a collected form. In spite of such unbalanced expressions as have been cited above, Hettner's criticism is as much based on facts as one can expect from a bitter opponent. Nevertheless he does not altogether avoid the fault of first drawing a caricature of the person attacked and then assailing that picture. Hettner's work gains in interest by the fact that he has expanded his criticism into a general survey of geomorphology as a universal science. On the other hand, when one reads through this book, one obtains a confirmation of the general truth that it is easier to criticize than to create, to tear down than to build up. This is further confirmed by the convulsive fumbings after a new system that Passarge has created on German soil to act as a counterpoise to Davis.

It is not the intention in this place to defend Davis against the criticism with which he has been favoured. That can certainly be better done by others, more especially by the "master" himself. But a number of general considerations put forward by Hettner should be mentioned, especially as many of them, in the opinion of the present reviewer, contain a great deal of truth, and should be able to be of interest, not least in Sweden itself.

It is with great joy that any person interested in physical geography greets such a book as Hettner's, if only for the reason that during the last few years interest in

morphology has undoubtedly fallen off in favour of anthropo-geography. This phenomenon is general, not only in Europe but also in America. Probably this, like so many other things, is a consequence of the war, which destroyed so many human things that man is now eager to make the best of what remains. Without casting the faintest reflection on the promising subject of anthropo-geography, the present reviewer is bound to regret this development, for geomorphology has been abandoned at the beginning of its career long before it had attained such clearness as is required to give human geography the firm topographical foundation without which it cannot build properly. The morphological foundation is now in many cases bad, if not entirely non-existent; and problems which demand a topographical basis are taken up for treatment by persons without any training in physical geography from the simple cause that they have lacked instruction and properly qualified guidance.

It is with the greatest satisfaction that we notice how Hettner proclaims the independence of geomorphology as a discipline within the limits of geography, and strongly emphasizes its causal nature. Without this causal element, morphology passes into topographical cartography, an auxiliary science to geography, and not an independent branch thereof. The present reviewer cannot share the view that the map is the aim of geography; it is the foundation for conclusions as to causality, correlation and general laws. The map is a method that specially belongs to geography, but it is not its be-all and end-all.

One thing which has been a delicate matter for geomorphology is its relation to geology. Geography, as an independent science, largely proceeded from geology, and later, in its efforts to maintain its independence, it came to take up a hostile position towards geology and to throw over structure and tectonics. Hettner's remark that Davis takes notice of the degree to which the different kinds of rock resist denudation only so far as to be able to attain clearness with regard to morphology seems quite correct to the present reviewer. The independence of geomorphology in respect of aim and means is so clear that one can without fear take as much as one likes from geology. Thus, in the opinion of the present reviewer, no clear picture of the morphology of the Alps, is obtainable without a knowledge of their structure and tectonics.

A misapprehension of the essence of the Davis' method appears in Hettner's frequent remark that Davis neglects detailed forms. Apart from the fact that, as a matter of fact, Davis is not guilty of this error, but both himself and through some of his pupils has made some of the most searching and comprehensive descriptions of detailed forms, this remark reveals a profound perversion of the true facts of the case. To the present reviewer Davis' cycles stand out as a scheme for help in analysis and deduction. It is a first skeleton, which has to be clothed with flesh and blood as our knowledge of the problems widens and deepens. If it still looks naked, that is due not to the incorrectness of the method, but to the fact that morphology as a science has not yet got very far. In the next place, to the present reviewer the development of the cycle stands out as the object of our knowledge with regard to the normal development of a certain form-group through the gradual work of the forces engaged. It would seem to be difficult to deny the justifiability of such a purely scientific object.

Many of Hettner's objections in principle seem to me to fall to the ground if we conceive the cycle in the way above indicated.

Of late years what is known as the knowledge of landscape (*Landschaftskunde*) has been boomed as perhaps the most important object of geography. This knowledge of landscape, which is to gather into itself all the elements of geography into a single unitary picture, is

of course an extremely important task for geography and may be its object; but the one-sided insistence on it harbours the same danger as has been pointed out above with regard to the setting aside of geomorphology by anthropo-geography. The multitude of elements that enter into the knowledge of landscape may easily conceal the lack of a through knowledge of the individual factors. The delight with which this knowledge of landscape has been embraced, therefore, does not always, when we come to think about it more closely, contain the best reasons for the study of geography.

The present reviewer has previously pointed out the defect in the Davis school through the insufficient attention given to the morphological processes themselves — erosion, transport, ice-movements and so on. Our knowledge of these circumstances is extremely defective, and it seems to the present reviewer that all possible energy must be devoted to them, inasmuch as in many cases they are of fundamental consequence for a deep understanding of the nature and succession of the topographical forms.

So too the present reviewer's conception of the peneplain accords with that of Hettner. It seems to me, however, as if in Davis' account of the cycle the peneplain stands out as the final goal to which the whole process of development strives but which it seldom attains. It is above all amongst a number of Davis' followers that the unfair insistence of the peneplain is carried on which has provoked both Hettner and other people into a justifiable criticism. This reckless treatment of a thing which is so problematical and rare as the peneplain, has largely contributed to the discrediting of the entire cycle theory.

The question of the peneplain is connected with the problem of the entire development of the fluvial cycle. In his criticism of this also Hettner seems to me to put forward several considerations of importance. Often, undoubtedly, there is an uncertain subjective factor in the estimate of the stage of development of a valley. In certain cases all the elements point to a certain characterization; but in many cases the fact is that the character of the rock-ground, the climatological conditions and the like, render incorrect the simple scheme in which the development of the fluvial cycle is summarized according to Davis. In regions with a powerful movement of earth (solifluction) even very young valleys are provided with more or less flat sides, while in limestone regions old valleys may have steep sides. These objections, however, seem to me to affect the principle and the value of the cycle theory just as little as the others do, but rather affect the incompleteness of our knowledge of the cycles which still exists. Every contribution to our knowledge as to the anomalies of the cycles ought to be greeted by the partisans of the new geomorphological "school" not as indications of the inutility of the cycle, but as contributions towards its perfection. When Hettner says, "dass eine genetische Klassifikation der Talformen weniger auf das Alter als auf die verschiedene Art der Vorgänge und die verschiedene Art des Gesteines begründet werden darf", he is right only if he caricatures the primary fluvial development series in such a way as to make it hold good "in all weathers". In other case Hettner's proposition breaks down, for it would seem to be difficult to deny that a valley in one and the same kind of rock does not undergo any change of form in the course of its development.

As has been mentioned above, it is not the intention in this place to refute Hettner's various remarks, which, in accordance with those that have been touched on above, have a certain degree of truth on the supposition that the cycle developments hitherto put forward are given the character of indefeasible laws instead of first attempts to summarize the main points of the knowledge so far attained.

On the other hand, one remark which seems to me to hit one of the principles in the Davis body of doctrine is the criticism of Davis' one-sided insistence on the deductive method. The present reviewer, in his morphological investigations, in connection with the cycle conception, has not been able to follow the deductive method to the extent that Davis seems to desire, but has preferred to go the way of analysis. In the future also I shall do the same, because our knowledge of morphology is still so defective, and views are so divergent, that one cannot come to results which can count upon an acceptance by any circle of readers without some analysis and exposition of the different premises. As an example it suffices to mention the hanging tributary valleys. In the opinion of the present reviewer, such valleys are not all caused by the overdeepening of the main valley by the glacial ice, and cannot therefore be taken off hand as criteria of such and be mentioned without commentary in the form-complex of the glacial cycle. Thus, for instance, most of the hanging tributary valleys in Hardanger Fjord, which Davis regarded as genuine, are in the reviewer's opinion false and have nothing to do with overdeepening. The deductive way of presenting things may be an object to aim at, but as yet it is a far distant one. A deductive summary of analytic investigation, on the other hand, may be justified by the fact that, if rightly used, it gives more clearly than other methods a synthesis of the region treated.

Accordingly, even after the perusal of Hettner's book, the present reviewer retains the opinion of the cycle theory that he has long entertained: Davis' body of doctrine, based on the exceptional observation of things large and small and developed with logical clearness, is a new and valuable contribution towards a continually increased knowledge of topography; the cycles that have been described, especially in "Die erklärende Beschreibung der Landformen", form no completely finished scheme applying to everything everywhere but are a first attempt towards a summary view of the natural development of forms — a summary which must be expanded, supplemented and amended as our knowledge advances; and the same applies to the terminology. The doctrine as to the geophysical processes must be given far greater scope, and greater attention should be devoted to structure and tectonics. Analysis and induction have their proper place alongside of deduction.

Many thankofferings will assuredly be made, especially in Germany, in honour of Hettner's criticism of Davis. To the present reviewer the value of his book will be not the critical character of the many wise things that are said in it, but those wise things themselves as a positive addition to our knowledge of the cycles and the author's insistence on geomorphology as the fundamental part of geography.

HANS W:SON AHLMANN.

NEVIN M. FENNEMAN, *The Circumference of Geography*; »The Geographical Review«, New York, 1919, pp. 168--175.

With American audacity and lucidity Fenneman has treated in a few pages the question of the scope and essence of geography, and in doing so he has dwelt on the great importance of regional synthesis or »land-knowledge« and also pointed out the character of geography as a science of distribution. He starts from an ingeniously designed circular diagram (Fig. 1), which expresses »the fundamental conception that sciences overlap and that each one of the specialized phases of geography belongs