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who would regard them as the form in which rolling material is generally transported by the current both in watercourses and along the sea-floor.

The work before us is illustrated with first-class photographs and representative sketches, while the map-material is scanty. The completeness of the work, as we have said, is that which gives it its high value. It would be a good thing if the other geomorphological cycles and main groups of morphological phenomena could be made the subject of monographs like the present one on the shore-processes.

H. W. SON AHLMANN.

SIEGFRIED PASSARGE, *Die Grundlagen der Landschaftskunde*. Ein Lehrbuch und eine Anleitung zu landschaftskundlicher Forschung und Darstellung.

Band I. *Beschreibende Landschaftskunde* (210 S. mit 83 Abb. im Text u. 31 Abb. auf 18 Taf.). Hamburg 1919.

Band II. *Klimat, Meer, Pflanzen und Tierwelt in der Landschaft* (222 S. mit 78 Abb. im Text u. 26 Abb. auf 18 Taf.). Hamburg 1920.

Band III. *Die Oberflächengestaltung der Erde* (558 S. mit 229 Abb. im Text und 26 Abb. auf 17 Taf.) Hamburg 1920.

Band I and III. Landschaftskunde and Oberflächengestaltung. The above work, by the well-known geographer S. Passarge, is planned on a broad basis, and its object is evidently very comprehensive. The fourth volume — *Der Mensch in der Landschaft* — has not yet appeared; but as the first three volumes form a complete whole, the following commentary on them may be given even now.

Like most modern textbooks on geography, this great work forms a contribution to the discussion on the general aims and methods of geography. Passarge wishes first and foremost to realize the idea of geography as »*Landschaftskunde*«. In the first part of his work he carries out this idea on the lines of pure description, thereby coming into direct conflict with the specially explanatory method which has its most famous and enthusiastic champion in W. M. Davis. Thus the first part comprises a systematic enumeration and definition of the different features and phenomena which form parts of the various regions of the earth and constitute them. Thus the volume is little more than a terminology. Passarge is right in maintaining the importance of a clear and concise terminology; and it seems to me that his opinion that terminology shall not be based on the genesis of the object, as are so many of Davis's terms, is correct. Passarge's division of valleys into (1) Kerbtal, (2) Flutsohlentahl, (3) Sohlental, (4) Muldental, and (5) Flutsohlen—Muldental mit Mündungsfläcker, seems from some points of view to be better than the American division into »young«, »mature« and »old«, inasmuch as the latter involves views or theories as to the age and genesis of the valley which can be formed only by a person pretty much at home in geomorphology.

The terminology of geography in general is so uncertain, incomplete, and ambiguous, that it would be no waste of time if every country were to devote to it more attention than is now paid to it, and, if possible, agree as to a definite terminology. Then is taken the necessary preliminary measure for the next step: an international, uniform terminology.

Passarge's first part must further be judged from the stand-point implied in the fact that it aims at being a text-book or guide-book for explorers, beginners, teachers, and non-geographers. But can it really be imagined that an enumeration and definition of a number of geographical features can serve this purpose? As Davis has remarked, in the first place, it is extremely difficult to keep up the purely descriptive method con-

sistently. It is true that Passarge has succeeded in this respect beyond what one could have expected; but nevertheless the whole of the first part has a painful resemblance to a catechism as an introduction to religion.

With regard to arrangement, Passarge begins Part I with »Planvolle Landschaftszergliederung», A. »Begriff», B. »Muster der planvollen Landschaftszergliederung, 1. »Datum», »Tageszeit» etc. In contrast to this extremely detailed systematization, scertain chapters are extremely meagerly treated, for instance that on geology, which can carcelly be said to contain anything whatever.

Chap XI is devoted to »Ästhetische Landschaftsbeschreibung». Passarge here continues to make sacrifices on the altar of systematization; but neither the altar nor the sacrifice are aesthetic.

The volume concludes with a number of model descriptions of select maps from Germany, the Alps, the Jura, Norway and Italy. These descriptions are instructive, and would speak highly in favour of the method followed in this volume, if they did not very largely rest on the experience knowledge, training, and lucidity which is personal to Passarge himself.

In Vol. II, of course, the strictly descriptive method must necessarily give place to the causal conditions of the various phenomena in the atmosphere and sea. The former is described clearly and concisely in 60 pages. The sea, on the other hand, has been assigned only 14 pages, owing to the fact that the sea does not form more than a minor ingredient in the »landscape», and »meereskundliche Studien auf Küsten oder Schiffsreisen beschränkt sind». If »Landschaftskunde» is to be conceived in such a way that this pronouncement shall be logical and consistent, a distinct objection must be raised against regional knowledge as the object of geography or even as its most important part. It is obvious that the sea occupies by far the largest part of the surface of the globe and it is of fundamental importance for the heat economy, anthropogeography etc. of the whole earth.

In the recently published third part of the work, which is by far the largest and most important of those which have yet appeared, the author devotes himself entirely to the genetic or explanatory method. The breadth exhibited in this part causes the previous morphological volumes to be too unnecessarily sharply divided from the last. The whole work is made over-systematized through this distribution of the matter according to a number of different points of view, which cannot be kept apart to such an extent that their areas do not partly overlap one another. The author's tendency to systematization indeed approaches the limit of the permissible in this last part. In spite of the very good ideas and views which are brought forward, specially in this last part, that part strikes one as litle attractive for people who have a somewhat less marked inclination for systematization than the German people. In spite of this systematization — or rather owing to the over-systematization — in this third part it is rather difficult to find the connected subjects.

In the preface to this third part the author says: — »hier soll vor allem untersucht werden, wie weit wir die Kräfte kennen und was unsicher oder unbekannt ist; dann erst soll eine Erklärung der Formen versucht werden.» This sentence, which is aimed against Davis, who, in the author's opinion, does not pay sufficient attention to the creative forces themselves, is undoubtedly quite correctly conceived; but one cannot say that it is carried into execution with equal success. With regard both to running water, glacier-ice and also the waves or breakers, in fact, we cannot say that the account of their general geophysical properties is satisfactory. Especially, it seems to me, are

the glaciers too scantily described; nor is any attention paid to the later larger works on the subject (e. g. Mercanton's work on the Rhône Glacier). On the other hand, as is only natural, the wind and arid phenomena are treated more fully and clearly.

In the sequel attacks are directed against Davis and the deductive school in several prominent places; and one gets a kind of impression that the new method and system which Passarge introduces here is to serve as a counterpoise to Davis and to be a programme against him.

Passarge divides the forms of the earth's surface into »Jetzzeitformen«, which can be explained by means of the forces now at work, and »Vorzeitformen«, which belong to the work of a past time. There are further introduced the two conceptions of »Aufschüttungsformen« and »Abtragungsformen«, of which the former are called positive and the latter negative. With regard to stage of development a distinction is drawn between »In Ausgestaltung begriffene Formen« and »In Umwandlung begriffene Formen«. The former are then divided into (1) »Arbeitsformen« which are in process of being formed by actually working forces, (2) »Ausgleichformen«, later developed forms on which forces worked more slowly, (3) »Ruheformen«, which now exhibit no change at all or an extremely slow one, (4) »Tote Formen«, which derive from forms that are no longer existent and are therefore dead, (5) »Verfallsformen« or »Ruinenformen«, which are being destroyed by the forces of the present day. The last two groups of forms are quite overwhelmingly »Vorzeitsformen«, while the others are for the most part »Jetzzeitformen«. This division undoubtedly contains several elements of considerable value for the practical description and the genetic explanation of a form complex. »Dead forms«, however, are probably few in comparison with »Ruin forms«, as extremely few points on the surface of the earth are not exposed to transformation. According to this terminology also, the greater part of Scandinavia would now be covered with »Ruin forms«, as the glacial sculpture is now in process of dissolution. At the same time one must say that it would not seem very attractive to characterize the main part of our fixed Archaeaen forms as »Ruin forms«. A number of similar examples can easily be cited which supply samples of the difficulties, complications and improprieties involved in this terminology. It can also be questioned whether these five groups of forms are more clearly distinguished from one another than »youth«, »maturity«, and »old«, despite the defects of the latter terms.

This classification, however, has the merit of being comparatively simple as compared with »Systematik der Oberflächenformen«, where one meets with the following:

- Main class: A. Landformen
 - B. Küstenformen
 - Class. A1. Endogene Formen
 - A2. Exogene Formen
 - Order: A2. I. Ausräumungsformen
 - II. Aufschüttungsformen
 - III. Chemische Umwandlungsformen
 - Family: I & II. 1. Durch Blitz
 - 2. » Besonnung
 - — — — —
 - 5. » Schnee u. Eis
 - — — — —

10. Durch Menschen

- Species: 5. (a) Die Gattung der durch Schnee entstehenden Aus-
 räumungs- und Aufschüttungsformen
 α Durch die Schneedecke
 β Lavinien
 γ Die Gletscher
 Ausforschungsformen etc
 Gletschertöpfe
 Aufschüttungsformen etc
 (b) Die Gattung der durch Eis enstandenen Formen.

Even if, in the presence of such over-classification as this, one wishes to fly to the freer, but not therefore less logically clear and firm, structure of American geographers, one should nevertheless hold one's ground and examine more closely what may be the living fundamental idea on which Passarge has built his to some extent over-elaborate system. Practical tests are the only means by which one can decide its real value. Before it has undergone practical schooling and all-round objective testing in practice, to which the Davis method has been subjected in all parts of the world and by the foremost representatives in morphological investigation, Passarge's great work will remain a mere schematich in experience and suggestion, but with little life owing to its various bases of division and its innumerable headings and sub-headings.

H. W:SON AHLMANN.

Band II. Die Pflanzendecke. Passarge's work on the foundations of regional research is strictly classificatory, and consequently his system of classification included a section on the importance of vegetation in forming a landscape. But he has perceived in this connection that it is not enough to state the character of the vegetation in different areas, but that regional research is also bound to make clear the connection between the types of vegetation and the outer factors by which they are conditioned. It is evident that Passarge has had a more living conviction of the importance of this physiological and ecological element in plant-geography than is generally displayed in the great geographical handbooks. In contrast to what we generally find in such books, Passarge gives in his first chapter a practically complete scheme of the different forms of adaptation that the plant assumes under the influence of light, air, warmth, supply of water, and the varying composition of the sub-soil. It may even be questioned whether he has not been even somewhat more detailed than was necessary in view of the subsequent account.

In this account plant formations are divided into (1) *general climatic* and (2) *local climatic and edaphic*. With special reference to woody plants the former are divided into (a) *cold formations* — with forms stunted by cold — (b) *dry formations* — with a stunting of forms caused by defective supply of water — and (c) where warmth and the water supply are sufficient, *woodland and grassland formations*, alternating with each other according to the amount of precipitation and its distribution over the year. This division, however, is hardly quite happy, for it does not take into consideration the fact that cold also gives rise to physiological drought; and it is therefore not always possible to decide whether stunted forms in cold regions have arisen through freezing or through shortage

of water. It would have been more suitable, therefore, and also more in accordance with the regional point of view, if the author had chosen a more physiognomical basis of division, that is to say, had paid more regard to the character of the vegetation than to the external factors.

With regard to the extent of these climatic formations in different climes, they are divided into the following plant formations — (1) tropical, (2) sub-tropical, (3) temperate, (4) those of arid regions, (5) polar. The author then passes to a description of the different formations which fall into each of these groups, and characterizes them according to the vital forms of their constituents. This part of the account is extremely even and consistent throughout; and we obtain a very good notion of the extent of types of vegetation and their dependence on the external factors. Nevertheless a somewhat fuller account on certain points would have been desirable. For instance, the author does not know of the birch region which is so characteristic of N.W. Europe. Above the polar forest-limit vegetation is stated to consist of the following formations — dwarf brushwood, tundra, and the polar desert. In the North of Europe, however, the tundra zone is said to begin at the coniferous forest limit.

The system thus put forward by the author is schematic, it is true, but clearly and consistently carried out. Much would certainly have been gained, however, if the old established international terms of plant geography had been retained instead of a number of new and rather difficult German terms which have here been substituted.

JOHN FRÖDIN.

Band II. Tierwelt in der Landschaft. A. SOKOLOWSKY, who has written the section on animal life in Passarge's *Die Grundlagen der Landschaftskunde*, has had the difficult task of giving a survey of the animal life of the whole earth, in its dependence on its environment, within the narrow frame that is prescribed by the character of the work. This dependence on environment is of a twofold kind. The external influences (the climate, the nature of the ground, the distribution of water, the vegetable world, the relation between different animals etc.) settle both the geographical distribution of the animals in the different landscapes and also their qualities: the animals are adapted to their environment. The author divides his account of the influence of these conditioning factors on animal life into six chapters — the animals of the woodland, of the open country, of the mountain districts, of the polar regions, and of the water, the air and cultivated country. In each chapter animal life is regarded from numerous points of view. In the survey of the woodland animals, for instance, the first thing treated is the size of the forest, the different layers of vegetation in the wood, the nature of the forest in different climates and at different elevations, and so on; then follows the adaptations to life in the forest — the size of the animals, ground animals, "neutral", and tree animals, different adaptations for climbing, protective colours and protective markings both in general and in different kinds of forest, the care of the young and nest-building, the nourishment and water requirements of the forest animals, their summer and winter sleep, the number of individuals and of species, habits and mental life of the animals; finally we have a survey of the forest animals which play an important part in giving one a picture of the landscape in different areas — the tropical rain forests, the mangrove forests, the tropical mountain forests, the xerophilous, evergreen leaf forests, the leaf, needle, and mountain forests of the intermediate zones. The chief stress is laid on the vertebrate animals, which of course play the greatest part in the landscape; the information given as to the lower animals is somewhat arbitrary.

The account is highly concentrated and largely consists in an enumeration of facts, which is often somewhat trying. A survey of animal life in which more space was given to general considerations and leading ideas at the expense of wealth of detail, would undoubtedly have given the work more value. Zoogeographical principles might have been more strongly emphasized. However important the power of the animals to adapt themselves to different conditions of life may be, nevertheless climate too exercises an important influence on the geographical extent of the species and consequently on the landscape. The difference between the animal life in the northern and southern forests of the Boreal zone, or on the plains of northern and southern Europe, for instance, is caused not only by the animals' adaptation to their environment but also by the zoogeographical boundaries. The important distinction between hardy animals (e. g. eurytherms), with a very extensive distribution and species that are tied by definite climatic conditions, ought to have been mentioned. These and similar considerations might surely have been mentioned without making it necessary to base the account on a zoogeographical division. A perceptible defect is that no attention has been given to recent attempts to distinguish animal communities (Biocoenoses).

These remarks are not meant to deny that Sokolowsky's description has many good sides and well merits its place in a geographical handbook of this kind. As far as one can judge, the author possesses vast knowledge and a rich experience in many departements.

N. VON HOFSTEN.

A. W. JOHANSSON: *Studier öfver Ålands klimat med sårskild hånsyn till temperaturen*. Fennia 36. Hålsingfors 1917.

L'auteur fait remarquer dans la préface que l'Åland peut sans doute paraître de peu d'importance comme superficie, mais que »sa situation maritime particulière doit, au point de vue climatologique, justifier qu'on lui consacre plus d'attention qu'aux différentes parties du reste de la Finlande». On peut cependant se demander si les observations faites sur l'Åland forment des matériaux dignes d'une étude aussi étendue que celle qui a été effectuée par l'auteur. Il y a certainement des parties de la Finlande qui à ce point de vue se prêteraient bien davantage à une étude féconde.

L'exposé de l'auteur porte essentiellement sur le climat de Mariehamn, par la simple raison qu'il n'y a guère de longues séries d'observations utilisables pour un autre endroit. Les observations des phares de Sålksår, Mårket et de la station plus éloignée de Bogskår, ont été employées principalement pour contrôler et compléter les observations de Mariehamn. Les quatre stations que l'auteur lui-même a établies sur l'île principale de l'Åland n'ont été en service que pendant 2 ans environ.

A Mariehamn, la température a été relevée depuis 1869 avec une interruption de deux ou trois ans; mais pendant une grande partie de cette période les relevés de 7^{ha} et 2^{hp}, dans les mois d'été, paraissent avoir été notablement vicies par le rayonnement du soleil. Pour l'étude de la courbe quotidienne de la température, à laquelle l'auteur n'a pas consacré moins de 27 pages, il n'a eu comme données que les valeurs enregistrées par le thermographe pendant deux années. Il n'y a pas eu de thermomètres à maxima et minima à la station avant 1908. Les observations sur la nébulosité n'ont été faites que depuis 1891, les mesures des précipitations et de l'humidité depuis 1885, les observations sur les vents depuis 1884. Les données sur l'humidité après 1910 sont considérées par l'auteur comme peu sûres.