

worker went further than this and tried to predict the 'communities' which might be expected to occur in (quantitatively) unknown faunas off the European coast.

By his use of the term 'community' Petersen seems to imply more than Hjort does, for example, in referring to 'societies' or communities of plankton forms in the different hydrographical regions of the Atlantic, or than botanists do in referring to ecological groups of plants, and by his relative neglect of soil analysis gives more importance to the mere association of animals than to the relation of the animals to the nature of the soil. In this attitude Petersen has in part followed Mobius, who long ago (1877) stated that the animals living on an oyster bed form a community, and goes on to say that "Science possesses, as yet, no word by which such a community of living beings may be designated . . . where the sum of species and individuals, being mutually limited and selected under the average external conditions of life, have, by means of transmission, continued in possession of a certain definite territory. I propose the word *Biocœnosis* (from *bios*, life, and *koinoein*, to have something in common) for such a community."

Obviously all these are the beginnings of attempts in marine zoöcology or *zoocœnosis*, and we are witnessing the early stages in the evolution of a nomenclature and, indeed, of method. Davis adopts, but unfortunately, we think, in a modified way, the Allen-Borley method of soil analysis, and pays insufficient attention to the hydrographical and topographical variants, which both Petersen and Borley noted. Thus in no case are all the correlated observations to date marshalled in such a way as to indicate an enduring natural classification of such associations or groups as do undoubtedly occur, although Petersen's broad method of treatment alone has certainly carried the problem beyond its initial stages. In his paper, Davis gives a remarkable table showing soil-analyses correlated with the animals inhabiting particular soils and clearly shows that a large number of animals prefer a particular soil in the North Sea, though some are more catholic in habitat. The author concludes that animal associations were found, but that in detail those groups (communities) which Petersen found are not homogeneous in nature when regarded in relation to the soil analyses, nor strictly comparable with one another in the areas investigated.

We hold, however, that there is not enough information available for the latter part of the conclusion, since (1) Petersen gives no analysis of soils to define his communities, (2) the fauna in relation to known soils has not been adequately investigated at stations linking Petersen's scene of work with the North Sea stations, (3) Davis has himself grouped together animals only in relation to soils without consideration of other biological factors—despite Borley's warning—and (4) what is more important, the biological significance of the soil and medium for the animals inhabiting them has scarcely yet been considered, and a close study of individual species will be required to give the information needed on this point.

The trend of modern work is indeed to delimit and to come to grips with the problem of the relation of any animal to its habitat. The essence of the work on marine animal communities is the provision of a complete description of the factors of the habitat and the inter-relationships of the members, and the results should be stated so as to be capable of comparison or contrast with one another in all parts of the world.

J. H. O.

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## Applied Psychology.

PROF. J. McKEEN CATTELL, the retiring president of the American Association for the Advancement of Science, gave in his address at Kansas City on "Some Psychological Experiments," a portion of which was published in *NATURE* of January 16, an illuminating account of the development of the experimental study of individual differences. Starting with a description of the measurement of a simple sense reaction time, he proceeded to show, step by step, how the same type of objective measurement can be used in such a complicated action as the selection of a career.

Although no striking new experiments were described, Prof. Cattell's account of the recent applications of psychology was both original and stimulating. "Daily, weekly and seasonal curves," he says; "the optimum periods for definite tasks and for a day's work; industrial fatigue; temperature, ventilation and humidity; the most desirable sexual relations, food, amount and distribution of sleep; rest, play and physical exercise; the use and misuse of emotional excitement and of drugs as sedatives and stimuli: these have been the subjects of many investigations. . . ."

An interesting point discussed by Prof. Cattell is the variation of the curve of ease of learning with age. It is well known that a young child can learn to pronounce a foreign language more easily than can his father and mother. Three years is found to be the optimum age for acquiring pronunciation, and after the age of twelve years it can but rarely be learnt correctly. In the same way other abilities—both physical and mental—have their optimum learning curve at various ages. It is an important task for the educational psychologist to examine the practice curves of the ordinary school subjects at different age levels, so that he can suggest at what stage they should be commenced. Mathematical relations, Prof. Cattell finds, are generally taught a couple of years before the child's age allows him to respond to them with the least effort.

Reference is made to the work that is being done in England by the National Institute of Industrial Psychology to reduce industrial fatigue. Psychologists have found that by arranging for suitable alternative periods of rest and exercise, and by supplying training in the use of the most physiologically economical movements, it is possible to increase the output of the worker—be he miner, mill-hand, or typist—and simultaneously reduce his fatigue. Prof. Cattell outlines the enormous economic importance of this work and describes how in America a Psychological Corporation has been formed to advance this new science, to allow of research, and to protect the interest of psychologists. "The Father of American Psychology," as Prof. Cattell is well named, is the president of this Corporation, and its establishment has already been amply justified. W. J. G. S.

## University and Educational Intelligence.

BIRMINGHAM.—Dr. Daniel Hanson, principal assistant in the Metallurgy Department of the National Physical Laboratory, Teddington, has been appointed to the Feeney chair of metallurgy, which will be vacated by Prof. T. Turner at the end of the current session.

Mr. J. Armitage Robertson has been appointed assistant lecturer in zoology.

LONDON.—The following doctorates have been conferred: *D.Sc. (Chemistry)*: Mr. H. T. S. Britton (King's College and Imperial College—Royal College

of Science), for a thesis entitled "Part I. Some Electro-metric Studies of Reactions, with special reference to the Precipitation of Basic Salts; Part II. Some Studies of Salts of Rarer Metals"; Mr. H. D. K. Drew (Birkbeck College), for a thesis entitled "Heterocyclic Systems containing Tellurium in the Ring"; and Mr. M. A. Matthews (East London College and the Sir John Cass Technical Institute), for a thesis entitled "The Reactions of the meso-Hydroxy Anthrones and their Bearing on the Mechanism of certain Reactions"; *D.Sc. (Statistics)*: Mr. E. S. Pearson (University College), for a thesis entitled "Bayes' Theorem examined in the Light of Experimental Sampling"; *D.Sc. (Geology)*: Mr. George Slater, for a thesis entitled "Glacial Tectonics as reflected in Disturbed Drift Deposits," and other papers; *D.Sc. (Horticulture)*: Mr. H. R. Briton-Jones, for a thesis entitled "On the Diseases known as 'Bark Canker' and 'Die-back' in Fruit Trees," and other papers; *D.Sc. (Physics)*: Mr. L. F. Richardson, for a thesis entitled "Collected Works on Meteorology, Differential Equations, etc."

DR. H. R. BRITON-JONES, lecturer in mycology in the Department of Agriculture of the University of Bristol, has been appointed professor of mycology to the Imperial College of Tropical Agriculture, Trinidad.

MR. FRANK BALFOUR-BROWNE, formerly lecturer in zoology (entomology) in the University of Cambridge, has been appointed professor of entomology in the Imperial College of Science and Technology, South Kensington, in succession to the late Prof. H. Maxwell Lefroy.

APPLICATIONS are invited for two scholarships in connexion with the Manchester Royal Infirmary, namely, the Dickinson research travelling scholarship in medicine, value 300*l* for one year, and the Dickinson pathology scholarship, value 75*l* for one year. Particulars are obtainable from the Secretary to the Trustees, The Royal Infirmary, Manchester. The latest date for the receipt of applications for the scholarships is May 1.

A CENSUS of graduate research students in chemistry in the United States in 1925 shows that of 1763 such students in 121 universities, colleges, schools of engineering and agriculture, medical schools, and schools of pharmacy, 544 were engaged on work in the physico-chemical group of subjects: general, colloid, catalysis, subatomic, electro-chemistry, and photo-chemistry. Organic chemistry comes next with 430 students of whom 44 per cent. were working on the aliphatic series. The remainder are classified under the groups, medicine (333), agricultural, industrial, and engineering chemistry (237), inorganic chemistry (86), analytical and metallurgical (72), sanitary and food (61).

IN connexion with the celebration of the fiftieth anniversary of the Johns Hopkins University, it is proposed to establish a Brooks Research Fund in memory of the late Prof. William Keith Brooks. The income of this Fund is to be used to give to some advanced student in zoology or in botany aid in carrying out his work in direct contact with Nature, as at a tropical marine laboratory, or under other stimulating conditions of environment for growth and widening of experiences. The hope would be that from time to time some man thoroughly devoted to zoology or to botany might receive in this way needed aid at a critical point in his career. An offer of five hundred dollars has been received if a further ten thousand is raised. The Fund will be distinct from that now being raised to celebrate the jubilee of Johns Hopkins. Prof. E. A. Andrews, Johns Hopkins University, is chairman of the appeal committee.

"WHAT every woman's college course ought to include" is a question which has been much discussed of late by the Faculty of Barnard College, Columbia University. The conclusions arrived at as a result of these discussions are described in an article by the Dean of the College, Virginia C. Gildersleeve, in the December number of *School Life*. While recognising that in many fields of work it is almost impossible to say that one subject is for all students more valuable than another and a wide range of choice must be permitted, the College prescribes for all the mastery of certain fundamental tools useful for successful work in any field. These are: "A command of written and spoken English, the ability to read at sight with ease at least one foreign language, a healthy body, and a knowledge of hygiene." To ensure the acquisition of these tools, courses in English composition, spoken English (chiefly for remedying defects of the voice), personal hygiene, and human biology are made compulsory—the three first-mentioned being taken during the first of the four years of college life. All students are also obliged to take, during their four years, appropriate physical exercise. As regards the selection of the remainder of the curriculum, two general rules are laid down. On one hand every candidate for a degree must pursue in some one subject a course, carefully planned and supervised by the department concerned, on lines designed to ensure a fairly thorough knowledge of it. On the other hand, in order to avoid too much concentration, every student is required to reach a certain minimum standard in at least one subject chosen from each of the three groups—languages, literatures, and fine arts; mathematics and natural sciences (including some laboratory work); and social sciences.

A REVIEW of Education in India in 1923-24 by the acting Educational Commissioner, which the Government of India has recently published, shows that in the field of higher education the year was in several respects one of disillusion and reaction. In the University of Allahabad, for example, the new constitution was found to keep the minds of the teachers so engaged in the technicalities of meetings of university bodies that they had insufficient time left for teaching duties. In Bengal a widespread dissatisfaction with the existing university system found expression in a reaction against literary education and a preference for science courses. From Assam came reports that graduates and undergraduates seek employment in vain and create discontent with the system which has brought them to such a plight. The University of the Punjab was reported to be "becoming more and more on the major side of its activities an examining body." The policy of separating the intermediate classes from the university course of study has been found in the United Provinces, where it was tentatively adopted, to be unworkable for the present in the colleges which prepare degree candidates. In Bombay the school-leaving certificate examination does not altogether fulfil the hopes with which it was instituted, and it was decided that the University should resume the conduct of its matriculation examination. The Dacca Vocational Education Committee presented a report in which doubt is thrown on the belief of the Calcutta University Commission that at the intermediate stage vocational education can be so combined with general education as to produce a worker competent to earn his living with the training which he has undergone at the close of that stage. There was also disillusion of a beneficent kind on the part of some political enthusiasts and the effect of the non-co-operation movement on attendance in schools became negligible. The University of the Punjab embarked on a new venture in the opening of its first science laboratory—that of chemistry.