descriptions of bacterial species from many widely scattered books and special monographs, but the orderly arrangement of these descriptions, many of them imperfect and fragmentary, is a labor calculated to daunt any but Teutonic patience. That the task has been accomplished in such a satisfactory fashion by Professor Migula is matter for general congratulation.

There doubtless exist differences of opinion among bacteriologists as to how far systematists should carry out the process of welding together descriptions of species. There can be no question that many of the 'species' now masquerading under different titles are in reality identical and should be grouped under one name. On the other hand, it is equally true that forms now classed as 'varieties' are actually distinct and may be shown by future investigators to be widely separated. Two opposite tendencies are plainly visible among bacteriologists concerned in work of this character—and all bacteriologists are sooner or later brought face to face with the question of the 'identity' of the forms with which they are working: the tendency to magnify physiological differences and erect into new species or varieties those forms showing even slight divergence, and the tendency to ignore minor physiological characters and to include closely allied organisms under one species or group-name. Much more detailed study of the natural varieties of bacteria and of their plasticity under artificial conditions is necessary, however, before the true path can be surely determined.

The course pursued by Professor Migula in this matter is likely to command general approval. It will probably be more useful at the present stage of our knowledge to possess a convenient and accurate record of all descriptions by all writers than to have an elaborate tabulation that has been subjected to too much revision and consolidation. At the same time it may be questioned whether it is necessary or advisable to include in a work of the highest standard, descriptions glaringly imperfect and defective, so imperfect in fact that identification and evaluation are not now and never can be possible. The pages of the *System der Bakterien* might well be pruned of much dead and useless material of this nature.

The permanent value of a text of this sort can be thoroughly tested only by continual practical use, and it would be a work of supererogation to seek for the minor sins of omission and commission which any work dealing with bacterial classification must at present necessarily contain. One regrettable, but perhaps pardonable oversight only need be mentioned. The careful descriptions of a large number of water bacteria by two American bacteriologists, Wright (Memoirs National Academy of Sciences, VII., 1895) and Ravenel (Memoirs National Academy of Sciences, VIII., 1896) have evidently not come under the author's notice. Omissions of an important character are, however, surprisingly few and Professor Migula's great treatise will long remain the standard work in systematic bacteriology.

Edwin O. Jordan.

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*SCIENTIFIC JOURNALS AND ARTICLES.*

*Bird Lore* for April opens with a description of 'A New Camera for Bird Photographers,' by the designer, John Rowley. 'Photographing a Robin' is described by A. L. Princehorn and 'How a Marsh Hawk Grows' is told by P. B. Peabody. In an article on 'The Egret Hunters of Venezuela,' George K. Cherrie shows the 'egret farms' of which we have heard are purely mythical and that the gathering of shed egret feathers is simply an incident in the work of the plume hunters. Marion E. Hubbard describes 'Bird Work at Wellesley College' and the balance of the number is given over to notes, correspondence, book reviews and reports of Audubon Department. The editor discusses the amendment to the law designed to protect non-game birds.

*The Plant World* for March begins with an amusing article on 'Popular Ignorance concerning Botany and Botanists,' by Aven Nelson T. H. Kearney discourses 'Concerning Saxifrages.' A. M. Curtiss tells of 'The Water Hyacinth in Florida.' A. Wetzstein of 'The Velvet Dogbane in Ohio,' and L. H. Pammel of 'The Twin-Leaf (*Jeffersonia diphylla*) in Iowa.' Under 'Plant Juices and their Commercial

Values,' Mrs. Caroline A. Creevy tells of tar, camphor, manna, opium and some perfumes. In the supplement devoted to the 'Families of Flowering Plants,' Charles Louis Pollard discusses the orders Pandanales, Helobiæ and Triuridales.

THE *Mathematical Gazette*, the organ of the English Mathematical Association, will in future be issued six, instead of three times a year. The *Gazette* will contain articles suggestive of improvements in methods of teaching, or covering ground not satisfactorily treated in text-books, reviews of mathematical books, together with shorter notices of new text-books, elementary mathematical notes, problems, and other matter of direct interest to mathematical teachers.

*Erythea*, the Italian botanical journal, will be discontinued at the close of the present volume.

## *SOCIETIES AND ACADEMIES.*

### SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE annual meeting was held on the evening of Monday, March 26th. Professor J. McK. Cattell was elected Chairman for the ensuing year. The Secretary of last year was continued in office.

Dr. A. L. Jones read a paper on 'The Symbolic Character of Geometrical Forms as a Principle of Explanation.' Among the attempts to explain formal beauty, that of Lipps in his 'Raumästhetik' is the most striking. He maintains that the æsthetical value of beautiful geometrical forms is due to the fact that they symbolize the activity of mechanical forces working themselves out freely; that we sympathize with the forces thus represented and receive pleasure when their action is unhindered; that the forces and laws of their action are not consciously recognized, but are merely *felt* or known unconsciously. His explanation involves some questionable metaphysics. The action of mechanical forces is no doubt an important element in many beautiful objects, but it remains to be proved that it is sufficient to explain all formal beauty in objects.

Dr. R. S. Woodworth presented a paper on 'The Fatigue of Voluntary Movement.' The fatigue of movement may be studied in reference to the loss in force, in accuracy, or in speed. In each of these respects experiments show that a movement may be continually repeated for hundreds and even thousands of times with only a comparatively slight loss of efficiency. The ergographic curve given by Mosso for force of movement is to be absolutely abandoned as a true picture of the curve of fatigue. This fact has been of late recognized in some able articles by Treves, working in Mosso's own laboratory; but it is best brought out by the use of Cattell's spring ergograph. One of the great causes of fatigue in force (and also in speed) of movement is the failure of the muscles to relax completely between successive contractions. If care is taken to secure this relaxation, 1000–1500 maximal ergographic contractions can be made with a loss of only 10 per cent. of the initial force. From the slowness of fatigue of various modes of voluntary movement, the inference follows that the fatigue of nerve centers is not rapid, as Mosso and Lombard have supposed, but slow in progress. This view is confirmed by tests of prolonged, hard and monotonous work of a mental kind. The quick and overmastering fatigue of common experience is not so much actual inability and loss of function as it is disinclination, resulting from disagreeable sensations and emotions and from impulses to change.

The third paper, given by Dr. Thorndike, was on 'Weber's Law in Judgments of Comparison with a Mental Standard.' This paper presented the results of some experiments on the accuracy of discriminations of weight, length and area, by subjects who judged by the aid of mental standards only. Within the limits chosen (40–120 gr., ½–12 ins., 20–60 sq. cm., and 2–12 sq. ins.) the accuracy of discrimination was found to decrease very slowly, very much more slowly than Weber's law or even the law of the combination of errors would allow. The theory proposed to account for this was that our judgments of amount or of difference are of complex origin, and may be made on various grounds. In so far as the ground is an accurate mental standard the sensations corresponding to large amounts may be associated with the proper judgment nearly or quite as readily as small amounts. In so far as the