ever seeing any mammalian generic names of the present day composed of three words or in the plural number. It is of course perfectly open to any one to accept Meuschen's polynomial plurals as 'genera,' if it seems good to them; the point here made is that a perfectly satisfactory bibliography should state the exact facts and leave the reader to apply them according to his own judgment.

Appreciating the immense and self-sacrificing labor devoted to this work by Mr. Sherborn and the committee, and the very great value to all working zoologists of the result; while feeling that any criticism must seem ungracious, we nevertheless believe that it is a matter of duty to insist on the importance of greater fulness in description and exactitude in citation of works in regard to which any doubt can exist. Otherwise an uncertainty which would be deplorable must rest on the published results, of such importance to every zoologist.

WM. H. DALL.

A Manual of Bacteriology. By ROBERT MUIR, M.A., M.D., F.R.C.P. (Edinburgh), Professor of Pathology, University of Glasgow, and JAMES RITCHIE, M.A., M.D., B.Sc., Reader in Pathology, University of Oxford. American edition (with additions), revised and edited from the third English edition by NORMAN MACLEOD HARRIS, M.B. (Toronto), Associate in Bacteriology, the Johns Hopkins University at Baltimore. New York, The Macmillan Company. 1903. 170 illustrations.

Every student of bacteriology is familiar with this excellent work of Muir and Ritchie, which must be regarded as one of the most comprehensive and most useful writings upon the subject, and every American student of bacteriology will welcome Dr. Harris's edition. In the preface of the American edition, Dr. Harris assures us that an endeavor has been made to add to the value of the book by giving practical expression of the best American laboratory methods and research, and at the same time to augment the general scope of the work without eliminating the personal impress of the author. Therefore, occasional alterations and additions of greater or lesser magnitude have been made throughout the book in general, but more especially in the chapters upon 'Methods of Cultivation of Bacteria,' 'Microscopic Methods—General Bacteriological Diagnosis—Inoculation of Animals,' 'Bacteria of the Air, Soil and Water—Antiseptics,' 'Typhoid Fever—Bacilli Allied to the Typhoid Bacillus' and 'Tetanus.'

Dr. Harris has so successfully introduced the added matter that it is practically impossible to differentiate his insertions from the original text, and we are pleased to observe that the original general arrangement and treatment of subjects has not been departed from. We are impressed with the care exercised by Dr. Harris in introducing new matter and bringing the book up to date, as well as by his selection of the important contributions of American writers to be introduced. We find the chapter upon 'The Methods of Cultivation of Bacteria' containing sufficient references to the work of Mr. Fuller upon 'The Standardization of Media' and the recommendations of the laboratory committee of the American Public Health Association upon the same subject. We also note with pleasure a description of Hill's 'Hanging Block Cultures,' by which the growth of bacteria upon solid media can be observed under the microscope. Stuart's 'Cover Glass Forceps' appear in the chapter upon 'Microscopic Methods.' Pitfield's method of staining flagella is considered with care. The chapter upon 'The Relation of Bacteria to Disease' has lost none of its excellency, though this chapter has always been of such a superior quality that it would be hard to find any way to improve it. Throughout the special part of the work we notice that matters of recent controversial interest are carefully, though not dogmatically, treated. The various toxic products of bacteria are mentioned in brief, commonly with the conclusion that very little is known about them, so that the student is not led astray. Likewise the importance of antitoxins and antiserums in those diseases in which their virtue is not proved, are but briefly dwelt upon. Koch's suggestion that the bovine tubercle bacillus does not infect man is discussed and Theobald Smith's pre-

vious contribution upon the subject mentioned. The matter is dismissed with the statement, 'As at present the subject is still under investigation in this and other countries, it would not be justifiable to dogmatize, but in the meantime we see no sufficient reason to depart from the view entertained up to this time, that the tubercle bacilli infecting mammals are of one and the same species, though differences in virulences obtained, and that milk containing tubercle bacilli is a highly important source of infection to the human subject.'

The other 'acid-fast' bacilli are mentioned briefly without speculation as to the probable ancestral importance of the grass bacilli of Moeller, to the smegma bacillus, lepra bacillus, tubercle bacillus and others. The chief use of tuberculin is said to be the diagnosis of tuberculosis in cattle. Concerning the new tuberculin, it is said 'Little success has attended the use of this substance as a remedial agent.' It is said that attempts to grow the leprosy bacilli outside of the body have so far been unsuccessful. Evidently the editor does not accept the recent contributions to the subject. The bacillus of rhinoscleroma is said not to stain by Gram's method.

The chapter upon 'Typhoid Fever' is excellent and the treatment of the colon bacillus unusually good. The author points out that the mere presence of the colon bacillus in water is not necessarily indicative of sewage pollution, as this organism is so widely distributed in nature. He also shows that the presence of the *Streptococcus* and *Bacillus enteriditis sporogenes* are important adjuncts in the detection of sewage. The microorganismal differences between fresh and stale sewage are also dwelt upon. Considerable attention is devoted to bacillary dysentery, the recent work of Flexner being given sufficient prominence. In the chapter upon 'Diphtheria' Dr. Harris seems doubtful whether the bacillus of Hoffman is an attenuated form of the diphtheria bacillus or a separate species, though he says: 'The possibility of the transformation of the pseudo-diphtheria (Hoffmann's) into the true diphtheria bacillus has been the subject of much controversy, but it can not be regarded as sufficiently established that such a transformation may be effected, still less that the former organism is related to the origin and spread of diphtheria.' We heartily endorse Dr. Harris's view that it might be well, when practicable, that every ragged unhealthy-looking wound, especially when contaminated with soil, should, as a matter of routine, be examined bacteriologically. Under such treatment from time to time cases of tetanus would be detected earlier and their treatment could be undertaken with more hope of success than at the present time. We have, however, not infrequently made very careful bacteriological studies of wounds, shortly afterwards followed by tetanus, in which for unknown reasons we failed to find any bacilli, and we regret that Dr. Harris does not recommend that simultaneously with this bacteriological examination a prophylactic injection of the antitoxic serum be given. We are fully convinced that by routine use of the antitetanic serum for purposes of prophylaxis many useful lives might be saved. We regret that in the chapter on yellow fever the name of Dr. Carlos Finlay does not appear. It was Dr. Finlay who originated the mosquito theory. The United States Army Commission of 1900 and 1901 simply proved it to be correct.

The chapter upon 'Immunity' is excellent, though we do not regard the space devoted to the 'lateral chain theory' of Ehrlich as sufficient, considering its importance and wide usefulness, and we also regret that no diagrammatic representation of Ehrlich's views is given. The usefulness of the book is augmented by excellent though brief chapters upon such other microparasites as molds, yeasts, the malarial organisms and the ameba coli. At the end of the volume eighteen pages of bibliography are appended in which a great deal of very useful material is stored away in such form that we doubt whether it will ever be utilized by students. There seems to be no systematic mode of reference to the literature given, and our impression is that references in the text to footnotes at the bottom of the page or to literature given at the end of each chapter is a far more useful

method of introducing bibliography into text-books.

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SOCIETIES AND ACADEMIES.

ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of June 1, 1903, Drs. B. M. Bolton and D. L. Harris exhibited sections cut after infiltration with agar-agar, and described the use of this material for embedding purposes as follows:

Tissues can be readily hardened and embedded for cutting into sections in a hot solution of agar-agar containing formalin. The proportions of the mixture which have so far yielded the best results are nine parts of a five per cent. aqueous solution of agar-agar to one part formalin. This mixture can be prepared beforehand and kept indefinitely in an air-tight vessel. The agar-agar should be boiled for several hours, and after the addition of the formalin allowed to clear by sedimentation. The bits of tissue to be embedded are placed in a wide test-tube or wide-mouth vial containing the mixture previously melted. This is kept at 65–70° C. for an hour or longer, and the tissues are ready to be blocked. After attaching to blocks they are placed in strong or absolute alcohol for an hour or two and can then be cut. It is important not to use dilute alcohol. The tissues are stuck to the blocks by means of the agar-agar itself and adhere as soon as the agar becomes cold. No previous hardening of the tissues is at all necessary; fresh tissues can be placed at once into the hot agar-agar-formalin mixture; in fact, fresh tissue is more desirable than that which has been previously hardened, though this can also be readily embedded by this method. But the main advantage of the method, aside from its convenience and simplicity, is the fact that the cells of the tissues are not at all contracted or shrunken, and the ordinary methods of hardening have this effect more or less. With sections prepared from fresh tissues by this method the cell-protoplasm fills out the membrane fully, and the granules of the protoplasm, the nuclei, and the cell contours are remarkably distinct. The whole process, hardening, embedding and cutting, does not occupy more than three or four hours, where the tissues are not larger than about one centimeter in diameter.

Professor A. W. Greely presented the results of an investigation of the relations of *Paramœcia* and other protozoa to chemical and electrical stimuli. A detailed account of this investigation has been contributed to SCIENCE.

WM. TRELEASE,
Recording Secretary.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

AT the 143d meeting of the society, held in the assembly hall of the Cosmos Club, Wednesday evening, April 22, 1903, a general discussion on the problem of the occurrence and storage of crude petroleum and petroleum products was opened by Dr. David T. Day in a paper entitled 'Experiments on the Diffusion of Crude Petroleum through Fuller's Earth.'

Dr. Day reviewed a series of experiments which he has been carrying on intermittently within the last five years on the changes which take place in crude oils by diffusion through various porous substances.

It was found that if crude petroleum were allowed to pass slowly through finely pulverized fuller's earth, it became separated by fractional diffusion into a series of oils differing in color and specific gravity from the original product, and representing the comparatively simple oils of which the complex crude petroleum is composed. In color the fractions varied from the dark brown or amber of the crude to the clear white of refined petroleum, and variations in specific gravity from .70 to .85 were secured.

An account was given of a series of experiments conducted by Professor Engler, to determine the nature of the changes which took place in the oil. Professor Engler's conclusion was that no chemical change whatever took place in the process of diffusion, the differences in the resulting products being entirely physical.

Experiments as to the effectiveness of various diffusion media tended to prove that the best results are invariably attained by the use