NOMENCLATURAL EFFICIENCY

THE economic bearings of nomenclature have been touched upon by Prof. C. W. Stiles, of the U. S. Public Health Service, in the issue of SCIENCE for February 25. No one can take exception to his plea for greater efficiency in nomenclature or to his suggestion that students be given instruction in regard to such matters.

It seems fitting in this connection to briefly summarize present conditions. Our system was proposed by Linnaeus, and doubtless in his day he was regarded as something of a nomenclatural heretic. The system has rendered admirable service and at the time it was proposed met every reasonable need. In those days, general zoologists were doing most of the work, describing species, building up nomenclature and all possessed a somewhat comprehensive viewpoint of the situation as a whole. To-day so far as active contribution to nomenclature is concerned, the general zoologist exercises a comparatively small influence and is mostly limited to passing upon questions of priority, general validity and taxonomic values with occasional dissertations upon the necessity of deriving generic names from the Greek and expressions of dissatisfaction at departures from this somewhat well-established procedure. The genera of the present day, the fundamental units in our system, are being proposed in large numbers mostly by specialists, some of whom at least are more concerned in securing diversity than in the effect the name proposed may have upon classification as a whole. In other words, the rather inexperienced men in general nomenclature are making most of the additions, while zoologists as a whole ignore the ascendency of the specialist, something entirely unsought in most cases, and insist that all generic names must be considered as a part of a large unchangeable whole in a world where stability is unknown. The law of priority is invoked as the stable feature of the system, and no restrictions whatsoever are laid upon the proposer of new names, save that he must see or think that he sees some form worthy of generic rank. Any combination of letters, significant or otherwise, short, long or unreasonable polysyllabic conglomerations are all acceptable, provided they have not been duplicated by any one else throughout the entire zoological series. There are cases where naturalists have proposed extremely long names simply to lessen the probability of creating a homonym, and in some instances the selection of a generic name has been prompted by a sense of satire rather than consideration for the system as a whole. This uncontrolled and to a certain extent irresponsible extension of nomenclature has continued for 175 years with little suggestion as to changes for the better, in the larger sense, at least.

It must be admitted at the outset that nomenclature is not an end in itself. It is presumably an aid to classification and therefore efficiency in the broadest possible sense should be the chief criterion. The system was not created to honor earlier workers, even though they have made large and valuable additions to knowledge as a whole. Nomenclature is not an exercise in Greek or a test for memory; it is or should be a tool to assist in the ready placement of the long series of species with which the naturalist is compelled to deal. With this clearly in mind, and remembering also that a very large proportion of our concepts, which we instinctively associate with generic names, are based almost entirely upon association, and to a very slight extent upon the significance of the name itself, we may well inquire whether our system of nomenclature is the efficient tool that it might be, and whether it is a credit to the organizing ability and acumen of the zoologists who have been responsible for its development. This is not a reflection upon earlier taxonomists. It is simply a statement of facts deserving most careful consideration.

The system is faulty in a number of respects. We would emphasize the following points in a summary of present conditions:

(1) The long and constantly increasing series of generic names, now some 160,000, possess little definitive value in themselves.

(2) Dependence for taxonomic significance in generic names is largely upon the position of the name in the systematic list or other work of a general character.

(3) A scrutiny of generic lists shows thousands of homonyms, many of which should have been avoidable.

(4) Zoologists generally have failed to take advantage of the superior classifying and placing value of the initial syllables in names.

(5) The short prefixes have been grossly abused by indiscriminate, unintelligent use.

(6) There has been no serious attempt, aside from a few proposals to be mentioned below, to take advantage of the possibilities of comprehensive placing systems.

(7) Zoologists as a whole have invoked the law of priority as the one stable feature in a system where stability is impossible, though recognition of priority is decidedly helpful.

(8) We have an exceedingly complex system to which nearly unrestricted, unregulated additions are made by practically independent workers throughout the world.

A very curious condition prevails at the present time. There is a general feeling that our system of nomenclature is stable, is satisfactory and should not be modified on account of the ill effects following any such change, and yet most scientists are changing generic concepts with their transfer of species, re-erecting under the law of priority older and forgotten names, and our International Commission on Zoological Nomenclature is wrestling with very abstruse problems and issuing from time to time official lists of generic names, which may remain in an accepted class for a decade, generation or longer. The relation between problems solved and those created is possibly one to ten. We are trying, as it were, to swim up stream against a strong current. The situation is such that some economic entomologists at least have felt that the despised and supposedly unstable common names were more reliable than the presumably superior scientific names, which have from time to time been applied to economic species. There is not a more instructive work for the man interested in nomenclature than Sherborn's "Index Animalium," with its lists of hundreds of species referred to various genera in earlier years and now widely scattered under other designations. Only a glance is sufficient to suggest the enormous amount of time which has been spent working out synonymy and referring these various species from genus to genus. It is the opinion of the writer that more time has been spent upon this relatively useless and to a large extent avoidable activity than would have been necessary to recast our entire system of generic names in a logical manner to accord with modern methods of classification or placing devices.

No one can deny the value of regulated diversity, provided it does not place intolerable restrictions upon individual workers. Why not recognize the fact that we are at present traveling toward greater confusion and loss of efficiency simply because, following the law of inertia, we have held that the methods of a hundred years ago are "good enough" and no one has dared to tackle this large proposition in a comprehensive manner? Should we not recognize the situation as it is and endeavor to find a practical solution for present difficulties? Some blame the inadequacy of our nomenclatural system upon the diversity of life itself and in a measure admit their inability to reach a successful solution.

Think for a moment of the opinion we would form if a business or political unit were to establish a comprehensive classification, and then turn it over without restriction to subordinates in all parts of the world. Chaos would speedily result, unless the organization maintained a certain measure of supervision, and if one were to go into business houses, he would be very apt to find a system of letters or numerals imposing a fairly accurate classification upon the various branches of the business. Compare the above with our present system or lack of system! No one to-day advocates the methods of one hundred or two hundred years ago in transportation, communication and the like, and why should we assume that a change for the better can not and should not be made in relation to nomenclature?

The practical advantages of systematically diversified generic names are indicated by the somewhat general employment in various groups of short and characteristic combinations as suffixes, and occasionally as prefixes, for related genera. For example, among the mammals there are some 348 genera with the combination mys, mouse, and 268 with nycteris, bat, and in insects a number of similar cases may be readily cited, such as thrips in 256 genera; termes in 121 genera; diplosis in over 100 and psylla or psyllus in some 99 genera. Similarity in generic names for related forms is certainly a great assistance, and the unfortunate condition in relation to those listed above, and numerous others to be found throughout the entire animal series, is that they have not been systematically applied.

The need of systematic diversity in our zoological names has been recognized by various individuals, and several proposals have been made, none of which have been adopted, largely on account of the conservative attitude toward changes in nomenclature, and presumably in some instances at least on account of the new methods not solving the problems in a satisfactory manner. One of the earliest was that of Professor Harting[1] in which he proposes a system of class suffixes combined with ordinal prefixes. The use of letter formulae for kingdom, phylum, class, order and genus and numerals for species was proposed by Tornier[2] for both animals and plants. The use of prefixes and suffixes for the ready placing of generic names of animals and plants was proposed by Herrera[3] and a series of initial letters for classes and ordinal prefixes by Rhumbler.[4] Jonathan Dwight, Jr.,[5] and Professor James G. Needham[6] both make pleas for a more logical nomenclature. Dr. Heikertinger gives a somewhat extended discussion of the possibilities of prefixes and suffixes.[7] A more recent and in certain respects, at least, a more com-

[1] *Archiv. f. Naturgesch.*, 1: 26–41, 1871.
[2] *Zoologischer Anzeiger*, 21: 575–580, 1898.
[3] SCIENCE, 10: 120–121, 1899.
[4] *Zoologischer Anzeiger*, 36: 453–471, 1910.
[5] SCIENCE, 30: 526–527, 1909.
[6] SCIENCE, 32: 295–300, 1910.
[7] *Zoologischer Anzeiger*, 47: 198–208, 1916; 50: 41–54, 299–302, 1918–1919.

prehensive system has been outlined by Felt and Bishop[8] in which code prefixes are proposed, these latter to have nomenclatural and differential status, to be written as a part of the generic name, save that the latter is also capitalized; they would therefore function as taxonomical classifying devices and thus facilitate the work of specialists by making it necessary to examine only the names in a given family or larger group before proposing a new genus, and this without material interference with the status of the genus as to date of erection, type and author or transferal from one family, order, class or phylum to another.

It should be assumed that the proposals outlined above were made for the purpose of bettering nomenclatural conditions. No one of them probably includes all that is best or acceptable. They all emphasize, however, the need of a systematic nomenclature and that can not be secured without more restrictions than now obtain. It is here suggested that our leading zoologists, particularly those interested in nomenclature, and this should really include all zoologists, give serious consideration to this entire matter and endeavor to work out, very probably through the International Commission on Zoological Nomenclature or a committee appointed by that commission, a method of more nearly meeting present-day needs than the one now current. This would mean a large amount of labor. It should be entirely possible first to establish within certain basic divisions such modifications as might be necessary, though a comprehensive presentation covering the entire animal group would be more satisfactory and entirely within possibilities. It may be stated in this connection that the writer has applied code prefixes under the name of classifying symbols to all the families of American insects and is using the system in arranging the New York State Collection of Insects. The precise plan adopted is not so important as to secure a material change for the better, one reasonably consonant with modern classificatory or placing methods. Objectors may claim that zoological classification has not advanced sufficiently to permit the adoption of a general plan. There is no greater aid to understanding than an effort to group logically the various components of a series. Several of our associates have expressed themselves in favor of a better system and have stated that a change should have been made years ago. Many of the older zoologists undoubtedly feel rather well satisfied with the present system, because it is the one which they have known for years. Efficiency should be the final test and if this generation fails to hand down a satisfactory terminology, it is well within possibilities that a succeeding generation, possibly driven to action by confusion worse confounded, may adopt such radical changes that our present nomenclature will become an historical relic. Mere age is no reflection. Linnaeus were he alive to-day would undoubtedly propose a system more nearly adequate to present needs.

The suggestion by Professor Stiles that there be a custodian, as it were, of zoological nomenclature has merit, though it lacks desirable comprehensiveness so far as meeting the situation as a whole is concerned. There is something in Professor Needham's plea for a better "way of disposing of our nomenclatural trouble than by making it as burdensome as possible and then making it permanent."[9] It is not enough simply to avoid homonyms. There is urgent need of some adequate differential or classifying device as part of the generic name before we can claim reasonable efficiency in nomenclature. A careful reading of the numbered paragraphs shows that improvement is possible. It may even be admitted that action along progressive lines is posterity's due.

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[8] *American Naturalist*, 60: 275–281, 1926.

[9] SCIENCE, 32: 296, 1910.

SCIENTIFIC EVENTS

MEMORIAL SERVICES TO CHARLES D. WALCOTT

IN commemoration of the life and achievements of Dr. Charles D. Walcott, memorial services were held at a number of educational institutions in the Pacific Northwest on or near the date of March 31. This particular date was chosen because it was Dr. Walcott's birthday.

The movement was initiated by the officers and council of the Northwest Scientific Association and meetings were held at the following places: Montana State University, Missoula; Montana State College, Bozeman; Montana State School of Mines, Butte; Idaho State University, Moscow; State Normal School, Lewiston, Idaho; Oregon Agricultural College, Corvallis; Washington State University, Seattle; Washington State College, Pullman; Washington State Normal School, Ellensburg; Washington State Normal School, Bellingham; Washington State Normal School, Cheney; Gonzaga University, Spokane University, Spokane College and Whitworth College, all of Spokane, Washington.

In addition to these services a joint service was held in Spokane, Washington, in which the following organizations participated: Eastern Washington His-