characters. But to-day no careful student would think of describing genera and species in this group without careful study of these characters. What of the future? Just as important characters await discovery, most, if not all, of our present concepts of genera and species will fade away before this broader knowledge like mist before the rising sun. In talking to some zoologists it seems to me that their conception of stability consists of a desire for the retention of the names that they learned, some of them 60, some 40, some 20 and some 10 years ago.

I remarked to a friend the other day that the whole thing reminded me of the embarrassment that we are sometimes confronted with in these days of easy divorce. We can never be sure whether the lady we are talking to is Mrs. Smith or Mrs. Jones, but we can be sure that it is the same person we knew for a long time as Mrs. Johnson. New names are embarrassing and confusing, but the true systematist can offer no escape from this confusion.

There is another idea prevalent in the minds of many biologists that needs to be corrected. For want of a better name I shall call this the pill-box in nomenclature. It runs something like this. If our conception of an animal fits a certain size pill-box it is a species; if it fits a larger box it is a genus. All that remains is to fit the animals in their appropriate boxes. All systematics degenerates, therefore, in the minds of many biologists to a kindergarten game of fitting triangles, squares, circles, *et cetera,* into appropriate openings. But the matter is hardly as simple as this. No one has defined the terms, genera and species. Concepts, especially concepts as varied as these, do not lend themselves to being crammed into pill-boxes. These objects that we call species are about as complex by comparison as the mosaic on the stairway of the Library of Congress. And it is, therefore, a little difficult to fit these complicated patterns into the appropriate openings in the general scheme of things. Stability won't do it. Stability simply puts many a square peg in a round hole and *vice versa.*

Dr. Gleason's two principles[1] won't do it, for no group of more than two systematists would ever agree as to what constituted a forgotten or nearly forgotten name. For the lines separating names in use, nearly forgotten and forgotten are as non-existent as other lines in nature; they are man made and, like all other boundaries, subject to shifts. Hence, good-bye stability. The second principle, that of making no changes unless the author believes he is thereby adding to the sum total of human knowledge, may be needed in certain fields of science, but in systematic zoology—never. All systematic zoologists (even the mythical Dr. X who discovered that the name of the cow should be *Equus caballus* and the name of the horse should be *Bos taurus*) know that they are adding to the sum total of human . . . (excuse me, I almost wrote confusion) knowledge.

Z. P. METCALF

NORTH CAROLINA STATE COLLEGE

[1] SCIENCE, 71: 459.

ADMIRAL WALKER'S APPRECIATION OF THE WORK OF COLONEL GORGAS

MY attention has to-day been called to an article in SCIENCE for May 30, 1930, written by Dr. John F. Stevens, formerly chief engineer of the Panama Canal, which is couched in such vague terms that I feel he may be doing an unintentional injustice to my father, Rear Admiral John Grimes Walker, the first chairman of the Panama Canal Commission.

Dr. Stevens writes of "the condition of affairs on the isthmus during a part of the year 1905" and speaks of his arrival there in July of that year and what he then found to be the situation—"the then chairman of the Isthmian Canal Commission accompanied me on my first visit to the isthmus, remaining there but five days, as the situation did not appeal to him. . . . Neither the Governor nor the chairman had the least faith in the efficacy of the mosquito theory—at least they so emphatically advised me at once, and their actions confirmed their words."

As the commission of which Admiral Walker was chairman resigned in a body on March 30, 1905, these remarks evidently do not apply to him but to his successor in office; as, however, few people are likely to remember the exact date of the formation of the new commission and as Admiral Walker's name has been long and widely connected, not only with the Panama Canal Commission but also with the preceding commissions which carried out all the vitally important preliminary investigations and studies, I feel that Dr. Stevens' omission of all names in making the foregoing statements is extremely misleading.

Admiral Walker had followed with deep interest Colonel Gorgas' wonderful work in ridding Cuba from yellow fever and was so firmly convinced of its value that when President Roosevelt sent for him and offered him the chairmanship of the commission being formed to build the canal the first condition he made was that Colonel Gorgas should be put in charge of the medical and sanitary work on the isthmus. As to the reference to "the then chairman's" stay of only five days on the isthmus "as the situation did not appeal to him"—to any one who knew Admiral Walker this in itself would prove that Dr. Stevens was not referring to him, for he was on the isthmus

many times in connection with canal matters, spending months at a time there, often living in tents in the jungle in order to know at first hand the problems along the proposed routes.

I am collecting material for a sketch of my father, but as I sail for Europe this week I have put all papers in storage and can at present only state the facts as known to myself, the only bit of corroboration at hand being a sentence from a report to Hon. William H. Taft, Secretary of War, dated March 16, 1905, as follows: "The Commission . . . moreover feels itself under obligation not only to provide screens for all buildings owned or controlled by it, but would like to see all buildings where screens would be of any service suitably screened."

I should be glad if you could find space for this letter in order to correct any possible misconception of Dr. Stevens' meaning.

FRANCES PICKERING THOMAS

BOSTON, MASS.

SCIENTIFIC BOOKS

Die Phylogenie der Pflanzen. DR. WALTER ZIMMERMAN, University of Tübingen. Jena, Verlag von Gustav Fischer, 1930.

THIS is one of the comprehensive works which are a feature of German scientific activity at the present time. It deals with the subject of the evolution of plants, particularly the higher plants, in a thorough fashion from the standpoints not only of morphology, anatomy and development, but also what is rarer, from the standpoint of fossil plants. It is dedicated to Graf Zu Solms-Laubach.

The volume consists of about 450 pages, only some 50 of which are devoted to the Thallophytes. This apparent discrimination against the lower forms arises out of the historical basis of the volume under consideration. Since the record of the lower forms is extremely imperfect, they naturally do not supply abundant material for this volume. About 400 pages are given over to the consideration of the Cormophyta. About 50 pages are devoted to general problems such as the structure and combination of organs, the differentiation of organs, the development and differentiation of the stele and wood, and to reproduction. Under the Cormophyta are included the Bryophyta, which are very briefly considered. Following is the division Psilophyta, to which the author appends the Asterophyta and Psilotales. The third division comprises the Lycopsida, including the forms which are now clearly recognized as coming under this comprehensive heading. The fourth division comprises the Articulata, which are equivalent to Dr. Scott's Sphenopsida. Under this group are arranged the Hyeniales, Pseudoborniales, Sphenophyllales, Cheirostrobales and Equisetales, which are divided into three families, the Asterocalamitaceae, Calamitaceae and Equisetaceae. Next comes the division Pteropsida, including the Filicinae—Primofilices, Eusporangiatae, Osmundales, Leptosporangiatae and Hydropterides. Follow the Gymnospermae, including Pteridospermeae, Cycadophyta, Ginkgophyta, Cordaitales, Coniferae and Gnetales. This chapter is most interesting because it correlates to a large degree the anatomical, morphological and paleobotanical work done in recent years. The treatment of the Conifers indicates the confusion of opinion which still prevails in that field. The botanical world will await with keen interest the complete publication of the investigations and views of Florin and Walton in this important field, since the Conifers, on account of their long duration in geological time and present good state of development, constitute the most important of all biological documents from the evolutionary standpoint. The unchallenged antiquity of the araucarian Conifers no longer prevails and the next few years are likely to see very fundamental changes in this important field. The third division of Pteropsida comprises the Angiosperms and reflects our doubts and difficulties regarding this extremely important group, concerning the origin of which we have scarcely passed beyond Darwin's statement of horrible mystery. Naturally the difficulties which beset the phylogenetic interpretation of the Angiosperms are very great in view of our almost complete ignorance of their early development.

Another division of the volume deals with the history of floras in which the Algae, the Pteridophyta, Gymnosperms and Angiosperms mark quite satisfactorily the main geological periods. A third main division of the volume deals with general historical laws. Under this heading are discussed the development of characters, ascending and descending evolution, the law of irreversibility, polyphyletic, parallel and convergent evolution, correlative evolution, the biogenetic law, reversions and teratological developments in relation to phylogeny.

The second main division of the volume deals with the so-called causal analysis of phylogeny. Under this heading the author deals with phylogeny as a physiological process with continuous and discontinuous variation and the development of characters suited to the environment. Further he discusses the Lamarckian and Darwinian attitudes towards evolu-