oppose the introduction into science of a correct and intelligible way of indicating the sounds of the human voice? How long will the American men of science who control scientific societies and scientific institutions and scientific journals, ignore or suppress the proposals of philological scholars to provide a definite system of indicating the sounds of the English language? How long will they oppose the movement to bring about a regulation of English spelling, so that English words may be spelt correctly and intelligibly, and so that a given man of science, in a journal devoted to science, and bearing the name of SCIENCE may present a simple idea, in simple letters, in a sure and certain way? How long? Ask our respected friends President X and Professor Y and Dr. Z, Editor P and Director Q, who sit at the gates of science, and scrutinize the tickets, and exclude every man who does not spell according to their Mohammedan way. In the name of the Prophet, phigs!

In the meantime the leaders in science will be writing in SCIENCE statements about language that are in fact futile, because, as we lawyers say, they are "void for uncertainty."

Of course I know, and you know, Mr. Editor, what Dr. Shull means when he says "pronounced gēn"; but we know it by a process of inference, and by a course of special study. No one else can tell what he means, except through the same process. The man of science wishes to be clear, but his colleagues won't let him. In the name of the Prophet, phigs!

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YONKERS, N. Y.,
June 24, 1912

## FORMATION OF SPURRED FLOWERS IN HYBRID CALCEOLARIAS

WEBBER[1] refers to hybridization as the apparent causal agent in the development of a marked spur or horn on the lip of a hybrid *Calceolaria*. Characters apparently new are said to appear rather commonly in hybrids and the idea is advanced that the teratological structure just mentioned may be a new unit character of the genus *Calceolaria*. The statement is made that "no such character, so far as can be learned, is known in the Calceolarias, and it would seem to have been caused by the hybridization."

M. T. Masters[2] states that the formation of spurs or spur-like tubes is very frequent in some seasons in the corolla of certain Calceolarias (*C. floribunda*). An excellent figure (Fig. 169) is also given.

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June 18, 1912

[1] SCIENCE, N. S., 35, p. 606, April 19, 1912.

[2] "Vegetable Teratology," 1869, p. 316.

## SCIENTIFIC BOOKS

*High School Education.* Edited by CHARLES HUGHES JOHNSTON, Ph.D. Charles Scribner's Sons. 1912.

To designate this book a notable effort in pioneer-work is to indicate at once its merits and its inevitable limitations. In its arrangement, in the assignment of general and of specific topics to writers whose interests concentrate in their respective fields of inquiry, it proclaims the fundamental belief that no single writer can hope to do justice to all the issues involved in secondary education. Where questions of general policy, of programs of study, of curricula and of method in individual subjects must be weighed to promote the ideals of efficiency, it is desirable that the inquiring teacher shall have the guidance of a number of experts whose utterances will help him to plot his own line of procedure. It speaks well for the firmness of the editor that his collaborators represent almost without exception a uniform tendency, though they are permitted full leeway in the advocacy of their individuality. Professor Johnston has on the whole been fortunate in the choice of his cooperating writers; even for some of the subjects that have not yet found general recognition in our high schools he has secured contributors of distinctly originative ability. Even though this book may be superseded before long by similar studies of greater value, it may claim the merit of having led the way to a proper consideration of the manifold problems of the secondary school.

The discussion of the educational significance of the various subjects in the curriculum of a secondary school, and of the methods that will make their teaching most effective, is preceded by five chapters in which a basis for the whole question of secondary education is offered. Of these chapters easily the most notable is Professor Davis's on Principles and Plans for Reorganizing Secondary Education; in its outspoken criticism of our educational shortcomings and its helpful constructiveness, the utterances of this chapter should sink deep into the minds of teachers. With a wide perspective of the whole field, here and abroad, it abounds in proposals of betterment that are capable of realization, if our communities realize the value of broadly trained teachers. We should exceed the limits of this review if we were to quote from the wealth of sound doctrine, incorporated in this one striking chapter. Next to it in importance among the initial five chapters is that of Professor Elliott on the Organization and Control of Instruction; exception, however, must be taken to what seems an unfortunate separation of *supervisory* from *inspectorial* control. The two are inseparable; inspection should be a constant accompaniment of supervision, a measurement of the results growing out of expert direction. To assign these two functions to two sets of officers is to deprive supervision of its ultimate test of efficiency; it introduces the danger of mechanical measurement of results, of which the teachers in our large high-school systems could reveal many a distressing tale. Barring this one defect, the chapter is admirable; it protests against the peril of transitory enthusiasms, against encroachment of non-technical administrative boards on the free exercise of expert insight; it advocates a training of the teacher not according to academic standards, but according to standards erected for secondary education, and puts the responsibility for this mistake upon the colleges, where it properly belongs; it demands that the selection of teachers inhere as a prerogative in the supervising officer. It is significant too that, distinguishing *identity* from *equality* of instruction, Elliott urges as of special importance the differentiation of the content and method of instruction of boys from those of girls. Turning now to the twenty chapters that bear upon individual subjects of the curriculum, it is in no invidious spirit that single ones are selected for special commendation; those that contain besides fertile discussions of method in their own particular field, suggestions of procedure from which teachers of other subjects may readily profit. No teacher of true professional spirit but will appreciate Karpinski's article on Mathematics, Chase's on History, Kester's on Physics, and, above all, Denney's on English. In the latter chapter in particular there are massed so many practical devices to render the teaching of English more effective (pp. 234–38) that one regrets the absence of similarly helpful suggestions in some of the other chapters; culled from a varied and rich experience, from a study of every promising method that has borne fruit, these comments of a successful teacher surpass in value all generalizations of theory. Not merely what to undertake, but how to do it, is what our inadequately trained teachers (and they are, alas! in the majority) need to know.

In the article on physics the question of the value and relation of laboratory work as an element, but not the sole element, in the secondary teaching of the subject is discussed with much sanity, and there is emphasized an urgent plea for the consideration of the historical evolution of physical science, a phase of the work to which the French attach much significance, but which we have been apt to slight. It was well worth while to include in the series of chapters discussions of sex pedagogy in the high school and of psychology in the high-school curriculum, though in the former case the difficulty of rational handling of the subject is made prominent, and in the latter, doubt as to the advisability of its introduction is obviously felt by the writer. As to psychology, your reviewer has no hesitation in advocating its exclusion from the high-school curriculum; the immaturity of high-school pupils calls for an emasculation of the subject that renders it valueless.

No greater praise can be accorded to the publication as a whole than that it is an epochal contribution to the library of the high-school teacher.

JULIUS SACHS

*A Monograph of the Mycetozoa:* A descriptive catalogue of the species in the Herbarium of the British Museum. By ARTHUR LISTER, F.R.S., F.L.S. Second edition, revised by GULIELMA LISTER, F.L.S. With two hundred and one plates and fifty-six wood cuts. London, printed by order of the Trustees of the British Museum. 1911. Octavo, 302 pp.

It marked an epoch in the study of these organisms when in 1894 Arthur Lister brought out an exhaustive monograph of the Mycetozoa based on the specimens in the British Museum. It was illustrated with seventy-eight plates of much more than usual merit, which proved invaluable aids to the student, as did also the illustrated keys to the genera which accompanied the "orders." Now, seventeen years later, and nearly four years after the author's death, a second edition is brought out by his daughter, who had aided him in the preparation of the first edition, as well as in the work undertaken in anticipation of the present edition. The result is a modernized and much augmented monograph, following, however, in the main the treatment given in the earlier volume. Some of the genera have been changed in their positions in the group, the most notable change of this kind being that by which *Lycogola* is moved from the Calonemineæ (with capillitium) to the Anemineæ (without true capillitium). In the new book families are still called "orders," in which one may discern the influence of the botanical nomenclature of the immediate English past. This appearance of botanical antiquity is shown also in the use of "Cohort" and "Sub-Cohort."

Comparing the two editions, one finds forty-nine genera in the new edition as against forty-three in the old, and two hundred and forty-six species in the new, to one hundred and seventy-six in the old. These numerical changes are mainly due to the very considerable increase of available material for study resulting from the widespread interest aroused by the publication of the first edition. Other changes which will be noted by the student of these organisms result in part from a better knowledge of their structure, and somewhat to the application of the laws of botanical nomenclature formulated in Vienna and Brussels, by which many names have been changed. For aid in this work cordial credit is given to Professor T. H. Macbride, the well-known American authority on the Mycetozoa.

Looking over the book, one is struck by the obvious mixing of botanical and zoological ideas. Nowhere in the book are the Mycetozoa spoken of as plants; nor on the contrary are they called animals. They are invariably called "organisms." Yet in the introductory chapter in connection with the statement that swarm-cells coalesce to form a plasmodium we are told that "in consequence of this discovery, which indicated a relationship with the lower forms of animal life, DeBary in 1858 introduced the name Mycetozoa." Yet the specimens on which the monograph is based are in the Herbarium of the British Museum, while the preface is written by A. B. Rendle, of the Department of Botany, and as has been said above the nomenclature has been revised in accordance with the laws of botanical nomenclature. Verily, it is difficult to break the traditions of even scientific men! If we were to take up the study of the Mycetozoa to-day for the first time it is certain that we should all agree that they are animals, but because they were thought to be plants for so long, it is difficult to transfer them from the plant kingdom to the animal.

And it must be confessed that the beauty of the spore-stage is so great that we can not blame the botanists for their unwillingness to let these pretty things escape from the botanical domain. There is also much the same feeling now among the myxomycologists that there was among the lichenologists thirty years ago when DeBarry and Schwendener and other botanical insurgents were saying that the lichens were fungi. And yet to-day the fungus nature of the lichens is conceded