

facts of man's whole history are brought into line, one can, sighting along it, see that his evolution is clearly to be away from war. Like an organic species, war is a species of conflict and it will give place to other forms of conflict, no less real but more humane.

To many scientific readers the most valuable part of this book will prove to be the convenient summary of man's physical and mental evolution during quaternary times, contained in Chapters II-V. Here are presented, in Professor Kellogg's well-known, striking style, and in a form well adapted for the general reader, the evidence for the existence of Tertiary man, and brief characterizations of early Quaternary man—"Homo Primi-genius: Man of the Great Ice"—who found in fighting his chief occupation and diversion. "Homo Priscus: Man after the Ice," partially freed by his wit from constant struggle with the rest of nature, devotes some of his newly acquired leisure toward fashioning his own environment.

Neolithic man, "Homo Sapiens: Man of History," gets something to call "culture." He begins to experience the results of his own modification of his environment, and finds that he has inherited not only instincts and reflexes, but also the capacity to modify these by the exercise of reason; and so he begins to take a hand in directing the evolution of his "human nature." Kellogg recognizes the proximity of this idea to the "inheritance of acquired characters," but proceeds. Man of to-day, as an individual, fights as a pastime chiefly, and international war has become primarily a struggle to destroy dollars. The real desire for war occasionally is said to be already a sub-modal species character.

As to Quaternary man, "Homo Superioris: Man of To-morrow," Kellogg ventures to prophesy, saying that his physical constitution seems fixed and unlikely to be much further changed, and he must perforce depend for his existence upon the evolution and use of his intelligence. As this develops man will recognize the truth about war and will, must, eliminate it from the species life.

It is obviously possible to arrange the leading facts of man's evolutionary history so as to indicate the future elimination of war, and, faith being the substance of things hoped for, let us have faith that this prediction may be speedily fulfilled. But that one may also arrange the facts of man's whole history, as well as of man's History, so as to point in any direction hoped for, is still true; and many of Kellogg's theses might serve as subjects for argumentation.

"Beyond War" is a clear indication of the now recognized necessity of enlarging history to include the whole history of man and his works, and of the important relation of biological facts to the work, not only of the historian, but of the politician, the economist, sociologist, philanthropist and peacemaker. While our biological substructure may not yet be able really to bear the load often thus placed upon it, we should and do welcome heartily every attempt of the trained biologist to make his science available for use and for human life.

WM. E. KELLOGG

BOTANICAL NOTES

THE BRUSSELS CODE

It may now be well in the middle of the lustrum between the Brussels Botanical Congress (of 1910) and the London Congress (to be held 1915) to make some pronouncements upon what progress has been made towards securing a useful and workable code and what remains yet to be done. Before the Vienna Congress (in 1905) there was great diversity of practise among botanists, and not a little heat and temper had been displayed by the champions of this or that particular view. When Otto Kuntze about twenty years ago stirred up the whole subject there were many who regarded his action as wholly unnecessary and uncalled for, and yet it is true that from this stirring up of things have come the two congresses, namely, at Vienna, and Brussels, and much that Kuntze contended for has now been enacted into botanical law. So too, the movement in America a little later,

culminating in one or two published "codes," served to accentuate the demand for a more general agreement as to what should be good botanical practise.

Most botanists have had in hand for about three months Briquet's report and compilation of the code as modified by the Brussels congress, and they have had time to consider the wisdom of the more recent changes and additions, and the adequateness of the code as a whole. In considering this code we must not overlook the fact that we have secured the recognition of our chief contention, namely, the "law of priority." So too we have secured the recognition of the necessity for a *beginning date* for nomenclature. And today the original name of the species is preferably retained, whatever generic wanderings it may suffer, and a name which has become a synonym can not be used for another plant. Even in regard to publication and the use of parentheses the essentials that we contended for have been enacted into law. Only in regard to the use of specific names which repeat the generic name does the new code run counter to the practise of many American botanists, and it must be said for this latter point that few of us would care to insist strenuously upon the acceptance of our practise.

So we have succeeded in having most of what we demanded included in the botanical code, but as always happens when legislation is had, some things have been added that are not at all to our liking. Thus with the underlying principles (Arts. 1 to 18) no fault need be found, but in our opinion the Brussels congress made a series of blunders in Art. 19, when it selected the starting points for the nomenclature of various groups. In fact here there was evidently a hopeless confusion of "starting points" with complete monographs, resulting in the designation of not less than twenty different dates, in eight publications, with at least four more groups still to be heard from. When it is suggested that the point of beginning for some algae is 1753 (Linne's "Sp. Plant."), while for others it is any place from 1891 to 1893, and for still others 1886, and for others again 1848, while

for one little family (*Oedogoniaceae*) it is as late as 1900, it is pretty evident that the law makers forgot what they were doing. This matter of starting points for nomenclature will have to be revised by men who can "keep their heads"!

Then while the law of priority is sanctioned (Art. 15) the vicious practise is enlarged of making exceptions (*nomina conservanda*) of names that are to be retained in spite of the law. Such "special legislation" reminds us of what political legislatures sometimes do when exceptions are made in favor of "special interests," but certainly such things ought not to be done by a body of scientific men. The Brussels Congress augmented the lists of *nomina conservanda*, and in doing so showed more forcibly than at Vienna that the lists have no scientific basis, but that they rest upon the prejudices and preferences of a few botanists who object to the use of unaccustomed names for certain plants. Prejudice and individual preference have no rightful place in determining scientific nomenclature. One is inclined to quote here the final article (58)—"The rules of botanical nomenclature can only be modified by competent persons at an international congress convened for the express purpose," and to make the very obvious remark that it may be questioned whether all of the work before us was done by "competent persons." In the opinion of the writer this question must be answered in the negative for some parts of the code.

Now, what shall we do in regard to this code? There are those who boldly say that a code so drawn up should not be obeyed, and accordingly they ignore such of the rules as they do not approve. And the temptation to do so is very great, especially in regard to the starting points of nomenclature, and the *nomina conservanda*, but we are convinced that the wiser policy will be to accept the code as a whole, and obey its dicta. Of course it is never an agreeable thing to have to do what our judgment disapproves, but the only way that we can make progress is to submit to the code as it is, with the determination, that we will bring about the desirable revisions and

changes as rapidly as possible. So we conclude that, disagreeable as it may be, it is the best thing for the science that we should obey the rules of the code.

CROWN GALL AND CANCER

ATTENTION should be called again to Dr. E. F. Smith's suggestive paper "The Structure and Development of Crown Gall: A Plant Cancer,"¹ issued June 29, 1912. In its preparation the author was assisted by Nellie A. Brown and Lucia McCulloch, scientific assistants. As expressed by Dr. B. T. Galloway in his letter of transmittal to the Secretary of Agriculture:

This paper is the result of many months of critical study of hundreds of serial sections prepared on the microtome; and so far as relates to the photographic demonstration of the presence of the causal organism within the proliferating cells, to several years of laborious and discouraging experimentation with a variety of fixing agents and stains. Only recently has it been possible to demonstrate clearly by means of the microscope the presence of the parasitic organism within the cells, although the authors have known for more than five years that this organism *must* be located within the cells.

Proof of the latter contention having been attained the conclusion is reached that

While it is the rapidly proliferating cancer cells that do the mischief they are impelled to behave in this way only because they are under the stimulus of a foreign organism which does not destroy them but irritates them to rapid division.

We can well agree with Dr. Galloway in pronouncing this "a discovery of the first magnitude in pathology."

The paper is accompanied with one hundred and nine "half-tone" reproductions of photographs, often very highly magnified, and these plates constitute the greater part of the evidence upon which the author relies. Among the statements given in the résumé the following may be quoted:

Crown galls occur on a great variety of plants, but not always on the crown; any part of the root or shoot is liable to attack.

¹Bull. 255, Bureau of Plant Industry, U. S. Dept. Agric.

Young, well-nourished, rapidly-growing tissues take the disease more readily than old or slow-growing ones.

They are all of parasitic origin, unless the one on the beet studied by Jensen, Reinelt and Spisar, in Europe, should prove an exception.

These galls are due to schizomycetes, either to one polymorphic species, or to several closely related species. Further studies are necessary.

The parasite has been shown to occur not only in the primary tumor, but also in the secondary tumors and in the connecting tumor strand.

The tissues of the gall multiply excessively and in opposition to the best interests of the plant.

The galled tissue, which is often of a soft, fleshy nature, is much subject to decay. It is not usually corked over, and this absence of a protective surface allows the ready entrance of water and of other parasites.

The tumor originates in meristem, usually in the cambium region. It may perish within a few months or continue to grow (parts of it) for years.

The tumor consists, or may consist, not only of parenchyma cells but also of vessels and fibers, *i. e.*, it is provided with a stroma which develops gradually as the tumor grows.

The tumor sends out roots (tumor strands) into the normal tissues. These may extend for some distance from the tumor—how far is not known. These strands consist of meristem capable of originating medullary rays, tracheids and sieve tubes.

The stimulus to tumor development comes from the presence of the parasite within certain of the cells.

The relation between the host and the parasite may be regarded as a symbiosis in which the parasite has the advantage.

The bacterium is a soil organism and planters should aim to keep their lands free from it by refusing to plant infected stock.

The organism is a wound parasite. Its entrance is favored by careless grafting and by the presence of borers, nematodes, etc.

Nothing in this bulletin should be construed as indicating that we think the organism causing crown galls is able also to cause human cancer, but only that we believe the latter due to a cell parasite of some sort, and offer the preceding pages in support of this contention.

CHARLES E. BESSEY

UNIVERSITY OF NEBRASKA