universities, a large medical school, the Geological Survey, and other research institutions. There is evidence that Peking is growing in importance as a center of scientific research. The membership of the newly formed club, of whom three fourths are Chinese, and one fourth Americans, is connected for the most part with Tsinghua University (the American Boxer indemnity school), Yenching University (a Chinese-American private institution), and the Peking Union Medical College (Rockefeller Foundation). Officers elected for the coming year are: *President,* W. H. Adolph (Pennsylvania), professor of biochemistry at Yenching University; *Vice-president,* Y. C. Mei (Worcester), president of Tsinghua University; *Secretary-Treasurer,* A. P. T. Sah (Worcester), professor of physics at Tsinghua University.

ACCORDING to a note in *Nature,* at the annual meeting of the British Science Guild held on May 25, Sir Samuel Hoare was reelected president for the ensuing year, and affirmed his faith in the aims of the Guild. The annual report shows a year of useful work. It is said that perhaps its most interesting feature is the attempt which the guild is making, in conjunction with the Association of Scientific Workers, to provide an adequate channel for bringing before Parliament the views of scientific men. A Science Advisory Council is being set up, and it is intended that this council shall be in some sense comparable with the Federation of British Industries, in the sense that it shall be the liaison body for providing contact with Parliament in connection with scientific and technical matters coming before the House. The success of the projected council will depend on the degree in which it enjoys the cooperation of scientific and technical societies, a number of which have already agreed to participate. The extent of its activities, however, will be mainly determined by that of the funds placed at its disposal, and in this aspect the matter has yet to be put on a satisfactory basis.

# DISCUSSION

## AN EXPERIMENT IN TEACHING PUBLIC HEALTH ZOOLOGY AT ROLLINS COLLEGE

IN 1892, I gave before the medical school of Georgetown University a course in medical zoology—the first of its kind in this country, so far as I have learned. Similar courses have since been introduced by a number of American medical and premedical colleges.

Very frequently the thought has occurred to me that a modification of courses on medical zoology, taking in the broader aspects of public health zoology, would present to students (besides those preparing for a medical career) an instructive and interesting study. An opportunity to try out the experiment was recently presented during my winter residence at Winter Park, Florida, after retiring from government service. President Hamilton Holt, of Rollins College, is always on the lookout for professional men retiring to Winter Park to live a life of ease and whom he can impress into special service in connection with the instruction at Rollins. Hearing that I had chosen Winter Park as locality in which to enjoy a few months as a member of the "Order of the Sons of Rest," he invited me to become a member of the winter faculty for 1932. The temptation to try out my idea of public health zoology at Rollins (which is proverbially ready to try out new ideas) induced me to accept the invitation—in spite of my conviction that the way for a man to "retire" is for him actually to retire. Probably my active colleagues in zoology will be interested in learning the results of the experiment.

Nineteen students who elected the course are preparing as follows: pre-medical 3, psychology 3, economics 3, teachers 2, mathematics 1, diplomacy 1, finance 1, business 1, welfare work 1, matrimony 2, book critic 1. They represented postgraduates, seniors, juniors, sophomores and freshmen. Eight were men, eleven were women. Taken all in all, this was the most enthusiastic and most progressive class to which I have given instruction—during forty years of special lecture work in various universities. Instruction lasted ten hours per week through the winter term. Within a week the class was "standing on tiptoes" and the students were asking for special assignments of work. Part of the instruction was given in the lecture room, part in the laboratory, part out of doors (under campus trees on the lake shore), and one afternoon per week was devoted to visiting country schools (in order to study medical inspection of the children—especially in connection with the parasitic diseases); these schools were located at various points up to about 20 miles from the campus.

The human being (*Homo sapiens*) was made the center thought; theoretical radii were drawn in all directions, representing the various phyla of the animal kingdom; every zoological subject considered was studied in its practical relations to mankind—medical, welfare, economics, national and international relations, legal, food supply, etc. One of the most popular features of the course was a study of the animals used as food in different parts of the world, for instance, mollusks, arthropods, fishes, amphibia, reptiles, birds and mammals; this gave an opportunity to study classification, biology, commerce, economics,

methods of preparation, etc., and was handled chiefly by assignments, thus turning the class into a zoological society.

The reaction of the students was most interesting. Time after time they remarked that they had no idea zoology had so many practical ramifications and could be made so interesting. For some of the students, this was their first course in zoology; others had studied zoology from one to three years in various colleges.

As nearly as I could sense the feeling of the students, they ended the course with a conviction that zoology does not consist solely of theory, Latin names, fresh and preserved animals, and chromosomes, but is actually a part—and an interesting and important part—of their daily life. To some instructors, students' interest in work is evaluated chiefly by the "marks" given; for the benefit of this class of instructor I may add that twelve students received a mark of "A"—which was based on a most critical study of the reaction by and results of the individual members of the class. So high a mark to such a large proportion of a class will seem absurd to many instructors—but even an instructor must play the game fairly with the student and by no stretch of my pedagogic conscience did I feel justified in lowering the marks, for the students had made good.

Toward the end of the term, the class elected three "honorary members," and a tree on the campus is to be dedicated to each of these three men, namely, Professor Irving Fisher (Yale), Dr. L. O. Howard (U. S. Department of Agriculture, retired), and Professor Henry B. Ward (University of Illinois). These elections were based on reviews (presented to the class) of the work of these three men in connection with public health and public health zoology.

From the results of the experiment at Rollins, I can heartily recommend public health zoology as a live subject, of interest and value to college students.

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## REGARDING THE C FORMS OF KUHN

UNDER the title, "Über Bakterien und Pettenkoferien," there has recently appeared a small volume[1] by Ph. Kuhn and Käte Sternberg, of Dresden, dealing with bacterial variation and the Pettenkofer bodies (Pettenkoferia), and summarizing earlier observations in this field made since 1919.

I venture to call attention of bacteriologists interested in variation phenomena to the studies of Kuhn, first, because they have an important bearing on the work of myself and associates with the G-forms of bacteria; and secondly, because Kuhn's publications are not commonly known in this country. The matters of special interest treated by this investigator deal with morphological variation and his conception of the parasitism of bacterial cells by a foreign microorganism believed by him to be related to the Myxomycetes. For these parasites Kuhn has coined the name, "Pettenkoferia." Although he has extended, in an ingenious manner, this view of parasitism to include the phenomena of the bacteriophage (alleged destruction of bacteria by attack from the minute and filtrable "spores" of the Pettenkoferia), this unique portion of his exposition does not concern us further at present. I have dealt with this aspect of the problem in detail in an earlier publication.[2]

Kuhn's delineation of variation among the Bacteriaceae is restricted chiefly to the field of cell morphology, and here he has focused attention on five different morphological cell types which he depicts as follows:

*A-forms* (ameboid forms): These are chiefly round or oval bodies which may sometimes attain the astonishing size of nine microns. They are often ameboid and, in reality, represent the parasitized bacterial cells (Pettenkofer bodies). They seem to be identical with the "giant cocci," "zygospores," "balloon bodies," etc., frequently seen and sometimes reported by courageous bacteriologists for many years. They also include at least some of the so-called "involution forms" of earlier years.

*B-forms* (Bakterienformen): These are represented by the common rod and spiral forms that are regarded by bacteriologists as the "normal" forms of the species. These develop from the slow upgrowth of the C-forms.

*C-forms* (Kokkenformen): These are chiefly coccus forms although the morphology is variable, and some of the bodies are very minute. Colonies of these forms are extremely small and frequently microscopic. The C-forms arise from the B-forms.

*D-forms* (dendritische Formen): These are thick filaments and rods giving root-like branches that are produced by the partial fusion of independent cells or filaments. The morphology is irregular and bizarre. These forms occur among B- or F-forms.

*F-forms* (Fädenformen): These forms are identical with what bacteriologists term "filaments," "thread forms," or much elongated bacteria. They often produce mycelial structures. They commonly develop from the B-forms.

The designations mentioned above were employed by Kuhn to indicate the varying morphology of the cells but were not, with the exception of the C-forms,

[1] Ph. Kuhn and Käte Sternberg, "Über Bakterien und Pettenkoferien," pp. 1–52, Taf. I–XV. Gustav Fischer, Jena, 1931. See also: *Centralbl. f. Bakteriol.*, Abt. 1, Orig., 1931, Vol. 121.

[2] "The Twort-d'Herelle Phenomenon," *Jour. Inf. Dis.*, 42, 263–434, 1928.