classed in three separate genera on the basis of differences in the position of the nasal opening, in spite of the fact that "their coloration is so exactly similar that they are with difficulty distinguished in the hand without examining the bill."[26]

There would appear to be a similar advantage in putting as broad an interpretation as possible also on the species, in accordance with the general principles which have been stated. Then for purposes of reference in general use it would not matter so much about changes and rearrangements in other groups. As species became more thoroughly analyzed they would naturally be split into subspecies, which might in turn be divided still further. Let these be carefully described, and if naming will serve any useful purpose, let them receive quadrinomials and quinquenomials, even to the ecotypes and ecads, and to genotypes and karyotypes and cytotypes; yes, even to individuals when necessary. But in general as the divisions are smaller the process of change will be greater, and any grouping is likely to be transitory. We should be careful, therefore, that these micro-groups should not acquire the sanctity that seems to attach to the species. Accuracy and intelligibility should be sought rather than priority.

It has also been suggested that the International Commissions on Nomenclature in both zoology and botany could help more towards stabilization if they were accorded somewhat broader as well as more arbitrary powers to deal with cases that come before them. Certainly there is danger that the rules of nomenclature, like any other legal code, will become inflexible and outmoded unless provision is made for change. Classical taxonomy should on the whole exert a conservative force, but it must nevertheless take cognizance of the advances in knowledge in order to keep abreast of the times.

Appeasement is not popular at the moment, yet I would bespeak an attempt at greater mutual understanding and certainly of tolerance. Much of the heat that has been engendered between and among taxonomists and other biologists has been due to the failure of each to understand the problems of the other. I will not presume to make any prediction of my own, but you may be interested, whether you agree with it or not, in a recent prophecy by Julian Huxley.[27] After saying that micro-evolutionary studies (that is, those dealing with small groups) will become increasingly important in the near future, he concludes as follows:

> As such work proceeds, the New Systematics will gradually come into being. It will in some ways doubtless help classical taxonomy in its practical pigeon-holing functions; it will give a more detailed picture of the actual facts of the diversity of organic nature and its distribution in groups and in character-gradients over the globe; it will reveal many facts and principles of great importance to general biology; and through it taxonomy will become the field of major interest for all those concerned with the study of evolution at work.

As for myself, I am uncertain whether to interpret this last prediction to mean that in that time the taxonomic lion and the genetics lamb will lie down peacefully together, or whether the latter will have turned carnivorous and have devoured his ancient and honorable companion.

[26] *Jour. Acad. Nat. Sci. Phila.*, 15: 314, 1912.

[27] "The New Systematics," 1939, p. 42.

OBITUARY

DAYTON C. MILLER AND THE POPULARIZATION OF SCIENCE[1]

ANY record of the accomplishments of the late Dr. Dayton C. Miller, the distinguished American scientist and teacher who died on February 22, would be incomplete without mention of his services in the popularization of science. A skilled worker in the research laboratory and a wise teacher in the classroom, he had broad enough vision to see beyond laboratory and classroom. A deep and sympathetic understanding of humanity impelled him to lend his influence and energies to this end.

In company with some of the greatest figures in the history of science, he possessed the gift of making science clear to laymen and to young people. In this he was one with the great Faraday, with Huxley, with Sir Oliver Lodge and with Sir William Bragg. It is interesting to note that one of the last major activities of his life was a series of children's lectures delivered at Christmas time at the Franklin Institute in Philadelphia in 1937 and expanded into a book two years later under the title of "Sparks, Lightning, Cosmic Rays."

With the reader's permission, I would like to draw upon my own experiences to illustrate Dr. Miller's efforts for the popularization of science.

I saw Dr. Miller for the first time at one of his young people's lectures. The year was 1913 and I was then a junior at Central High School in Cleveland. Our scientific club, named the Faraday Club, had been invited to the Physics Laboratory of Case School of Applied Science to hear Dr. Miller lecture on sound waves.

Had Professor Miller been lecturing to his colleagues in the National Academy of Sciences, he could

[1] An obituary appreciation of Dr. Miller, by Professor H. W. Mountcastle, of the Case School of Applied Science, was printed in the issue of SCIENCE for March 21.

not have made more elaborate preparations than he did for the enlightenment of our half a hundred high-school boys and girls. He not only used stereopticon slides to illustrate his lecture but performed more than a dozen experiments for us upon the table at the front of the lecture room. The lecture concluded with a demonstration of the phonodeik, the device which he had invented to make sound waves visible.

I still remember the delightful enthusiasm with which Dr. Miller spoke to our group of students and the enthusiasm for science which we brought away from that lecture.

In 1915 I entered Western Reserve University in Cleveland and obtained the job of college correspondent for *The Cleveland Press*. My duties were to "cover" football games and other athletic events and otherwise report campus activities at both Western Reserve and Case School of Applied Science. As many readers of SCIENCE know, only a fence separates the campuses of the two schools.

Almost at once I began to hear of the remarkable experiments with sound waves which Dr. Miller, then professor of physics and director of the Physics Laboratory, was performing at Case. Remembering the inspiring lecture I had heard two years before, I decided to call upon him.

And so, holding in my hand the green cap that the Reserve freshmen of that day were required to wear, I climbed the stairs of the Physics Building on the Case campus and knocked on Dr. Miller's door.

Had I been a visiting professor from some great European university, I could not have been received more graciously. Dr. Miller listened sympathetically while I explained who I was, the vivid impression I retained of the lecture I had heard, my own enthusiasm for science, and finally my desire to write an article about his work.

Dr. Miller agreed to show me through his laboratory and under his personal guidance I was introduced to the enchanted land in which he was unraveling some of the secrets of nature. I did not then realize that Dr. Miller was doing a courageous thing in entrusting his scientific reputation to the mercies of a college freshman, particularly in view of the fact that back in 1915 most scientists feared newspaper mention.

My article appeared in the next day's *Cleveland Press*. It was, of course, my first newspaper article on science. That first meeting marked the beginning of a friendship that lasted until Dr. Miller's death. I became a frequent visitor at his laboratory, and his encouragement had much to do with my decision to devote myself to the popularization of science.

In December, 1922, at the suggestion of Dr. Miller, I attended the Boston meeting of the American Association for the Advancement of Science. That meeting was the first one to be reported in a serious and thorough fashion with a genuine effort to interpret its importance to the public. Present at it were the late Dr. E. E. Slosson and Watson Davis, representing Science Service, Alva Johnston, representing the *New York Times*, and myself, representing the Scripps-Howard Newspapers.

The following April, again at Dr. Miller's suggestion, I attended the spring meetings of the American Philosophical Society and the National Academy of Sciences. I have missed only three or four of the meetings of these three organizations since.

Dr. Miller was a sympathetic and helpful friend to the science writers of the nation from 1922 until his death. He was well known to all of them and always ready to befriend them.

The last public affair at which Dr. Miller appeared was a "Star Gazers Dinner" given by the *Cleveland Press* on January 24, 1941. In the summer of 1939 and again in the summer of 1940, I had arranged with the amateur astronomers of the Cleveland Astronomical Society, for a series of "star-gazing parties" in Cleveland parks. More than a dozen telescopes were set up on a given night in a particular park and the citizens of Cleveland invited to come and have a look. About 15,000 people took advantage of these invitations each summer.

Dr. Miller showed his interest in these affairs by coming to several of the "parties" to observe the crowds and so when the *Cleveland Press* decided to give a dinner on January 24 for the amateur astronomers who had so generously supplied and operated the telescopes, I asked Dr. Miller to be one of the speakers.

A number of our telescopes had been operated by college students and even high-school students and characteristically Dr. Miller thought chiefly of these in preparing his remarks. He brought to the dinner an old notebook in which he had made sketches of comets and other phenomena when he himself had been an undergraduate at college. He exhibited this notebook with the hopes that the young people present might be inspired to keep similar sketches of their observations and spoke with enthusiasm of the success of the "star-gazing parties" in spreading a knowledge of popular science.

The last time I saw Dr. Miller was at the close of the dinner. The young people had crowded around him with enthusiasm for a closer look at his drawings. Their enthusiasm was reflected in his own friendly smile. I like to remember Dayton C. Miller that way.

DAVID DIETZ,
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