

ceive sufficient training in the public presentation of their ideas, whether those ideas be original or borrowed. Most advanced scientific students in our colleges are obliged to attend and take part in seminars or conferences, at which their colleagues and teachers are supposed to criticise any scientific papers that may be presented. So far as my experience goes, the criticism is apt to be almost wholly as to scientific accuracy, with but little thought of several other points that are of vital importance. I fear teachers and professors are too apt to tolerate poor order, poor English and a 'dead-and-alive' manner of speaking, thinking the unfortunate beginner will gain wisdom by experience.

Judging from my own experience and the comments of others, I would say that our scientific workers often fail to carry their point and to win public sympathy for their work and cause because in their public utterances they do not follow rational lines of procedure. They are very apt: (1) to present an unorganized and apparently unrelated series of facts—their plan is rambling; (2) not to choose and emphasize the important points, probably because of lack of training in measuring the comparative worth of facts; (3) to use poor and inexcusable English; (4) to speak in a dazed sort of way, as though they themselves were not thoroughly convinced, as yet, of the truth of their results; (5) not to address the audience, a map or a blackboard under their influence being as inspiring as the audience, and much less embarrassing; (6) not to divide their time so as to complete their presentation within reasonable limits, thus causing weariness and restlessness on part of audience; (7) not to make good use of illustrative material in the way of maps, diagrams, specimens, lantern slides, etc.

Now the remedy for these serious failures that few men can outgrow seems to me to be largely in the hands of our college and scientific school teachers, and I would like to see a plan adopted in college seminars that would not allow a student to appear before his colleagues and masters until his plan of procedure had been censored, along the lines I have suggested, by some one of experience in public utterance.

The student should also receive criticism

after his paper, so as to bring out the weak points in his argument or manner, thus minimizing the possibility of an equal failure at his next appearance. Such criticism does not kill individuality, but strengthens it, and certainly gives the student a greater confidence in and respect for his teachers. Should our colleges and scientific schools uniformly adopt such a method of training, our scientific gatherings ten years hence would not be so largely composed of specialists and those who attend from duty and with considerable sacrifice. It would also be much easier to secure public support for scientific work were more of our leaders able to win the interest of the public, without becoming merely 'popular lecturers,' by whom scientific accuracy is apt to be sacrificed for the sake of impressiveness.

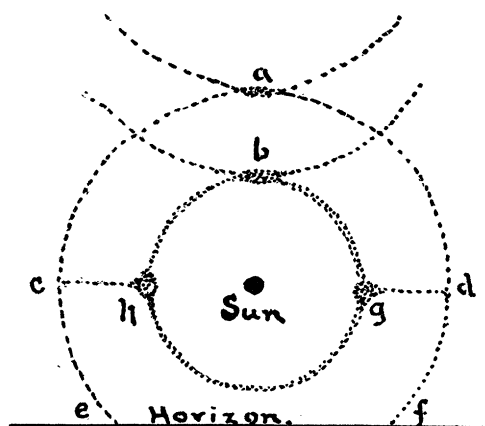
Such work as I have suggested for our teachers takes much time and energy and seems at first not to pay; but immediate returns are not always the best, and there is no work on the part of a teacher that can give greater satisfaction in the long run than that which has helped beginners to make the most of their latent powers.

RICHARD E. DODGE.

TEACHERS COLLEGE,
COLUMBIA UNIVERSITY.

A REMARKABLE SUN-DOG.

THE appended diagram is an attempt to record the appearance presented by a rare and remarkable 'sun-dog' seen at Hamline, Minnesota, at 9:50 a. m., on February 10th. It was a very



cold and damp morning; the air was not clear, and there was a film of thin clouds over all the sky. The weather records at St. Paul Observatory, five miles distant from Hamline, indicated, S. E. 6 miles per hour for the wind, 29.50 as the Barograph reading of the barometric pressure, and 20 degrees below zero as the thermograph reading of the temperature. The two 'sun-dogs' proper were *g* and *h* of the figure and were so brilliant that it was painful to look at them, and a line of intense light stretched from them outwards toward *d* and *c*. There were two circles surrounding the sun; one, the inner one, was complete; the other was nearly so, but dipped below the horizon. There were arcs of two circles turned from the sun at *a* and *b*, and at these points there was a display of prismatic colors. The large outer circle looked much like a rainbow, especially near the horizon. This latter fact seemed connected with the fact that there was almost moisture enough in the air to constitute a very fine snow.

H. L. OSBORN.

HAMLIN UNIVERSITY, ST. PAUL, MINN.,
February 20, 1899.

DEGREES IN SCIENCE AT HARVARD UNIVERSITY.

HARVARD UNIVERSITY conferred for the first time last year the degree of 'Master of Science.' As the creation of this degree appears at first sight to be a new recognition of science, it may be desirable to point out that there are aspects under which it is, in fact, harmful to science and a retrograde movement in that university to which we look for guidance. It is, indeed, logical to have a degree between the S. B. and S. D. parallel to the A. M., but it would be equally logical and, in my opinion, far better to abolish the S. B. and S. D.

The composition of the Lawrence Scientific School of Harvard University is not made less heterogeneous by giving all its graduates the same degree. Some of the students are pursuing studies in applied science exactly parallel to those of the schools of medicine, law and theology, and should on graduation be given a technical degree signifying the profession that they have been trained to practice, *i. e.*, C.E., civil engineer, etc. Others of the students are following the same scientific studies as may be elected

by students of the college who receive the A.B. The difference is that the Lawrence Scientific School may be entered with an inadequate preparation. Fortunately, plans have been adopted that will gradually raise the requirements for admission to the Scientific School to substantial equality with those of the college. At present consequently the S. B., in its sense of a liberal education based upon science, means, as compared with the A. B. for the same studies, an inadequate preparation; later it will signify a secondary education without Latin.

Students of Harvard College, as of the Great English universities, may now take the A.B. without any study of Latin or Greek at the University. This freedom of election has, as President Eliot points out in his last annual report, maintained at Harvard the relative numerical importance of the traditional degree better than in any other American institution. The A.B. is becoming almost obsolete in our great State universities. Thus at California last year among 191 bachelors only 30 were in arts, at Wisconsin among 173 only 13, etc. I regard this as unfortunate as the Ph.B. and S.B. at these universities means simply a liberal education without Greek or without Latin and Greek. It seems to me more consistent to give the A.B. for liberal studies as is done at Harvard, Johns Hopkins, Columbia, Cornell and the English universities. But of these universities only Cornell is sufficiently logical to admit that a liberal education is possible without 'small Latin' in the preparatory school. President Eliot will anticipate the course of educational progress, as he has so often done, if he will transfer the required study of English to the preparatory school, as he aims to do, and will secure the admission of students to Harvard College without Latin. The S.B., S.M. and S.D. would then be superfluous as degrees for liberal studies. I regard them as useless altogether, except that it might be desirable to give the Sc.B., simultaneously with a technical scientific degree and to maintain Sc.D. and Litt.D. as honorary degrees. In the English universities Sc. refers to science, while B.S. and M.S. refer to surgery, consequently Sc. rather than S. should be used.

At Harvard the A.M. and the Ph.D. are