ural coke along the contacts and which contain occasional crystals of sphalerite, thus suggesting relationship to near-by counties which produce lead and zinc.

Panama Stratigraphy: Mr. ERNEST HOWE.

Following andesitic breccias that are supposed to be of early Eocene age, sedimentary rocks belonging to three epochs have been recognized in the section exposed on the Isthmus of Panama. The oldest, the Bohio formation, has conglomerates associated with volcanic breccias near the base, but consists for the most part of fine calcareous sandstones and shales. An abundant fauna contains species characteristic of the Claiborne Eocene and some common to the Upper Tejon. Separated from this by an unconformity are the Peña Blanca marls rich in foraminifera that, from the characteristic species *Orbitoides fortisi,* Dr. Dall considers of Lower Oligocene age corresponding to the Vicksburg. The youngest sedimentary rocks are those of the Monkey Hill formation consisting of fine calcareous and argillaceous sandstones and marls. From abundant fossils contained in these beds they are regarded as equivalent to the Chipola Oligocene. Of these three formations the oldest only, represented by the Culebra beds, has been observed on the Pacific side of the isthmus.

Eruptions of rhyolitic rocks, both massive and fragmental, occurred at some time between the close of the Bohio epoch and the beginning of the Monkey Hill, while all the rocks in the central and southern portions of the isthmus were invaded in the Miocene by pyroxene-andesites and basalt.

RALPH ARNOLD,
Secretary

DISCUSSION AND CORRESPONDENCE

THE CHAIR OF PHILOSOPHY AT THE UNIVERSITY OF CINCINNATI

TO THE EDITOR OF SCIENCE: I beg permission to make a statement relative to my deposition from the University of Cincinnati.

First, I should like to say that the three reasons assigned for declaring my chair vacant are either inadequate grounds for such action or are false in fact. Furthermore they are not the reasons stated in private by the president.

The three grounds assigned were (1) The suppression of the real reasons for my leaving Vassar when I applied for the position at Cincinnati. I agree with the president on this point that this was not fair to him and so informed him before his request for my resignation. But is this an adequate basis for deposing an officer whose work is admittedly satisfactory?

The second ground was that I held views destructive of society which affected my teaching and my life. The testimony of my students both here and at Vassar College refutes the charge that my views on certain ethical topics had entered the classroom. The testimony of my wife and of those who know me must intimately is sufficient reply to the charge of baneful effects of my alleged sinful views upon my life and character. The objection that now, at least, I have taught my views by their publication in the newspapers is certainly met by replying that a man has a right to state his views on any subject in this age and country as long as he does it in a dignified and decent way. And since I was asked to resign on account of my views (which fact is significantly omitted from the formal statement issued by the president) I maintain that I had a right to vindicate myself before the public by stating the views for which I was to be ejected. If it be objected that I did not choose the proper place and manner of publicity in stating my views, it is replied that the only statements authorized by me were given to the Cincinnati *Times-Star* with the understanding that they were to be printed just as I wrote them or not at all. They were so printed in that paper. Additions and embellishments by reporters unhappily have been taken as expressing my views, instead of my own carefully prepared statement of them.

The third ground assigned by the president for my dismissal, that I threatened him, did not exist.

I made this stand here at Cincinnati in the hope that I might be dealt with on the

basis of the merits of the case. The three grounds assigned evade the real issue of my views which was privately stated by the president to be the basis of his action. And this real issue, which is not frankly stated, but set aside by the interposition of an unjustifiable personal attack, is a violation of the principle of *Lehrfreiheit.*

H. Heath Bawden
University of Cincinnati,
May 31, 1908

SPECIAL ARTICLES

A METHOD OF SENDING PURE CULTURES OF FUNGI

For several years the writer has had occasion to receive cultures of moulds from different parts of this country and from abroad and has learned to expect a large percentage of contaminations even when the cultures are pure when shipped. The usual method is to send a pure culture of the mould in a fresh slant tube of nutrient which has been hardened with either gelatin or agar. During transit the nutrient generally becomes shaken up against the cotton plug and there results an infection of bacteria or of moulds like *Penicillium* and *Aspergillus,* the spores of which are usually present on the outside of the cotton plugs but which germinate and grow down into the tubes when the plugs are wet or the surrounding air is rendered moist by rubber caps or even by paper wrappings which more or less completely seal the tubes. Recently the writer received a shipment of a considerable number of tubes from Utrecht, Holland, from the fungus collection of the Association Internationale des Botanistes. They were apparently fresh cultures and a very large proportion were thus irredeemable from contamination with weed fungi. It seems not undesirable, therefore, to describe in some detail a method of shipping cultures which experience has shown to be free from the objectionable features already mentioned, although it is a method which might naturally occur to any one having spores to send.

If cultures are to be sent in test-tubes it is advisable to avoid gelatin and to use rather stiffer agar than usual, which should be allowed to dry out and thus fasten itself against the sides of the tubes before packing. For stock cultures, which are to be kept a year or so, the writer has successfully used as much as 30 and even 35 grams of agar to the liter, and agar of this degree of hardness might be used for shipping. While with proper precautions pure cultures may be sent in test-tubes yet the possibility of breakage or of infection already pointed out, as well as the possible inconvenience of custom-house inspection when packages are received from foreign correspondents, are objections to this method.

These disadvantages have led the writer to use small paper envelopes such as are made by druggists in putting up powders or by botanists in preserving fungi in exsiccati. A mass of the fungus filaments containing spores are taken with a sterilized instrument from a pure culture of the species desired, together with some of the substratum, and put into the envelopes, where it is allowed to dry. Several of these culture envelopes may be sent with little inconvenience in an ordinary letter. It has been the writer's practise as a matter of precaution to sterilize the envelopes either in an autoclav or in a dry oven at 140° C. before using them. The danger of infection is probably not very great if the culture envelopes, although unsterilized, are made up of clean paper that has not been unduly exposed to contamination since the few spores of *Penicillium* or other fungus weeds that may be present have little opportunity of germinating and spreading if the material used in the transfer be rapidly dried and kept in a dry condition. In making up the dry cultures it seems desirable to include some of the substratum mixed with the spores. In this way even such bacteria as *Bacillus prodigiosus* have been successfully sent through the mail and moulds have been received in good condition from as distant countries as the Philippines. Naturally with those fungi that fail to fruit well in captivity and to form spores or other reproductive bodies which retain their vitality, recourse must be had to test-tube cultures with hard agar. The envelope method has been used for several years by the writer and by several of his correspondents, and for the forms most generally cultivated seems to meet