colored ones. This exception was the dark red color under which the husks remained green. This Cellophane transmitted no light at all below 5,400 Ångström units, as shown by a spectral analysis secured from E. I. du Pont de Nemours and Company. Here the transmission was but 2 per cent. At 5,800 units there was 18 per cent. transmission, while at 6,500 units the transmission was 86 per cent. The range of transmission was much narrower for the red than for any other color used, the effective transmisison being mostly between 5,800 and 6,500 Ångström units. All the other shades used had a greater range of transmission, covering almost the entire visible spectrum as well as transmitting considerable ultra-violet light. Much more selective filters will be necessary to localize the area chiefly responsible for the production of sun-red. Further work on this subject is in progress.

It is not possible to state as yet just what wavelength of light is most effective in the production of sun-red. Red light alone is not capable of producing the red color.

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BENTONITE IN THE UPPER CRETACEOUS OF NEW JERSEY[1]

ON October 12, 1936, the writer, in company with Charles W. Carter, a graduate student in the Geological Department of Johns Hopkins University, examined a 30-foot section of Upper Cretaceous sand in a cut of State Highway 41, 3 miles southwest of Haddonfield, ¾ mile northeast of Runnemede, Camden County, New Jersey. The material consists mainly of massive, unconsolidated, marine sand containing evenly distributed dark grains of glauconite in a proportion such as to give to the sand a so-called "pepper-and-salt" appearance. Poorly preserved markings of *Halymenites major* Lesquereux were observed at several places in the sand, particularly in the upper part. In an inconspicuous, nearly horizontal layer 5 or 6 inches thick, 12 feet below the top of the cut, the sand contains numerous fragments of a soapy, clay-like substance resembling bentonite, up to a maximum dimension of perhaps 2 inches. As shown on the state geological map of New Jersey, this sand falls within the lower part of the unit mapped as Wenonah and Mount Laurel sand and probably belongs to the Wenonah.

The clay fragments in the sand do not appear waterworn. Apparently the clay was deposited in a continuous layer and was later mechanically broken up, possibly by differential compaction of the sand. A sample of the clay was submitted to Dr. C. S. Ross, of the U. S. Geological Survey, whose report is quoted herewith in full.

> The clay sample from 3 miles southwest of Haddonfield, New Jersey, has been studied in thin section, and it proves to be bentonite with unusually well preserved volcanic ash structures. Very perfect plate-like, Y-shaped, and lune-shaped volcanic shards are only partly altered to glass or perhaps more probably to the type of clinoptiolite described by M. N. Bramlette and E. Posnjak from bentonites (*Am. Mineralogist*, vol. 18, pp. 167–171, 1933). The shards vary from .05 to .15 millimeter in their longest direction and average .10 millimeter. The shards are transparent and isotropic or slightly birefracting, but show more strongly birefracting alteration products along their borders. These shards are in a matrix of typical bentonitic clay which forms at least 75 per cent. of the material. Associated with this are a few grains of oligoclase, orthoclase and biotite. Quartz and glauconite grains are present in small amount and no doubt represent sedimentary materials, but the admixture with these has been small.
>
> This sample presents such perfect ash structures, and such characteristic minerals that its volcanic origin is indicated with more than usual clearness.
>
> Mr. P. G. Nutting has made acid-leach and oil-bleach tests and finds that the material has the properties of a very pure bentonite that has been rather completely leached by percolating waters.

According to Ross, the material is a true bentonite. So far as known to the writer, it is the first authentic bentonite deposit recorded from the North Atlantic Coastal Plain. Although this bentonite possesses good bleaching qualities, the meagerness of the deposit renders it of no commercial importance. It is, however, of great scientific interest because there is general agreement among authorities that bentonite originates from volcanic ash. Where was the volcano that furnished the ash from which this New Jersey bentonite was formed?

There are volcanic vents of Cretaceous age in southwestern Arkansas, and deeply buried volcanic rocks of that age have been identified from wells at Jackson, Miss. Although volcanic ejectamenta of the kind that would produce bentonite are known to have been carried by wind and deposited in beds of measurable thickness as far as 600 miles from their source, the Cretaceous volcanoes of the Gulf region seem too far away to account for this North Atlantic bentonite. The volcanic necks of southwestern Arkansas are fully 1,100 miles from the New Jersey locality, and Jackson, Miss., is distant therefrom more than 1,050 miles. Volcanoes to the eastward in some area now covered by the waters of the Atlantic Ocean might be considered as a possible source. The Bermudas, distant a little more than 700 miles, are known from one well boring to be underlain by volcanic rock, but the age

[1] Published by permission of the Director, U. S. Geological Survey, Washington, D. C.

of this rock has not been definitely determined. Submerged Cretaceous volcanoes may exist nearer the Atlantic Coast than the Bermudas. An opposing argument to an eastern source would be the prevailing-wind direction, which at present is toward the east.

LLOYD WILLIAM STEPHENSON

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A TECHNIQUE FOR THE SLIDE CULTURE OF FUNGI

IN an attempt to obtain uncontaminated slide cultures of various fungi in the biological laboratories of the University of Pittsburgh, where a sterile chamber is not available and where conditions are as yet particularly unfavorable because of unplastered walls and many cross-draughts, a technique was employed which permitted all stages of typical growth on one slide and also made available a slide culture particularly satisfactory for permanent mounting.

Microscope slides were sterilized in 30×140 mm test-tubes, which were ordered from a local supply house to fit the regulation size slides. Sterile agar medium, tubed in quantities of 3 to 5 cc, was melted and cooled to the point of gelation. The agar was shaken to break up any lumps which were forming; the plug was removed, the mouth of the tube flamed, and the agar poured over the sterile slide in a similarly flamed tube. As the agar flowed down the slide it hardened and formed an uneven layer on which several light inoculations were made. A very dilute suspension of spores in the agar to be poured was sometimes substituted for the latter step.

After about forty-eight hours of incubation at room temperature, the agar film was usually dry enough to permit the elimination of drying before mounting. The unevenness of the film allowed for all stages of growth from spore germination to spore formation. Plasmolysis was exhibited only at the center of old colonies, or where the agar layer was insufficiently thick. No difference was observed between slides incubated without the addition of sterile water to the tube and those incubated with several cubic centimeters.

A simple technique, recommended by Henrici,[1] was used for permanent mounting. After fixation for several minutes in a solution of 100 cc 50 per cent. alcohol, 6.5 cc formalin, and 2.5 cc glacial acetic acid, a change was made to 35 per cent. alcohol and then to distilled water. Staining five minutes in an acid dye was followed by washing in distilled water until all the stain was removed from the agar. The slide was then dried in air overnight and mounted in balsam.

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[1] Henrici, "Molds, Yeasts, and Actinomyces," John Wiley and Sons.

SIMPLIFIED PREPARATION OF MICROSCOPE CROSS HAIRS

FOR some time I have been using spider silk for the cross hairs in the oculars of my microscope. This was a rather tedious procedure because the spiders that are usable are not always at hand and even when they are, it is a long and delicate procedure to draw out the compound thread from the spinnerets, separate a single component and then without breaking or tangling to lay it accurately upon the glue previously applied to the diaphragm.

Recently I found a much quicker and more convenient method of producing "hairs" equal or even surpassing in fineness those produced from spider silk.

This I accomplished with a commercial waterproof adhesive. By taking a small globule of this transparent substance on the end of a probe and touching it to the surface of the diaphragm in the ocular, the removal of one lens of the ocular is all that is necessary, then pulling the probe away some nine or twelve inches there remains a single extremely fine and elastic, though not very adhesive, thread connecting the side of the diaphragm and the probe. Then moistening the opposite side of the diaphragm opening with the same adhesive, being careful to dispose of the resulting thread without entangling it with the first one, catch the first thread a little short of the length necessary to cross to the other side and stretch the necessary amount and touch to the adhesive on the opposite side. This method has several advantages over the spider silk method previously used: the diaphragm does not have to be removed from the ocular tube with consequent necessity for adjustment when replaced in the tube to bring the thread into sharp focus; it is so easily applied, the placing of a single hair requiring no more than two minutes from the time the ocular is removed from the microscope until it can be replaced ready for use, that these threads can be removed or replaced as needed without losing much time. The thread is single, which gives a fine sharp image and in addition is elastic, automatically taking up any slack in the line. One precaution must be used. When preparing the thread it is necessary to pull evenly. If it is drawn out in jerks there will be irregularities in thickness of the resulting thread. When using this method, the same substance acts both as the adhesive and the thread.

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