and mouse brain strains, namely, about 10,000 intracerebral fatal doses.[1]

Dogs given a single peritoneal injection of culture virus remain healthy and show neutralizing antibodies in their sera against the homologous "street" virus strain within 14 days. Their ability to resist subsequent exposure to "street" virus is now being tested.

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A CHEMICAL REAGENT FOR THE DETECTION AND ESTIMATION OF VITAMIN B_1

THERE has not been reported as yet in scientific or patent literature any information concerning a specific chemical reagent capable of reacting with small quantities of vitamin B_1.[1, 2] Such a reagent would provide a means of qualitative as well as quantitative estimation of the vitamin in foodstuffs or biological preparations.

Investigation carried out in our laboratory has shown that certain derivatives of aniline or the naphthyl amines have the property of producing characteristic colorations with solutions of the vitamin. After intensive research it was found that certain derivatives under certain conditions will react with vitamin B_1 to produce a stable colored compound which is insoluble.

We have found that when a solution of either p-amino acetanilid or methyl-p-amino phenyl ketone (p-amino acetophenone) is treated with nitrous acid and the resultant product is treated under certain conditions with vitamin B_1, there is produced a characteristic purple red compound which is stable and highly insoluble in water. The solutions of the treated amines will not react under these conditions with any substances as yet tried to form the same characteristic insoluble compounds which are colored.

The respective reagents produced from the amines mentioned have been successfully tried on samples of wheat germ, rice polishings, Seidell's International Adsorbate, Anheuser-Busch yeast concentrate, Merck concentrate, Eli Lilly adsorbate, Merck crystals (natural) and synthetic crystals from the Winthrop Chemical Company (Windaus synthesis). In each case the same characteristic product previously mentioned was obtained.

The colored vitamin-reagent compound may be extracted by means of a suitable selective solvent. Such a method may afford means of concentrating vitamin B_1. Since the coloration is of a permanent nature, it provides a method for the quantitative as well as qualitative estimation of the vitamin. This test is extremely sensitive; preliminary examinations show that determinations may be made within several millionths of a gram of the active material.

Work is now under way to permit accurate chemical determination of vitamin B_1 in natural products as well as commercial preparations.

Investigation on regeneration of the vitamin-reagent compound and feeding tests of such products is now in progress.

Further details on the progress of this problem will be published in the near future.

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EFFECT OF COLORED CELLOPHANE ON THE PRODUCTION OF SUN-RED COLOR IN MAIZE

PRELIMINARY attempts have been made to determine, if possible, the wave-length of light responsible for producing the sun-red pigment in maize plants of the genetic composition *A B pl*.

It has been long known that such plants when exposed to light develop a red pigment in all parts of the plants, especially pronounced in the husks on the ears. The outer husks are deep red, while those underneath show very little if any of this color. Ears that develop under kraft paper bags fail to develop pigment.

In this experiment we used several hand-pollinated ears of a stock of Purdue 39 × Connecticut 75 (*A B pl*), backcrossed twice to Purdue 39 and then selfed once. The plants were either homozygous *B B* or *B b*, otherwise were quite uniform. The ear shoots were bagged as soon as they appeared, and the developing ears were also covered with kraft paper bags. Hence the husks had not been exposed to sunlight and showed no red color.

On September 15, 1936, the paper bags were removed and the ears were covered with various colors of Cellophane purchased at one of the S. S. Kresge stores. Four ears were covered with each kind of Cellophane. The colors used were red, pink, Tango (yellow), amber, dark green, dark blue, light blue, violet and light violet. Also four ears were covered with clear Cellophane to serve as checks.

On October 1, the ears were harvested and the color of husks noted. By that time an intense red had developed under the clear wrapping and all but one of the

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[1] A short report on the immunization of mice against rabies will appear in the *Am. Jour. Pub. Health*, 1936 (December).

[1] This research was supported by a grant from Eli Lilly and Company, Indianapolis, Ind.

[2] Preliminary report. The authors wish to express their appreciation for the kind suggestions received from Dr. S. M. Weisberg, Sealtest System Laboratories, Inc., Baltimore, and Dr. Elsa R. Orent, of this laboratory.

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

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