From the foregoing brief review it is seen that the cycadeoids of the Fossil Cycad National Monument are fundamentally important in botanical science. Furthermore, nowhere else so far have the specialized and heavy-stemmed branched types been found. Nor has a display of such gemstone beauty ever been brought together anywhere else on the globe.

Regarding the field conditions at the monument it merely remains to add that the location is a most sightly one and very accessible. At a moderate expense it can because of accessibility and surroundings be brought into a remarkable beauty of landscape, where the students may study at first hand in nature's own primitive setting the facts of the past, "the evidence that has never been tampered with by the hand of man," as Andrew Carnegie said. Furthermore, in addition to the plethora of material already had there is the sure promise of far more beneath the front mesa. The horizon is perfectly defined and traced around the monument borders. There are small shifts, slips or faults cutting these rim strata at various angles. But such have also tended to protect considerable material from loss by erosion. The cycadeoid level extends under fully three fourths of the entire monument area, while the trend of occurrence for the finest of the petrified stems indicates the presence within easy reach on the main mesa-capping of new material in excess of all ever recovered so far. One of the most splendid of all specimens, one of the most remarkable for beauty of silicification is the type *Cycadeoidea superba* which I secured absolutely *in situ* on the mesa cap at a point free from fault or shift for a long distance. Only shallow quarrying must reveal more such great specimens.

Fossil Cycad Monument more than all others of its series is as we now see dependent on an absolutely *in situ* development and display. Without this it can mean but little, as a mere blurred shadow, all but lost again in the shuffle of time. With it come into view a panoramic beauty, educational values of the highest and all that fuller realization of those far-away landscapes of dinosaur times, without some understanding of which we may scarce expect to learn or know life and ourselves.

What may the future wish and what do we owe? Shall we ourselves never develop the greater schools combining both exactitude and the open spaces? A recent summary shows that at the largest woman's college in the North (Hunter College of the City of New York) fully half the students preferred courses in some form of art. Here is time and here is nature in their highest expression. It is the artistic, trained sense that must best comprehend.

Just now, too, six students of the Yale Art School have in competition presented fully drawn-out plans for the monument field museum. All are of interest and merit. All show once and for all that the place for the monument display is on the monument itself and that there alone may a primary display be set to full advantage, there being as little reason for failure or going elsewhere as there would be for monumenting Gettysburg on other hills than where the historic action was fought.

The proposed Fossil Cycad National Monument development, as now quite definitely planned, will cost $65,000 initially. The question as to whence this money should firstly come was partly answered by the late Senator Norbeck, of South Dakota, who took the trouble to draft in preliminary form a bill providing for the planned development which he unqualifiedly favored. The plans, too, had the commendation of Mrs. Anna Wilmarth Ickes, who wrote the fine book "Mesa Land."

Meanwhile the visitor to the Black Hills is warned that without this development he can at present see next to nothing aside from fine "Rim" scenery at the monument, unless he is an extremely well-read and trained geologist. Above all, he need not go there, as many have done, expecting to quickly find and take away valuable specimens. Except for some mere accidental fragment meaningless to the layman, nothing is to be seen at the surface fulfilling the untrained conception of petrified forests.

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BUILT-UP FILMS OF PROTEINS AND THEIR PROPERTIES

RECENTLY, Irving Langmuir, V. J. Schaefer and D. M. Wrinch[1] published in this journal experiments in which protein monolayers were deposited on chromium-plated slides, which were covered with several layers of barium stearate. By this procedure it was possible to build up several layers of protein films, which, depending on the method used, had either their lyophobic groups ("B" layer) or their lyophilic groups ("A" layer) exposed to the surface. From these experiments the following appear to be noteworthy and apparently open to objections:

(1) The protein layers were built up from films which were spread on distilled water and compressed to a pressure of 30 dynes per cm. (2) Lyophobic B-layers are wetted by water to the same extent as lyophilic A-layers. (3) PRBB layers can be obtained by suitable procedures, whereas it was impossible to build up PRAA layers.

According to Gorter,[2] Hughes and Rideal[3] and to my

[1] SCIENCE, 85: 76, 1937.
[2] *Proc. Acad. Sci. Amsterdam*, 29: 371, 1926.
[3] *Proc. Roy. Soc.*, 137A: 62, 1932.

own experience[4] homogeneous films can be obtained when proteins are spread on a salt solution having the P_H of the isoelectric point of the protein in question (egg albumin $P_H 4.8$). In no instance was it possible to obtain homogenous films—as observed through the ultramicroscope—on a surface of distilled water. Likewise, at salt solutions of $P_H 3$ or $P_H 7$ the protein films contained signs of inhomogeneities. It has been found also that films of egg albumen start to collapse at a pressure of about 18 dynes per cm.

In the light of these observations it seems to be possible that in those cases in which protein layers were built up from films which were spread on distilled water, and compressed to 30 dynes per cm, Langmuir, Schaefer and Wrinch were dealing with inhomogenous and collapsed films whose surfaces were to some extent both lyophilic and lyophobic. This would explain the observation that A and B layers are wetted equally by water and by lyophobic solvents, respectively.

Whereas it was not possible to build up PRAA.. films, it is surprising that the authors were able to build up PRBB... layers. In both PRAA.. and PRBB. . layers the lyophilic $-NH_3^+$ and $-COO^-$ groups of one layer would be attached to the lyophobic paraffin groups of the neighboring layer. On theoretical reasons these groups should exert relatively weak cohesive forces upon each other (ion-induced dipole) which probably could be overcome easily by the attractive forces between water and the lyophilic groups (ion-dipole) when such a polylayer is dipped into water. That the polar groups of proteins do not interact with lyophobic groups of other molecules has been suggested by experiments of the author—to be published shortly—in which the molecules of a mixed protein—fatty acid film occupy apparently the same area which they occupy when the compounds are spread alone. The question arises, therefore, whether or not the PRBB layers likewise consist of inhomogenous protein layers which to some extent are both lyophobic and lyophilic.

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A REAGENT FOR VITAMIN B_1

A PRELIMINARY report by McCollum and Prebluda[1] on a reagent for the detection and estimation of vitamin B_1 prompts me to send this note on a reagent for vitamin B_1 which I have been investigating for some time.

An investigation recently completed, and soon to be published, showed that the thiazoles form with potassium iodide a sensitive reagent for the detection of bismuth and antimony. It was also shown that a solution of bismuth iodide in potassium iodide is a sensitive reagent for thiazoles. Since Williams, Clarke and coworkers have shown that vitamin B_1 contains a thiazole fraction, it was suggested by Dr. Benjamin Harrow, of these laboratories, that bismuth potassium iodide be tested as a reagent for vitamin B_1.

This research was begun and a characteristic orange-red precipitate was obtained with the reagent and the following vitamin B_1 products: Fleischmann's yeast cakes, Squibb's malted wheat germ extract (vitavose) and Squibb's vitamin B and G syrup. Fresh orange juice, fresh grapefruit juice and canned tomato juice also gave a characteristic precipitate with the reagent. Certain brands of canned orange juice and canned grapefruit juice did not give the reaction. These products, when treated to destroy the vitamin, gave no precipitate with the reagent unless care was taken to preserve the thiazole nucleus.

The orange-red precipitate formed by the reagent with the above-mentioned products can be filtered, dried and weighed. The weight of the precipitate was found to be proportional to the amount of product used.

This work is being extended further, and complete details will be published later.

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THE EFFECT OF TEMPERATURE UPON THE RESPONSES OF PLANTS TO PHOTOPERIOD[1]

To furnish material for further studies of the relation of anatomical condition to blossoming,[2,3] more than 100 varieties of plants, including some monocotyledons, are being grown in different environmental and cultural conditions. The principal variables being used are photoperiod and temperature, although some partial defoliation, girdling, shading and low nitrogen treatments are also included. It appears that temperatures a little above or below the usual range employed in greenhouse culture have been effective in altering the responses of some plants which are commonly considered to have a fixed or definite reaction to relative length of daylight. For instance, poinsettia plants grown in the short days of winter at a temperature of 68° to 70° F. remained strongly vegetative and did not blossom, while plants in temperatures of 60° to 65° blossomed normally and plants in temperatures of

[4] *Jour. Phys. Chem.*, 40: 361, 1936.

[1] SCIENCE, 84: 488, November 27, 1936.

[1] Published with the permission of the director of the Wisconsin Agricultural Experiment Station.

[2] Ocra C. Wilton and R. H. Roberts, *Bot. Gaz.*, 98: 45–64, illus., 1936.

[3] R. H. Roberts and Ocra C. Wilton, SCIENCE, 84: 391–392, 1936.