concentrated separately in partial *vacuo* at a low temperature and the residues thoroughly extracted with benzene. The benzene is removed in partial *vacuo* at a low temperature and the lipoidal residue extracted with acetone. The acetone-soluble material, after removal of the acetone in a similar manner, is distributed between 70 per cent. ethyl alcohol and low-boiling petroleum ether. The alcoholic phase is washed repeatedly, the petroleum ether washings combined and the petroleum ether removed by distillation. The residue is again subjected to the distribution procedure. The petroleum ether washings are washed with 70 per cent. alcohol. The alcohol is removed as before, and to the aqueous concentrate sufficient distilled water is added to obtain the desired volume. In the present study we have arbitrarily made the dilution so that 1 cc represents 30 gm of freshly dissected cortical tissue. The extract is clarified and sterilized for subcutaneous injection by filtration through a Seitz filter. The solid content of this extract varies between five and ten milligrams per cubic centimeter. The extract is not entirely adrenalin free.

Present knowledge of the functional significance of the suprarenal cortex is so vague and uncertain that the only reliable criterion for testing the activity of a cortical extract is its effect upon the life-span of adrenalectomized animals. The criterion is severe and requires much time and effort, but at any rate it is an excellent index of potency.

All cats, both controls and extract-treated, were given uniform treatment. They were treated with a vermifuge upon first admittance to the laboratory—a necessary precaution since many animals in the vicinity of Princeton are heavily infested with hookworm—kept in thermostatically heat-regulated rooms, fed identical diets and operated by the same individual. At least seven days intervened between removal of right and left adrenals.

The average life-span of twenty-five bilaterally adrenalectomized control cats (untreated) was seven days; the maximum survival period of any animal in the control series was fourteen days; the minimum survival was four and one half days. Twenty-four hours following the second operation the first injection was given. Each animal received subcutaneously 0.5 cc to 1.0 cc of extract per kilogram of body weight daily.

Animals so treated remain in perfectly normal condition forty to fifty days, and can not be distinguished from normal unoperated cats. They eat, play, fight with one another and keep themselves sleek and clean. Most of our animals have shown weight increases during treatment. We have sacrificed several of our animals on the fiftieth day of survival in order to search for accessory adrenal tissue, but in no case have we found anything, despite the most exhaustive search.

In our earlier work with the lipid fraction which was injected in oil subcutaneously, considerable difficulty was experienced in keeping our animals much beyond forty or forty-five days, owing to accumulation of oil under the skin and abscess formation. The animals' coats became rough, the hair fell out in patches and their weight gradually declined. None of these difficulties have arisen in the experiments when the aqueous preparation of the original lipid fraction was employed.

The interesting point is that all healthy double operated animals survive and remain in normal condition when treated with the extract. Just how long cats so treated will survive we are unable to say at present, since our longest surviving animals are now in their eightieth day and in excellent condition. The experiments, however, justify the conclusion that we have successfully extracted from the suprarenal cortex of beef an active hormone which maintains the life of bilaterally adrenalectomized cats.

A detailed account of the various experiments will be published shortly.

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## THE PRE-OLIGOCENE STRATIGRAPHY OF PORTO RICO

A RECENT geological survey of northeastern Porto Rico shows that the stratigraphic sequence suggested by Carlotta J. Maury in SCIENCE for December 20, 1929, needs emendation, at least so far as the formations which lie unconformably beneath the Oligocene-Miocene coastal plain are concerned.

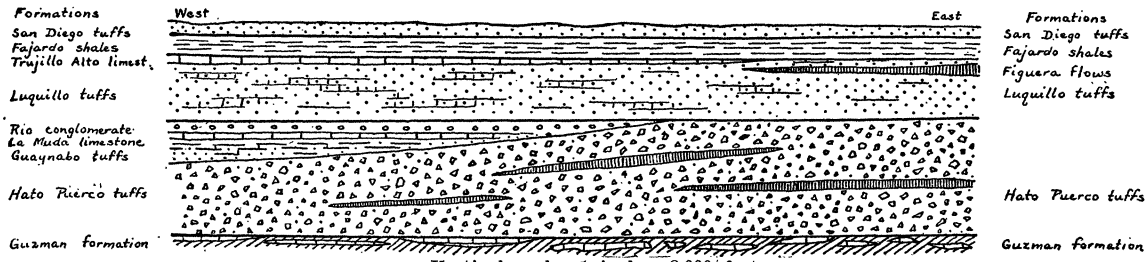
According to Dr. Maury, rocks of Eocene, Upper Cretaceous and possibly Lower Cretaceous ages are present. She regards the La Muda limestone as one of the youngest pre-Oligocene horizons, placing it in the Upper Eocene; and a similar, if less precise, position was given it by D. R. Semmes in 1919[1] on the basis of a small and inconclusive micro-fauna. The writer's structural studies have developed the fact that the bed lies stratigraphically beneath the Upper Cretaceous formations which Maury calls the Fajardo and Cape San Juan limestones.

Both Maury and E. T. Hodge[2] believe that the limestone south of Cidra lies at, or near, the base of the Porto Rican section, and they both place it tentatively in the Lower Cretaceous. This formation, however,

[1] D. R. Semmes, "The Geology of the San Juan District, Porto Rico," "Scientific Survey of Porto Rico and the Virgin Islands," Vol. I, pp. 74–75, 1919.

[2] E. T. Hodge, "The Geology of the Coamo-Guayama District, Porto Rico," *idem*, pp. 132, 192–193, 1920.

has been found to be the La Muda limestone, repeated on the flank of one of the several folds which rib the island. It lies neither at the base nor at the top, but slightly below the middle of the 10,000 to 11,000 feet of pre-Oligocene volcanics and sediments in this part of the formations undergo. The accompanying restored section will illustrate the type of lateral change that occurs in northeastern Porto Rico within a distance of thirty miles. The geological age of the basal formation is not known; the others are Upper Cretaceous but do not include the highest members of the pre-Oligocene sequence.




Vertical scale: 1 inch = 8,000 feet.

FIG. 1. Restored section of the Upper Cretaceous rocks between Bayamon and Fajardo, P. R.

of Porto Rico. The limited evidence available indicates that they are all Upper Cretaceous in age.

It must be assumed that the designation of the rocks in the vicinity of Fajardo and Cape San Juan as limestones was an inadvertent slip, for the outcrops in this region consist of the Fajardo ashy shales and of a formation of stratified tuffs for which the name "San Diego" is herewith proposed. There are no limestones nearer than the valley of Rio Sabana, six miles to the west, where a thin wedge of the Trujillo Alto limestone is present.

The writer is not familiar with the structural and stratigraphic details in central and western Porto Rico, but the facts published suggest that some caution is necessary in formulating a geologic section which utilizes stratigraphic units from those portions of the island. Hodge placed the Rio Jueyes series in the Eocene on the strength of a single specimen identified as *Venericardia alticosta* Conrad,[3] and Maury apparently accepts his conclusion. Above the Rio Jueyes series lie the Coamo tuff-limestone and the Rio Descalabrado series, which both authors have necessarily referred to the Eocene. Yet, in the calcareous strata of this entire sedimentary series, which outcrops on the southern slopes of the Cordillera Central, G. J. Mitchell has reported abundant specimens belonging to the rudistid genus, *Radiolites*.[4] No better index fossil of the Cretaceous can be found, and in view of the presence of rudistids in the Rio Jueyes and Rio Descalabrado series, their assignment to the Eocene may well be questioned. The presence of Eocene rocks in any part of Porto Rico thus appears to be extremely dubious, although the possibility of their existence has not yet been completely eliminated.

At the present time the information in print is not adequate for the development of a stratigraphic succession that will apply to the pre-Oligocene rocks of the entire island. Determination of such a sequence is rendered triply difficult by the large intrusions which cut the section, by the complexity of the structure and by the baffling lateral gradation which some

[3] *Idem*, pp. 193–194.

[4] G. J. Mitchell, "The Geology of the Ponce District, Porto Rico," *idem*, pp. 255–257, 1922.

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## THE PROPER TAXONOMIC CLASSIFICATION OF CERTAIN PYTHIACIOUS ORGANISMS

THE literature of mycology and plant pathology of the last few years contains many such phrases as "Pythium-like fungus causing this or that disease."[1] It is unfortunate to find in highly technical papers such expressions as the above, that tend to confuse rather than clarify the true taxonomic position of a group of organisms of great economic importance, since many of them are very aggressive plant pathogenes. This group of Pythium-like fungi is represented by such species as *P. gracile* Schenk,[2] *P. monospermum* Pringsh.,[2] *P. Butleri* Subram.,[3] *P. aphani-*

[1] B. B. Branstetter, "Corn Root Rot Studies," Res. Bulletin 113, Agr. Exp. Sta. Univ. of Missouri, 1927; C. W. Carpenter, "Pythium in Relation to Lahaina Disease and Pineapple Wilt," *Hawaiian Planters' Record*, 23: No. 3, pp. 142–174, 1920; C. W. Carpenter, "Morphological Studies of the Pythium-like Fungi Associated with Root Rot," Hawaiian Bulletin Exp. Sta. Hawaiian Sugar Planters' Association, Bot. Series, Vol. 3, Part I, pp. 59–65, 1921; C. W. Edgerton, E. C. Tims and P. J. Mills, "Relation of Species of Pythium to the Root Rot Disease of Sugar-cane," *Phytopath.*, 19: 549–564, 1929; Helen Johann, James R. Holbert and James G. Dickson, "A Pythium Seedling Blight and Root Rot of Dent Corn," *Jour. Agr. Res.*, 37: 443–464, 1928.

[2] Alfred Fischer, "Die Pilze: Phycomycetes," pp. 383–410 in Rabenhorst's "Kryptogamen Flora von Deutschland, Oesterreich and der Schweiz," IV. Abtheilung, Leipzig, 1892.

[3] L. S. Subramanian, "A Pythium Disease of Ginger, Tobacco and Papaya," Memoirs of the Dept. of Agriculture in India, Bot. Series, Vol. I0, No. 4, 1919.