podus riparius is currently identified with *Trogosus* or *Tillotherium* of the Bridger Middle Eocene. If this identification is correct and if it came from the Shark River beds, then these are probably Middle Eocene, possibly later, but not earlier."[5] (*d*) The fact that the Pamunkey embayment or segment filled in seaward during Eocene time till the Carolina end of the arc was reached in late Eocene times, would suggest a similar age for the New Jersey beds at the other end of the arc.

The conclusions from the above outline of facts may be thus briefly summarized:

(*a*) The Eocene beds in New Jersey may be in the same trend of the Maryland Eocene outcrops, but this fact has little to do with the relative age of the deposits.

(*b*) The known Shark River fauna shows very little relationship with the comparatively near-lying Pamunkey faunas; still less with any known lower or basal Eocene, Midway fauna.

(*c*) The general aspect of the Shark River fauna with its many species closely allied to or identical with Claibornian forms would seem quite sufficient in itself to cause these New Jersey beds to be referred to a horizon *above* instead of *below* the mass of Pamunkey deposits.

(*d*) Data from other paleontologic sources are of a questionable nature, but so far as they go they seem to support the writer's contention.

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A PHYTOPHTHORA ON OATS

While in the recently started experiment garden at Stanford University on February 10, I noticed on the leaves of volunteer oats markings such as I had not seen before.

On examining the material in the laboratory, the markings were found to be due to a species of *Phytophthora*. The markings may appear as spots or as stripes along one or both margins of the leaf, or as a stripe down the center. The diseased areas become yellowish, and then whitish when conidia are abundant. Later these areas, which sometimes have a water-soaked appearance, become brown or reddish-brown, and the parts shrivel and dry up.

The short, hyaline, unbranched conidiophores (4–5×15–$300\,\mu$) issue from the stomata on both sides of the leaves and usually bear a single ovate or obpyriform conidium. The conidia are quite large (30–42×42–$78\,\mu$, occasionally one is much smaller) and fall away with a small part of the conidiophore attached. They germinate by producing numerous zoospores. Chlamydospores were found crowded together in the tissues of some of the older diseased areas. They were globular, hyaline or very light yellow, some thin-walled and others thick-walled, and 12–18 μ in diameter. In some leaves oospores were also found abundantly. The oogonia were thin-walled and 30–39 μ in diameter. The globular oospores were 27–30 μ in diameter, the epispore being smooth, hyaline or light yellow, and about 2 μ thick.

The species is certainly very similar to *Phytophthora Colocasiæ* Rac. on the taro (*Colocasia esculenta*) in Java, India and Formosa, but a more extended study is necessary to determine its specific rank. It has been found in several fields about Stanford University and by the state highway near Mayfield, California. As a large percentage of the plants were infected in some localities, the fungus may become of considerable economic importance.

James McMurphy
Stanford University,
February 17, 1916

ENDURANCE OF THE PORPOISE IN CAPTIVITY

The New York Aquarium lost last year a most attractive exhibit, the bottle-nosed porpoise (*Tursiops truncatus*) which has lived in the large central pool of the building for more than twenty-one months.

The cause of its death was a mixed infection, which in a few days attacked every part of its skin, covering the smooth glistening surface with unsightly pustules. This infection

[5] Matthew, *ex lit.*

was clearly the result of keeping the animal in water pumped from New York Harbor, the only supply available for the large floor pools, under present conditions.

The water of the harbor is always of low salinity and is charged with sewage, its foulness being especially noticeable in midsummer.

The propoise had grown perceptibly since its arrival on November 15, 1913. Its weight at death was 293 pounds and its length eight feet. Four other porpoises received at the same time lived seven months in captivity, when they died of pneumonia in rapid succession.

Like the one referred to above their skins at death were also filth-infected, although not to the same extent. Our experience has shown that the porpoise readily endures captivity and might live much longer if pure sea water were available. Other porpoises will be obtained and equipment is now being installed for filtering the harbor water—an improvement that has long been needed at the Aquarium.

The school of porpoises contained both sexes and they were often observed mating. The loss of the females was especially disappointing as the prospects for breeding in captivity were promising.

All of these porpoises were constantly active and playful to within a few days of their deaths.

C. H. Townsend
The New York Aquarium

SCIENTIFIC BOOKS

A Treatise on Light. By R. A. Houstoun, Lecturer on Physical Optics, University of Glasgow. Longmans, Green and Co., 1915. Pp. 478. $2.25 net.

To the student of optics familiar with the treatises of Drude, Preston, Shuster and Wood, and numerous other text and reference books on optics, there would appear to be little need for a new text in this field. Professor Houstoun's treatise is, however, unique in scope and treatment, and will doubtless prove of great value both as a text and for reference.

In scope, this treatise covers both theoretical and physical optics, together with geometrical optics, vision, photometry, illumination, spectroscopy and X-rays. Part I. deals with Geometrical Optics, Part II. with Physical Optics, Part III. with Spectroscopy and Photometry and Part IV. with Mathematical Theory. An extremely concise treatment of each subject makes it possible to cover this wide field in so few pages, the style is lucid and free from unnecessary explanation and deductions. Except, perhaps, in the chapter on the nature of light, the treatment is nowhere exhaustive or profound, and is well adapted to the use of advanced undergraduate students.

Part I., on Geometrical Optics, deals in seven chapters with the elementary theory of image formation, the theory of the simple optical instruments and the determination of refractive indices. The third order defects of images (Seidel aberrations) are barely mentioned. This section of the book, while an excellent teaching text in that it presents a well-balanced outline of the subject, would be much more valuable if it included a little modern technical optics dealing with lens calculation, the third-order aberrations and precise methods of testing.

The hundred pages on Physical Optics is a discussion of the velocity, interference, diffraction and polarization of light in six chapters. A rather full treatment of the diffraction grating is given, but otherwise the matter presented is quite academic and very concise. On page 190 statements (3) and (4) regarding interference between two beams of plane polarized light evidently require revision. The description of improved polarizers and analyzers does not mention those devised by Brace and used with such success by his students.

Part III., entitled Spectroscopy and Photometry, contains two chapters on the spectroscopy of the visible spectrum, a chapter on the ultra-violet and one on the infra-red and X-rays. The remaining three chapters are devoted to Photometry and Spectrophotometry, the Eye and Color Vision and Lamps and Illumination.

The two chapters on general spectroscopy, for their length, could hardly be improved upon in choice and presentation of material. The chapter on the ultra-violet impresses the re-