vary considerably in composition. The *Cladophora* balls (see Kindle[4] for description and figures) result from the radial growth of this Alga. Schröder gives quite a number of cases of both plants and animals (*e.g.,* sponges) which may take a spherical shape in their growth when free from the bottom and kept rotating by water oscillations. In 1923 the Biological Board boat *E. E. Prince* obtained at a few fathoms depth in an arm of the Bay of Exploits, in northeastern Newfoundland, roundish masses of the calcareous alga, *Lithothamnium,* as much as six inches in diameter and three inches deep. They were hollow and usually there was an opening through to the central cavity, which had evidently been formed by the disintegration of the oldest part of the plant, the shell that remained and continued growing on the outside being for the most part less than half an inch thick. These masses had been resting loosely on the bottom on one of the flattish sides.

Many of the balls that are found on shores are not living growths, but are composed of varied debris. These seem to have been universally attributed to their constituent parts becoming matted together under the action of waves in shallow water. If built up in this fashion, they would tend to have, not a radial structure, but an interlacing or felted structure with more or less distinct concentric lamination. Perhaps the best instances of this type are the balls found on certain shores of the Mediterranean, the essential parts consisting of thread-like fragments of the rhizomes of *Posidonia,* as described by Russell.[5]

While some of the balls formed of debris may have had such an origin there are those that must be explained otherwise. They show no concentric lamination, and the materials of which they are composed tend to separate under wave action on a beach. I have been able to examine a number of balls, obtained in 1919 at Little Kedron Lake, New Brunswick, by Dr. H. S. Everett. He obtained others in 1931, and Ganong[6] obtained and described one from this same lake in 1904. They are not found elsewhere in the many lakes of the region so far as known, and they are found only in one bay of this lake. They are locally known as "spill balls," as they are largely made up of the "spills" or needles of fir and spruce. While some were almost perfect spheres, others were somewhat irregular, though well rounded. When sawn through there was no evidence of concentric, but some of transverse, lamination. The surface was evidently being worn away by rolling on the bottom, and the spherical shape seemed, therefore, to have been produced in the same way as the rounding of stones on an exposed beach. Ganong appears to have had only one dried specimen and, believing that it had been put together by wave action, comments: (1) "It is very remarkable that such smooth objects (the needles) can thus cling together, but still more remarkable that they should become interlocked in the first place." One of the balls, on being dried, promptly went to pieces, showing how insecurely the needles were interlocked. It may be safely surmised that the needles settled into some relatively deep and quiet water, forming in the course of time a thick dense mat, which would be broken into pieces by an exceptional storm and the pieces rounded on the beach by wave action. The combination of conditions which would make this possible is sufficiently unusual to account for the rarity of these "spill balls." It seems probable that the balls of fir needles mentioned by Russell[7] as being in the Zurich Museum and coming from lakes of the Engadine were formed in similar fashion, as also the "sea-balls" from the coast of Nova Scotia figured by MacKay.[8] As this method of the formation of lake balls seems not to have been hitherto recognized, it seems worth while to present the case for it.

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THE SOLDADO ROCK SECTION

IT is to be regretted that Dr. H. W. Shimer's recent correlation[1] is marred by a serious error on plate 122 where the Soldado Formation is referred to the Upper Eocene and placed as equivalent to the St. Bartholomew limestone, the type of the Upper Eocene of the Antilles. In truth the Soldado Formation is the type of the Lower Eocene of the Antillean and northern South American areas.

The faunas of Soldado Rock, Gulf of Paria, were described and figured by me in 1912,[2] bed No. 2 being correlated as basal Eocene. Later I extended this horizon to Margarita and Toas Islands, Venezuela.[3] In SCIENCE, 1925, I named this No. 2 bed the Soldado Formation,[4] "to stand as the type of northern South American and of Antillean basal Eocene deposits."

In 1928, Mr. Liddle gave the name Soldado Formation,[5] *as new,* to a very different geological formation

2 *Rhodora,* 11: 149, 1909.
3 *Die Naturwissenschaften,* 8: 799, 1920.
4 *Amer. Midl. Nat.,* 15: 752, 1934.
5 *Rev. gen. de bot.,* 5: 65, 1893.
6 *Bull. Nat. Hist. Soc. N.B.,* 23: 304, 1905.
7 *Loc. cit.*
8 *Proc. Trans. N.S. Inst. Sci.,* 11: 667, 1908.
1 Hervey W. Shimer, *Bull. Geol. Soc. America,* 45: 909–936, Pls. 118–122, 1934.
2 Carlotta J. Maury, *Jour. Acad. Nat. Sci. Philadelphia,* second series, XV: 23–112, Pls. 5–13, 1912.
3 C. J. Maury, *American Jour. Science,* fifth ser., IX: 53, 412, 1925.
4 C. J. Maury, SCIENCE, LXI: 1567, 43, January, 1925.
5 R. A. Liddle, "Geology of Venezuela and Trinidad," p. 225 and elsewhere, 1928.

referred by him to the Upper Eocene. Dr. Shimer has followed this invalid usage. In citations from my 1912 memoir, Mr. Liddle actually mixed together my faunal lists, and inverted my foraminiferal bed (No. 6) and my upper molluscan bed (No. 8), and pronounced the results confused!

Thereupon, I published in 1929 a complete history of the Soldado Rock Section,[6] again defining the Soldado Formation as Lower Eocene. Furthermore, I gave the name Boca de Serpiente Formation to my upper molluscan bed (No. 8), correlating it as Uppermost Eocene, equivalent to the European Ludian; while the foraminiferal bed (No. 6) was placed in the Bartonian. All due credits and citations were given.

Soldado Rock is of extreme paleontologic and stratigraphic interest. The Soldado Formation (bed No. 2) has a fauna linked by allied forms to the Lower Eocene of Alabama and to that of Pernambuco, Brazil, as shown by the writer in 1912. It also contains a remarkable genus, *Veatchia* Maury, with the genotype and only known species, *Veatchia carolinae* Maury, which in 1926 was traced from the rock to the mainland of Trinidad by Waring and Harris, in the Marac quarry,[7] in the southern part of the island, and referred by them to the basal Eocene.

In conclusion, the Soldado Rock section is the key to the interpretation of the Antillean and northern South American Eocene. The lower molluscan bed (No. 2) the Soldado Formation Maury, 1925, represents the first discovery of Old Eocene in the entire Antillean area. The foraminiferal bed (No. 6) is Bartonian, and goes with the foraminiferal marls of Bontour Point, Trinidad, referred by Douvillé,[8] in 1924, to the Bartonian. My upper molluscan bed (No. 8) is Ludian. This marked the first recognition of both Bartonian and Ludian deposits as separate entities, in the entire Western Hemisphere.[9] As I noted in 1931, this South American Bartonian can be traced from Soldado Rock and Trinidad to Panama, Ecuador and Peru, and is comparable in age and faunal affinities with the Upper Mokattam of Egypt. The St. Bartholomew limestone, long the type of Antillean Upper Eocene, goes with this Bartonian horizon. In Colombia, I regard a horizon west of El Carmen as Ludian and equivalent stratigraphically to my Boca de Serpiente formation (bed No. 8) of Soldado Rock. This ties up with the Saman formation of Peru. The main fossiliferous beds of the 1912 Soldado section are thus traced across the entire northern South American mainland.

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[6] C. J. Maury, *Journal of Geology*, XXXVII: 2, 177–181, February–March, 1929.

[7] G. A. Waring and G. D. Harris, The Johns Hopkins University Studies in Geology, No. 7, pp. 99, 101, 1926.

[8] Douvillé, Memoires Société geol. de France, p. 19, 1924. See also Illing, *Quarterly Jour. Geol. Soc. London*, 84, pt. 1: 7, 1928.

[9] C. J. Maury, *American Jour. Science*, XXII: 375–376, October, 1931.

UNISEXUAL LIMBER PINES

IN the course of an investigation on alpine vegetation in the Rocky Mountain National Park in Colorado in the summer of 1932, the writer found at timberline individuals of limber pine (*Pinus flexilis* James) that differed in appearance so markedly from the usual form as to suggest an unknown species. Close scrutiny, however, revealed that the characteristics of the aberrant form intergraded with the normal except in two ways: (1) All the leaves on a tree were uniformly shorter in length and closer spaced on the twig, and (2) the individual trees produced only male cones. Inasmuch as many of the typical trees produced but very few or no male cones, there is apparent a tendency of the species to separate the sexes to different individuals, a deviation from the normal, which is to have both sexes on the same tree. From the Alps of Switzerland a similar tendency has been reported of the five-leaved mountain pine (*Pinus montana* Miller).[1] In spite of much search in the region, and over the whole altitudinal range of the species, this phenomenon was found to exist only at timberline. Because of its many important implications, it would seem very desirable to know more about the areal and altitudinal extent of the occurrence of this tendency. It is hoped that other observers will communicate their observations.

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AN APPEAL TO SCIENTISTS OF THE USSR

A RECENT study of the extinct elasmotherine rhinoceroses necessitated assimilation of the literature, in large part by Russian vertebrate paleontologists. During the eighteenth and nineteenth centuries such Russian works were almost invariably published in French, German or Latin and, therefore, were readily available to non-Russian workers. During the present century, a constantly increasing proportion of the valuable Russian work in vertebrate paleontology has been published in the Russian language. Such papers may be entirely in Russian, may append a translated title, usually in the table of contents, or they may add a short résumé, of a paragraph or so, in English, German or French. Any one of these procedures makes the paper virtually unavailable to non-Russians, except for such inferences as may be based on the illustrations. On the other hand, another author, or the same author on another occasion, may append a full résumé, covering all essential facts and generalizations, or he may publish a briefer version, in one of

[1] C. Schroeter, "Das Pflanzenleben der Alpen," 1926.