

may have desired to cultivate their woods on scientific principles may have met with the difficulty of obtaining expert advice; but such a difficulty no longer exists, for there are in this country now retired forest-officers of the Indian service to whom proprietors may readily go for sound and safe guidance. At the same time we cannot hope that the cultivation of crops of timber in this country will attain the dimensions which it must do if it is to affect to an appreciable extent the market supply of timber until means for the acquisition of knowledge of scientific principles underlying it are available to those to whom woods belong and to those who have the direct management of the woods. Within the last decade several trustworthy text-books upon forestry have appeared, but our only school for instruction in forestry at the present time is that at Coopers Hill. Coopers Hill is, however, open only to entrants to the Indian Forest Service, and there is no institution in the country to which any one desiring a thorough acquaintance with the principles of forestry can go. Our Universities are now alive to the claims of agriculture as a subject of study, and agricultural colleges are being formed in different districts. How long will it be before the Universities recognise that forestry also is worthy of attention, or the agricultural colleges take up the subject in their curricula? It is matter of common knowledge that a committee appointed by the Secretary of State for India recently reported in favour of the transference to Cambridge of the forest-school from Coopers Hill. As yet, however, no action has been taken upon the recommendation. The Secretary of State may rest assured that such a transference would be a reform meeting with the hearty approval of men of science, and the presence at Cambridge of such a school would give an opportunity to undergraduates connected with the landed interest to obtain some acquaintance with a subject of intimate concern to them. The influence of this upon the prosperity of the country would ultimately be most beneficial. As has been said above, ignorance is the real cause of our present condition as a wood-growing country, and until systematic instruction is provided in some of our Universities or colleges there will be no great reformation in forestry practice, although there may be amelioration through the action of intelligent and far-seeing individual proprietors.

#### THE CONCRETIONS OF THE CONNECTICUT VALLEY.<sup>1</sup>

THE curiously-shaped concretions met with in the Champlain clays of the Connecticut Valley have for many years attracted attention. Indeed, so long ago as 1670 some specimens were sent to the Royal Society of London. A detailed description of them and of their mode of occurrence, illustrated by fourteen beautiful quarto plates, has now been issued by Mr. J. M. Arms Sheldon. Four principal types of concretions are met with; some are discs which call to mind the Kimeridge coal-money; some are cylindrical or club-like, one example (probably a compound one) being a little more than twenty-two inches long; others are botryoidal, and not a few are "queer little images" resembling "fishes, birds, ant-eaters, elephants, dogs, babies' feet," &c. (Fig. 1).

These occur in stratified river-drift clays, some of which are of a kind suitable for modelling, and some are more or less gritty. The most remarkable point is that "each clay bed has a form of concretion peculiar to itself," that is to say, the principal types are never found together. The author has seen "forty-eight specimens from one bed so similar it was impossible to tell one from another."

<sup>1</sup> "Concretions from the Champlain Clays of the Connecticut Valley." 4to. (Boston, 1900)

Compound forms occur, where, for instance, two or even three discs have coalesced or been joined together (Fig. 2); and intermediate stages of such examples, and of immature concretions of horse-shoe type, are met with.

These remarkable bodies occur along the planes of bedding in the clays, and the lines of stratification may sometimes be seen to run in unbroken continuity through concretion and clay. In composition they consist of argillaceous and somewhat sandy limestone with small amounts of iron-oxide, magnesia and manganese oxide. They contain from 42 to 56 per cent. of carbonate of lime, whereas the clay possesses but 2 or 3 per cent. The concretions spread out laterally in the clay, as if water holding carbonate of lime in solution made its way

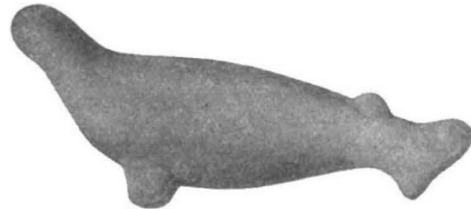


FIG. 1. - An animal form of concretion.

along the planes of stratification; and unless in the case of tiny spheroidal concretions they are almost invariably flattened. No doubt they are due to the obscure process of segregation, whereby the mineral matter, tending to collect together, has been unable to assume definite crystallographic shape, but has concentrated itself in nodular form. Some of the concretions show evidence of concentric structure, but no appreciable nucleus has, as a rule, been seen, though it might have consisted of a particle of carbonate of lime. Evidently the concretionary process went on in a quiet way, but not always uninterruptedly, as indicated by the distinct stages of growth seen in some specimens. The shape of the concretions is held to be partly determined by the structure

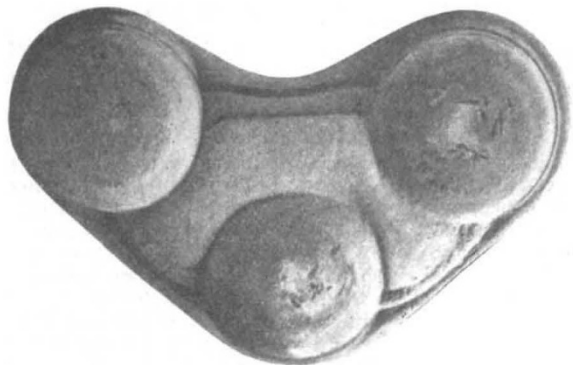


FIG. 2.—A treble form of symmetrical concretion.

and composition of the matrix which holds it, and by the amount of carbon dioxide and other organic acids present.

The author concludes his work with a useful bibliography, wherein the well-known researches of De la Beche, and the observations of A. H. Green and others are mentioned; but we miss the name of Sedgwick, who, in 1835, brought the matter before the Geological Society of London. The author, however, does not enter into the general question of concretionary structures; his work is essentially local, but it will be none the less interesting to those who give attention to the subject.

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