

divided by very thin dissepiments resembling those of a *Cyathophyllum*, but they are irregularly distributed, being in some parts entirely absent and in other places so numerous that they completely fill the loculi with small cells, constituting the 'poriferous or cellular tissue' mentioned in the original description of the genus. The central cavity extends nearly the whole length and constitutes a large proportion of the bulk of the fossil. Below it there is a portion of the smaller extremity or base, which is composed only of the outer wall, the septa, and the dissepiments. The section across this part shows that the new septa, which are introduced from time to time, as the diameter increases, do not at first extend to the center, and it would appear from this that they were developed on the inner surface of the outer wall, and gradually widened as in the genus *Zaphrentis*. Close to the extreme point of the base the septa and dissepiments have an irregular arrangement, and the loculi sometimes here appear to be mere circular perforations.

"The small branching spicula, above figured, are seen imbedded in and forming a part of the substance of the outer wall of *A. Minganensis*. The fusiform and cylindrical varieties are also seen, but rarely, either adhering to or partially imbedded in the same specimens. As they were obtained in thousands in the sediment left after dissolving pieces of the limestone holding fragments of this species, they were at first thought to belong to it; but I have recently, while treating other pieces of limestone from the same bed, also holding fragments of *A. Minganensis*, found that another large species, *Trichospongia sericea*, occurs in this rock, portions of which are crowded with, and seem to be almost altogether composed of, these spicula. It should therefore remain an open question whether or not these fusiform and cylindrical spicula actually form a part of the structure of *Archeocyathus* or are those of *T. sericea*. There can scarcely be any doubt about the branched spicula, as they can be seen not only projecting from the surface of the silicified specimens, but also in the thin slices prepared for the microscope. No spicula have been detected in *A. profundus*. In *A. Atlanticus* there are several objects visible, in the only specimen of that species that has been collected, which resemble branched spicula. No silicified specimens of these two latter species have been procured, and I think it probable that if such could be examined spicula would be found in them.

"As to the zoölogical rank of this genus there yet remains some doubt. The general structure is such that it may possibly be a sponge. The apertures in the external wall may be the homologues of the inhalent pores of the ordinary sponge, while those of the inner wall may represent the exhalent orifices. The great internal cavity in that case would have the same function as the large central cloaca of the fistulose genera of sponges. A radiated and more or less perfectly septate structure occurs in many undoubted sponges. In this genus, however, the substance of the septa is almost as compact as that of the true