

which the horny fibres had been changed to stone by means of the processes of petrefaction. Similarly, the works of Geinitz, Klipstein, Pusch, Reuss, Quenstedt, and Roemer increase the knowledge of the endless diversity of form presented by sponges, but add little to a scientific comprehension of their structure.

A notable position in the older literature of sponges is taken by the two short memoirs of Toulmin Smith (1847-48), wherein the structure of the Ventriculites from the white chalk is fairly accurately represented. Owing, however, to the fact that the nearest allies among living sponges, the Hexactinellids, were unknown at the time of his investigations, Smith drew fallacious inferences regarding the nature and systematic position of these fossils. He compared them with Bryozoa.

In the year 1851, D'Orbigny devised a badly-arranged scheme of classification for fossil sponges, upon the basis solely of external features. He called all fossil sponges "*Petrospongiæ*," and contrasted them with recent sponges, ascribing to fossil sponges an originally stony skeleton composed of calcareous fibres. According to D'Orbigny, the *petrospongiæ* form a curious and extinct sub-division of the sponges. This erroneous conception of D'Orbigny's was shared by Fromentel, but the latter author, in differentiating genera and species, made use of differences in the canal system and in the kinds of pores and openings at the surface. Friedrich Roemer followed Fromentel's method, and he differentiated between sponges with fenestrated skeletal structure and sponges with a skeleton composed of "worm-shaped fibres." Pomel also made careful observations of the skeletal structures so far as those could be distinguished with the naked eye or by the aid of a hand-lens.

The deep-sea investigations of the last part of the nineteenth century initiated a new era in the investigation of sponges, recent and fossil. Wyville Thomson, the leader of the *Challenger* Expedition, was the first to point out the similarity in the structures of fossil ventriculites and living silicispongiæ. In 1870, Oscar Schmidt, by the method of etching Jurassic and Cretaceous specimens, demonstrated in fossil forms the presence of certain skeletal structures similar to those of existing hexactinellids and lithistids. Nevertheless the fossil sponges still presented an apparently distinct and well-defined group, until almost simultaneously Zittel and Sollas resolved to apply Nicol's method and prepare thin slices of the fossil