SOME MUSEUM METHODS DEVELOPED IN THE NEW YORK STATE MUSEUM

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When the State Museum was moved in 1912 from its cramped quarters in the Geological Hall into the top floor of the Education Building, it found itself in possession of five times the floor space it had before and a general expansion of exhibits took place. This was especially the case in the departments of geology and paleontology, which took over the Main Hall, nearly 600 feet long.

As in the more than 80 years that the Geological Survey had been carried on large collections had been brought together from the State, among them over 10,000 types or originals of figures of fossils, there was no lack of material for exhibition, but the problem was how to make this unwieldy mass attractive and instructive to the visitor. We have in a former article (Ruedemann and Goldring '29) described the restorations that were undertaken for this purpose and the arrangement of the material to give it educational value. In the present article we shall set forth a number of minor methods that were developed in the process of installation and that serve to make the exhibits more attractive and instructive. We have not found these methods described in other publications on museum installation but have frequently been asked about them by visiting experts and therefore believe that their publication may be helpful to others who have to meet similar problems.

In putting the thousands of invertebrate fossils on exhibition, it was found of good advantage to select originals which had been figured and to place the figures alongside the specimens, because the figures add, so to say, a human element that attracts the eye first and leads to an inspection of the specimen.

In numerous cases the fossil was but a mold, from which a gutta-percha squeeze had been made that served as original for a figure. Usually the body of the fossil on the squeeze had been blackened with Chinese sepia or Indian ink to bring it out more sharply, a process that, however, only served to dull or hide the sculpture. An attempt to rub the blacking off with a wet finger, showed that thereby the finest details of sculpture became beautifully outlined in black on the red gutta percha. Numerous very attractive squeezes were thus obtained, especially among the crinoids, star-fishes and crustaceans. The older the squeezes and the ink covering, the better the process will work.

Many fossils, as for example the trilobites of the Trenton and Hamilton formations, are made black and lustrous by a thin coat of banana oil that does not destroy the visibility of sculpture details and can easily be removed with absolute alcohol without harm to the fossils.

There was a good-sized collection of large, fairly thin slides of corals, especially of the Onondaga limestone, once made by Hall for a study of the corals. These were not transparent and lacked cover glasses. It was found that by treating them with shellac and putting the section inside against a black background, they became most beautiful transparent sections, exhibiting the delicate tracery of the coral structure in the finest detail; and a large exhibit of these was made.

The Museum contained extensive collections of Devonic corals, again largely from the Onondaga limestone, partly or wholly silicified in limestone. Specimens partly etched by weathering were collected in the early days in stone fences etc. It became desirable to etch these corals to such a depth that the larger part of the stock became free. It was found that in dipping the corals into diluted acid, the effervescing carbonic acid would destroy some of the more delicate structures. A siphon arrangement, however, developed by C. A. Hartnagel, by which the acid was dripped slowly on a particular spot, served to etch out gradually whole coral stocks without loss of the thinner corallites. Where it was desired that a solid platform remain for the coral stock to stand on, the block was suspended by clamps held in holes in the block with the coral downward in diluted acid; and beautifully etched specimens, as that of Romingeria, were obtained in this way. This method was not mentioned in the very complete chapter on chemical preparation in Stromer von Reichenbach's *Paläozoologisches Praktikum* and therefore is undoubtedly new.

In some cases, as in that of crinoids, it was desired to show both sides of the fossil, a result easily obtained by placing a small hand mirror behind the tilted object. In other cases, where enlargements of objects in the cases were to be shown, plano-convex lenses were attached by Canada balsam to the inside of the glass pane of the case. This otherwise excellent method of bringing the exhibit nearer to the visitor, has the disadvantage that small children want to look through the lenses and are liable to kick and scratch the drawers under the cases, or the legs of the latter, when held up by their elders.

Models of various objects, mostly to show their interior structure, were made first in the rough in plasticine, then cast in plaster of Paris by way of a plaster of Paris mold. The final cast was worked out in detail—especially as far as reentrants, undercuts and hollow places that could not be cast were concerned—while the plaster was still moist and soft, with specially made tools of steel and boxwood. The senior author made thus the models of cephalopods and of growth-stages of eurypterids on exhibition, the latter in some cases standing free on their legs. The work proved to be both easy and interesting and can easily be carried out by scientists with no great artistic skill.

Later, under the influence of Henri Marchand, the plaster of Paris was replaced by wax, which allows more delicate tints and adds a transparency that gives life and beauty to the restorations and models. Mr Marchand was the first to develop in the Museum the making of wax groups of mushrooms by using glue molds. He later made for the Illinois State Museum a forest with some four hundred groups of mushrooms and a brook in the middle of the forest, an altogether admirable piece of museum work.

Mr Marchand also used running water falling in a cascade from the rocks in the Gilboa group, partly to add life to the group and partly to settle the dust into the pool by the resulting spray and moisture, as the group was too large to be encased in glass. The water seems so far to have succeeded well in keeping the group free from thick accumulation of dust.

Speaking of water, we should mention Mr Marchand's method of attaining an underwater effect in our Portage group of submarine life. Dr F. A. Bather in his valuable paper, *A Cargo of Notions,* has described this method as follows:

An ingenious way of managing light for a special purpose is illustrated by figure 5, which is a section through a case displaying submarine life, in the New York State Museum. The light is daylight coming from the top. The top and front of the case are of clear glass. At the surface of the supposed water is a sheet of glass coated with a green varnish. All above this receives the ordinary daylight, while all below it is in a subdued green light, which gives, without loss of clearness, precisely the effect of being under water. Above the green glass is an ordinary painted background of shore scenery. Below it is a sheet of ground glass, on the far side of which are painted seaweeds; light coming from above is reflected through this and produces the illusion of a fading distance.

The lifelike restoration of the mastodon, with its coat of fur, was a new venture in instalment work. This has been already described by Noah T. Clarke in a previous Director's Report.

A very instructive model of the Mineville iron mine was obtained by a series of parallel glass plates, upon which sections of the ore-body, the parts of it already worked out and the surrounding rock are painted. This model was made by Robert Jones under the supervision of D. H. Newland.

We may finally add a few hints on methods of preservation and drawing used for years in our laboratory but not mentioned in books on museum work. Finding that the gutta-percha squeezes of fossils —often all that is left of a type when the fossil was but an impression in soft shale—became brittle and fell to pieces we have made copper electroplates of a number of them by covering the squeezes with graphite to make them conductive and putting them in an electroplating tank. Thus a copper mold is obtained from which the replica of the fossil is made. The process is very successful when handled with sufficient care and skill.

In the study of the eurypterids it was found that the leathery or chitinous shell of these creatures in the Bertie waterlime had been altered into a carbonized film that is not amenable to treatment by Eau de Javelle and other chemicals for the purpose of making the test transparent, as had been done by Holm with eurypterids from the island of Oesel. It was, however, found that by brief, carefully timed immersion in muriatic or nitric acid, the test could be lightened so that details of structure not visible before could be brought out. The senior author thus brought out the genital tubes of *Eurypterus remipes* (Clarke and Ruedemann, '12, pt 2, pl. 8, fig. 1), the epistoma of *Pterygotus macrophthalmus* (op. cit. pl. 71, fig. 5), the epistoma of *Hughmilleria socialis* in place (op. cit. pt. 1, p. 428, fig. 118) and other details figured by Clarke and Ruedemann in their memoir on the Eurypterida. This method is to be used with great care, however, as the film is easily destroyed.

The senior author in desiring to make natural size drawings of graptolites and other flat objects found a fairly easy and accurate method by putting a sheet of lithographer's gelatine over the fossil and tracing it with a lithographer's needle. Then, so that the drawing is not to appear reversed, its outlines may be traced with a needle on the reverse side. Into this drawing lamp-black is rubbed with a fine brush and transferred, by rubbing with the finger nail over the opposite side of the gelatine onto the paper laid below. The Lapworth-Parkes microscope offers now a means of obtaining more accurate drawings of graptolites, but for larger objects, as eurypterids, the gelatine process is still very useful and easily applied.

We may add that our systematic collection was mounted on wood, following the National Museum method of mounting, with a mixture of glue and plaster of Paris. It was found that when the specimens were mounted on the painted surface they would come off in a few years, but where the paint was removed before mounting they have stood now for more than 15 years without any indications of loosening.

The authors will be glad to give more detailed information to any one interested, concerning any of these methods.

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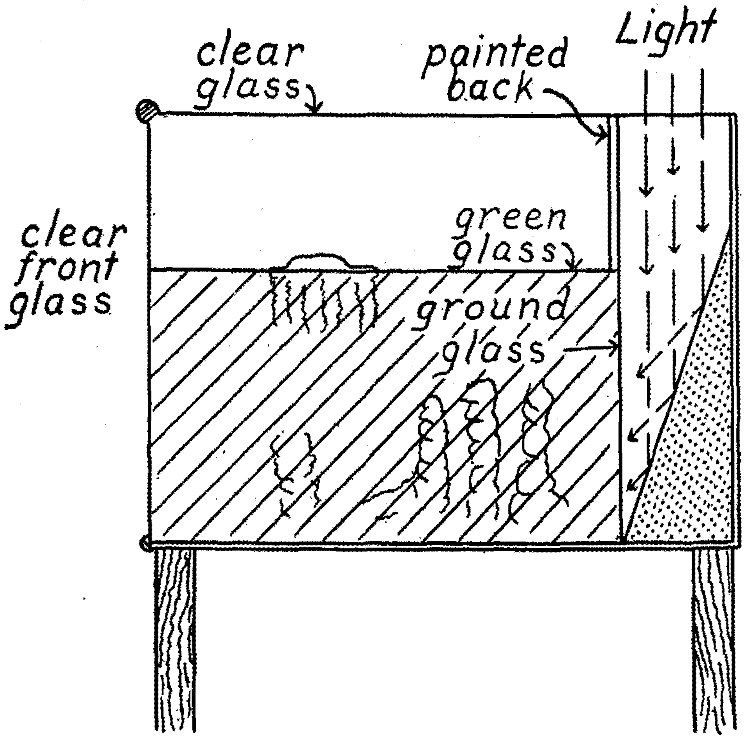

FIGURE 11 Section of case to show submarine life in New York State Museum (From Bather, 1926, p. 222, fig. 5)

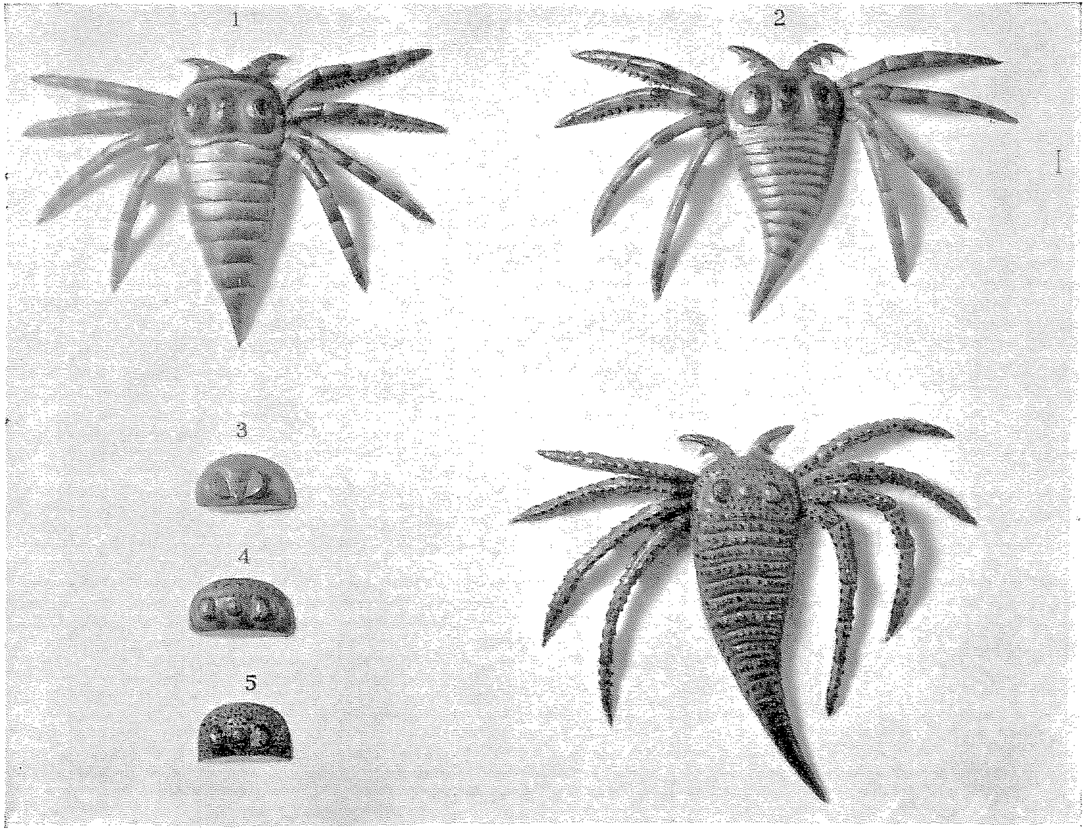

FIGURE 12 Growth stages of the eurypterid *Stylonurus*, modeled in plasticine and cast in plaster of paris

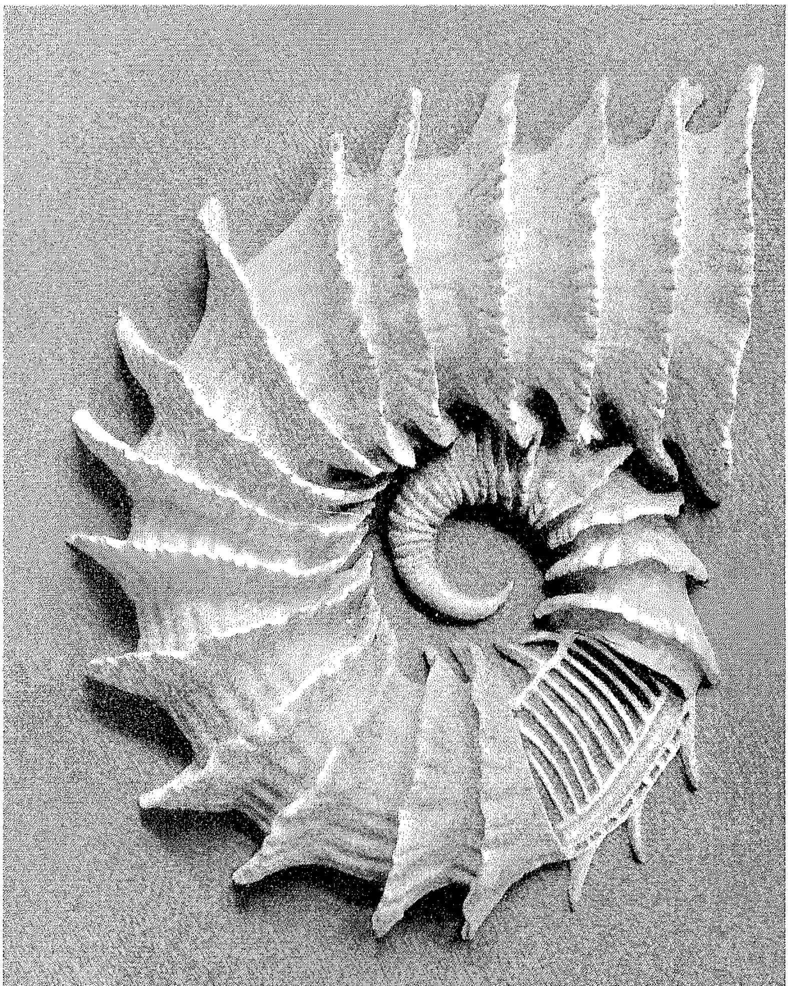

FIGURE 13 Restoration of the cephalopod *Rhyticeras*, modeled in plasticine and cast in plaster of paris

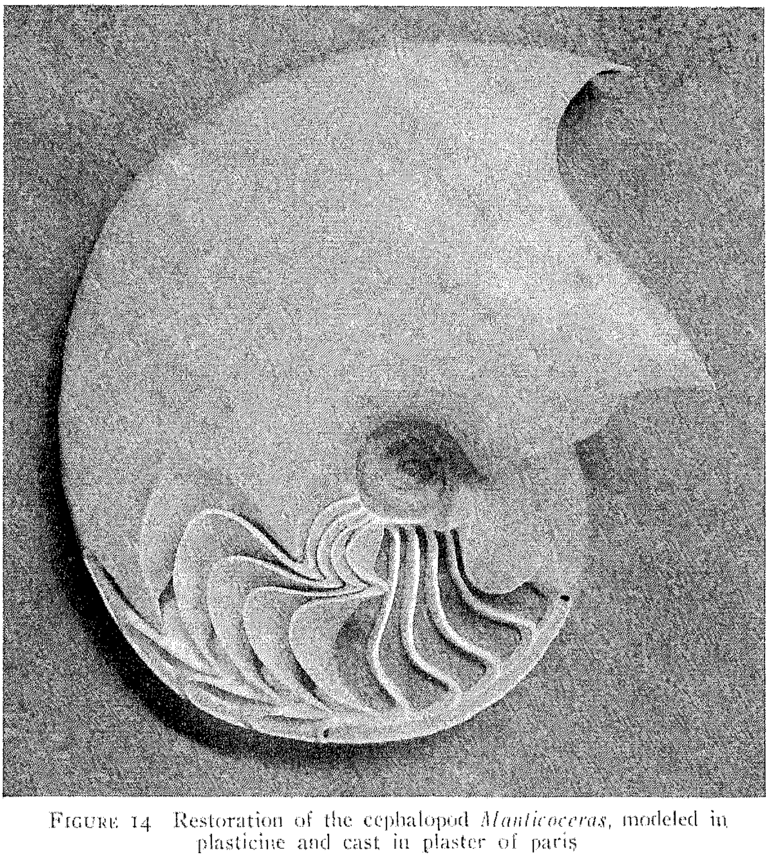

FIGURE 14 Restoration of the cephalopod *Manticoceras*, modeled in plasticine and cast in plaster of paris

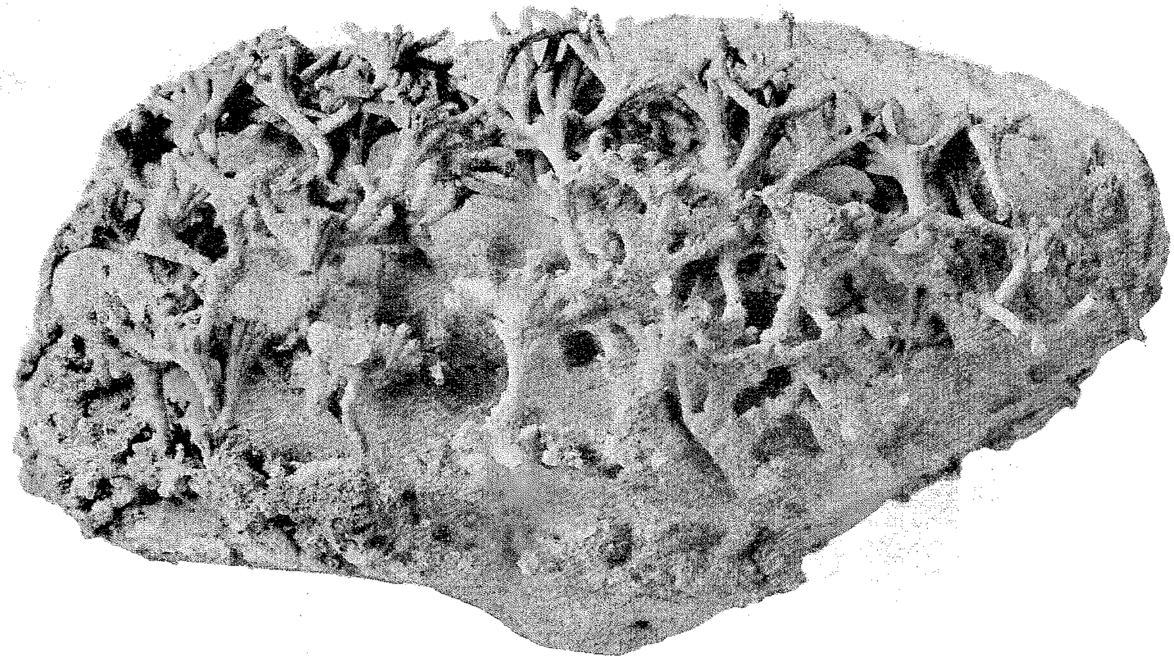

FIGURE 15 The coral *Romingeria*, etched out by suspension in acid

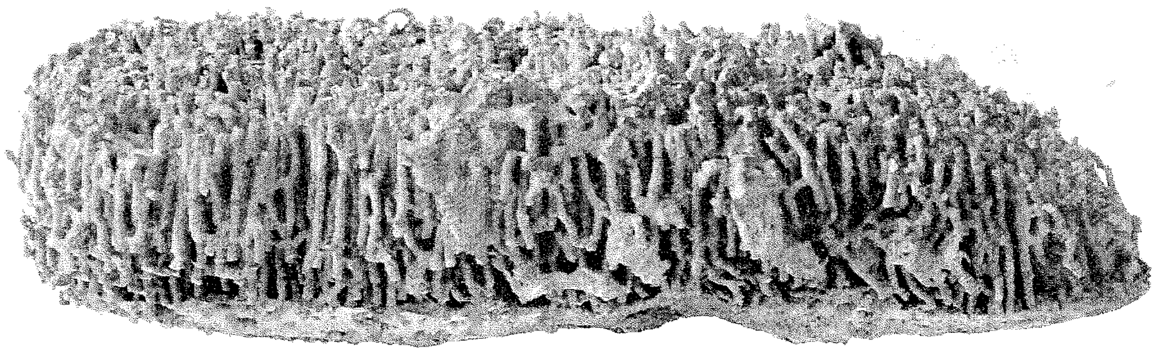

FIGURE 16 The coral *Syringopora hisingeri*, etched out by siphon arrangement. Lateral view.

FIGURE 17 Top view of large stock of the coral *Syringopora maclurei*, etched out by siphon arrangement

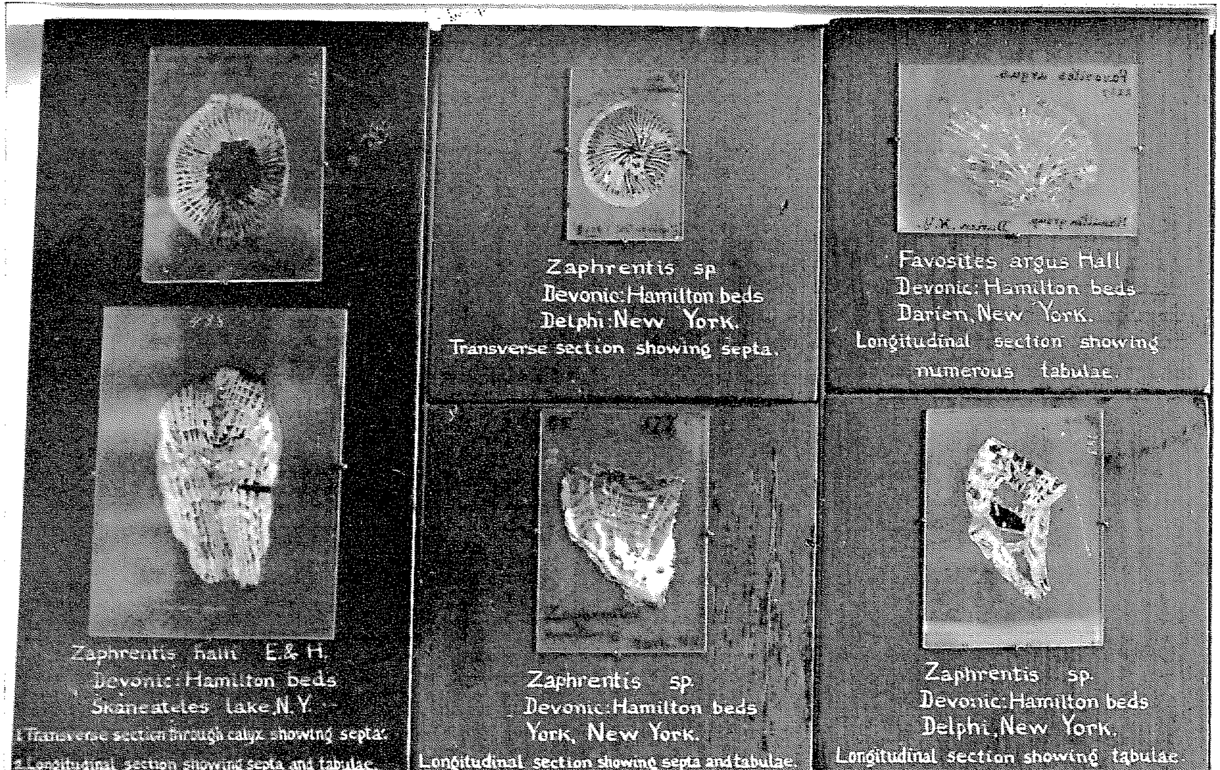

FIGURE 18 Group of coral sections made transparent by shellac