Appendix:

A new casting-method for palaeontological purposes

By

Eric Ståhl

Introduction: To produce satisfactory impressions of fossils, especially of small internal moulds, has often proved difficult and sometimes even impossible. In order to obtain good results the author has worked out a new method, the dibutylphthalate-polyvinylchloride-method, the description of which is given below.

The dibutylphthalate-polyvinylchloride-method has the following features:

1. In fluid condition the casting material possesses a relatively low viscosity, so that the liquid can easily penetrate into rather small and narrow cavities.

2. The impression is elastic, and can be easily removed from the mould and without breaking be withdrawn also from narrow cavities and undercut parts. This property is of great value, particularly with regard to internal moulds of brachiopods, the cavities (e.g. of crural plates) of which generally project more or less deeply into the internal mould.

3. The impression is unshrinkable.

4. The surface of the impression exhibits such minute details that it may be studied satisfactorily also under magnification.

5. The impression is tough and, as far as can be judged from our experiences, suffers no change during a long space of time.

6. No solvent which has been tried by us has been found to act upon the compound.

7. The outer layer of the impression is partly transparent. It is therefore appropriate to apply a thin coat of ammonium chloride in order to produce an opaque surface when studying it and taking photographs.

Description of the method: The following material is required:

Plaster (alabaster-, dental-)
dibutylphthalate (soaphthal B can also be used)
fine-ground polyvinylchloride
plasticine or clay.

Pl. III, Fig. 1 shows an internal mould of which an impression will be made.

A roll of clay or plasticine of about the length of the circumference of the internal mould or fossil is formed and rolled out to a ribbon about 20 mm broad and 3 mm thick. The edges are cut straight and cleaned with a knife. The ribbon is then mounted like a wall around the fossil. Observe that the ribbon must fit closely to the stone, and this is accomplished when by the careful use of a fine knife its outside is made as even and smooth as possible. Pl. III, Fig. 2 shows the mounted ribbon.

Water of about the same volume as the 3 mm thick mounted clay ribbon is poured into a bowl of rubber or china and as much well loosened plaster as can be absorbed is strewn by hand without stirring into the water, or one proceeds until small spots of dry plaster are forming upon the surface. After about 20 seconds the compound is stirred with a spatula in order to mix the plaster with the water as homogeneously as possible. A 2—3 mm thick layer of plaster is now with a spatula applied to the outside of the clay ribbon and like the latter closely attached to the stone. The layer or coat of plaster must not be too thick as it will have to be removed later on.

Pl. III, Fig. 3 shows how the coat ought to look. The clay ribbon is now carefully removed with a thin knife so as not to damage or detach the coat of plaster (Pl. III, Fig. 4). If small clay or plasticine particles should adhere to the specimen they can be removed without damaging it with a pointed piece of clay or plasticine which is carefully pressed against particles until they cling to it.

The stone with the adhering coat of plaster has now to be immersed into water and left there till it is thoroughly saturated whereupon it is taken up and all superfluous water blown off, so that the stone and the plaster show an evenly damp surface.

About the same quantity of dibutylphthalate as the bowl formed by the coat can hold is poured into a jar of glass or china. Under constant stirring fine-ground, well loosened polyvinylchloride is strewn into the dibutylphthalate till the compound shows a white, smooth, creamy consistence. At this stage it is now ready to be poured into the bowl formed by the coat. Let the compound flow slowly down the inner side of the coat and spread evenly upon the moist fossil avoiding the formation of air-bubbles. In order to prevent air-bubbles in narrow deep cavities, the latter can advantageously be filled with the compound by means of a sliver of wood or a hair from a brush. When the whole surface is covered more compound up to 2 cm thickness is poured on (Pl. III, Fig. 5).

The internal mould with the filled coat of plaster is now placed in an oven heated to 120° C where it usually is left 2—2 ½ hours at constant temperature. The compound then turns into a rubber-like elastic mass. It becomes harder during the continuous heating which, however, must not extend beyond 5 hours as otherwise the compound may shrink. The

whole specimen is then immersed in cold water to cool. Afterwards the coat of plaster is broken with a hammer and the elastic cast removed (Pl. III, Fig. 6). If there are strongly projecting parts or cavities where the cast adheres to the stone it is best to put the specimen back into water and try to remove the cast by carefully lifting the projecting portions of the impression so that the water can penetrate between the mass and the stone.

The elastic cast, the outer layer of which is partly transparent, should now in the ordinary way be treated with the ammonium chloride in order to obtain an evenly white surface. After whitening the cast is now ready for examination and photography (Pl. II, Fig. 2).

Should plaster casts of the elastic cast be required it is, of course, not necessary to whiten it. When removed from the stone it is first covered with a thin layer of plaster. On pouring the plaster the cast is knocked against the table so that the plaster can penetrate into every cavity and accidental air-bubbles may loosen. More plaster is poured on up to the required thickness. For plaster casting the plaster is mixed in the same way as described above.

In order to obtain a plaster impression identical with the elastic one made directly from the fossil, first a 3 mm thick plaster cast of the elastic impression is made. This cast is then dipped for about one minute into a solution of one part of potash to 25 parts of water. When the surface of the plaster is damp but free from aggregations of water more plaster up to the required thickness is poured over the cast treated with the solution. And finally the first, thin plaster is carefully removed with small chisels so as not to damage the plaster impression.

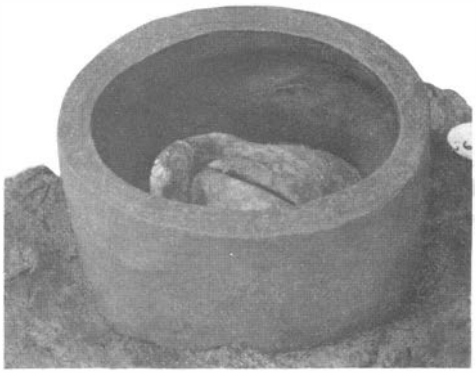
Plate III

The plate illustrates the dibutylphthalate-polyvinylchloride-method. The internal mould belongs to *Terebratella* sp. UM (LJUNGNER's collection) No. 5616 (see also Pl. II, fig. 1—2). ×1. N. HJORTH phot., unretouched.

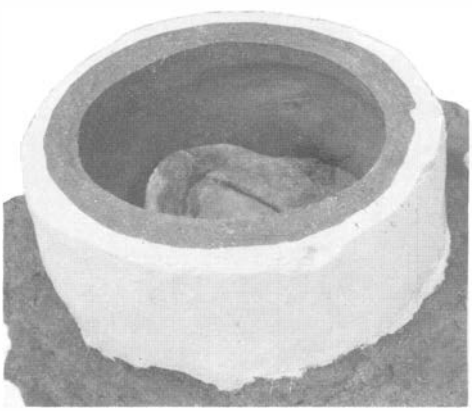
1. The internal mould of which the impression is to be made.
2. The plasticine ribbon has been mounted around the internal mould.
3. The plaster coat has been built around the plasticine ribbon.
4. The plasticine ribbon has been removed, the plaster coat is left standing around the internal mould.
5. The plaster coat has been filled with the dibutylphthalate-polyvinylchloride compound.
6. After heating the plaster coat has been removed.

15† — 496075

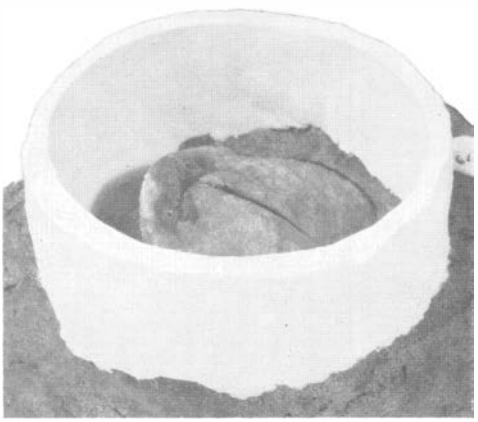
1



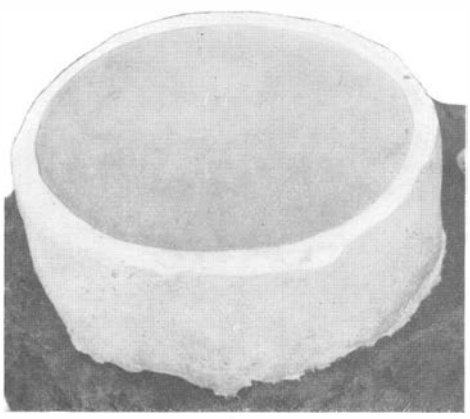
2



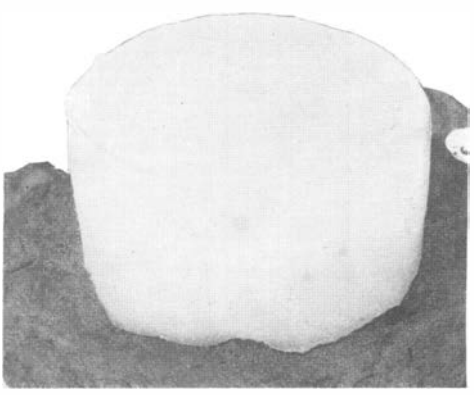
3



4



5



6