have a nutritive function. The absence of a placenta or any matrix about the glochidia of *Anodonta imbecillis* is of interest since the non-existence of parasitism in this case is apparently under quite different conditions from those governing in *Strophitus*. I have mentioned above the extreme lightness of the juvenile shells in *Anodonta imbecillis* up to a considerable size. In the resulting buoyancy we have undoubtedly a device for distribution of the young and thus a compensatory provision for the loss of the usual means of distribution by fishes.

At the U. S. Fisheries Station, Fairport, Iowa, there are several ponds used for retaining fish seined from the Mississippi River. In these ponds have been found a great many young mussels of species known to be parasitic on fish and evidently introduced into the ponds during the parasitic stage. A concrete reservoir was at first used to supply the water to the ponds. Upon examining the bottom of this reservoir in 1912 the presence of mussels (Unionidæ) was discovered. This at first seemed surprising as no fish had been put in the reservoir, but it was noteworthy that these mussels were all of one species, *Anodonta imbecillis*. The explanation given for their presence was that owing to the lightness of their shells in the juvenile stage they had been pumped through the intake pipe from the river. This explanation made without the knowledge of the non-parasitic metamorphosis was undoubtedly the correct one and I give the incident only as an illustration of the possibilities of their distribution in water currents. It is my opinion that the so-called "placenta" of *Strophitus edentulus* has a similar distributing function; the cords being buoyant may be readily carried by flowing water. In this case, however, the mechanism is quite different and thus we have in the two species different devices for accomplishing the same purpose.

The question arises as to the nutrition of these non-parasitic glochidia during the period of metamorphosis. Both of these species undoubtedly have come from parasitic ancestors which received at this stage nutriment from their hosts so that one would look for some provision for nutrition here.

I have not as yet observed any such provision in *Anodonta imbecillis* and I do not know that this has been demonstrated for *Strophitus*. In the latter case to prove a nutritive function for the cords it would seem necessary to demonstrate an absorption of the substance of the cords by the young mussels. As the cords swell considerably upon leaving the gills such a determination is difficult.

The discovery of so fundamental a change of habit, apparently derived independently by two lines, should give opportunity for many interesting comparisons; for *Anodonta imbecillis* already possessing the distinction of being an hermaphroditic species it adds another eccentricity to its reputation.[10]

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LABORATORY NOTES

I. EMBEDDING TRAYS

IN the laboratories of this country and Europe a variety of receptacles are used to hold the melted paraffin in embedding. Doubtless all of them have certain advantages and it is certain that most of them have annoying disadvantages. Paper trays are not stiff enough for large cakes and are very likely to stick. L-shaped bars of metal that can be adjusted to a variety of sizes are placed on glass plates. They are very likely to leak if the paraffine must be kept liquid any length of

[10] Since the above was written I have been able to secure infections and encystment on fishes with *Anodonta imbecillis* as well as *Strophitus edentulus*. In the latter complete metamorphosis was observed. Thus for *edentulus* we have indicated facultative parasitism while in the other we have a persistence of the parasitic reaction at least when artificially brought in contact with a host. Metamorphosis on fishes was not secured in *A. imbecillis*. Abundant additional evidence is at hand that development in this (*imbecillis*) species normally proceeds without parasitism.

time to make the proper orientation of the objects to be embedded. The paraffine frequently sticks to the glass unless considerable care is taken to keep it absolutely clean and to smear it carefully with glycerine or albumen fixative. Metal and porcelain dishes have the same likelihood of sticking, but are otherwise excellent.

The author owes to Dr. Hally D. M. Jollivette the suggestion that has led to our present laboratory practise. Her original suggestion was to make handmade trays of plaster of paris. This was tried with excellent results except that the trays break very easily. This led the author to seek for a substitute that would retain the advantages of plaster of paris but would be less fragile. After a number of experiments it was found that dishes made of the same sort of *unglazed* earthenware as flower pots answer all the requirements.

The advantage of these earthenware dishes are that they can be dipped in water until thoroughly saturated so as to be entirely impervious to paraffine. Danger of sticking is thus entirely obviated unless one carelessly overheats them. If the water is driven out by heating, the paraffine, of course, penetrates the porous clay and renders the dish useless until it has been dissolved and completely removed. I have found that the best results can be achieved in handling large quantities of materials by keeping the dishes in a vessel of water a few degree warmer than the melted paraffine. When one is wanted, remove it from the warm water to a position on the warming stand that will prevent its cooling off too rapidly. The objects can then be oriented at one's leisure. To cool the paraffine set the tray of melted paraffine in a dish of cold water until hard enough to immerse. As soon as the cake has hardened it will float out without any difficulty.

II. TURPENTINE AS A LABORATORY REAGENT

THE waste of expensive laboratory reagents by elementary students, who do not know their value, is oftentimes a considerable annoyance to the instructor in histology or other subjects where students must be allowed more or less ready access to the stock room. Aside from waste the economy of reagents is a matter of no inconsiderable importance to the directors of most laboratories. Such considerations as the above have influenced us in trying various experiments in substitution.

Commercial turpentine, such as is sold by the hardware store to painters, has been found a valuable substitute for other much more costly reagents. In fact, for many purposes it is superior to the much more expensive article purchased from the chemical-supply house.

Most laboratories use turpentine for dissolving the paraffine after the ribbons have been fixed to the slide. While this usage is comparatively widespread the practise of using it in place of xylol, oil of bergamot, etc., for clearing preparatory to embedding in paraffine appears to be less frequent. After much experience with these various reagents the author is convinced that it is not only vastly cheaper, but that it is on the average quite the equal of any of the others. It penetrates freely and dissolves proportionally as much or more paraffine. The specimens of plant materials clear readily, infiltrate quickly, and cut as well as if embedded through other reagents.

I have found it actually superior to other reagents in clearing sections. It clears readily from 95 per cent. alcohol and so avoids the use of absolute alcohol. Both time and expense are saved in this way. Slides and sections should, however, be rinsed in xylol before being mounted in balsam. Some stains are soluble in turpentine and so slides must not be left overlong in it unless they are overstained. It is valuable in reducing overstaining from analine blue and bismark brown.

The ease and convenience of handling wood sections and celloidin sections in which it is desirable to retain the celloidin is an enormous convenience. Sections can be transferred to turpentine from 95 per cent. alcohol. In the former one step in the process is saved and in the latter the danger of dissolving or softening the celloidin is avoided.

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