and the paired connectives are separate. The supra-esophageal ganglia are small, with the exception of the huge optic ganglia. The simple gross structure of the nervous system simplifies operatic procedures, though unfortunately there is very little information on its histological structure.

The method of raising practiced here is somewhat similar to that mentioned by Przibram[3] who worked with *Sphodromantis bioculata,* a different species. The egg cases, containing 150 to 200 eggs, can be obtained during the winter months for a small sum from any of the larger supply houses. They should be suspended by a thread in a 16-ounce wide-mouthed bottle, which is closed with a piece of bolting cloth secured by a rubber band. A hole about half an inch in diameter should be cut in the cloth and plugged with cotton. This is to allow for the introduction of food. The eggs should be kept at a temperature of 25° to 30° C., and a 50 to 70 per cent. humidity, and should be inspected daily. Under these conditions the eggs usually hatch in three weeks. Previous to hatching a large continuous supply of wild type Drosophila should be on hand. In this laboratory the Drosophila are raised in quart bottles in the same incubator with the mantids. At least one quart bottle of Drosophila culture for every five mantids should be allowed. It is important to have a constant supply of flies, as the young mantids hatch with no food reserves and quickly starve. They usually refuse food for the first 12 to 24 hours after hatching, and a number will die. During this first day the most viable of the young nymphs should be selected and transferred with a camel's-hair brush into a 16-ounce bottle covered with cloth, as mentioned above. A little sand and a few twigs should be placed in the bottles to give the insects a foothold and prevent them crowding in one part of the bottle. Not more than 10 to 15 nymphs should be placed in one bottle. The bottles containing the mantids are then placed in an incubator at 25° to 30° C., which should be illuminated artificially or by daylight. This is important, since mantids catch their prey entirely by sight and the acuity of vision is greater in higher light intensities. They should also be lightly sprayed with water from an atomizer once a day, though too much water may drown them in the first instar. During the first day a number of living adult Drosophila should be introduced. This is simply done by holding an eight-ounce wide-mouthed bottle over the quart bottle containing the Drosophila culture. When the flies have passed into it, it is removed and held over the hole in the jar containing the mantids. If it is tapped lightly the flies will fall through the hole in the cloth, and the cotton stopper can be replaced. The flies will soon be captured and eaten, only the wings and harder portions being discarded.

After a week to ten days the mantids will moult for the first time, and care should be taken to disturb them as little as possible at this time. Since they do not eat for a day before and a day after moulting the food can also be reduced during this period. It takes nine to ten weeks at 25° to 30° C. for them to reach full size and sexual maturity, and during this period they will moult seven times. Drosophila or aphids make ideal food for mantids during the first three instars, but as they increase in size they require larger food. Any insect which is not strongly negative to light is suitable, and flies of all kinds, grasshoppers, moths, caterpillars and cockroaches have all been employed. Insects larger than the mantids will not usually be attacked and should not be presented. During the winter months living insects are more difficult to obtain, but meal worm larvae, cockroaches and flour moths can usually be obtained from neighboring factories and warehouses. On several occasions, when the food supply has failed, the mantids have been kept alive by feeding them by hand with meal worm larvae or even small pieces of frog liver. The food is held to the mouth of the mantis so that the juice touches the maxillae; it will then be grabbed and eaten. This is obviously a laborious process, and should only be resorted to when nothing else can be obtained.

As already mentioned, the mantids are cannibalistic, but this trait is not common until they become half grown, unless they are underfed or overcrowded. By the fifth instar they should be further segregated until there are only one or two mantids to a container. The adults should be kept singly in battery jars or other suitable container and should be provided with twigs to serve as a foothold.

In the writer's experience the raising of *Mantis religiosa* in captivity presents little difficulty, the presence of an observer and other artificial conditions interfering with their normal habits, mating, etc., to an inappreciable extent. The only difficulties likely to be encountered are in the provision of a continuous supply of living food. Though this can be easily overcome during the summer months, careful planning of food supplies during the winter will result in a good percentage of perfect mature insects at any time of year.

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[3] H. Przibram, *Blätter für Aquarien und Terrarienkunde,* 42, 669, 1909.

DECALCIFICATION AS A METHOD OF PREPARATION OF GROSS ANATOMICAL MATERIAL

IN an elective course in fetal anatomy, which follows the regular dissection course, the fetuses were dissected for some years using the method described by Scam-

mon.[1] Several years ago the study of cross sections was substituted. This later method seemed to give the student a new approach and a new idea of relations, which was beneficial not only in this course, but it also served as a review of the relations studied in the first course in anatomy.

Following the suggestion of Jackson,[2] fetuses were decalcified in 5 per cent. hydrochloric acid and then cut into rather thin sections of a centimeter or less in certain regions, with a long butcher knife. The hydrochloric acid was found to work satisfactorily for both the fetuses and for entire adult heads and then nitric acid of the same strength was tried. Nitric acid gave fully as satisfactory results, with even better differentiation of the tissues. In some cases there was a slight stickiness in the sections of both the heads and the fetuses decalcified with the nitric acid, which was not readily washed off. We found that we could use from 5 to 10 per cent. hydrochloric or nitric acid, changing the solution every week or ten days until a needle would easily penetrate the jaw bone, and then section with the knife.

Following the satisfactory results obtained with the adult heads and the fetal material, these methods were tried on other parts of adult cadavers. Material taken from a 2 per cent. phenol solution, used to store our cadavers, and put into nitric acid did not work satisfactorily. In many cases the tissues softened before the bone decalcified. Later on the material was put in a 10 per cent. solution of formalin for some weeks and then into a 10 per cent. solution of hydrochloric acid, following which excellent sections were obtained. They could be cut as thin as desired and the tissues were in excellent condition. From 5 to 10 per cent. solutions of hydrochloric acid seem to work equally well. The time varies, due to the character of the bone and the variation in the strength of the commercial acid used. The acid should be renewed every week or ten days for a period of from three to six weeks. The progress of the decalcification can be tested with a needle. When the needle passes into the jaw bone, temporal bone or other hard bone, the material should be removed, washed in water and cut.

This method of decalcification with hydrochloric acid has been found excellent for temporal bones, making the dissection of the human internal ear as easily done as that of the dogfish.

At first there was some trouble in holding the body of the fetus so as to get sections cut perpendicular to the axis of the body and parallel to each other. Recently we have been using a device similar to a carpenter's miter box. This is made very easily by nailing three boards together forming a trough just wide enough and deep enough to hold the fetus. A slit or guide is cut perpendicularly with a saw in the sides of the box toward one end and through this the long knife slides. The fetal cadaver is held securely by hand and advanced just the desired distance, the equivalent of the desired thickness of the sections. Lines may be marked on the cadaver for cutting as suggested by Ruth[3] after the decalcification and before the sections are cut.

Fetuses and adult entire heads may be decalcified in either weak hydrochloric or nitric acids, but adult material containing a larger proportion of soft parts is better decalcified in hydrochloric acid, with a previous soaking in strong formalin solution. Sections thus prepared are tough, not easily injured and may be cut as thin as desired. The edges are smooth, thus giving excellent differentiation of the various tissues. Sections fully as good as those from frozen material may thus be obtained when an expensive high speed band saw is not available. Decalcification of temporal bones or other head bones in hydrochloric acid makes the bone soft enough to permit its being cut away with a sharp scalpel.

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[1] R. E. Scammon, *Anat. Rec.*, 21: 19–24, 1921.

[2] C. M. Jackson, *Jour. Am. Med. Assoc.*, 39: 813–817, 1902.

[3] Elbert B. Ruth, *Anat., Rec.*, 58: 241–243, 1934.

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