

# On the Collection and Preparation of Fish Scales.

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**I**n the case of fish, such as the herring, whose scales are covered by thin and colourless dermal tissue the simplest and best method of mounting is that adopted by LEA and others, in which the scales are wiped in the fingers immediately after removal from the fish and straightway mounted on a droplet of albumen on a glass slide. But this simple procedure is only possible when samples are brought to a laboratory or similar place ashore or aboard a research ship, where there are facilities for handling glass slides. It is almost impossible, for example, in collections made on commercial fishing boats. Furthermore, the scales of some fish, being more opaque than herring scales, are best mounted in glycerin jelly. (BRANDT'S formula is suitable and gives preparations which have been stored for six years without appreciable change.)

Where the scales cannot be mounted immediately it has been common practice to place them in small envelopes, which are allowed to dry. In LYMAN DUFF'S collection of cod scales, which was made at shore stations, the envelopes were laid out separately from each other and dried slowly, taking one or two days. The scales were found to lie flat on a slide and were examined dry. DUFF makes no mention of cleaning being necessary; but it is our experience that the adherent pigmented dermal tissues must then be removed or bleached.

Leaving aside for the moment the case of the scale with pigmented dermal tissues, we may consider the technique of collecting and preparing the scale with delicate and colourless dermal tissues, under such conditions that the scales may not be mounted immediately on collection. In this case we have followed a suggestion of Mr. EINAR LEA, designed to eliminate the lengthy cleaning of dried scales, that the scales should be preserved between sheets of absorbent paper made damp with dilute formaldehyde. Small books have been made of blotting paper, about 3 inches by  $1\frac{1}{4}$  inches in size. The blotting paper is interleaved with

a much smaller page of thin cartridge paper, on which the length and sex of the fish is recorded. The covers of the booklets are made of thin cartridge paper on which may be entered the particulars of the haul etc. The books with the scales within them are placed in metal boxes in which there is a pad of cotton soaked in 2 per cent. formaldehyde at the bottom of the box, and another pad damp with formaldehyde in the top. Scales thus preserved are clean of excess of slime, which apparently soaks into the blotting paper, and when they are not cumbered with pigmented dermal tissue, they may be mounted in glycerin jelly without any cleaning whatsoever.

In the case of scales with pigmented dermal tissue it was formerly the practice to soak the dry scales in dilute alkali and then remove the adherent dermis and epidermis with needles, or by rubbing between the forefinger and thumb. A considerable saving of time was made by bleaching the tissue instead of removing it mechanically, using sodium peroxide, as has already been described (GRAHAM, p. 9). Unfortunately this bleaching method had also the disadvantage that unless the sodium peroxide were thoroughly removed bubbles tended to appear in the preparations, and for complete removal of the peroxide it was necessary to use ten changes of water. This lengthy washing has now been superseded by the use of sodium sulphite solution. The scales are left overnight in the peroxide solution (17 hrs.), and in the morning the peroxide solution is drawn off and solution of sodium sulphite immediately added. The scales are then mounted directly from the sulphite solution into glycerin jelly. The preparations so produced are perfectly clean and clear of bubbles. In this way two assistants, working without haste, mount 6 or 8 scales from each of 100 fish in about 4 hours — 1 hour placing the scales in freshly made peroxide solution, and 3 hours carrying out the remainder of the operations on the following morning. The strength of solutions to be used depends on what method has been adopted for preservation of the scales. Where these were preserved in spirit we use 2 per cent. peroxide and 2 per cent. sulphite solutions; where the scales have been dried in envelopes we use  $\frac{1}{2}$  per cent. strength for both solutions, since in this latter case the stronger solutions cause slight maceration at the margin of the scale.

#### References :

- MICHAEL GRAHAM. Studies of Age-Determination in Fish. Part I. Fishery Investigations. Series II. Vol. XI. No. 2. London 1929.
- G. LYMAN DUFF. Factors involved in the Production of Annual Zones in the Scales of the Cod (*Gadus callarias* Linnaeus). Cont. Canadian Biol. N. S. IV. No. 21. Toronto 1929.