



Fig. 3—Drawing of an otolith from a muttonfish 8 inches in length. For explanation see text.

were examined. A drawing of an otolith is shown in fig. 3. The otolith is a small compact mass of calcium carbonate. The stone drawn was 4mm. long, and 2.6 mm. wide. It is found in the internal ear which is an organ of balance not of hearing. The otolith increases in size as the fish grows and this increase takes place by additions of thin layers which show on the stone as fine lines. During the colder season of the year the amount of material laid down is small and the lines appear close together, resulting in a dense opaque area. In the warm season more material is laid down than in the cold season, resulting in the lines being farther apart and producing a lighter, less opaque area. It has been assumed that the muttonfish gives birth to living young, probably in January. The method of computation used in the determination of ages has been the same as that used for its European relative, *Zoarces viviparus*. The dark centre or kernel has been taken as the embryonic beginning, and the narrow light band following as representing the short period in the body of the mother. The first dark band represents the remaining part of the winter period following birth, and the next broad light area, the first summer. From this on the dark and light areas represent the succeeding winters and summers respectively. For example in the illustration (fig. 3) the otolith shows the fish from which it was taken to have