THE REPRODUCTIVE BEHAVIOUR OF THE RIVER BULLHEAD (COTTUS GOBIO L.), WITH SPECIAL REFERENCE TO THE FANNING ACTIVITY

by

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(With 22 figures)
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INTRODUCTION

There are three common species of fresh-water fish in Britain which construct nests and rear their young. They are the Three- and Ten-spined Stickleback (Gasterosteus aculeatus and Pygosteus pungitius) and the River Bullhead (Cottus gobio). In the spring, these three species take up their breeding territories in the three basic ecological niches of most streams, namely the sandy, weedy and stony stretches, respectively. The reproductive behaviour of the sticklebacks has been the subject of intensive investigations by ethologists recently, but little or nothing has hitherto been recorded of the behaviour of the Bullhead. Brief notes on the habits of this latter species have appeared from time to time in the general literature, usually to the effect that it forms a cavity beneath stones in which the eggs are laid and guarded. DAY (1880) reports that there has been much discussion as to whether the male, or the female, or both, perform the parental behaviour. He quotes MARSIGLI and various other authors as saying that it is the female which protects the eggs and young. However, this is not so and later writers, such as MEEK (1916) and MACMAHON (1946), report, correctly, that it is the male which assumes the role of parent, as in the stickleback species. It

1) I am indebted to Dr N. Tinbergen for his helpful advice during the above work, to Dr E. Cullen for preparing the German summary, and to the Nature Conservancy for sponsoring this research.

2) Cottus gobio must not be confused with the Bullhead Catfish (Ameiurus nebulosus), which American ichthyologists sometimes also refer to simply as "The Bullhead". For example, BREDER'S (1932) paper on "The breeding of Bullheads in the aquarium" refers to the catfish and not to Cottus. Cottus gobio is known by many popular names (e.g. Miller's Thumb, Tom-cull, Nogglehead, Bull-jub, Bull-knob, Horbeau, Cod-pole, Tommy-logge, Cob, Stargazer, Tom-thumb, etc.), but despite this, it is preferable to retain the name Bullhead, since this is the most widely recognised.

Behaviour VII
will be shown that there are other striking similarities between the behaviour of the sticklebacks and the Bullhead, which make it a valuable species for comparative study.

All the observations reported here were carried out in the laboratory using aquarium tanks of $24 \times 15 \times 15$ inches, with a substratum of sand and gravel. These tanks were unplanted, but were aerated profusely. Several pebbles and stones were placed in each tank and where possible the Bullheads dug pits and hid underneath these. Unlike the sticklebacks, the Bullhead is a solitary fish out of the breeding season, and hides under stones, swimming little except for sudden short darts after prey. Whilst it will accept almost any crack or crevice as a lair, it appears to be more particular