Book reviews

Advances in Invertebrates and Fish Telemetry

Reproduced from Hydrobiologia (volumes 371/372), this book is a selection of forty papers from the Second Conference on Fish Telemetry in Europe, which was held in La Rochelle in April 1997. The papers are organised in four sections entitled Methodology and New Developments, Tagging Procedures, Behavioural and Physiological Ecology, and Fish Migration and Stock Management. There are no dividers in the book and, whilst this structure is clear from the list of Contents, it is not very evident from the text. This is a minor criticism, however, because otherwise the book is well presented. The two-column layout is easy to read and the tables and figures are generally clear and well positioned. The exceptions are a few fish tracks, where the figures have been reduced too much for the amount of detail they contain. This is a pitfall into which many editors have fallen, fish track being notoriously difficult to describe and illustrate. Otherwise the editing is good and, apart from a curious title and the occasional solecism (e.g. ‘caught’ for ‘catched’ on page 102), the editors are to be congratulated on their achievement.

There have been so many symposia on fish telemetry over the years that conference proceedings are two a penny. I consequently approached this volume with mixed feelings; interest because I was unable to attend the La Rochelle meeting and trepidation that there would be too much overlap with material from previous meetings. Reading the book, however, my fears soon evaporated and I became fascinated by the wealth of new material, particularly in the freshwater field, to which most of the papers relate. Here it is encouraging to see how much telemetry is already contributing to the solution of practical problems of resource management, such as the rehabilitation of the River Rhine for migratory fish, and to understanding the nature of the problems caused by the construction of dams and other obstructions. Many of the studies described in this volume are, however, still exploratory in nature and there is clearly still a long way to go before engineers are required to defer to biological knowledge before committing their ideas to concrete.

The book contains several papers on the behaviour of marine fish, which promise interesting advances in this important and developing field. There are two fascinating French contributions on the diurnal behaviour of tuna in the Indian Ocean. One (Josse et al., pp. 61–69) deals with the vertical movements of yellowfin (Thunnus albacares) and bigeye (T. obesus) tuna and their apparent association with the vertical migration of the
Sound Scattering Layer (SSL). The other (Marsac and Cayré, pp. 155–171) describes the horizontal movements of yellowfin tuna among a network of fish aggregating devices (FADs). There is a short Norwegian paper (Engås et al., pp. 199–206) describing preliminary results of a study of the reactions of cod to an approaching trawler, which shows how acoustic telemetry can provide the quantitative data needed to assess the scale of the avoidance problem. A related paper (Skajaa et al., pp. 143–153) deals with activity patterns of edible crabs (Cancer pagurus) and the role of chemical attractants in the location of baited pots. This is an important area for study because catch per unit effort, which is not always easy to interpret for crustacean fisheries, is strongly influenced by behaviour. In their various ways, these studies all demonstrate that there is still a long way to go before the full benefits of acoustic telemetry are realised in marine fisheries biology. Data storage tags offer the prospect of even greater benefits. Some of these are explored in an interesting Spanish paper (Freire and González-Gurriaran, pp. 123–132), which describes the application of these new devices to studies of the behavioural ecology of decapod crustaceans.

One of the great merits of a book of this type is that it allows biologists to publish negative results as Thorstad and Heggberget (pp. 339–346) do when discussing effects of artificial freshets on adult salmon migrations. Engineers also have a chance to describe their developments and remind biologists of the physical principles that constrain them. Sisak and Lotimer (pp. 53–59), for example, review the factors that limit the performance of a radio telemetry system and provide biologists with the means to make an informed choice about the best operating frequency for a specific application. In describing a new combined acoustic and radio transmitting (CART) tag, Niezgoda et al. (pp. 47–52) similarly explain the basic principles that govern whether the tag operates in radio or acoustic mode. Voegeli et al. (pp. 35–46) detail the technical and biological processes needed to develop the miniature coded transmitters and small receivers capable of simultaneously tracking large numbers of small, wild salmon smolts in the sea.

Conference proceedings also serve another important function by allowing researchers to air the practical problems that are usually ignored in scientific journals. Users of biotelemetry encounter more than their fair share of difficulties and it is gratifying, therefore, to see papers dealing with these essential issues. Smith et al. (pp. 9–17), for example, discuss the location errors associated with fixed hydrophone arrays and Baras (pp. 19–28) deals with the problem of selecting optimum positioning intervals. There are also several papers on the effects of tags on the performance of the fish. Those by Martinelli et al. (pp. 79–87) and Ombredane et al. (pp. 99–106), which deal with the effects of radio tags on sub-yearling chinook salmon (Oncorhynchus tshawytscha) and the effects of PIT tags on juvenile brown trout (Salmo trutta), respectively, are well worth reading. The first paper has an interesting comparison of responses to surgical and gastric implantation, which may be relevant to other species.

Surgical techniques per se are considered in two subsequent papers. Eels are difficult to handle, but Baras and Jeandrain (pp. 107–111) have discovered that a freshly cut fragment of dorsal fin placed over the wound stops the fish biting the cyanoacrylate adhesive and re-opening the surgical incision. Claireaux and Lefrançois (pp. 113–116) describe a new technique for tagging cod (Gadus morhua) and European sea bass
(Dicentrarchus labrax) with a heart rate transmitter attached close to the ventral surface of the fish below the pelvic girdle. Stainless wires sheathed in kevlar, are inserted through the skin posterior to the pectoral fins and passed around the pelvic girdle with, occasionally, a third wire passed through the Maeckel cartilage between the opercula. Although the method would appear to be suitable for the laboratory, my experience of studying cod behaviour at sea leads me to doubt whether a tag in this location would last very long in the natural environment, where conditions are very different. Figure 1 of Claireaux and Lefrançois’ paper illustrates the attachment process very effectively, but it is both curious and alarming that the editors have chosen such a dramatic figure to illustrate the front cover of their book. With ever increasing public concern over the welfare of experimental animals, it might have been wiser to choose something potentially less controversial.

Five papers in Section 3 (Behavioural and Physiological Ecology) deal with physiology and three discuss the use of heart rate or EMG (electromyograph) telemetry. Interesting and informative although they are, these papers all reveal the extent to which fish physiology still relies on laboratory measurements. Clearly, there is a lot of work to be done before we can reliably record basic physiological processes from free-ranging fish in their natural environment. When we can do this over long periods, physiological ecology will have caught up with behavioural ecology and it will become possible to establish the vital links that surely exist between the two.

Overall this is an interesting book with a wealth of useful detail for the working scientist; I am glad to have a copy on my bookshelf. Those who wish to catch up on the subject should enjoy dipping into selected papers.

Geoff Arnold
CEFAS Lowestoft Laboratory, Pakefield Road
Lowestoft, Suffolk NR33 0HT, UK

What is Natural? Coral Reef Crisis

This book tells the complex story of the crown-of-thorns seastar (Acanthaster planci) outbreak phenomenon first witnessed on coral reefs in the central and western tropical Pacific in the early 1960s – at a time when coral reef biologists were just beginning to investigate first hand the sea below the low tide mark.

Sapp begins with the following statement . . . ‘This book is about knowledge and action’. However, in the process of getting to that point, action replaced reaction and knowledge was gained only after heated debate gave way to rational hypothesis testing. The author provides a very comprehensive and well-cited review of the, sometimes