the O.A.S. His response on learning of the award was to say that it should be shared by his whole team of research workers, and particularly his close collaborator Dr. Jean Brossel.

More Columnaris

A FURTHER spread of the salmon disease columnaris is now apparent in England. The Ministry of Agriculture, Fisheries and Food has been compelled to declare infected the rivers in the area of the Lancashire River Authority. The Lune and the Duddon are particularly affected, and large numbers of dead fish, sea-trout as well as salmon, have been taken from them. There are also some signs that the River Dee in Scotland may be infected, although the dead fish taken from that river in the last few days are not known for certain to have died of the same disease. Taken together, these developments suggest that columnaris will spread through rivers in England, Wales and Scotland as inexorably as it spread to most Irish rivers in the last twelve months or so. At present, the Irish rivers are not infected, but this may only be a temporary lull brought on by the relatively high temperatures in the summer. Because of the inadequacy of means of controlling columnaris, there will be anxious months ahead for sporting and other interests in the health of salmon.

Long Range Forecast

ONE of the most useful ways of looking at weather is by studying the atmospheric circulation; peculiar disturbances in weather conditions, such as extreme cold, can generally be related to disturbances in the atmospheric circulation pattern. This has prompted the Meteorological Office to collect all available data since 1750, and publish them as a complete volume—*Secular Variations of the Atmospheric Circulation since 1750*, by H. H. Lamb and A. I. Johnson (H.M.S.O., £1 7*s*. 6*d*.).

The authors have had to make use of a large number of sources, many of which are fragmentary, but it has proved possible to check their reliability by comparing them with sources of known accuracy. In principle there is no reason why these sources should not be accurate, as it has been established that the best barometers of the late eighteenth century were quite capable of giving accurate figures in the hands of a careful observer. The work has also involved converting a variety of ancient units into modern equivalents —while 1 Bavarian foot, for example, equals 29·186 cm, Austrian feet were longer, at 31·611 cm, and Paris feet longer still, at 32·48 cm.

The tables are to be used for long range weather forecasting; day to day circulation patterns are examined for similarities with patterns which have occurred in the past. If they do, similar developments in weather conditions are to be expected.

There is, of course, no suggestion that the Met. Office intends to blame clumsy eighteenth century meteorologists for its own inadequacies.

Model-making

A NEW method for making three dimensional models is being financed by the National Research Development Corporation, which was approached by its inventor, Mr. A. E. Goodson.

The models are made from maps or aerial photographs, and the method is best described by its application to a simple contour map. The operator traces around the contours with a pointer at the end of a pivoted arm; at the other end of the arm a cutting tool follows the movement of the pointer. The material used for the models is rigid polyurethane foam in the form of a sheet, and the cutting tool is a dentist's drill. The cut extends through the thickness of the sheet, so that after tracing around the contour lines the foam is cut into rings lying flat inside one another and exactly matching the contours in shape. The scale of the model can be controlled by the relative positions of the pointer and cutting tool, and reductions of up to 1 in 5 are possible. The rings are then pushed up telescopically until each ring protrudes above its neighbour by a controlled distance; rapid setting glue is applied to fix the rings in position. The small steps in the profile can be filled in with a suitable plastic filler to give a smooth surface, and a coat of resin hardens and strengthens the whole model.

The method is more economical in materials than any other, and is quicker and more precise than the methods in common use. Mr. Goodson sees no reason why it should not be applied to more sophisticated model building by using photo-electric control of the pointer or even control by a suitably programmed computer. Polyurethane of any density between 1 and 20 lb./cu. ft. can be used, giving lightness at one end of the scale and great strength at the other. Town planners, teachers, lunar explorers, ship designers and archaeologists are all expected to be interested in the method.

Sonar for Fish

THE increasing acuity of the submarine vision provided by sonar was one of the themes in the lecture by Prof. D. G. Tucker to the Challenger Society on October 26. The modern trend to narrow beams of sound, generally less than one degree wide in at least one axis, together with the use of pulses as short as 0·1 msec increases resolution, but at the same time decreases the rate of search because only a small volume of water is reached by each pulse. It is therefore necessary to scan with the beam, and Prof. Tucker described two approaches which had been made to that problem—one by his own group in the Department of Electronic Engineering at the University of Birmingham and the other by workers in the Navy Department of the Ministry of Defence. Both instruments are designed to work through a 30° sector and to scan this electronically from side to side by a receiver with a narrow beam acceptance. The display of such a system must necessarily be three dimensional since the range and bearing of objects are continually changing with time. Prof. Tucker showed a film of the oscillograph display from a sector scanning transducer mounted on a pier and projecting laterally. Fish shoals could be seen clearly moving with the tide.

The possibility of acquiring more information about targets by using different frequencies of sound raises problems of generating beams of constant width over a great range of frequencies. Particularly at high frequencies, this implies physically large transducers, but one solution may be found in the way in which an acoustic wave of sufficient magnitude may affect the density and bulk modulus of the medium in which it is propagated. The velocity of propagation is thus a