NEWS AND VIEWS

Mussels Not for Eating

A CHAIN of ecological events extraordinary for the British Isles is reported in this week's issue of *Nature* (pages 21–27) and the corresponding issue of the *Lancet*. They concern the unusual bloom of a planktonic alga, the dinoflagellate *Gonyaulax tamarensis*, off the Northumbrian coast of Britain in May this year. This eventually led to the illness of more than eighty people through mussel poisoning and the deaths of about 80 per cent of the breeding population of shags on the Farne Islands. The principal events—the cases of illness and the deaths of the birds—lasted less than a month, but it has taken until now for the scientists concerned to untie the tangled strings and to present their conclusions. It was not until nearly the end of August that the toxin accumulated by the molluscs had fallen everywhere to safe levels. What has now emerged is a neat piece of coordinated research, covering a wide range of subjects and involving at least ten different groups of people. But, as so often with events of this kind, more questions are posed than answered. Certainly the laboratories concerned were caught unprepared, principally because they had no previous experience in Britain to fall back on.

Blooms of phytoplankton are common all over the world, but blooms of toxic dinoflagellates are usually found only in such places as the coasts of Japan, Peru, Africa and the eastern and western coasts of the United States and Canada. Toxic blooms are almost unknown in Britain, and it seems there is only one recorded case of toxic mussel poisoning. Dinoflagellates are common enough in British waters, but this year there must have been just the right conditions of climate and nutrients to cause a particularly large bloom of the *Gonyaulax tamarensis*. The sea birds were the first casualties. Agricultural chemicals and pesticides were soon ruled out as causative agents, and, when poisoned mussels became involved, all the signs pointed to toxic dinoflagellates as the cause. At first, however, it was difficult to pin the blame on them, partly because of difficulties in identification. Fortunately for all involved, routine plankton samples had been taken in May in the North Sea by the Oceanographic Laboratory in Edinburgh, and when these came to be analysed, *G. tamarensis* was found to be very abundant during the crucial time. But there were several other factors operating—some quite incidental. In most parts of the British Isles, mussels are not caught during the summer months. It so happens that in the Northumberland area, where the climate is favourable, there is no closed season for mussels. If the toxic bloom had occurred elsewhere, the toxicity might never have been recorded, although the cockle industry might have been affected. As it turned out, the toxicity recorded in mussels in Northumberland must rank among the highest natural toxicities ever recorded. Fortunately for the mussel eaters of Northumberland, most of the mussels eaten had been well cooked, the juices had been drained away, and in this way some of the poison was eliminated. Otherwise there would probably have been much more serious effects and even some deaths.

This event may have caught everyone off guard, but moves are afoot to try to stop people getting poisoned again. Talks are in fact going on to try to get a system of routine checking of shellfish toxicities during the crucial spring months. This type of sampling goes on already in countries where toxic blooms are fairly regular occurrences. The event will also have sparked off research into fundamental questions of the ecology of dinoflagellates and their part in food chains of shellfish and other animals.

FISHERIES SOCIETY

Growing and Watching Fish

from a Correspondent

THE autumn scientific meeting of the Fisheries Society of the British Isles was held in London on September 28. Mr I. D. Richardson of the White Fish Authority spoke about some cultivation techniques for marine fish. He emphasized that most marine fisheries are currently based on the hunting of natural populations and, because many of these are being over-fished, it is necessary to seek alternative species, new grounds or to attempt artificial cultivation. Despite a lack of biological information on many aspects of the life of the species upon which cultivation techniques were being tried, the work had been started and was having considerable success.

Because it had been shown that there was a thirty per cent mortality each month if young fish were placed in the sea, attempts were made to culture the fish to a marketable size in tanks and in enclosures in the sea. The effects of using heated seawater from power stations, artificial fertilization of the environment and additional feeding of the fish were also tried. In three years it had been shown that such cultivation techniques were biologically feasible, but the primary resource, whether of eggs or young, must be reliable. Fully marketable fish had been raised in an enclosed sea loch in two years, and in tanks using heated seawater from a power station, 7°–8° C above ambient, in eighteen months. For example, sole had grown from 3 cm to 25 cm in this time. A commercial judgment on cost had yet to be made.

Dr N. B. Marshall of the British Museum (Natural History) talked about deep sea fish, with particular reference to fish occurring on the sea floor at depths of about 3,000 m. His study was based on thousands of photographs taken of the sea floor by workers at the Woods Hole Oceanographic Institution. Some of these photographs showed fish in their natural swimming attitudes at these great depths. Dr Marshall also showed a film taken from a bathyscaphe at 2,500 m