

the only plant that will be lost completely from the part of Teesdale which is to be flooded.

As well as flowering plants, algae have been taken to Durham, and a stream is being built where Drs B. A. Whitton and M. K. Hughes hope to be able to study communities taken from calcareous flushes. The prominence of the blue-green alga *Rivularia basiolettiana* makes these communities unique in such cold water.

SKIN CANCER

DNA Repair Defect in Rare Disease

from our Medical Biochemistry Correspondent

ALTHOUGH mutagens are known to be implicated in human cancers, there is little direct evidence of alterations in DNA or DNA metabolism. Some recent work which suggests that there is an inherited deficiency in the DNA repair system in the disease xeroderma pigmentosum is therefore of great interest. This disease is a rare inherited condition in which the skin is extremely sensitive to ultraviolet light and numerous skin cancers develop. In the more severe forms of the disease, called the de Santis-Cacchione syndrome, there are neurological disorders as well.

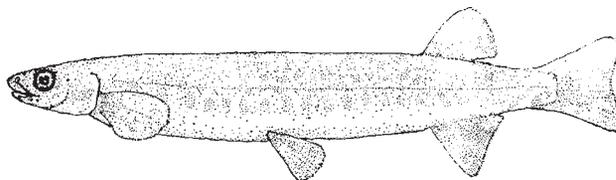
It has previously been shown that tissue cultures of fibroblasts from patients with this disease do not incorporate tritiated thymidine into DNA after ultraviolet irradiation as well as do normal fibroblasts. This work suggested that there is an inherited defect in the repair system of unspecific DNA synthesis, and now Epstein *et al.* (*Science*, **168**, 1477; 1970) have shown that this effect can be observed *in vivo* and that the defect affects all types of cells in the skin. They gave eight normal controls and three patients with xeroderma pigmentosum irradiations of 13.6×10^6 ergs/cm² of ultraviolet light at wavelengths of less than 320 nm. Tritiated thymidine was injected 15 min later into the irradiated area and adjacent unirradiated skin and, after 1 h, biopsies were taken for sectioning and autoradiography. There was dense labelling indicating DNA synthesis before cell division in 5 per cent of the basal cell nuclei and in 1 per cent of the dermal fibrocytes. Sparse labelling of three to fifteen grains per cell occurred in a very few unirradiated normal cells but, in the irradiated normal samples, about 500 out of every 1,000 cells of all types had sparse labelling. Two of the patients had the severe form of xeroderma pigmentosum with neurological abnormalities and these showed no sparse labelling at all after irradiation. The other patient had skin changes only and, after irradiation, his cells showed some sparse labelling ranging from 4 per cent of that in the normals in the upper dermal fibrocytes to 20 per cent of the normal value in the basal cell layer. There is therefore clear evidence that patients with this inherited defect are unable to respond to irradiation by DNA repair in the normal way, and the enzymological change responsible for this should be interesting. This defect is very probably the cause of their skin cancers, and because ultraviolet irradiation seems to cause skin cancer in normal humans, the inefficiency of the DNA repair system might well be a factor concerned in the development of other skin cancers.

GALAXIID FISHES

Speciation in New Zealand

from our Marine Vertebrate Correspondent

NEW ZEALAND has been geographically isolated from other land since at least the end of the Mesozoic and its native freshwater fish fauna shows this long isolation by its relative poverty. Only thirty-one species are known, compared with 127 in Japan and seventy-two in the British Isles, and fourteen of these species belong to the family Galaxiidae. This suggests that this family may be the oldest existing element in the freshwater fish fauna and, as such, it is of considerable interest. In addition, the study of this family is likely to shed light on speciation within the group in New Zealand and their relations with other galaxiid fishes elsewhere. A recent publication by R. M. McDowall (*Bull. Mus. Comp. Zool. Harv.*, **139**, 341; 1970) marks a major advance in knowledge of these fishes.



Galaxias maculatus.

Most of the galaxiids are small and scaleless, with rounded trunks and rather broad heads. They tend to be solitary and are usually rather secretive; some live in overgrown pools and are nocturnal in habit, while others have midwater shoaling habits. Body shapes and fin form tend to respond to these varying habits. One of the most extreme New Zealand habitats is that in which the fishes of the genus *Neochanna* live. McDowall reports on a kauri-gum swamp at Waiharara, South Island, in which there were many small depressions a few inches to several feet across and up to eighteen inches deep. These holes were heavily overgrown with sphagnum and filled with twigs to the extent that they were scarcely distinguishable from the surrounding swamp. This unpromising area proved to be the major habitat of the species *Neochanna diversus*. It seems very likely that this and the related species aestivate during the dry season, when their ephemeral habitats dry up, or at least become deficient in oxygen.

By contrast with this species, other New Zealand galaxiids are diadromous, the juveniles being well known as "whitebait" during a shoaling, migratory phase when they enter the estuaries on their return to the rivers in which they live. *Galaxias maculatus* is the most commonly encountered of this type, and is widely distributed both in New Zealand and elsewhere. This species is peculiar in that it breeds amongst grasses on estuarine flats synchronously with the spring tides. The eggs are deposited amongst the bases of grasses and sedges and do not hatch until the next cycle of spring tides, when the larvae are carried out to sea. The young fish are found as migratory whitebait in the estuaries in the subsequent spring some six months after spawning. McDowall confirms that this species is highly fecund, and its eggs are very small when compared with the freshwater