the fairly uniform climate, daylight and the small changes in water level.

Before Mr Dunn's talk, Mr H. C. Gilson, director of the association, described some of the work in progress both at the Windermere laboratory in the Lake District and at the River laboratory in Dorset. One interesting development is the establishment of a Quaternary Research Group directly under the association. The programme of the group is essentially an investigation, by parallel analyses, of the late glacial deposits at the bottom of the Lake District lakes. Through these studies it may be possible to obtain a picture of the history of the lakes, and the successional changes they undergo in the long-term as the result of climatic and other changes. Another development, but this time more on the applied side of freshwater biology, is the association's involvement in the feasibility study for the Morecambe Bay Barrage. The interest of the association in this project was described earlier in the year (*Nature*, 217, 599; 1968). So far the operation—led by Mr John Corlett—consists principally of "picking people's brains", or of collecting and digesting existing information in collaboration with the Lancashire River Authority, the Nature Conservancy and many other bodies.

At the same meeting Mr D. F. Westlake of the River laboratory spoke on the amount of water-weed (almost all *Ranunculus calcareus*) in the River Frome in Dorset. Each year the river authority has two weed-cutting operations, and Mr Westlake took advantage of this to estimate the weight of weed removed. In May 1967 some 300 tons (fresh weight) of weed was removed from 16 km (10 miles) of river below Dorchester. Another estimate was made of the weed cut in July of the same year. In terms of weight per unit area the crops agree well with estimates obtained from small scale sampling in other chalk streams.

Living and Partly Living

from a Correspondent

DURING the Bangor meeting of the Biochemical Society, a colloquium on "Some Aspects of Soil Biochemistry" was held on June 21 and 22 and attended by the major workers in this field from the United Kingdom.

"The soil lies on the twilight of life, a connecting link between the living and the non-living, between material animated by vital forces and material subjected to physical forces"—so wrote C. F. Marbut. The biochemist J. H. Quastel regarded soil as a tissue with a metabolism of its own, due to its micro-flora and fauna. Because it is the ultimate source of all the chemicals which participate in life processes, together with air and water, biochemical events in this medium demand the attention of biochemists.

R. D. Haworth (Sheffield) discussed the chemical nature of soil humic acid—that *bete noire* of organic chemistry. Electron spin resonance spectra, coupled with degradative experiments, suggest that humic acid is composed of an "aromatic core" with a semiquinone ion radical associated with this extensive conjugation: polysaccharides, proteins, metals and relatively simple phenols are attached by chemical or physical means or both. M. V. Cheshire (Aberdeen) dealt with the difficult problem of the origin of the polysaccharide fraction of soil organic matter, which varies little with soil type. Radioactive starch or glucose incubated with soil led

to a redistribution of label mainly among the hexoses in soil hydrolysates, but little in the pentoses—are the latter derived mainly from resistant plant residues?

D. S. Jenkinson (Rothamsted) reported some fascinating work on the turnover of organic matter in soil from the unmanured plot in the Broadbalk Continuous Wheat Experiment, showing that materials of vastly different turnover rates exist in this fraction. M. G. Yates (Sussex) gave a masterly account of recent work on the biochemistry of nitrogen fixation by both anaerobic and aerobic organisms—culminating in the separation of two metallo-protein enzymes containing either iron or iron and molybdenum which, together with an ATP-generating system and an electron source, produce ammonia from nitrogen anaerobically.

W. C. Evans (Bangor) showed how microbes from the soil can be made use of to elucidate the precise biochemical pathways of detoxication of pesticides. The promising new technique of γ -radiation to sterilize soils, and thus reveal the relative sensitivity of its microflora, its effects on humus, soil enzymes and plant growth, was discussed by P. A. Cawse (Wantage). Finally, D. A. Barber (Wantage) outlined work on the rhizosphere and its influence on ion uptake by plants from soils. This extremely important area is now coming within the scope of precise quantitative experimentation as a result of developments in technique.

Natural Carcinogens

from a Correspondent

THE Pharmacological Biochemistry Group, meeting at the University College of North Wales, Bangor, on Thursday, June 20, held a colloquium on naturally occurring carcinogens. This is a subject of general interest, with increasing relevance to human and animal health and the meeting was well attended with a lively discussion. The environmental carcinogens dealt with were those produced by the mould *Aspergillus flavus* (the aflatoxins), the bracken fern *Pteridium aquilinum* and members of the tree fern family *Cycadaceae*.

P. M. Magee (Middlesex Hospital Medical School) dealt with the glycoside cycasin and its aglycone, methylazoxymethanol, which is the active carcinogen, and showed how their biological actions are closely similar to those of the nitroso carcinogens. Single doses are sufficient to induce tumour formation, and there is evidence that these compounds are produced more frequently than has been suspected.

The simulation of both long and short term aspects of the radiation syndrome in a variety of species by the ingestion of bracken was described by Antice Evans (Bangor). The strong carcinogenic and mutagenic activity has now been obtained by administration of extracts purified by chromatographic methods. The causal relationship between bracken and bladder carcinogenesis was emphasized by A. M. Pamukcu (Ankara), and in particular its role in the aetiology of bovine enzootic haematuria. He illustrated the results of his experiments on tumour induction in cattle, rats and mice with the pathology of urinary bladder and rat intestinal tumours. Notable differences in susceptibility of different species of animals to aflatoxin were discussed by Ruth Allcroft (Weybridge). She presented information on the metabolism and various routes of excretion, including milk, of the different aflatoxins, relating their structural alterations to their observed