

remarkably similar to the conditions in the natural habitats.

Why is there this wide discrepancy between laboratory and field values for optimum growth temperatures? In the sea, *Leucothrix* grows epiphytically on algae, and so the conditions of the laboratory culture are unlikely to mimic the complex nutritional situation provided in nature. And the nutrient status can induce profound changes in the optima of other growth parameters.

A further clue to the disagreement between field and laboratory studies can be found in the work of J. M. Sieburth (*J. Exp. Mar. Biol. Ecol.*, **1**, 98; 1967), who found that the temperature optima of marine bacteria varied as a function of the temperature of the sea, and that the optima lagged about two months behind the changes occurring in the habitat. These results have been interpreted as a selection of different temperature strains of specific bacteria rather than a physiological adaptation which could occur much more rapidly. Kelly and Brock isolated their *Leucothrix* populations at 20° to 25° C, and so it is possible that only strains with high temperature optima were recovered.

MOODS

Changed by Cyclic AMP

from our Medical Biochemistry Correspondent

THE wonder compound of modern biochemistry, cyclic-3',5'-adenosine monophosphate, may have yet another role, as a controller of human moods. Earlier this year M. I. Paul *et al.* (*Lancet*, **i**, 88; 1970) found that manic patients excreted significantly more cyclic AMP every twenty-four hours than normal, while psychotic depressives secreted significantly less than normal. Recently Y. H. Abdulla and K. Hamada (*Lancet*, **i**, 378; 1970) have demonstrated a correlation between depression or mania in twenty-six female patients and changes in the urinary excretion of cyclic AMP.

They found that normal women excreted on average $2,282 \pm 566$ nmoles of cyclic AMP in twenty-four hours, while in the same time thirteen depressed women excreted 523 ± 282 nmoles before treatment, and $1,283 \pm 123.5$ nmoles when their condition had been improved by treatment. In two weeks the amount of cyclic AMP excreted by normal women changed by only 0.3 per cent, so that both the initial concentration and the 147 per cent increase in excretion in the depressed women were significant. If the group is considered as a whole, all the depressed patients excreted less than $1 \mu\text{mole}$ of cyclic AMP each twenty-four hours, while all those diagnosed as manic or hypomanic excreted more than $3.4 \mu\text{moles}$. Normal values ranged from 1.4 to $3.2 \mu\text{moles}$, so that all patients were outside the normal limits at the beginning of their illness.

Manic patients excreted less cyclic AMP when they improved, and a patient who went from mania to depression excreted even less after the change in mood. In two depressed patients who became hypomanic, excretion increased by 521 per cent and 1,150 per cent respectively, while in those whose condition did not change, or worsened, there was practically no change, or a decrease.

Abdulla and Hamada point out that many of the symptoms of depression can be explained by known effects of decreased concentrations of cyclic AMP. They also claim that the tricyclic antidepressant drugs imipramine, amitriptyline, nortriptyline and protriptyline are eight times as effective as caffeine in inhibiting cyclic AMP phosphodiesterase in rat brain. This is the enzyme which degrades cyclic AMP. Because the mode of action of these drugs is not certain, though most clinicians are convinced that they relieve depression, publication of details of the work on this enzyme will be eagerly awaited. It is not yet possible to decide whether alterations in cyclic AMP can be reconciled with the view that affective disorders—which involve emotional disturbance—are caused by interference with amine metabolism, or whether this work is the first step in a different and better understanding of these conditions.

TAXONOMY

Parrotfish Ironed Out Again

from our Marine Vertebrates Correspondent

THE taxonomic confusion surrounding the parrotfishes may be cleared considerably as a result of a recent study by L. P. Schultz, who has already revised the group once.

Parrotfishes are among the most brilliantly coloured of the many beautiful fishes that inhabit coral reefs. Some are quite large; the Indian Ocean species *Bombometopon muricatus*, for example, reaches 150 pounds. By their brilliance and size the parrotfishes have caught the attention of naturalists since the biological exploration of coral reefs began. It is not surprising therefore that there is a surfeit of named forms, unidentifiable species, and confusion all round. Schultz, with his publication, "The Taxonomic Status of the Controversial Genera and Species of Parrotfishes with a Descriptive List (Family Scaridae)" (*Smithsonian Contributions to Zoology*, No. 17; 1969), should do much to ease the situation.

Previously, many students of the systematics of parrotfishes relied heavily on coloration as a distinguishing feature. This caused great confusion, which is now beginning to be resolved through the study of living fish by scuba divers and by the critical examination of many specimens, particularly by such experts as Schultz and the late J. L. B. Smith. Parrotfishes change colour with age, sexual dichromatism and sex reversal, but this was not appreciated until comparatively recently. Because some of the species are wide-ranging, there are problems of local races and subspecies. Several of these local populations were investigated by Smith, and Schultz has now been able to correlate the colour differences between males and females as well as describing colour changes due to ontogenetic factors in many species.

Schultz's contribution has been most notable in that in his first revision he made extensive use of the pharyngeal dentition of the parrotfishes to supplement the chiefly external features used by earlier workers. He has now extended the use of this feature, and reduced very many earlier names to synonymy. In spite of this, he still recognizes the validity of sixty-eight species in eleven genera, including a previously unnamed species recently discovered in the Red Sea.