and those whose thorough training in the subject fits them to become, after the necessary experience, self-reliant research workers.

Briefly, then, the committee's recommendations for dealing with this urgent problem are: (1) that bacteriology should be recognized, in universities and elsewhere, as an independent science; (2) that research scholarships in bacteriology should be established in universities and research institutes; and (3) that industry should recognize the value of the trained bacteriologist and should offer him status and prospects which are attractive. In the minds of those conversant with the subject, no doubt exists as to the magnitude of the contribution which bacteriologists can make to the history of progress. The committee feels strongly that this contribution will be more effective and much more quickly realized if the suggestions it has made are considered, at an early date, jointly by the two groups mainly concerned, namely, those who train bacteriologists, and those who employ them.

THERMOTHYRIN A AND B: TEMPERATURE-REGULATING HORMONES OF THE THYROID

By DR. ANN MANSFELD

Institute for Experimental Pathology and Pharmacology,
University of Pecs

THE role of the thyroid gland in temperature regulation through chemical means has been investigated by G. Mansfeld in a series of studies which have at last been summarized in his monograph on "The Hormones of the Thyroid Gland and their Actions" (Basle, 1943, Benno Schwabe and Co.). The principal results of these studies are as follow.

(1) By means of serum transfer experiments it was shown that the temperature regulation not only against cold, but also against heat, is accompanied by the secretion of substances which decrease the level of the oxidative processes in normal animals, and that the secretion of these substances is dependent on the intact function of the thyroid gland.

(2) An analysis of the action of thyroxine has shown that the thyroxine sensitivity of the organism during the months March–November is decreased to such an extent that it is necessary to administer three times the amount of thyroxine in order to get the same increase of oxidation as during the winter months. After removal of the thyroid gland, the animals become as sensitive to thyroxine during the summer as they were during the winter.

(3) G. Mansfeld succeeded in preparing an active extract by hydrolysis of thyroid glands which not only decreased the higher sensitivity to thyroxine of winter animals, but also lowered the level of oxidation in normal animals and in animals in which the metabolism had been raised by thyroxine.

(4) It could be shown that this activity of the extracts was due to the action of two substances, which have been termed thermothylin A and B.

These substances have been obtained in the crystalline state. They were isolated not only from the thyroid gland, but also from the sera of human beings and animals. It was found that thermothylin A is produced throughout the whole year when human beings or animals are exposed to high temperatures ('cooling hormone'); thermothylin B is pro-

duced during the summer months, independently of the external temperature ('summer hormone of the thyroid gland'). Thermothylin A has a melting point of 53° C. Elementary analysis of three samples which were in good agreement among themselves gave the following mean values: C, 80.73; H, 13.93 per cent. From these figures the empirical formula is calculated as $C_{20}H_{40}O$ (calc.: C, 80.46; H, 14.18); or $C_{20}H_{40}O$ (calc.: C, 81.0; H, 13.6). The molecular weights, determined cryoscopically in exaltone, was found to be 290 (calc. for $C_{20}H_{40}O$, 296).

Thermothylin B has a melting point of 66° C. Elementary analysis of six samples which were in good agreement among themselves gave the following mean values: C, 85.15; H, 14.87 per cent. Thus, thermothylin B consists only of carbon and hydrogen. From the analytical figures the empirical formula is calculated as $C_{20}H_{42}$ (calc.: C, 85.01; H, 14.98). The molecular weight, determined cryoscopically in exaltone, was found to be 277 (calc. for $C_{20}H_{42}$, 282).

Injections of 1 mgm. doses of these substances into rats produce a lowering of oxidation, which after five days still amounts to about 50 per cent, and disappears only after nine days.

The elucidation of the chemical constitution of these highly active hormones is in progress.

FOSSIL FLORAS OF THE KAREWA SERIES

THE Karewa series are deposits laid down in an ancient lake in Kashmir and now exposed on hillsides and in the valley at elevations of 5,500–10,600 ft. The flora is rich, including many dicotyledons (mostly identified as hill trees and shrubs), monocotyledons (mostly lowland aquatics), gymnosperms and abundant algae. The aquatics are of special interest because they are not known to occupy elevations greater than 5,200 ft. at the present time in the Himalayas. This suggests that the lake deposits may have been afterwards raised at least 5,000 ft.—a conclusion in accordance with recent geological views. The flora from different localities is distinctly diverse. That from Liddarmarg (altitude 10,600 ft.) is tropical in its trees, including such genera as *Ficus*, *Quercus*, *Litsaea*, etc. Such genera occur at present at a low altitude of 3,000–6,000 ft. in the Himalayas.

The flora of Laredura (altitude 6,000 ft.) includes a mixture of temperate genera such as *Aesculus*, *Juglans* with tropical genera, which are, however, so strongly developed as to suggest at least a sub-tropical climate. The Ningal Nullah flora discovered at an altitude of 9,000 ft. consists exclusively of temperate genera such as willows, poplars, walnuts and elms such as grow at present in Kashmir at 7,000–10,000 ft.

The age of all these fossiliferous deposits is regarded as Lower Pleistocene, and De Terra and Patterson think they may belong to the first Interglacial period. According to a communication to the Editors submitted by Dr. G. S. Puri, of the University of Lucknow, at present working at University College, London, it now proves unlikely that they all belong to one period, for the first two floras are tropical or sub-tropical and suggest an elevation lower than 6,000 ft., while the third flora, which suggests an elevation a good deal higher, must have grown at a rather different period and perhaps a different Interglacial after the level had been raised.