



Inversion at C₁₄ must occur in *one* of these dehydrogenations, even if the biologically inactive *isoequilenin* (dose > 500γ) has not, as previously thought, a *cis*-C/D-ring junction (XXIa, XXIb), but the *trans*-C/D-ring union hitherto attributed to the biologically active equilenin (XVI; dose, c. 30γ) by analogy with oestrone. Whatever the stereochemical relationship between oestrone and equilenin, one or other of the conflicting alternatives, stated above, will remain.

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GLACIOLOGICAL RESEARCH

By GERALD SELIGMAN

A NUMBER of scientific expeditions to polar regions are under consideration and in preparation at the present time. In no part of the globe are there more glaciological problems awaiting solution than in the Antarctic. In recent years many important new discoveries in glacier physics have been made, especially north of the equator, and they naturally urge us to find parallels in the Antarctic where less research has been done than elsewhere.

The important climatological work of Prof. H. W. Ahlmann, who has made careful measurements of the economy of northern glaciers, calls for similar work in the south. The results in the north indicate a general recession of the ice, and the question arises whether this is also the case in the great Antarctic glaciers. This is of considerable importance, not only in the long-term effects but also in the present, for the weather of the southernmost inhabited countries is closely linked up with Antarctic snow conditions. Any changes, therefore, in polar regions will be fairly certain to be echoed in these countries.

Recently, the Royal Geographical Society and the Scott Polar Research Institute of Cambridge formed a joint research committee, under the chairmanship of Lord Wakehurst, to co-ordinate polar research on scientific and geographical subjects. The committee requested the British Glaciological Society to formulate a programme of promising fields for snow and ice research with special reference to the Antarctic. A similar request had been made in 1939 by Prof. F. Alton Wade, senior scientist of Admiral Byrd's projected United States Service Expedition to the Antarctic. As a result, a symposium was held on July 12, 1939, at the Royal Geographical Society's house, and the report of it was sent to Prof. Wade. This programme formed the basis of the expedition's glaciological researches and would have been carried out almost in its entirety but for the War cutting short the Expedition's stay in the south.

The success of the 1939 discussion encouraged the Society to adopt this method again, and a meeting took place at the Department of Geography, Cambridge, on May 14, 1947. A number of experts in kindred subjects attended. These included Prof. C. A. Hart, Department of Photogrammetry, University of London; Mr. L. G. Dobbie, Australian Scientific Research Liaison; Dr. C. E. P. Brooks, Meteorological Office, Air Ministry; and Dr. J. N. Carruthers, oceanographer to the Hydrographer of the Navy. The Rev. W. L. S. Fleming, director of the Scott Polar Research Institute, presided.

A list of subjects had been prepared before the meeting in order to direct discussion into channels. This was, in effect, an amplification of the programme prepared for Prof. Wade in 1939 but brought up to date in the light of recent knowledge. It was, however, conceived on a broader basis; there is practically no glaciological problem which can be said to be peculiar to any given area of the world. Conditions may vary in glaciers in Greenland, the Himalayas, the Alps and Graham Land, but the differences are those of degree only. Shelf ice may be considered typical of the Antarctic; nevertheless, evidence of similar formations in the Arctic are believed not to be entirely absent. Therefore, the programme can, broadly speaking, be considered to be very nearly complete for snow and ice research in all parts of the world. The only conspicuous omission is that of the study of the permanently frozen ground covering vast areas of Siberia and Canada, which involves interesting questions of meteorology, recent geology and ice physics.

Scientific workers about to go on expeditions frequently ask for profitable lines of snow and ice research. In my opinion the newly evolved programme should supply material for investigation for some years to come. Selections from it could be made which are in accord with the investigators' interests and resources. A verbatim report of the discussion will be published, from which he will be able to ascertain with whom he must place himself in touch in order to obtain detailed information. Such information cannot form part of a short article

and, indeed, it is not easy to elaborate the bare list of subjects without transgressing the limits set. But mention must be made of one point that emerged during the symposium, namely, the great promise that is held for the advancement of glacier physics. This has been perhaps the chief interest of the British glaciologists since Forbes and Tyndall, and later Deeley and Tutton, carried out their quests in the Alps. There has now been formed a Glacier Physics Committee on the initiative of Dr. M. F. Perutz of the Cavendish Laboratory and under the chairmanship of the Society's President. Several distinguished men of science have joined it in order to give assistance in subjects not normally part of glaciology but which will profoundly affect the course of the contemplated research.

The Glacier Physics Committee is in contact with Swiss glaciologists, and this combination should be able to make important advances in their main theme—the mechanism of glacier flow. This has been a source of controversy for nearly two and a half centuries and, although the subject of much research and a good deal more speculation, there has never been a really well organised, systematic attack on the problem. It is not only of pure glaciological interest; it has been pointed out that a flowing glacier may be likened to a greatly accelerated rock mass in process of translation and recrystallization, and there are other obvious analogies, especially in metallurgy, to the behaviour of ice under stress.

It is only possible to single out two other points upon which discussion centred, namely, the climatological factors touched on above and the movement of the pack ice, so important for whaling and for shipping generally.

The wide field covered by the word 'glaciology' has had many brilliant exponents in Great Britain, but it cannot be said that there has been a regular school of research as there has been in other countries. It was not until after the meeting of the International Union of Geodesy and Geophysics in Edinburgh in 1936 that an atmosphere of continuity began. Since then, except for the war years, interest has increased steadily, and the science now seems to be on a firm basis and the course set for intensive work.

The full report of the meeting will be published in the Society's *Journal of Glaciology*. A detailed exposition of the programme proposed for the Glacier Physics Committee will be found in the *Journal of Glaciology*, Vol. 1, No. 2, pp. 45–51.

RECENT RESEARCH ON LOCUSTS

THE establishment of the Anti-Locust Research Centre at the British Museum (Natural History) marks an important step in solving problems of locust control. One of the main functions of that organisation has been the assembling and recording of reports on the breeding and migrations of locusts in Africa and Western Asia. No fewer than 7,986 reports have been received from the Governments of the territories in these areas up to the end of 1945. The collation and sifting of the data thus acquired entails a large amount of detailed work, which is ultimately incorporated in the publications of the Anti-Locust Centre. These latter are planned in two series. First, memoirs of quarto size adapted for the publication of detailed charts, etc., devoted to biogeographical and bioclimatic papers; secondly, bulletins intended for the

publication of papers on all other aspects of locust and grasshopper research and control. Up to date, two memoirs have appeared and a third is in the press. The first of the bulletins is also in the press.

Anti-Locust Memoir 1, by Z. Waloff, is entitled "Seasonal Breeding and Migrations of the Desert Locust (*Schistocerca gregaria*) in Eastern Africa" (1946; 76 pp., 30 maps)*. The primary purpose of this study was to analyse and describe the seasonal breeding and migrations of the swarms of this locust in the East African area. The material used to form the basis of this study was the data relating to an outbreak of this insect lasting from 1928 until 1931, and to the outbreak from August 1941 to February 1945. It appears that there is no inherent urge on the part of this locust to migrate in any particular direction or to search for suitable breeding grounds. The major trends of migrations are down the prevailing winds and change with them: old mature swarms, however, tend to fly against the wind. The distribution of the swarms in any season is largely dependent on the pattern of the air temperatures and winds. The incidence of breeding depends, among other factors, on the incidence of suitable rainfall conditions. Because of this, and of the mobility of swarms, the location of breeding areas is not constant but follows seasonal fluctuations of rainfall.

Anti-Locust Memoir 2 is by Miss V. Morant, and is entitled "Migrations and Breeding of the Red Locust (*Nomadacris septemfasciata*) in Africa, 1927–1945" (1947; 60 pp., 32 maps). The outbreak considered in this memoir lasted from 1927 until 1944, a period of more than eighteen years, during which time swarms were recorded from the Anglo-Egyptian Sudan and British Somaliland southwards to the Union of South Africa. In other words, the whole of Africa south of the equator was infested at some time or another during this outbreak, excepting certain coastal areas and the Equatorial Rain-Forest Belt in the north. The greater part of the material used in this study was derived from monthly reports sent to the Anti-Locust Centre from the various countries that were invaded during the outbreak. No fewer than 23,270 records of swarms have been received at this Centre, which enabled the application of cartographical methods to obtain a more complete picture of the rise and decline of the outbreak than has been previously available for any locust.

This same species of locust also forms the subject of an extensive paper by A. P. G. Michelmore in the *Bulletin of Entomological Research* (37, pt. 3, 331; 1947), and entitled "The Habits and Control of the Red Locust in Outbreak Areas and Elsewhere". The last great invasion of this insect started almost certainly from two restricted areas only, namely, the Mwera Marsh in the extreme north of Northern Rhodesia and Lake Rukwa in the south-west of Tanganyika Territory. The regular and constant observation of these areas is of prime importance, in that it enables incipient swarms to be destroyed, as happened in the rainy seasons of 1942–43 and 1943–44. At present, the best method of control in widespread campaigns is arsenical baiting. It is hoped, however, that insecticidal dusting from aeroplanes will soon be possible. The use of arsenicals puts certain limitations on campaigns on account of their danger to

* Copies available to institutions and persons engaged in locust and grasshopper research, in exchange for their publications. Requests to be addressed to the Director, Anti-Locust Research Centre, British Museum (Natural History), London, S.W.7. Also obtainable from "The Times" Printing Works, Richmond, Surrey. Memoir 1, 8s. post paid; Memoir 2 6s. post paid.