

Geomagnetism and Aurora Programme in Antarctica

The Aurora Programme

At present this programme consists of an all-sky camera recording of aurorae, supplemented by visual observations. From 1960 to 1963 the recordings were made by means of a Stoffregen all-sky camera of 16-mm black and white film. This camera was obtained from the Norwegian Antarctic expedition when the first South African Antarctic Expedition took over Norway Station (70° 30'S, 02° 32'W geographic; -63,9°, 43,8°E geomagnetic). The camera was later transferred to Sanae Base (70° 18'S, 02° 22'W geographic; -63,6°, 43,9°E geomagnetic) when Norway Station was abandoned.

In 1964 a SCAR-type all-sky camera was put into operation at the Sanae Base. This camera is still in operation and makes recordings on 35-mm black and white film. The camera normally runs on a 15-minute programme, in which a sequence of four exposures of 10 secs., 2½ secs., 40 secs., and 10 secs. duration are made every 15 minutes. This sequence takes up the first three minutes of every 15-minute period. When active forms are observed in the aurora, the camera is switched to a 1-minute programme in which the above sequence of exposures is supplemented by a 10-seconds exposure once every minute for the remainder of the 15-minute period.

The records are analysed and tabulated as hourly auroral plots.

The Magnetic Programme

This programme was also taken over from the Norwegian Antarctic Expedition in 1960, and later transferred to Sanae.

Continuous recording of the magnetic field elements H, Z, and D is done on a La Cour storm magnetograph and on a 3-Axis Kelvin Hughes Fluxgate magnetometer. The recording speed of the La Cour magnetograph is 12mm per hour and the sensitivity of the instrument is of the order of 3,5γ per mm for D, 18γ per mm for H and 22γ per mm for Z. The fluxgate records are used to supplement incomplete La Cour records.

Absolute observations of the magnetic elements are made regularly to maintain base-line control and to establish the secular-change rates of the magnetic field elements. The instruments which are at present used for the absolute observations are:

1. quartz horizontal-force magnetometers (QHM) for determining the horizontal intensity and declination;
2. a magnetometric zero balance (BMZ) for determining the vertical intensity;
3. a fibre declinometer for determining the declination; and
4. an Elsec proton precession magnetometer for determining the total field intensity.

Whenever conditions at the base permit, absolute observations are made at a number of established field stations in the vicinity of Sanae, and also along routes taken by the geological field parties. This is done with the object of obtaining data for the determination of secular changes.

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Review —

Quaternary Studies of the Antarctic

“The study of the palaeoecology of the Antarctic region is of paramount importance for our understanding of the age, origin and ecology of the present-day flora and fauna of that region. Such study is also essential for an explanation of the Quaternary palaeoclimates of the Southern hemisphere in general.” With these sentences Dr G. de Q. Robin, secretary of the Scientific Committee on Antarctic Research (SCAR) introduces his foreword to the proceedings of a conference on *Quaternary Studies of the Antarctic* which was held in Cambridge (England) from 24–27 July

1968. This conference was organized on the initiative of Prof. E. M. van Zinderen Bakker Sr, with the approval of the SCAR Working Group on Biology and the financial support of SCAR.

Nine scientists from six different SCAR nations representing biogeography, climatology, geology, glaciology, micropalaeontology and oceanography held a very successful meeting at which eleven review papers in different fields were presented and discussed. The collection of material was of such general interest that it was decided to publish the complete proceedings and discussions. The financial assistance of the South African Council for Scientific and Industrial Research made it possible for the proceedings to be published in a special volume (no. 5) of the sequence *Palaeoecology of Africa and the Antarctic*.

This issue, published in 1969, can be obtained from Messrs A. A. Balkema, P.O. Box 3117, Cape Town, at R6-00.

This important volume contains the following contributions:

- L. M. Cranwell:** Palynological intimations of some Preoligocene Antarctic climates
- H. H. Lamb:** Investigation of the climatic sequence: A meteorological-empirical approach
- D. L. Linton:** The abandonment of the term "Periglacial"
Evidences of Pleistocene Cryonival phenomena in South Africa
- A. T. Wilson:** Ice Age theories and Antarctica
Chemistry and the Quaternary in the Antarctic
- J. T. Hollin:** The Antarctic ice sheet and the Quaternary history of Antarctica

- J. D. Hays:** Climatic record of late-Cenozoic Antarctic Ocean sediments related to the record of world climate
- P. Bellair:** Données actuelles sur les Archipels des Crozet et des Kerguelen
- E. M. van Zinderen Bakker Sr:** Quaternary pollen analytical studies in the Southern Hemisphere with special reference to the sub-Antarctic
- N. M. Wace:** The terrestrial biogeography of Antarctica

The former volumes of the sequence *Palaeoecology of Africa and the Antarctic* deal mainly with the Quaternary of Africa but also with Antarctica and cover such fields as: climatology, geology, archaeology, palaeontology, biogeography, palynology and dating of deposits. The volumes present comprehensive research reports which should be of interest to every Quaternarist.

Review—

Monograph on the 1965/66 Expedition to Marion and Prince Edward Islands

The South African Expedition to these sub-Antarctic Islands in 1965/66 was financed by the South African Government. A small team of geologists and biologists stayed on the islands for three and 15 months respectively and collected as many data as possible. These islands were previously little known to science and the results obtained by the expedition have revealed important information on the origin, the age and the geological history of these islands and on their flora and fauna.

Accurate maps have been drawn of these islands and their volcanic origin has been studied in detail. The glacial history gives very valuable information on the world-wide lowering in temperature that occurred during the Würm-Wisconsin ice age and also on the age of the animal and plant life. The biological work which was primarily concerned with taxonomic studies, is important for the understanding of the dispersal problems in the sub-Antarctic region, while

extensive botanical investigations have given an insight into the ecology of the vegetation which is poor in species.

The general survey of the avifauna of these bird paradises is of great value, as the islands are completely protected. For instance, an analysis of the behaviour of the Gentoo Penguin has provided a great many new details of the life of this bird species.

Many specialists have been working on the material collected by the expedition. Unfortunately, the data on some of the groups such as the fresh water algae, the lichens, and diatoms have not yet been analysed, and some collections are still awaiting attention. However, a monograph covering the first stage of the biological-geological investigations of these islands, which are invaluable from the biological point of view, is complete and has been published by Messrs. A. A. Balkema (93 Keerom Street, Cape Town).