ANTARKTIESE BULLETIN

Sponsored by—Onder beskerming van

BP South Africa (Pty.) Ltd.

OCTOBER to DECEMBER 1969 — No. 29 OKTOBER tot DESEMBER

Published by the South African Antarctic Association
13 Stellenbosch, Mossie Street, Horizon, Roodepoort

Uitgegee deur die Suid-Afrikaanse Antarktiese Vereniging
13 Stellenbosch, Mossiestraat, Horison, Roodepoort

REDAKSIONEEL—EDITORIAL

Dit was met skok dat die *Bulletin* verneem het van die skielike heengaan van Dr. André le Roux van der Merwe —ontvanger van die 1969 BP Antarktiese Medalje en skrywer van „Die Wit Horison". (Sien *Bulletins* No. 28, Junie tot September, 1969 en No. 26, Julie tot Desember, 1968).

Dr. van der Merwe was geneesheer met SANAE 1 en het ook as redakteur van die *Bulletin* opgetree.

Dr. van der Merwe se dood op 4 Desember, 1969 het saamgeval met die tiende herdenking van die vertrek van SANAE 1 uit Kaapstad.

Die *Bulletin* spreek sy innige meegevoel uit vir Dr. van der Merwe se vrou, familie en vriende. Sy heengaan los 'n leemte wat nie maklik gevul sal word nie.

Dit word ook berig dat Mnr. Gordon Mackie, lid van SANAE 10, in Antarktika as gevolg van 'n ongeluk gesterf het. Die *Bulletin* sal 'n verslag oor die ongeluk plaas sodra Departement Vervoer al die feite tot hul beskikking het.

FIRST COLLOQUIUM ON ANTARCTIC RESEARCH

On November 24th and 25th, the first colloquium on Antarctic research programmes was held at the Council for Scientific and Industrial Research (C.S.I.R.) in Pretoria. Members of SANAE 11, directors of research programmes and Antarctic research staff, members of the South African Committee for Antarctic Research (S.A.S.C.A.R.), representatives of various government departments closely associated with the running of the present South African base and the design of the new base and ex-expedition members with continued interest in Antarctic research were invited to attend.

The programme directors gave summaries of the various programmes' aims and objectives. This served the useful function of underlining the fact that the various Antarctic projects should be treated as a team effort and not as a number of separate little programmes.

The highlight of the colloquium was undoubtedly the talk by Mr. D. C. Neethling who used a set of very interesting slides to illustrate the sort of life and terrain that SANAE 11 would have to contend with during 1970.

After the colloquium the provisional design of the new base was discussed to see what improvements in facilities could be incorporated in the final design.

Mr. D. G. Kingwill, Director of the C.S.I.R.'s Science Co-operation Division, is to be congratulated on the success of the colloquium and it is hoped that this will become a regular feature of the familiarisation programme of future expeditions.

Photographed at lunch on Tuesday, 25th November, at the C.S.I.R.'s recreation site are, from left to right, Mr. D. Vaclavik, a Czechoslovakian, who is a geologist, and who, with three other expedition members, will spend most of his time at the newly established Borga Base (see following article); Mr. Marten du Preez, a former leader and chairman of the Antarctic Association who, in 1966, was awarded the Antarctic Medal (Antarktiese Bulletin, *No. 16, July, 1966); Mr. W. J. van Zyl from the communications section of the Department of Transport, a former expedition member and leader of SANAE 11; and Mr. Dirk Neethling, a member of a former expedition, an Antarctic Medal holder* (Antarktiese Bulletin, *No. 26, July to December, 1968) and director of the South African earth sciences programme in Antarctica. (Photo*—Council for Scientific and Industrial Research).

UNIQUE OPPORTUNITIES FOR PROBING THE EFFECTS OF COLD AND ISOLATION ON MAN AND ANIMAL LIFE

An Antarctic expedition provides a unique opportunity for carrying out research in medicine, physiology and psychology. The effects of cold on animals and man have been studied since ancient times. Observations were made by Aristotle and Hippocrates. Towards the end of the nineteenth century the atmospheric gases were liquified and the effects of very low temperatures on a wide variety of micro-organisms, cells and tissues of higher animals were studied. The experiences of frostbite in Antarctica led to intensive studies of the effects of temperatures in the range occurring in nature.

In addition to research associated with the Antarctic climate and environment, studies can be made of groups isolated from all other human contact for a prolonged period. Each group has a uniform diet, lives under regular physical conditions where there is relatively uniform climate indoors, and out-of-doors exposure to cold is intermittent. Important work can be carried out on such a group, free from all outside influences, especially in the physiological and psychological fields of medicine. The length of the period over which studies can be made, viz. a year, means that results are far more truly representative than those obtained from short-term experiments elsewhere. It was as a result of experiences of scientists in the Antarctic that led to the study in the laboratory of the effects of cold on many forms of life.

By 1940 it was established that minute organisms that survived dessication (drying out) under natural or experimental conditions, would also survive freezing at any temperature between 0°C and —269°C. At temperatures below —100°C, biochemical changes were either arrested or slowed to such an extent that storage for indefinitely long periods was possible, and certain viruses and pathogenic bacteria were indeed banked in this way.

Studies on higher animals, however, soon showed that cold-blooded animals, such as frogs and fish, would not stand freezing at temperatures below about —1°C, while warm-blooded animals, including birds and

mammals, would not recover if cooled beyond a limit characteristic for each species between 15°C and 28°C, because breathing and heart beats ceased. Some hibernating animals, however, are able to withstand their bodies being cooled down to temperatures of 5°C to 10°C. The only mammalion cells that withstood freezing *in vitro* were human spermatozoa, skin cells and certain tumour cells.

In 1949 the whole outlook was changed by the chance discovery that glycerol would protect the spermatozoa of birds and mammals against cold for long periods. Red blood cells can be banked in the same way and subsequently used for transfusion, provided that the glycerol is removed after thawing and before blood is introduced into the blood stream. Between 1949 and 1959 a wide variety of living cell tissues were banked at very low temperatures in media containing glycerol without loss of viability.

A wide variety of other substances also seem to protect living matter stored in this way. Of these the least toxic and most effective is dimethyl sulphoxide. This agent has made it possible to bank the human cornea at very low temperatures for subsequent transplantation. The major problem today is to bank whole organs, such as the kidney and heart at low temperatures. For this it is necessary to fill the vascular channels of these organs with increasing concentrations of the protective agents during cooling to very low temperatures.

The Antarctic is the ideal source of material to aid scientists in their study of the effect of extreme cold on living organisms. The importance of a co-ordinated international programme in which all SCAR nations participate is that by making the same tests simultaneously in various parts of Antarctica, comparisons can be made of variations occurring in different areas. This is particularly true in the case of reaction of subjects in an experimental group, which can be compared with those of others of different nations accustomed to different climates and living conditions in their own country.

A medical research programme was drawn up by the Biology Working Group of SCAR, which all participating nations were asked to adopt. South Africa's contribution to this programme is supervised by the Human Sciences Laboratory of the Chamber of Mines. The programme includes a study of the environmental conditions to which members of Antarctic expeditions and bases are exposed, together with as detailed a study as possible of their physical activities, the clothing worn, sleep periods and other relevant data. (See *Bulletin* No. 27, 1969, for extracts of some of the results published).

Apart from this work SCAR nations are free to follow any other line of medical research in which they may be interested and for which they are equipped. Specific South African research programmes have been carried out by the South African Institute for Medical Research, the Human Sciences Laboratory of the Chamber of Mines, the National Nutrition Research Institute and the National Institute for Personnel Research of the Council for Scientific and Industrial Research and the Department of Physiology of the University of Pretoria.

(The preceding article has been reprinted from *Archimedes*, Vol. 11, No. 3, August, 1969, by kind permission of the publishers, The Foundation for Education, Science and Technology).

KAART VAN OMGEWING TE SANAE

Die Staatsdrukker het goedgunstelik toestemming verleen om die nuutste kaart van Queen Maud Land, Antarktika om en by SANAE in die *Bulletin* te reproduseer. Kennisgewing van sy vergunning verskyn onderaan die kaart wat bladsye 62 en 63 in beslag neem. Dié kaart sal ons lesers daartoe in staat stel om die gebeure by SANAE beter te volg.

Een van die belangrikste veranderings aan die ysfront van Antarktika in die afgelope 5 jaar, die wegbreek van bykans twee-derdes van die Trolltunga (Sien „Earth Science Programme, S.A.N.A.E. 1969-1970" in hierdie uitgawe) word duidelik aangedui. Hierdie gebeurtenis kan verrykende gevolge hê op die aflaai van voorrade by SANAE.

Ons wys belangstellende lesers dat die sketskaart (T.S.O. Misc. 4382) by die Direkteur, Driehoeksmeting, Posbus 624, Pretoria in 'n groter formaat, geskik vir muurkaarte in skole ens., beskikbaar is.

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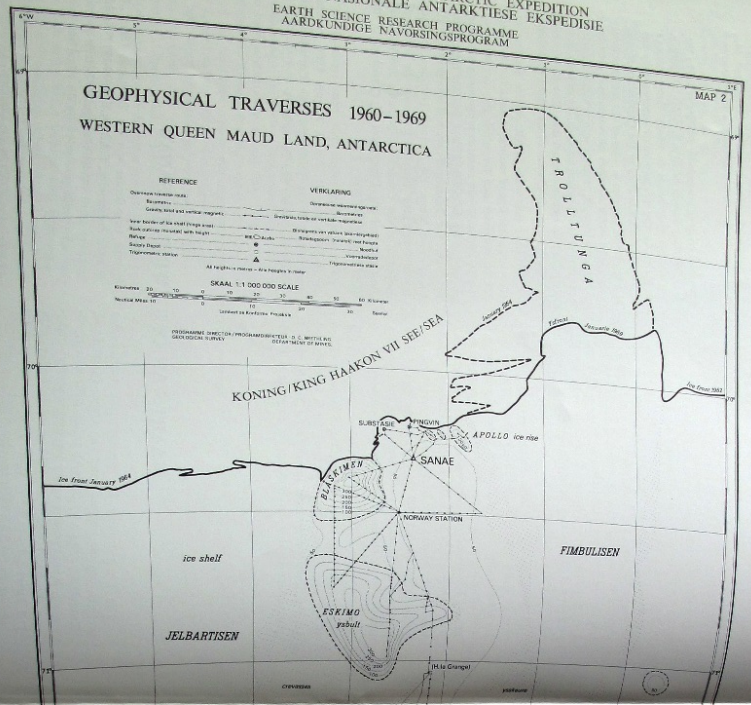
SUID-AFRIKAANSE NASIONALE ANTARKTIESE EKSPEDISIE
EARTH SCIENCE RESEARCH PROGRAMME
AARDKUNDIGE NAVORSINGSPROGRAM

GEOPHYSICAL TRAVERSES 1960–1969

WESTERN QUEEN MAUD LAND, ANTARCTICA

MAP 2



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SOUTH AFRICAN NATIONAL ANTARCTIC EXPEDITION
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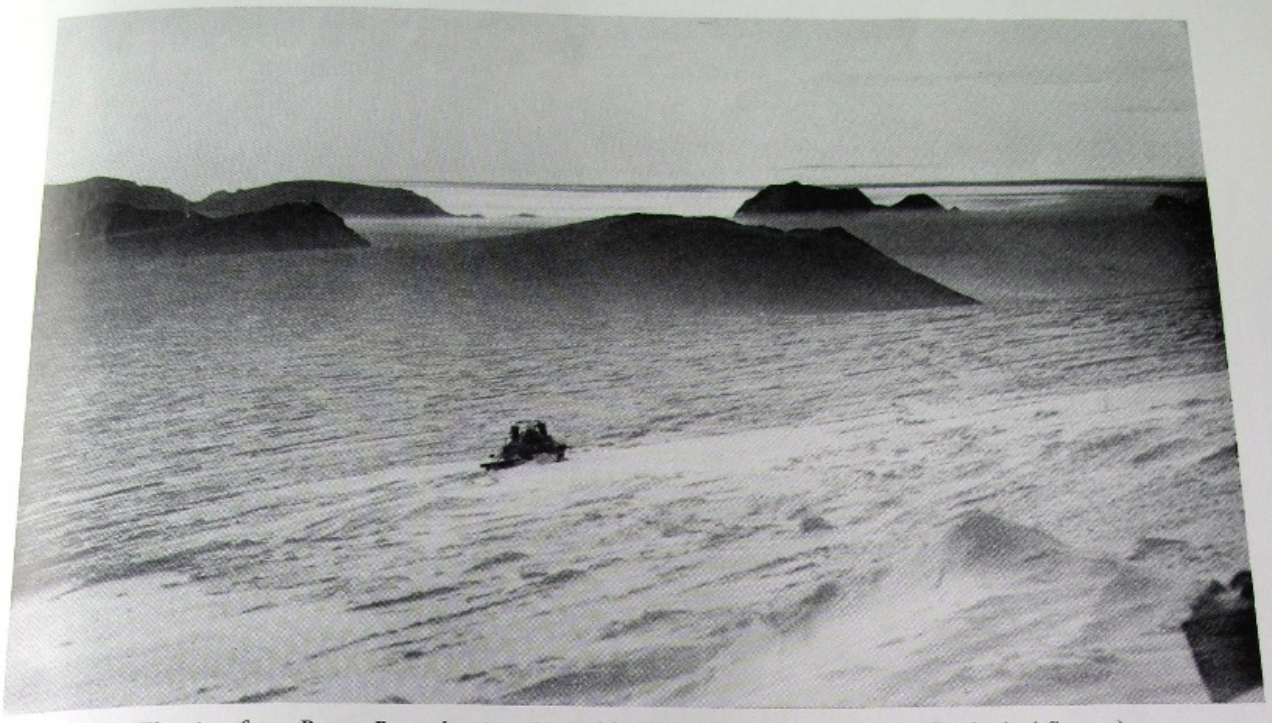
MAP 2

GEOPHYSICAL TRAVERSES 1960–1969

WESTERN QUEEN MAUD LAND, ANTARCTICA

62

63



The view from Borga Base showing the Huldreslottet Mountains. (*Photo*—Geological Survey).

BEWEGING VAN DIE ANTARKTIESE YSKLEED

Onlangse koerantberigte het weereens aandag daarop gevestig dat, vanweë die feit dat die Antarktiese yskleed so 'n belangrike rol speel in die wêreld se weer, heelwat tyd, geld en energie daaraan bestee word om die beweging van hierdie ysmassa te bestudeer.

Oor 'n periode van etlike tien duisende jare het die sneeuval in Antarktika daartoe gelei dat die kontinent onder duisende voet sneeu begrawe is. Die gemiddelde dikte van die sneeu- en yskleed is ongeveer 6,000 voet en dit bevat nagenoeg 10 miljoen kubieke myl ys. Indien hierdie ys en sneeu alles sou smelt word daar gemeen dat die oseaanoppervlakte tussen 200 en 300 voet kan styg. (Vir verdere inligting op 'n populêre vlak word die leser verwys na *Scientific American*, September 1962).

In Januarie 1968 het wetenskaplikes van die Amerikaanse-lëer daarin geslaag om deur die ysmantel naby Byrdstasie te boor. Rots was eers op 'n diepte van 7,150 voet bereik (*Antarctic Journal of the United States*, July-August, 1968). Verbasend genoeg was water teen sub-zero temperature tussen die ys en die rots gevind. Die geweldige drukking wat die ysmassa uitoefen smelt die onderste laag ys en hou dit gesmelt aangesien water moet uitsit om te verys.

Daar word natuurlik gegis dat die ysmassa vinniger kan begin beweeg aangesien die water as smeermiddel kan dien en dat dit duisende ysberge tot gevolg kan hê met verreikende gevolge op die wêreld se weer en dat dit selfs tot 'n nuwe ystyd kan lei.

Totdat verdere inligting beskikbaar is bly hierdie maar blote gissings.

In die gebied van gletserkunde dra Suid-Afrika ook sy deel by tot die Internasionale poging om Antarktika beter te leer ken. 'n Langtermyn gletserkundige projek wat gedurende 1962 deur SANAE 3 begin is word daarop gemik om die ysmassa balans te bestudeer.

Ondermeer sluit die program in die bestudering van die sneeu-akkumulasie op die ysbank en by meer as 200 traversstasies wat van die ysfront tot by 72.5°S op die binnelandse ys reik. Ysdikte, sastrugi orientasie (vir heersende winde), 10-meter temperature, statigrafiese profiele met gebruik van 'n rammsonde, 'n SIPRE-kernboor en pitte word ook gedurende oorsneeu traverse gemeet. 'n Stratigrafiese profiel wat oor 52 jaar strek is opgestel uit data wat deur behulp van 'n diep put en 'n SIPRE kernboor ingewin is. Die deining van die ysbank as gevolg van die seegetye is ook gemeet. Die absolute en relatiewe beweging van die ysbank asook die hoogte van die ysbank oppervlakte word deur landmeters bepaal.

Resultate en gevolgtrekkinge van die Suid-Afrikaanse gletserkundige program is alreeds vir publikasie voorgelê en die werk word voorgesit namate verdere gegewens ingewin word.

REQUEST FOR CONTRIBUTIONS

An appeal is made for contributions to the *Antarktiese Bulletin.*

Articles should be of general interest with a direct bearing on the South African effort in Antarctica or concern the efforts of other countries on the continent. Contributions from people who participated in noteworthy events concerning Antarctica would be of particular interest to our readers.

It would be appreciated if ex-expedition members would contribute short anecdotes, humorous or otherwise, reflecting the whole spectrum of human emotions experienced by expedition members at SANAE as these will give a valuable insight for most of our readers into life in Antarctica.

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