

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 mammalian 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 simul-

taneously 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 goedgeunstelik toestemming verleen om die nuutste kaart van Queen Maud Land, Antarktika om en by SANAE in die *Bulletin* te reproduceer. 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.

SOUTH AFRICAN NATIONAL ANTARCTIC EXPEDITION
 SUID-AFRIKAANSE NASIONALE ANTARKTIESE EKSPEDISIE

EARTH SCIENCE RESEARCH PROGRAMME
 AARDKUNDIGE NAVORSINGSPROGRAM



