

SANAE THREE MOVES IN

by D. C. Baker

THE *RSA* appeared to hover at the entrance of the bukta and quietly slid from view. Our spirits fell to their lowest ebb when we turned round and saw the mountains of supplies which still had to be taken to the base. We remembered the haven of warmth and comfort the *RSA* had been for the 18 days that she had been moored to the ice-shelf while the team from the Public Works Department in Cape Town assembled the vast jig-saw puzzle which was to be the new base.

Our minds flashed back to September of 1961 when most of us met as a team for the first time. For some of us the training period meant a lot of specialised training compressed into a short time, for others it meant bloody fingers from sewing dog harnesses and harassed trips to Cape Town to be shown how the base should be assembled in case the *RSA* had to leave in a hurry.

Finally we thought of when we left Cape Town on the 6th of January, 1962 – the *RSA*'s maiden voyage to

Antarctica. The trip was fairly uneventful except for the mental agony of having to do P.T. "to keep fit" and the agonies of trying to stay awake during interminable, but vital, lectures on the design of the base. We stood by on iceberg watch at night when we started passing the odd loose berg. I doubt whether we would have seen anything, but it gave our team a greater feeling of cohesion. The worst experience was undoubtedly when heavy seas started washing our petrol overboard and we had to work waist deep in freezing water to move the drums into the external passageways in order to lash them down. All the time Captain McNish was extremely patient with us landlubbers and did much to make our stay on the ship pleasant.

After the inevitable delays of being stuck in the ice we finally reached the appointed bukta. The reception committee from *Sanae 2* were taken on board and the ship was used to carve away the dangerous overhang before unloading started.



Another load of supplies arrives at the base and members of Sanae 3 take a break.

The materials for the animal laboratory were the first to go. These had been stored on the heliport and this hut would serve as a preliminary shelter for the PWD team once it was erected. Unloading started at once. We split into two teams who were supposed to work twelve-hour shifts. We found the fuel drums heavy going and Sanae 2 were in stitches over our amateurish attempts to handle them. We gazed with envy at the almost effortless way they were able to pick up these bulky drums and put them where they wanted to. It was to be many months before we discovered the knack.

Time soon lost all meaning for us. We worked till we dropped and then crawled into our bunks only to be woken after an hour or two to start again. Tempers became a bit ragged as we suspected each other of swinging the lead, but after a few days a pattern developed. We all knew that we were extending ourselves to the limits of our endurance in order to get the hundreds of tons comprising the base offloaded. After the initial misunderstanding, no-one was hauled out of his bunk – he deserved his sleep and no-one shirked.

Meanwhile at the base the PWD were working like slaves and gradually things took shape from the South end. The animal lab, balloon hut, diesel shack, dining and recreation area with kitchen, sleeping quarters,

latrine, science hut and finally the emergency power shack. Somehow the right materials appeared at the right time as needed. The PWD had very carefully seen to it that the materials were stowed so that they would be unpacked in the correct sequence.

We were finally able to start on the interconnecting snow passages and part of Sanae 3 was delegated to do this. We spent our time nailing poles and laying corrugated iron sheets over them. We cooked and washed dishes and more dishes. We occupied the bare boards of the sleeping bunks as one occupant after another rose from a dead dreamless sleep. The agony in our finger-joints became almost unbearable. Our fingers were so sore they could hardly be bent, and only loosened up after a few tons of material were shifted. Our gloves took on a permanent clenched shape as the result of the work. Somehow we staggered on and survived . . .

The news that the *RSA* was leaving came as a shock. Captain McNish decided that the safety of the ship and its crew could not be jeopardised any longer and that we should be able to carry on with what we had. There was a frenzied rush to write our last letters and to get our gear off the ship. We finally hoisted the South African flag at the base on the 12th of February and went down to the ship for our final farewells.



Establishing a bulk fuel supply in the south end of the snow-passage.

A disheartening scene which no member of Sanae 3 can forget. Many hundreds of valuable man-hours were spent in clearing the passages, only to have them partially filled up by another storm.



At 5.45 p.m. the same day the *RSA* left.

We loaded up as much as we could and returned to the base to see what we had inherited. Slowly the realisation would come that ours was the first truly South African Antarctic Expedition with our very own base. At this stage only the shell and internal walls of the buildings had been finished. The buildings consisted of prefabricated panels, mostly 4 ft by 8 ft. These panels were actually a sturdy framework clad with marine ply. The open spaces were filled with insulating materials. Metal clasps were provided so that they could be clipped together. The weight of the buildings was distributed over the snow by three sets of spreader boards laid along the length of the huts. On top of these came runners in the same direction and across these heavy beams at 2-foot intervals. The "house of cards" was then built on these beams. The roof had a very slight pitch and was covered with a special rubber sheet. The various buildings were to be connected by passages in which our supplies and spares were to be stored.

The day after the *RSA* left was proclaimed a public holiday and we had a well-deserved sleep till after noon. We started to move supplies from the old Norwegian base at this stage. Lights were rigged in the diningroom to run off the small auxiliary diesel which also powered the blower on the excellent diesel-fired stove.

Water was a constant problem both for cooking and washing. We simply put as many four-gallon tins full of snow as we could on the stove, and by diligent and constant filling, because of the low density of snow, could have as much as 12 to 20 gallons of water with which to cook, bath and wash our clothes. The cooking was divided into four-day turns, and a new skiewie assisted the cook each day. The highlight of the skiewie's day was being able to bath in front of the hot stove at night, even if the other members of the team

were sitting and making small talk in full view of the man in the tub.

Our first Saturday night set the theme for the Saturday nights to follow. This was a social gathering at which a film was shown. A large supply of snacks from the excellent food stores supplied by the Department of Transport was placed on the tables; raisins, a variety of nuts, biltong, etc. and an adequate supply of beer and spirits. We were to refine the technique of thawing out frozen beer in the oven in later weeks, but not until a couple of cans had exploded and lifted the oven door off its hinges.

The first Sunday after the *RSA* had departed we were hit by our first blizzard. Although a storm was always to be expected this one did more damage than any of the others. All our supplies were still in the open and were completely buried. We were to spend many days looking for items and could really have used a metal detector to find the many metal objects buried under a few feet of snow. The after-effects of this one storm were to haunt us until we left. We had to dig ourselves out of the hut after one of the smaller members squeezed through a window and managed to dig the door out. A temporary passage was built between the sleeping quarters and diningroom.

My diary from this point on bears one oft-repeated phrase: "dig, dig, dig". After a while it was possible to identify people by their shovel technique which soon became highly refined to enable the maximum amount of work to be done with the minimum of effort.

About two weeks after the *RSA* had left, the radio-operator started going to the old Norwegian base regularly to receive our radio letters and to send our joint common letters, four or five persons per single group letter.

We started clearing the snow passage. This was back-breaking; we would only just clear it when a new storm would fill it up again. Gradually the walls grew higher as we used the snow that we had dug out to build them up.

Most of our boxes were located from photographs which had been taken before the storm and we were able to establish a bulk diesel fuel store by laying five or six rows of drums on top of each other at one end of the snow passage. By 1st March we had moved over 400 tons from the passages and buildings. Our calculations were probably conservative.

Gradually as work inside the base progressed, the agony of the searing pain in our finger joints started to ease. We were finally able to get mattresses and extra blankets. The sewing machine was unearthed and we were able to start repairing our clothes.

At the end of March and beginning of April we finally wired up lights from the main generators and managed to get our communications going. With the temperatures

plummeting towards -30°C we finally started the meteorological tower. By now we had all suffered from frostbite in various degrees – but fortunately nothing serious.

The outside work came to a halt and we tackled the job of applying fire retardant paint to the inside of the base. No matter how carefully we worked we could not get the stuff to stick to the varnished plywood and only tremendous effort on our part enabled us to complete this job. However, the final finish fell far short of the manufacturer's recommendation.

About this time we were able to start working on our scientific programmes to varying extents. The work on the base would still limit and rule our activities for the rest of the year, but the mere fact that we were able to spend some time on scientific projects marked the end of phase one. Phase two was in fact the scientific work; this was why we had come and it was to enable this work to be done in greater comfort and safety that the Department of Transport had commissioned the new base.

SCIENCE

THE IONOSPHERE

Part 2 – Ionospheric Research at Sanae

To a first approximation, the Earth's magnetic field may be regarded as that of a dipole magnet. However, this magnet should be regarded as being displaced from the centre of the globe towards Vietnam. This results in a very strong magnetic field region in the vicinity of Vietnam and a "weak spot" on the opposite side of the globe viz. the South Atlantic region. The region of anomalously low magnetic intensities is known as the South Atlantic Geomagnetic Anomaly. A consequence of this is that electrons trapped in the Van Allen radiation belts surrounding the Earth are able to penetrate deeper into the atmosphere in the South Atlantic region than elsewhere and as a result would cause more ionization in this region than elsewhere at similar latitudes. Satellite observations have confirmed that large fluxes of charged particles are being precipitated into the ionosphere in the vicinity of Sanae. These regions of high particle intensities are shown in Fig. 1 and it can be seen from this that Sanae is ideally situated to study the effects of this radiation.

South African interest in the Antarctic polar ionosphere began with an experimental programme designed to detect possible effects of corpuscular radiation in the South Atlantic Geomagnetic Anomaly. Whether or not the electrons would interact sufficiently with the atmosphere to produce observable geophysical effects had been a matter for speculation until 1961, when two American scientists, Cladis and Dessher, suggested that balloons carrying X-ray equipment should be launched south of Cape Town to detect bremsstrahlung X-rays produced by bombarding electrons.

Gledhill and Van Rooyen of Rhodes University initiated South African research in this field by theoretically examining the possibility of corpuscular effects. They predicted that there should be observable airglow,

enhanced heating, X-ray and ionization effects in this region. Consequently, an ionospheric and airglow observatory was established at Sanae for the purpose of observing these phenomena.

The first ionospheric measurements were made at Sanae in 1962 by D. C. Baker (Sanae 3) and in subsequent years by:

D. G. Torr	Sanae 4	1963
M. B. Ezekowitz	" 5	1964
D. W. Sharwood	" 6	1965
D. P. Homann	" 7	1966
A. W. V. Poole	" 8	1967
M. H. Williams	" 9	1968
S. Engelbrecht	" 10	1969
D. W. L. Scorgie	" 11	1970
R. Haggard	" 12	1971

A number of papers have appeared on the observations made at Sanae and the results of these will be discussed in the ionosphere articles to follow.

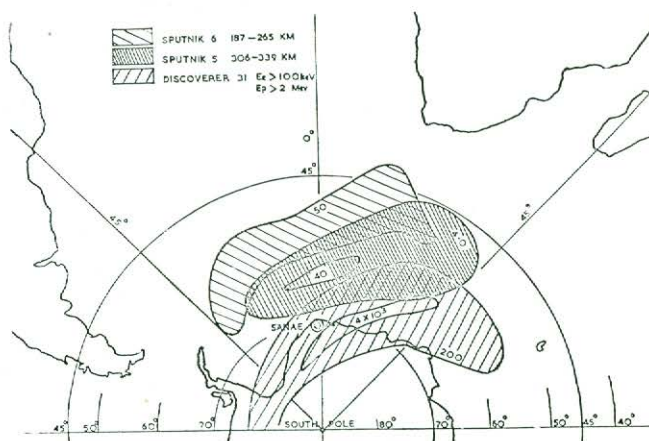


Figure 1.