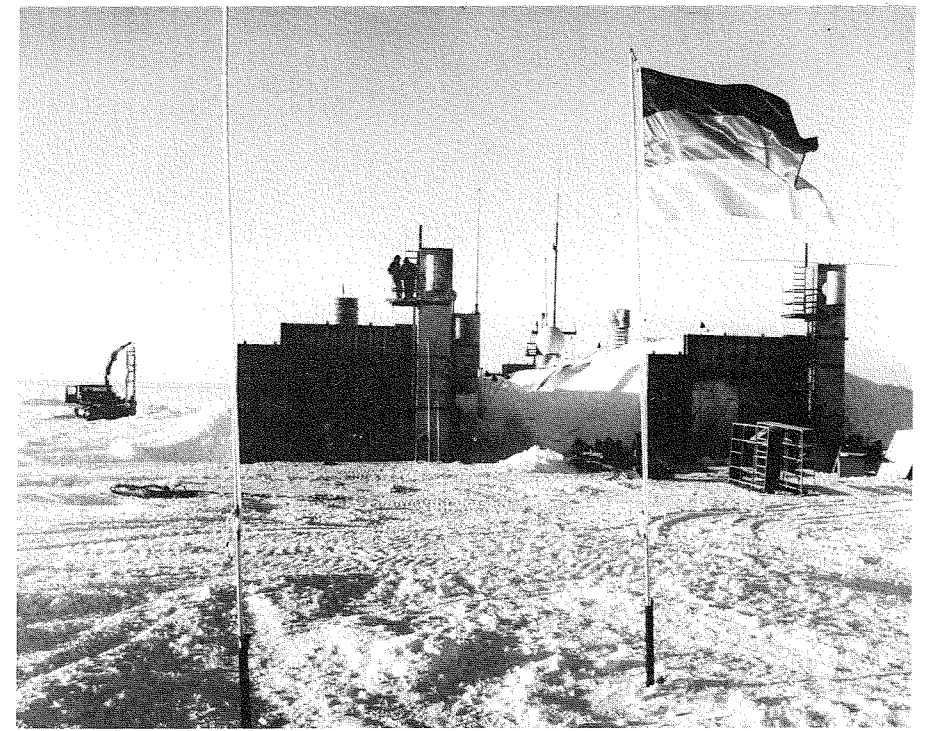


Christiani & Nielsen's Activities in Antarctica 1980-81

BY DIETRICH ENSS

The research station
shortly before the completion



Christiani & Nielsen's Activities in Antarctica 1980-81

Early in 1980 the Minister for Technology and Research, German Federal Republic awarded the contract for the supply and erection of the first German research station in Antarctica to Christiani & Nielsen Ingenieurbau AG, Hamburg (see also CN Post No. 129, May 1980, p. 9).

After thorough planning of all aspects of the project the procurement and construction of all parts and equipment were concluded on schedule and the lot shipped from Germany in November 1980. The erection crew and wintering team followed by air in December, meeting the three ships of the expedition in Montevideo.

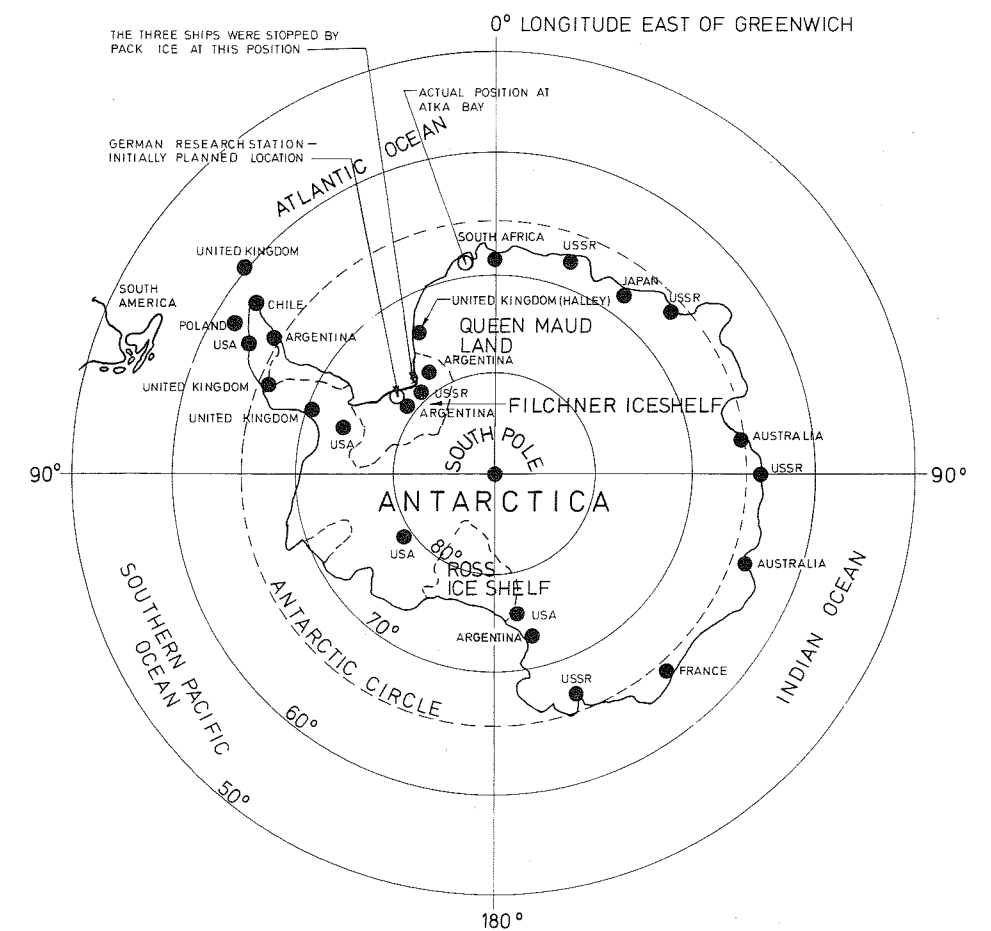
The expedition arrived early in January 1981 in Antarctica where, however, heavy pack ice prohibited access to the planned landing place and forced the expedition to change plans and proceed to an alternative location. Here, a concentrated effort over 6 weeks gave all participants an extraordinary experience characterized by outstanding teamwork and unusual challenges.

The manager of C&N AG, Mr. Dietrich Enss, who personally took charge of the expedition, here gives an account of the final phase of this unique construction contract.

By Dietrich Enss

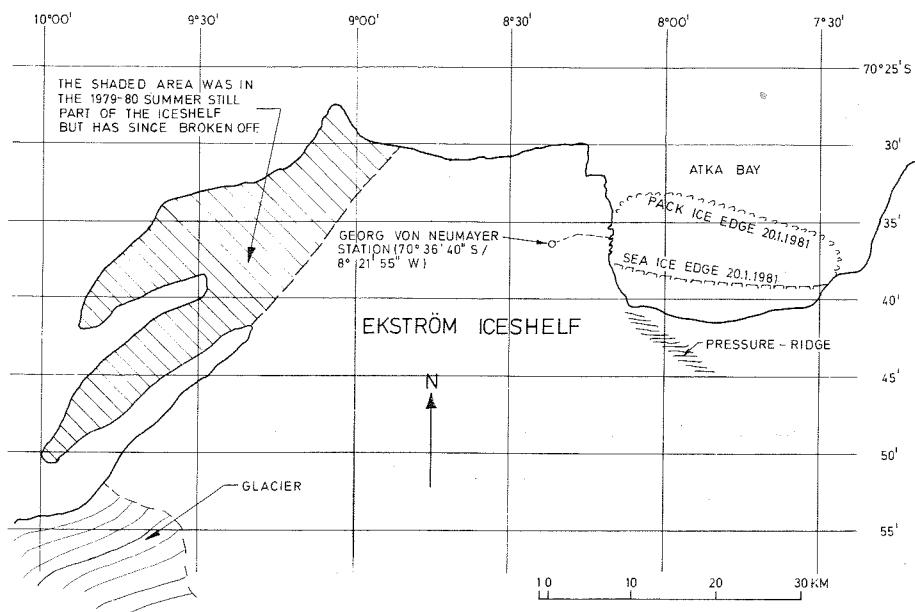
Ice conditions in the Weddell Sea were by far worse this season than last year, but by no means unusual. Our three ships of the expedition, MV Polarsirkel (50 m long, 590 dwt, 2495 HP), MV Titan (77 m long, 1600

Map of Antarctica showing existing stations and the initially planned location as well as the actual position of the German research station



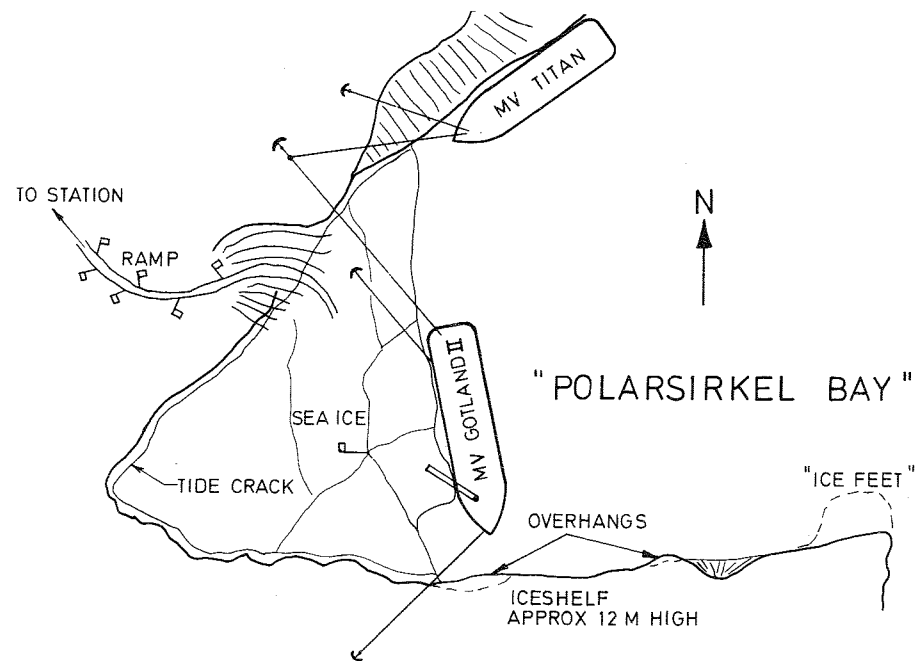


Titan and Polarsirkel as seen from Gotland II off Gould Bay at the Filchner Iceshelf where the vessels were beset by the pack ice



Sketch map of The Atka Bay area

Sketch map of the unloading place in »Polarsirkel Bay« on the west »shore« of Atka Bay



brt, 2 x 8000 HP), and MV Gotland II (91 m long, 2492 dwt, 2670 HP) were beset by pack ice near the British station Halley at latitude 74°24' S for two days early in January, before we could proceed through pack ice covering up to 9/10 of the sea towards Gould Bay at the southern limit of the Weddell Sea. Here, at 77°47'S/43°28'W, heavy pack combined with unbroken fast ice barred our way to the proposed landing place only 90 miles away at the Filchner Iceshelf. Air reconnaissance by helicopter furthermore revealed that a huge iceberg threatened to crash into the stretch of the ice edge low enough for unloading.

The waiting time from 7th through 15th January was easiest to endure for the scientists on board Polarsirkel who could start or go on with their programmes. When no sign of changing weather showed and time ran out for erection of the station at a location so exposed as the Filchner Iceshelf, a decision was obtained from our client, the Minister of Research and Technology, to turn about and try an alternative site – also scientifically surveyed by the previous year's expedition – at Atka Iceport further north, near the eastern entrance to the Weddell Sea.

After reaching Atka three days later we suffered still another delay when freshly broken sea ice filling the bay made access to firm ice impossible. Finally, on 23rd of January, we had succeeded in breaking through with the help of some northerly swell which reduced the sizes of the closely packed floes to pieces weighing between 1,000 and 6,000 tons each. Gotland II was caught sitting astride such a floe unable to move for one night.

Due to some underwater ridges, the ice edge at the west side of the Atka Iceport is not straight but irregular, forming several small inlets usually filled with one year old fast ice until late in the season. After much laborious search for a crevasse-free landing place, Gotland II made fast in the only suitable inlet, and we started unloading onto the fast ice. The term »fast ice« is misleading, however, because soon enough cracks opened here and there caused by wind, tide and current. We kept a close eye on these, bridging gaps too wide for our vehicles and sledges to get across with hatch covers from the ship. Special care was required when we unloaded our heaviest vehicles, two Chieftains of 18.5 tonnes each. One of our helicopters hovered over them with rescue equipment ready while Klaus Obel bravely steered them over the floes and up the ramp towards safety on the shelf ice.

The situation at the unloading place caused much concern. We decided to alter our plans and give top priority to unloading day and night (the polar night is as light as the day), collecting all cargo in a depot some 200 m away from the ice edge. We were only half way through, however, when all of a sudden the floes in the inlet started moving towards the bay, breaking the mooring lines of MV Gotland and sinking our hatch covers. Since we kept one piece of cargo together with one sled and vehicle only on the floes at any one time no losses were suffered here.

While the ships moved out, awaiting a new chance for landing the rest of our equipment, our men on the ice rushed cargo in convoys of two or three vehicles with three to five sledges from the depot to the site some 7.5 kilometers to the west. The route slowly rising on flat surface had been flagged out by the scientists and was later in addition marked with stakes and empty drums.

Unloading was resumed when the floes had left the inlet and Gotland II was able to make fast direct to the shelf ice near our old ramp. This place could be used for getting the rest of our 1,100 tonnes of cargo ashore, although it had to be left intermittently for short periods whenever sea or wind threatened to bump the ship against the 8 m high ice wall. One of our helicopters, a Dauphin 360 C, carrying nine people or 900 kgs of cargo, helped very much by taking off almost all fuels in drums from the ship, some 250 tonnes altogether.

Meanwhile our men on the ice made their first experience with the weather and especially with the drifting snow, which could hamper the sight so much that one could not see the next flag along the route 20 meters away. The drift also covered in minutes all items left unmarked in the snow. When combined with snow-fall or certain other conditions, the so-called »whiteout« occurred, stopping all activities in the open due to complete loss of orientation. We experienced walking into steep walls of snow or falling into trenches during such conditions.

Although 400 miles further away from the pole than the Filchner Iceshelf, weather conditions at Atka are more severe for building a station. There, depressions pass by on their easterly course while they hit Atka, often gaining strength by taking up energy from the warmer sea. The average wind speed at Atka is double that at Filchner Iceshelf, and February is the windiest month. We counted nine days in February with winds of or above force 7 Beaufort and many more with force 6 winds. Snow-fall in February at Atka also occurs with double the frequency.

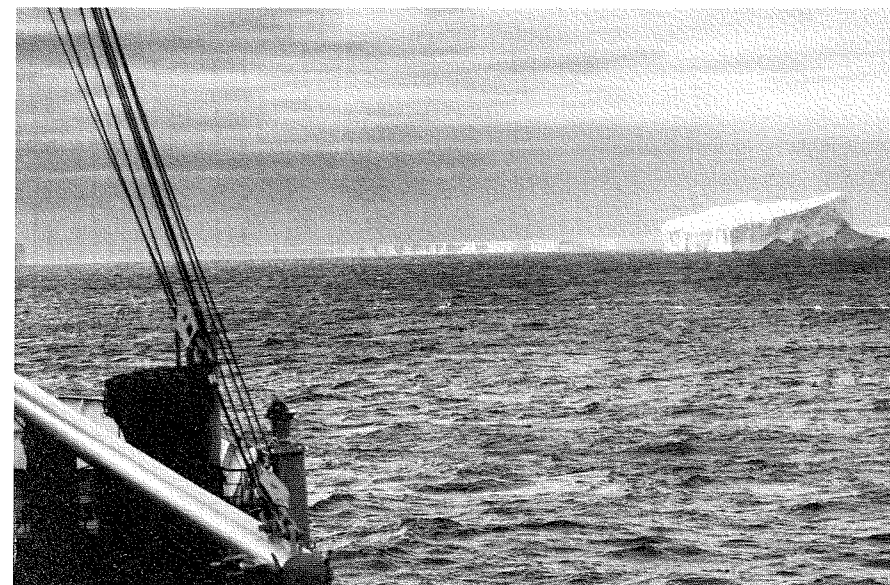
The main wind direction is ENE. All materials placed on the surface for storage should therefore be stretched out in a line perpendicular to that direction in order to be least effected by drifting snow. Even so we could not entirely avoid to dig out equipment and materials after heavy snow-storms. It was astonishing to notice how extremely hard the snow can get when accumulated by drift.

Temperatures range from a few degrees above freezing point to minus 20 degrees in January and February. Temperature alone, however, is of little consequence to working conditions. The combination with winds, usually termed wind-chill, determines whether work and travel are still comfortable or becoming uncomfortable or even hazardous. In our experience at Atka, the limiting factors for outside work were drifting snow reducing visibility to nil and blinding sunglasses and goggles, while only once wind-chill stopped us with temperature down to minus 12 degrees and a force 8 wind.

The snow had one disagreeable property as we were soon to find out: if the tracks of the

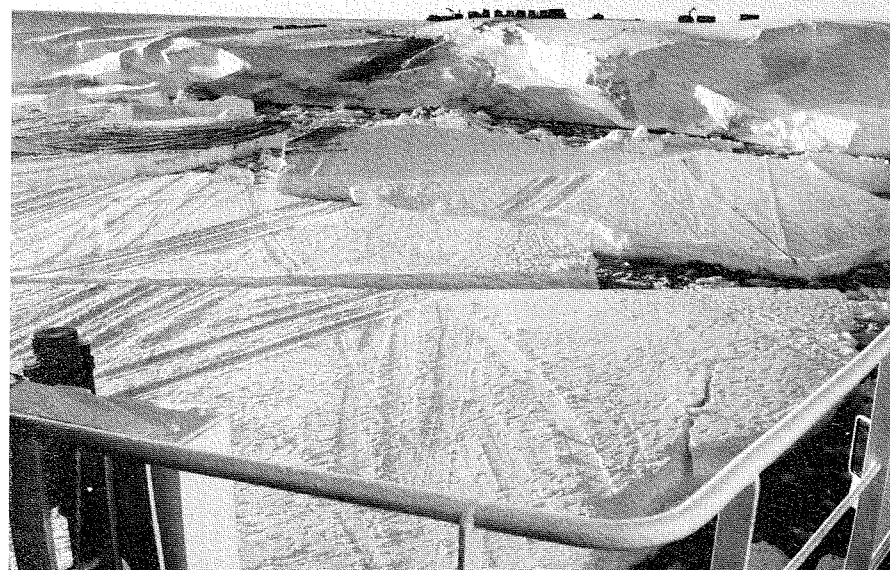


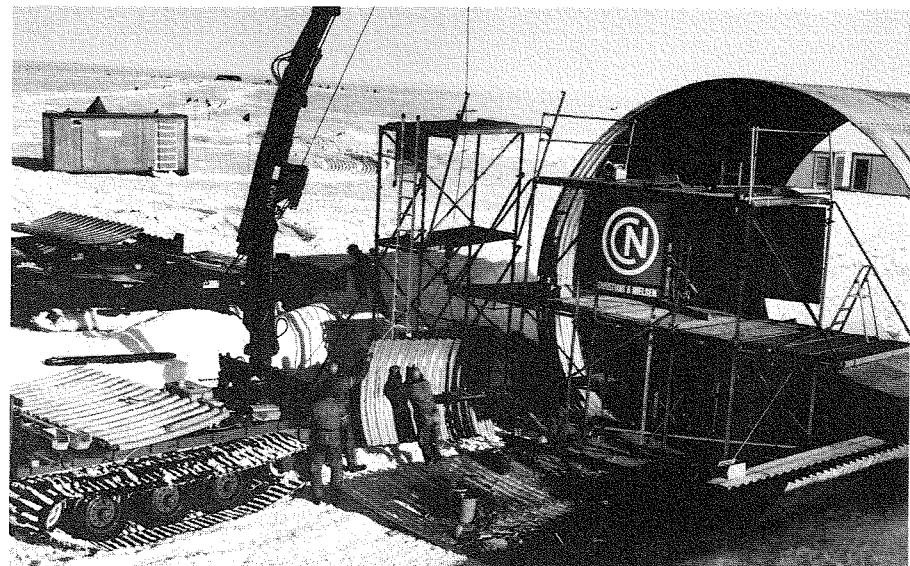
Offloading by helicopter from Gotland II



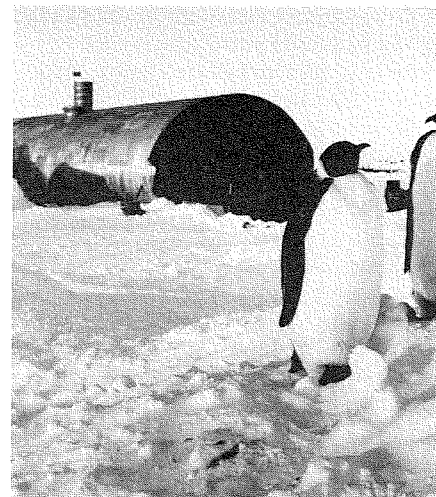
Icebergs in Atka Bay

Sea ice breaking up at the landing place in »Polarsirkel Bay«. The intermediary depot is seen on the iceshelf





Start of erection of the tubes



Visit to station by local residents

vehicles broke through the hard surface of the drifts, the soft snow underneath proved to have no cohesion and this caused the tracks to spinn and the vehicles in turn to come to rest on their »belly«. Assistance from another vehicle was then required to free the immobilized one.

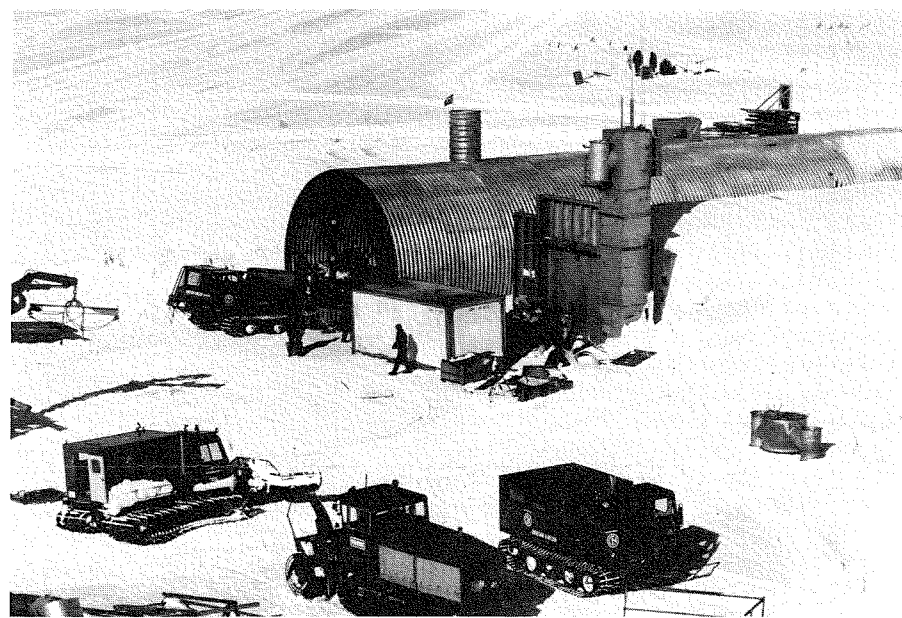
The late beginning, changed and different weather conditions plus difficulties unaccounted for during unloading with necessary change of plans, compelled us to challenge the validity of the contract. This stipulated an unloading and construction time of 45 days including 15 bad-weather days, and severe fines in case of non-fulfillment, viz. to come back next season at our own expense and finish the work. It was agreed with the client to go on as if the contract was still in force and evaluate our qualification in case of delayed or part completion.

Our race against time and weather thus began. It was imperative to get as many of our 34 men to work as soon as possible, although most of them had been signed on because of their special skills required sometime during the building process. Now one could see radio specialists hauling cargo up to the site from our depot and our cook fitting in beams for our construction camp.

The camp was established after 5 days, complete with workshop, power station, snow melter, showers, toilets, sleeping and drying facilities, kitchen and messroom, the latter being »the biggest room for hundreds of miles around«. There were voices claiming that our camp out-did many a station in the Antarctic.

We had a base now from where to press on with the construction proper of the research station, when another blow hit us at a sensitive spot: one of our biggest vehicles, a chieftain of 195 HP with attached 12 tonmeter hydraulic crane, developed engine trouble. Repairs were endeavoured under appalling conditions, but the vehicle had to be given up for the time being, limiting our crane capacity to less than 2/3 of the original.

The mischief had some good effect also. It made our team all the more determined to get through »in spite of all that«. The good spirit was not even broken when a snow-storm in



Research station almost completed

no time blew snow up to the rim of our excavation for the two 50 m long steel tubes which were to give structural protection for the containerized buildings of the research station.

The Armcotube solution consisting of galvanized corrugated steel plates which are bolted together to form a pipe section is a proven design for under-snow structures in both polar regions. As the annual natural accumulation of snow will quickly bury any structure not elevated and jacked up again and again, the main function of the pipe section is to accommodate all pressures exerted by the surrounding snow and ice.

Our »all weather gang« hammering home happily bolt by bolt with their impact wrenches was soon to become the symbol of our sting and stamina. A second team followed on their heels installing the steel girders inside the tube bottom which were to support buildings and wooden platforms. 340 tonnes of steel went into steel constructions, the heaviest parts being the bulkheads, designed to withstand 25 m of snow overburden at the bottom.

Before we could seal off our tubes with

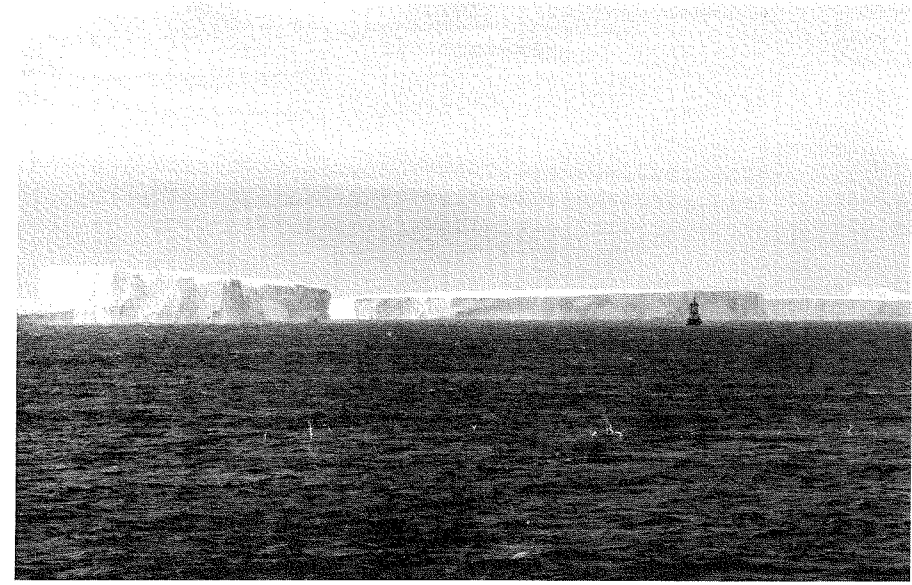
bulkheads, however, we had to bring in the containers which weighed up to 10 tonnes. Since placing them with cranes on our special carriage running on steel tracks along the tube was not any longer possible we resorted to building a steel platform to the side of the tube entrance. Containers were jacked onto this platform from their sleds and from there by help of chain pulleys skidded onto our carriage, pulled to their final position and lowered down.

Only from now on all our specialists could excel at their skills. It was at this time when outsiders would not fathom that all the materials they saw built in or lying about had been carried in one single ship of little Gotland's size. In fact, the organization of transport, storage and distribution of materials was a major task of the whole scheme. We had prepared computer lists identifying all items as regards weights, dimensions, classifications, packings, markings, stowage in the ship, placings in the station, and other relevant information. The files with these lists soon became known as our »bibles«.

As the containers with the power station were brought in first, we soon had »self-



The wintering crew. From the left: Ekkart Müller Heiden, Physician; Matthias Idl, Cook; Friedrich Obleitner, Meteorologist; Jürgen Janneck, Diesel Mechanic; Paul Herbert Hag, Wireless Operator



Close-up of iceberg in Atka Bay

Departure from Atka Bay showing Titan against a back-drop of icebergs

supplied« power in the tubes. A heated sewage pipe of 80 m length had been laid right at the beginning, so that after connecting a few pipes inside the station we could produce fresh water in our melter and hot water in the boiler for the kitchen, bathroom and toilets and dispose of it through the pipe. The snow melter works with surplus heat from the cooling water of our station's diesel generators.

The wireless station was soon established. All antennae are mounted on access- and ventilation-shafts of the station with the exception of a Marisat-antenna in a fibre-glass dome and one shortwave-antenna, which are placed on an extra shaft right above the radio station. From the Marisat terminal in the radio room, telex and telephone traffic are conducted via satellite with extremely good quality of communication being attained.

In order to finish the interior of our second tube we had to dismantle our construction camp and transport 8 containers furnished for sleeping into the tube. This also enabled most of us to move into the station and to a far more protected place.

According to our plans the remainder of

our camp was now to be transported back to the ship while the rest of our work was carried out at the station. In the meantime, however, the weather at the bay had become foul for days on end and the ice edge and inlets were deteriorating fast. Big pieces of ice were permanently breaking off, ice feet (underwater projections) were forming everywhere and swell from the open sea prohibited berthing altogether. At the same time the bay was filling with icebergs floating on irregular tracks due to unpredictable tidal currents.

A decision was reached then, rather to leave the camp where it was and let all materials be taken over by the station. Now all hands could be used for finishing the station. Our Danish ice pilot on Gotland II, Anders Jacobsen, an old hand in these waters, recommended the 5th of March as the latest day for a safe departure. Time was running short, owing to the late start. It became clear that the weather, especially conditions in the bay, would not permit us to make use of the contractual 45 days.

On the 3rd of March, 40 days after we hauled the first load ashore, the »Georg von Neumayer-Station« was completed and ap-

proved of by Germanischer Lloyd. On the same day the Federal Republic of Germany was elected full member of the Consultative Body of the Antarctic Treaty States at Buenos Aires.

Christiani & Nielsen AG, Hamburg under a separate contract is also responsible for manning and maintaining the station for the first year. Our five men to winter at the station, Ekkart Müller-Heiden, Jürgen Janneck, Paul-Herbert Hag, Matthias Idl and Friedrich Obleitner had helped with the erection as much as they could, all the while not knowing whether the race against time and odds would be won. So these brave men were happy and sad at the same time when we left them in the morning of March 4 after everything was ready for their long and lonesome vigil. The farewell could easily have lasted a day or more longer, because a force 8 wind blew and flying our people back on board the heaving ships was still only just possible.

