

From Monastery Nunatak we flew north to Upper Beacon Valley and settled down on a rock glacier that streamed from a narrow source near the top of the headwall and swept down the end of the valley in a long curve that widened to a flat talus on the valley floor. The surface was completely covered with angular fragments of a dark brown dolerite among which stood many large sandstone boulders that had fallen from the cliffs above. Long prisms of dolerite, a cleavage characteristic of basalts, lay side by side like cordwood where they had split apart. Some of the sandstone boulders were streaked with black veins probably of organic origin and possibly fossiliferous, a surmise supported by the lumps of coal intermixed with the broken rock. The sandstone and coal came from the sedimentary strata and black seams visible on the valley walls.

Arena is a small valley five miles east of and parallel to Beacon. We landed on a small hill in the middle of the valley that was paved with doleritic ventifacts, polished and grooved, and colored by reddish desert varnish. A thirty knot wind made photography very difficult but we stayed about an hour while everyone collected souvenirs. We flew home by way of lower Taylor Glacier, Pearse Valley, the Catspaw and Stocking Glaciers, and *then* returned by the same route we had taken on the way out over Ferrar Glacier.

It was New Year's Eve and a large crowd gathered at the Officer's Club for a ~~rowdy and bibulous~~ celebration. Sixty cases of beer were drunk and the empty cans stacked beside the

bar in a huge pyramid inevitably came down in a splendid crash. At midnight, to usher in the New Year, a charge of 3000 pounds of dynamite was to be exploded on the McMurdo Sound ice. The intercom gave a five second countdown. At zero came the flash, followed instantly by a billowing black cloud, then a jolting shock, and a few seconds later the rumbling report. The black cloud drifted slowly north in the light wind, and until the ice moved out days later a large black-rimmed crater marked the spot.

New Year's Day was a holiday with no flying and, of course, the day was bright and windless. A low cloud ceiling over the dry valleys marked the 2nd of January, but in the afternoon I was flown out to the edge of the dirty ice to photograph Emperor penguins and killer whales. On the afternoon of the 3rd, I visited again the Scott and Shackleton huts on Capes Evans and Royds.

The Coast Guard Cutter Glacier had been working her way south through fast ice in McMurdo Sound and was within sight of the station the day after New Year's. Because I was station-bound by bad weather, the Coast Guard Commander at McMurdo invited me on board to watch the ice breaking. He arranged for me to be flown out to the Glacier by one of her Sikorski helicopters. I sat in the co-pilot's seat, more convenient for photography than the passenger and cargo compartment. The ~~obliging~~ pilot circled the ship while I took pictures and then landed on the ice in front of her for a better view. I watched the ice breaking from the foredeck for the rest of the afternoon, had supper in the wardroom, and was flown back to the station in the evening.

The Glacier was clearing a channel to McMurdo Station for the annual return of the supply ship and oil tanker which were expected before the end of January.

Three techniques are used for ice breaking: "scarfing" consists in cutting into the ice at an angle to pry slabs off from the ice edge; "herringboning" involves ramming the ice alternately in parallel tracks to break out everything between; the third method, "railroad tracking," requires two icebreakers ramming the ice in parallel courses. Herringboning was the technique I witnessed. In McMurdo Sound, ice so loosened is carried away on the tide or blown north by the prevailing winds. The hull of an icebreaker has steel bow plates an inch and a half thick and the forefoot, where the keel and stem meet, curves up causing the hull to over-ride the ice on impact. The weight of the ship pressing down breaks the ice off. In heavy ice, when the ship becomes stuck and cannot back ^{away} off, it can often be freed by rolling, which is accomplished by rapidly pumping fuel from tanks on one side of the ship to the other.

As the ship backs away after each attack, the broken ice is churned up by the backwash from the screws overturning many of the pieces to expose the snow-free undersides colored green and yellow-brown by algae and diatoms. Skuas, always alert for a new source of food, are attracted in large numbers. Scarcely has the ship begun to back away than they swarm down onto the stained ice to pick off the organisms attached to the under surfaces. So bold and greedy are they that they continue to feed as the vessel returns to ram the ice until the bow seems

^{over-ride}
^{over-ride}
about to ~~crush~~ them.

On the morning of January 5, the Coast Guard icebreaker Burton Island appeared in the Sound and by evening was working with the Glacier to clear the channel.

[~~By now~~] I had almost run out of helicopter time and was saving what was left for a flight to the area around Cocks ~~Mountain~~ ^{Mount} at the southern end of the Royal Society Range. I was fortunate in being able to join a group of geologists on their trip to lower Taylor Valley where I spent most of the day on Nussbaum Riegel and at Mummy Pond. This was my last excursion to the dry valleys.

In more ways than one, Antarctica is a frustrating place for a photographer. Distances even in the relatively small portion of the continent not buried in ice are so great that to visit the most interesting places in one or two summers requires air transportation. And flying is subject to the vagaries of the most unpredictable weather on earth. To add to the frustration, the more of the continent one sees, the more eager one becomes to visit even remoter places. [~~in the expectation that amazing geological phenomena might be discovered.~~] Moreover, from several hundred feet above the ground, the strangest and most fascinating details of geology are not always recognizable. It was so in Victoria Valley and on Bull Pass; in the former the ventifact paving and in the latter the cavernous erosion could be seen only on the ground for what they are--spectacular. The same is true for ice formations on the lakes and at the junction of land and sea where one is constantly surprised by the varying phenomena

of crystallization. Thus the urge to pursue in form and color the exotic and strange in this pristine frigid land is never satisfied.

At last the weather over the Royal Society Range improved enough to allow the scheduling of the flight to Cocks Mountain on January 8. Joining the flight were the Russian, Dr. Barkov, who was to be left off on Brown Peninsula, and a New Zealander from Scott Base with provisions for a Kiwi camp under Hooper Crag, not far from Mt. Cocks, from which the New Zealanders were exploring the area. The mountains at this end of the Royal Society Range tapered off to the south to become a group of isolated nunataks surrounded by snow and ice fields reaching so high up their flanks that little rock remains exposed. The camp consisted of a group of red Scott type pyramid tents. ~~We~~

cut ~~set down one hundred feet from the nearest tents so that the air blast from our rotor would not affect them.~~ Skis and poles

were stuck in the snow beside each tent, sledges stood near by, and a dog team was chained not far away. The New Zealanders crowded around to unload the crates of provisions and to talk with me and the crew. I told them that I had been sent to Antarctica on a photographic project and that we were headed for Mt. Cocks and the Cocks Glacier beyond. One man said that I should visit Ant Hill, a nunatak near Cocks Mountain, where beautiful examples of sharply folded marbleized limestone could be seen. One side of Ant Hill, he told me, is a sheer wall on which the swirling patterns of the stratified marble are displayed and can be photographed from a helicopter. One can also land on the bare top of the hill for a closer look.

I thanked my informant and asked if he and some of his compatriots would care to fly there with us. Three eagerly accepted, filling the Huey to capacity.

We took off flying south over a widening white featureless plain from which the Koettlitz Glacier originates, passing on our right a chain of ridges and peaks buried to their tops in snow. Ten miles from Hooper Crags the chain of peaks comes to an end at a higher mountain on which much bare rock is exposed. This is Mt. Cocks. From here, stretching across our direction of flight, a group of hills rises above the snow to the east to make a barrier dividing the ice that flows into the Koettlitz Glacier from the flow to the south towards Cocks Glacier which is a tributary of the huge Skelton Glacier. One of the nunataks on this divide, distinguished from the others by its truncated pyramidal configuration, was Ant Hill. One side is sliced away to produce a perpendicular wall on which the convoluted pattern of metamorphosed limestone is plainly visible. Two times we circled the hill and then flew over it to reconnoiter for a landing which we made with ease. Patches of snow filled depressions in the gray twisted limestone. The limestone is veined and banded by a softer, brown stained rock, broken pieces of which ^{littered} ~~strewn~~ the surface.

The marbled limestone was laid down in ancient seas from the myriad skeletons of tiny marine animals. Covered by countless other sediments deposited over ~~a period measurable in~~ millions of years, it became deeply buried in the earth's crust where, subject to enormous geotectonic forces, its

character was transformed. Heat and pressure and sheering forces obliterated the original structure of the sediment and altered its mineral composition from the amorphous carbonates, extracted so long ago by those primordial organisms from the sea, to a harder crystalline form.

We returned to McMurdo late in the afternoon by way of the Kiwi camp and the Koettlitz Glacier. The sun, having circled the northern horizon, was riding low to the southwest over the Royal Society Range, and its rays, refracted by fine snow crystals in the air, produced a hazy prismatic display in the sky above the mountain tops.

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January 15, 1976
 After completing the ice breaking with the Burton Island, the Glacier had gone off for a week to take cores of the continental shelf sediments in the Ross Sea with Dr. Thomas Kellogg for his paleoclimatic investigations. Following this assignment, the Glacier was to proceed to Palmer Station on the Antarctic Peninsula, a distance of 2300 miles around the continent through the Ross, Amundsen, and Bellingshausen seas, a voyage of nine to eleven days, and I was to be a passenger. From Palmer Station, the Glacier was to continue around the peninsula into the Weddell Sea where she would engage in oceanographic research under Dr. Theodore Foster of the Scripps Institution of Oceanography. Dr. Foster and his party had recently flown into McMurdo on a Hercules flight from New Zealand. ⁹On the afternoon of January 15 I boarded the Glacier with the oceanographers and was assigned a berth in the forward officers' quarters where I shared a cabin with Ens. Curtois. Departure, scheduled for

the early morning, eventually took place at ten in the evening. The white mass of Mt. Erebus, gray streaked with outcrops of bare rock through its mantle of snow, rose faintly differentiated from the clear eastern sky. A pennant of smoke and condensed vapors, ethereal yet unchanging, floated north from the crater. I stayed on deck as the ship stood north past Tent and the Inaccessable Islands, the black volcanic cones that lie off Cape Evans, and on past Cape Royds before I turned and went below.

The next morning the ship was sixty miles northeast of Ross Island. The twin volcanoes, Erebus and Terror, much diminished, were still in sight on the southern horizon. This would be my last view of Antarctica until the islands of the Peninsula came into view ten days later. The ship skirted to the west a large mass of loosely packed sea ice into which she occasionally sliced. As we steamed northward the floes became more extensive and reached to the horizon on both sides. By steering to the open water between floes the Glacier was heading more and more to the north. Eventually we established a parallel course, offset to the east. As the ice became thicker, we crashed into floes that we could not avoid, splitting them and driving the fragments apart. Each time we hit ^{the ice} ~~the~~ blow would throw the ship to one side or the other. It was like driving over a rutted road in a truck with stiff springs. Ice breaking is accompanied by thumping and scraping sounds against and along the hull, and by the sloshing of the broken pieces as the bow wave overturned them and exposed the dirty yellow bottom layer of marine algae and diatoms. The progress of an ice breaker

is made by direct attack rather than by the circumvention practiced by wooden ships seventy-five years ago.

The ship's helicopters were dispatched on reconnaissance flights in the afternoon and I went along to photograph. The flight lasted two hours and went sixty to eighty miles ahead of the ship. The sea was covered with scattered floes of snow-covered pack ice varying from acres in extent to a few yards across. These floes, smooth white on top and bordered with pale blue and green ice, lay on the dark steely matrix of a sea flecked with small cakes of ice and whitecaps. From the air all sense of scale disappears and it is impossible to establish a measure of the true dimensions of unfamiliar objects beneath. We flew at 1500 to 2000 feet; the occasional seals we saw were mere specks on the white surface. At 500 feet, the few Adelie penguins ^{seen} ~~we saw~~ ^{were} easily recognizable as they raced away in panic from the sound of the machine.

At thirty miles from the Glacier, we encountered low clouds at 500 feet, a fog-like layer well under the high overcast. We rose above it and continued on over a gray floor of banded clouds looking for holes through which we could descend for a view of the sea and ice. The helicopters kept in constant communication and stayed within sight of one another whenever possible. When it was decided to descend through the cloud cover ~~the~~ helos took ~~a~~ separate directions to minimize the chance of collision. The descent was a sudden severing of all connection with the physical world and an entrance into a gray dimensionless non-world in which the concept of distance was meaningless.

The first thing we saw was the faint outline of an ice edge opposed against the darker gray of water, the snow surface itself being undifferentiated from the surrounding fog. When we broke through the low clouds at 600 feet above the sea, The ice looked no different to me than that which had surrounded the Glacier when we took off. We rose above the fog and turned back towards the ship, both helos flying along together. As we left the low clouds behind we descended again to 600 feet and whenever seals were spotted circled low so that I could photograph them. Except for one leopard they were all Weddell seals. With the door open I became cold in the rubber dry suit which I was required to wear and I was glad to see the icebreaker again, plowing slowly along far below, a small red toy ship.

Tabular icebergs could be seen in all directions on the horizon but few were close to the ship's course. Some of the floes were very hummocky with blocks of ice heaped in wild disorder, probably the remains of pressure ridges produced during the winter, and where these occurred, as well as on the sheer sides of icebergs, blue ice showed through the cover of snow. The blue ice in bergs is denser and older than the sea ice of the floes which becomes mushy during the summer and is easily broken. In fact, the sea ice seems hardly to be composed of ice at all, but rather of poorly consolidated snow. Lying on top of decaying, yellowish ice which extends out from the edge of the floes as an underwater shelf, a white layer of snow perhaps two feet thick curls over this submerged layer. When the ship's wake hits, the white top layer breaks off in long

occurred

start

strips that rapidly crumble and disintegrate in the water.

Days followed, each no different from the last nor marked by interruption of night, with heavy skies low hanging over floes of broken ice that rested immobile on an iron gray sea. Icebergs were all about, both tabular bergs of ice shelf origin and bergs with pointed and lofty tops calved from glaciers. We continued to push northeast to circumnavigate the denser pack ice near the coast, trying to conserve fuel so that more would be available for Dr. Foster's work in the Weddell Sea. To take the shortest course would mean battling thick pack ice through which progress is always slow and wasteful of fuel. Yet the longer way around the ice to the north would also use more fuel because of the greater distance. A compromise between the two routes was therefore sought. During the second night, however, the ice became so thick that the ship had to backtrack to search for open leads. In the morning the ice was still very heavy but with open water developing to the north. The estimation of ice conditions from shipboard is ~~always~~ difficult because the ice ^{always} appears denser on the horizon than close to the ship.

We maintained a northeasterly course of 40 by the compass under an ever gray sky. A twenty knot wind arose out of the east and kicked up whitecaps in the widest leads; otherwise the weather remained unchanged. When we crossed the International Date Line on Longitude 180° on our easterly course we had two Mondays in succession. The next night the sea ice became much reduced and just north of Latitude ^{68° 5} 68°S our course was changed to 90 and shortly thereafter to 100 which was approximately a

Great Circle course for Anvers Island. The thick pack ice that made the continent so inaccessible to sailing ships was at last well to the south. But the gloomy weather continued with further lowering of the monotonous gray clouds reducing visibility and auguring fog. A long slow swell became perceptible, the attenuated seas of the stormy Fifties which have been damped by sea ice below the Antarctic Convergence. Gradually the condition of the sea ice changed from compact discrete floes to brash--small fragments and slush--and isolated cakes. Small rectangular icebergs, dingy gray in the subdued light, rode the horizon to port and starboard and the wind moderated and shifted to the southeast.

On January 19 the Glacier was 970 miles from McMurdo but still more than 1500 miles west of the Antarctic Peninsula. White ice islands outlined with blue-green translucent margins contrasted sharply with the gray sea and gray sky in the changeless antarctic scene where the only visible living things were pelagic birds--buff-winged antarctic petrels and the snow petrel, that pure illusive wraith of the southernmost ice-bound seas. In these cold waters they obtain a living from an unsuspected richness of marine life. They flew by the ship driven by curiosity, singly or in small groups, twisting and turning in the wind, dipping and rising with the air currents.

In the afternoon the wind stiffened to twenty knots, whipping up whitecaps in the open water between the accumulations of sea ice and brash. Poor visibility obscured the icebergs a few miles off; closer ones stood out white against the black water,

and the Prussian blue of the deeper recesses of growlers (small icebergs) from which the snow had been washed away enhanced the sense of an inhospitably cold antarctic.

As the afternoon advanced, the fog ^{thickened} increased. The course of the Glacier, now 110, was taking her back again towards the continent and closer to the pack ice. We sighted larger floes and encountered more icebergs. Gradually the pack and brash ice became so thick that the ship began plowing through them, producing all the sounds of hard ice striking against her hull. The next morning the sky brightened but the fog persisted and even increased approaching whiteout conditions with fine ice crystals in the air. In all directions brash and cakes of ice uniformly covered the sea. A swell ran through the pack raising and lowering it in long slow undulations.

By ten that night the clouds had thinned in the southern sky and the sun shone low above the horizon, a fuzzy white globe. The sky above the sun was streaked with pale pink strato-cirrus clouds and below lay a bank of fog darker than the sea. The sun's faint disc, surrounded by a halo of amber light that faded outward to many times its diameter, was reflected by the ruffled sea between the rafts of ice. About fifteen degrees to the left of the sun and at the same altitude a refractive phenomenon of the atmosphere produced a prismatic display linked to a small spurious sun which was leashed to the parental orb by a golden band.

After the evening meal on the 21st, Captain Gillette announced to the gathered officers and passengers in the wardroom that an

engine room petty officer had been electrocuted when he accidentally touched an open high voltage circuit, and that the course of the Glacier had been reversed for a rendezvous with the Burton Island in McMurdo Sound to transfer the seaman's body for a flight back to the United States. The course to the rendezvous followed a Great Circle and therefore did not retrace our outward route, which had been considerably farther to the north. The effect of the accident was to delay our arrival at Palmer Station by at least six days.

Snow fell during the night, blanketing the ship, and continued to fall in the morning, whipped by a strong east wind. We were running through patches of dense pack ice separated by open stretches of water. Crabeater seals, recognizable by their light colored hair and dog-like muzzles, were much more numerous than on the outward trip. As the ship approached a sleeping seal, the seal would raise its head to stare in [apparent] bewilderment at the monstrous object bearing down on it and would wait until the last minute to plunge into the water. Adélies in groups of a dozen or more stood on the ice pans curiously watching our approach but hurried away when the ship loomed over them. Snow petrels were abundant and for the first time I saw arctic terns, indistinguishable in breeding plumage from antarctic terns, but these were wintering birds from the northern hemisphere and their bills were black. All day we drove through an ice-covered sea under a white sky. From below decks, ice scraping along the hull sounded like surf on a gravel beach.

When I awake in the morning, the ship was not moving. I

thought we had reached our rendezvous point. It turned out, however, that we were beset in a polinium--a body of water surrounded by pack ice--and were still 390 miles from the meeting place. The ice surface was very irregular. Smooth, snow-covered areas were fenced in by ridges of upended blocks and hillocks of ice of considerable height, indicating a recent condition of extreme lateral pressures. Frozen into the pack ice that surrounded the small pond in which the ship was trapped were icebergs in all directions, large and small, some flat-topped and others bizarrely shaped in jagged peaks. Extending around three-quarters of the horizon, a narrow yellow band cast a brighter light on the distant bergs, indicating clearer skies not far away. When momentarily struck by a shaft of sunlight, the peaks of ice lit up as though illumined from within.

A helicopter carrying the Executive Officer was launched to reconnoiter the ice pack. On his return, the Officer was able to guide the ship through an escape route he had discovered. He described the situation as like being lost in a maze; the way out could be found only from above.

The next morning the Glacier was again dead in the water, but this time we had reached the designated meeting place within sight of Erebus and Terror on Ross Island--a view that ten days before I had expected never to see again. The sea was glassy and the sky cloudless. Since the Burton Island had not left McMurdo to meet us, our helicopters were dispatched to the station with the body of the seaman. As soon as they returned

we got under way again for Palmer Station.

The weather was much improved, sunny and warmer with a light southerly breeze that had cleared away the ice. But by evening we had again entered heavy pack. The density of pack ice is rated in octas; an octa is an eighth of a square mile. A rating of eight octas means that the sea is completely covered with pack, and four octas means half covered. The ice density was estimated as four to five octas but increased until the ship was threading narrow winding leads. The weather, however, remained fair, the pleasantest it had been since we first left McMurdo on the 16th. The following day was brilliant with ice floes and icebergs on all sides, and the ice pack condition had improved to one or two octas. The colors were more varied than on any day so far. The low sun was so dazzlingly reflected from the small waves that ~~we~~^I could not view it directly. The wrinkled navy blue sea was streaked with darker horizontal facets and speckled with pieces of ice and occasional breaking wavelets. Icebergs, mostly tabular, rose black against the sun whereas those facing it in the opposite quarter were a glaring white. The snow cover on the floes and on the sloping sides of the icebergs was lavender pink; hollows in the snow and under the ice blocks on old pressure ridges were a deep ultramarine blue; and the underwater extensions of the floes where they were washed by waves were a pale blue-green.

Good days are the exception in the seas that surround the antarctic continent and rarely succeed one another. It was no surprise, therefore, when low gray clouds returned with a near

zero ceiling reducing visibility intermittently to a few hundred yards. Now and again for a tantalizing moment the clouds would clear to uncover a pallid northern sun.

80. insert These seas are the feeding grounds of petrels, penguins, and seals, and an occasional whale which gives notice of its presence with a plume of vapor when it rises to breathe. The commonest birds are the ubiquitous antarctic petrels and the pure white snow petrels that flit and swoop like large swallows over the ice floes where, when they alight, they vanish. Other petrels less often seen are the southern giant fulmar and the ~~diminutive~~ white-rumped Wilson's storm petrel, the little bird that appears to walk on the water as it pats the waves with its broad webbed feet. One day a flock of ten to fifteen antarctic petrels fed on the sea beside the ship, fluttering and snatching food from the surface. Sometimes the birds alighted on the water and dove immediately, only to emerge a moment later. The flock moved along while feeding as though following a school of krill. I also saw larger flocks of many hundreds that milled about over the ice floes, on which other petrels were resting, in such great numbers that when they all took flight together, presenting to view ~~their~~ white under-plumage, they became a filmy cloud, evanescent as a puff of snow.

The ice condition was extremely variable. For a while the sea was covered by smooth-topped polygonal rafts of decaying sea ice separated into floes by a network of narrow channels of open water. Many seals--crabeaters, Weddells, and a few leopards--lay on the larger floes and from time to time groups of Adélie and

The Antractic Sea that borders the polar continent between Cape Adaire and the Antarctic Peninsula is arbitrarily divided for the convenience of geographical description into regions named for three famous explorers, Ross, Amundsen, and Bellingshausen.

Emperor penguins slid past the ship on smaller floes. When a hazy sun shone through a break in the clouds it cast a yellow tint on the metallic sea between the pans of ice.

Later that day we left the ice behind and ran for many miles through an ice-free sea. Then we came to more sea ice-- circular pans like enormous lily pads with turned up margins-- and then to larger cakes with much brash filling all the spaces between. On open stretches with a sheen like pewter new ice forming in thin brittle plates that advanced in curving bands acted as a shield against the wind, the way oil poured on water smoothes the waves. With a cross swell undulating it at random, the surface looked like metal, then like silk, constantly changing. Icebergs were always in view. //

81. insert

The low gray overcast was illuminated from below, evidence of heavy pack ice on and beyond the horizon, for most of the sunlight that filtered down through the clouds ~~was~~ reflected back by the white surface of the sea ^{so that we saw} ~~and~~ a white band, called ice blink, ~~in~~ along the horizon. In contrast, over open water the cloud cover shades from pearly gray high in the sky to a dark band on the horizon where the slanting rays of light reach the observer through a greater thickness of cloud.

Sometimes these effects are seen in juxtaposition where an ice floe beyond the horizon ends and the ice blink is abruptly replaced by a dark strip. Where the clouds are very low and the sea is completely covered with pack ice, the reflection from the surface produces whiteouts in which light, direct and reflected, is scattered by ice crystals in the air.

Low gray overcast gives evidence of the ice condition on the horizon. Over open water the cloud cover shades from pearly gray high in the sky, where light from above penetrates directly, to a dark band on the horizon where it touches the sea and where the slanting rays of light reach the observer through a greater thickness of cloud. When, however, pack ice covers the sea beyond the horizon, most of the sunlight that filters down is reflected back by the white surface, illuminating the clouds from below. Then a white band replaces the dark one along the horizon and is called ice blink.

On January 30, we had regained the distance lost by retracing our course, but we were still more than 1500 miles from Palmer Station, cruising along in the Amundsen Sea 200 miles from the coast of Marie Bird Land. Since we were north of the dense sea ice we encountered only loose pack and intermittent patches of brash, but icebergs continued to be numerous. The temperature was well below freezing and ice formed on the lee side of ice rafts where the water was unruffled. Once new ice is established the thin sheets ^{CAN} spread along the surface ^{to give} giving the sea that quality so suggestive of silk or metal. It seems certain that the freezing I observed did not presage the advent of winter, but was rather a transitory phenomenon which could take place at any time during the summer when the temperature drops below freezing. Sea water ~~probably~~ does not begin to freeze in earnest until March.

Occasionally we passed close to an iceberg and could see down through the breaking waves to its submerged blue wave-washed foundations. The great majority of bergs are white, but once in a while we would see one composed of the older, harder ice that is entirely and intensely blue, not simply blue below the water and in wave eroded caverns. The blueness of pure dense ice is said to be due to dissolved air under pressure which escapes with a crackling sound when pieces are placed in water.

The heavy overcast stayed with us for the early days of February and fog was an imminent possibility as well as a frequent presence. Visibility could suddenly decrease to a

quarter of a mile or less as the ship entered a bank of sea fog, and then as quickly increase when the ship emerged. In this tenebrous atmosphere where objects were not sharply defined, judgment of distances and sizes of objects was uncertain. Icebergs loomed up unexpectedly close when they had been thought farther off, or turned out to be more distant than supposed. The officers on the bridge kept careful watch for icebergs by radar. On February 3, the ship's position was 68° 49' S latitude and 102° W longitude, 970 miles from Palmer Station on Anvers Island. The nearest land was Cape Petersen more than 200 miles due south. At this latitude and time of year the sun set briefly. Darkness was never complete, but the twilight was often greatly prolonged by fog.

During the night of February 4, we passed fifty miles north of Peter I Island, named for the Russian Tsar by Bellingshausen. Peter I Island has rarely been seen and ^{seldom visited} ~~no men are known ever to have set foot on shore~~. Shrouded in fog and encircled by icebergs and impenetrable ice pack, the island is unapproachable. Reputedly a home for penguins and antarctic seals, from the sea. ^{the} twelve mile islet lies in the Bellingshausen Sea 270 miles north of the uncharted and unmapped Eights Coast of Antarctica and more than 400 miles west of Palmer Land on the Antarctic Peninsula.

The Executive Officer had offered the day before to have the helicopters fly me and another passenger to Peter I Island to see and photograph it and, weather permitting, to land. Naturally I was excited and eager to go. The helicopters took off in the morning heading south by west towards the island which

was now astern ~~and~~ sixty miles away. After we had flown about twenty miles the sea became obscured by clouds which continued to thicken until the pilot decided that a view of the island would be unlikely and to land impossible; we turned back towards the Glacier. ~~[My hope to be with the first party to set foot on Peter I Island was dashed; it was a great disappointment.]~~ As a consolation program the helicopters circled for an hour over the ice floes for us to photograph and make a count of seals. We saw a great number of all three common species of seal and, according to my fellow passenger, one rare Ross Seal. That there were so many seals intimated a very large population around Peter I Island.

As the Glacier continued her eastward course that day and the next, floating ice thinned out and finally disappeared altogether. The wind increased steadily from the northeast until we were bucking a forty knot gale and the sea was white with breaking waves. The ship pitched sluggishly into the onrushing seas, throwing spray high over the bow and bridge superstructure. Low stratus clouds added to the stormy scene. ? My only ^{Solace} ~~comfort~~ was the birds that had increased greatly in number and kind as we neared the Antarctic Peninsula. Flocks of Cape Pigeons flew past, wheeling and gliding in the troughs of waves; albatrosses appeared, both the gray-headed and wandering, and many southern fulmars in the dirty gray plumage with dingy wing margins that contrast with whiter primaries, giving them that rather undistinguished appearance of northern gulls soiled by industrial pollutants.