BLACK ICEBERGS

ANDRÉ VAN DER MERWE, SANAE I

During a recent visit to London I had the pleasure of a lengthy interview with Sir Vivian Fuchs, Director of the British Antarctic Survey. He is more generally known as the leader of the Trans-antarctic Expedition which made the first crossing of the Antarctic continent during the summer of 1957-58.

During our discussion I raised the matter of black icebergs which the R.S.A. encountered on its voyage to the Belgian base and on its return from SANAE at the beginning of 1967, when I again visited Antractica. Their origin and composition still seem to remain a puzzle, as it also appears from the comment by Dr. Swithinbank which is contained in a letter from Sir Vivian. Owing to the terrific rise and fall of the waves (± 24 ft.) against these bergs in the open water, it is hazardous to attempt to collect specimens from a boat. Contact with helicopter might be feasible.

I submit copies of the relevant portions of my letter to Sir Vivian, in order to give the precise locality of these bergs, and his reply.

"26th April, 1968.

"I promised to send to you copies of the photos of black icebergs which we encountered on our trip to and from SANAE-base at the beginning of 1967.

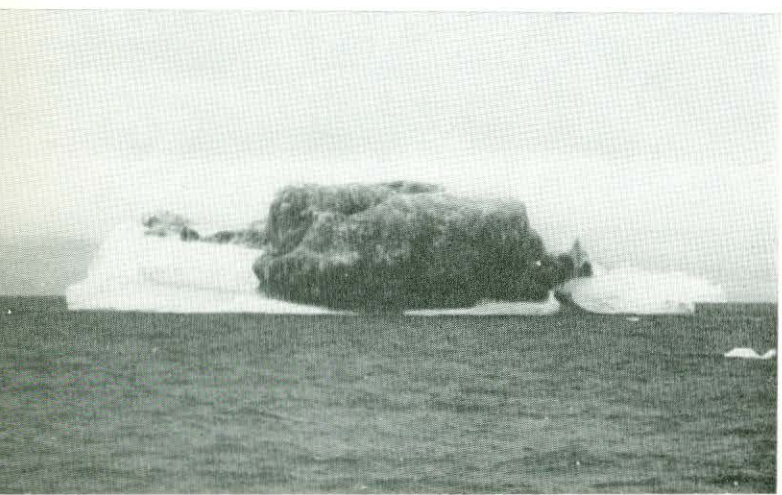
"Unfortunately we found all of them in open water so that there was no chance of getting specimens for closer examination and analysis. We can, therefore, at this stage only guess at their composition.

"Mr. Dirk Neethling of Geology in Pretoria also saw some black bergs on another occasion and ventures the thought that the black colour might be due to increased density. I, not being a geologist or a glaciologist, venture the theory that the discoloration may be due to chemically decomposed plankton. What is remarkable is the sharp demaracation line between white and black in some of the bergs.

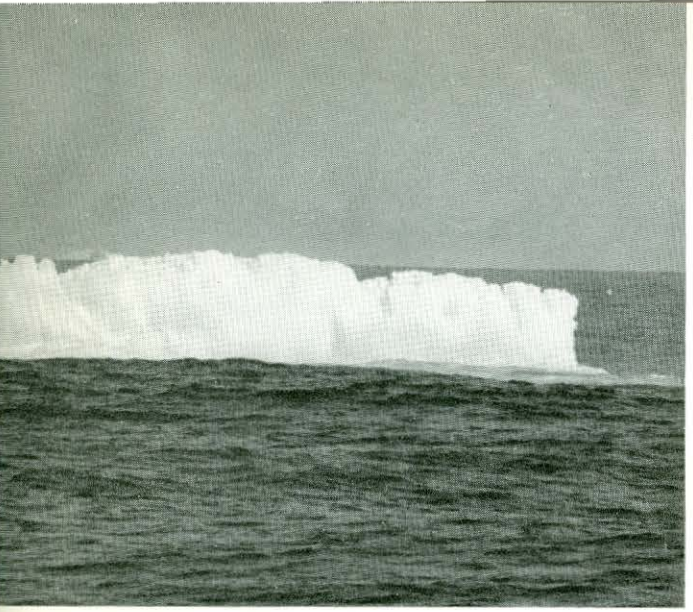
"The bergs of which I enclose photos (the black one and the one with stratification) were found between 47° 35′S, 8° 54′E (water temperature 7.6°C, air 5.4°C) and 47° 14′S, 9° 16′E (temperatures 5.5° and 4.5°C respectively) on 13th February, 1967.

"On our way down south towards the Belgian base we also spotted a partially black iceberg at 59° 25′S, 25° 10′E (water temperature 0.5°C, air 1.0°C). It was flat on top and round with a black eastern face. Wherever we found the black bergs there were white ones around. In the vicinity of the latter black berg we passed a smallish one with bright green peaks.

"One photo shows a berg with a solid rock in one of its faces."



Black iceberg.



Discoloured iceberg with stratification.

Sir Vivian Fuch's reply: "1st July, 1968.

"I am sorry to have been so long in replying to your letter about the black icebergs. Because I myself did not feel I knew enough about the subject I passed your letter and photographs to Dr. Swithinbank who looks after our glaciological programmes.

"The following is a copy of the note he sent me and you will see that in fact very little is known about this phenomenon.

"It would certainly seem desirable for any of our ships, which observe such icebergs, to bring back samples of the white and black ice.

"I have done no work on black icebergs and I do not know anyone who has, though they are not very uncommon and there are many reports of such sightings in the literature. Samples held in the hand have been reported to consist of clear bubble-free ice, providing a conspicous contrast with the white bubbly ice of which most antarctic bergs are made. Until someone takes home a substantial and representative piece and subjects it to chemical analysis (organic and inorganic), all suggested explanations are no more than guesses.

" 'I have two alternative guesses. The first is that the black ice represents what was formerly a layer in an ice shelf or iceberg tongue that became soaked with sea water and then froze. This would account for the clean ice above and below the black ice, since brine-soaked layers are believed to be of only limited thickness (Ref.: *N.Z.J. Geol. & Geophys.*, Vol. 10, No. 2, May, 1967, pp. 484-97). The icebergs calved from the ice shelf have later capsized, so that the layer of black ice may be at an angle.

" 'The alternative is that the black ice represents what was formerly water at the bottom of the ice sheet (Ref.: *Antarctica Journal of the United States, Vol. III*, No. 2, March 1968, p. 51). This would explain the occasional association of rocks and rock flour with the black ice, for the water refreezes before the ice reaches the edge of the ice sheet. The fact that there is white ice not only above but also below the black ice would then have to be explained by the refrozen layer overriding more stagnant ice at the edge of the ice sheet. This is known to occur whenever such a process can readily be identified, that is to say where the ice sheet terminates on land.' "

Signed V. Fuchs.

This photograph illustrates the difference between a black iceberg (see left facing photograph) and a Moraine iceberg which contains a solid rock in one of its faces.