America is a significant source area for a portion of the lutite sediment being deposited in the Argentine Basin. Since the discharge of suspended matter into the Atlantic by river systems draining the northern part of the Argentine land mass is much greater than those in the south, and because the transport path across the continental shelf is generally shorter than in the south, it could be assumed that suspended mineral matter is carried across the shelf and is available for transport to and deposition in the northern part of the Argentine Basin. A systematic study of suspended matter in Argentine continental shelf waters north of 48°30′S., collated with quantitative physical samples from the AABW entering the basin, would enable an acceptable estimate of the relative contributions of lutite from Antarctica and South America.

On the basis of mostly unpublished data from Lamont-Doherty Geological Observatory, Ewing *et al.* (1971) emphasize that major sediment sequences are adjacent to continents, suggesting that continents are major sources for the sediment. They also believe that there are no exceptional sediment accumulations near Antarctica, which suggests that the southern continent has been a major source of deep-sea sediments. Based on these ideas and calculations from assumptions on possible suspended loads carried by the AABW nepheloid layer and probable residence times for the sediment, Ewing *et al.* (1971) write that if the major source of the sediments in the Argentine Basin is South America, then the fraction brought in is about half or less of the total (if the assumed residence time of 1 year is correct). No factual data on quantities of suspended matter present in waters were presented, either of total suspended matter or of inorganic and organic contributions to the total.

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Diatoms in a phytoplankton sample from the 1907-1909 British Antarctic Expedition

GRETA A. FRYXELL *and* SAYED Z. EL-SAYED
Department of Oceanography
Texas A&M University
College Station, Texas 77843

In 1907 Sir Ernest Henry Shackleton (1874-1922) commanded *Nimrod* on an expedition to Antarctica. The ship was loaded to capacity and had only about a meter of freeboard when it left Lyttelton, New Zealand; it was too small to carry all the provisions needed for the expedition, including coal for the journey to the Ross Sea and back to New Zealand. So Shackleton hit upon the idea of having a steel-hulled steamer, *Koonya,* tow *Nimrod* as far as the Antarctic Circle (Fisher and Fisher, 1958). One is reminded of his statement, "Difficulties are just things to overcome," as quoted by Fuchs (1975). The party wintered over after *Nimrod* left the Antarctic for New Zealand on 22 February.

On 20 August 1908 the British Antarctic Expedition took a phytoplankton sample from 50 to 80

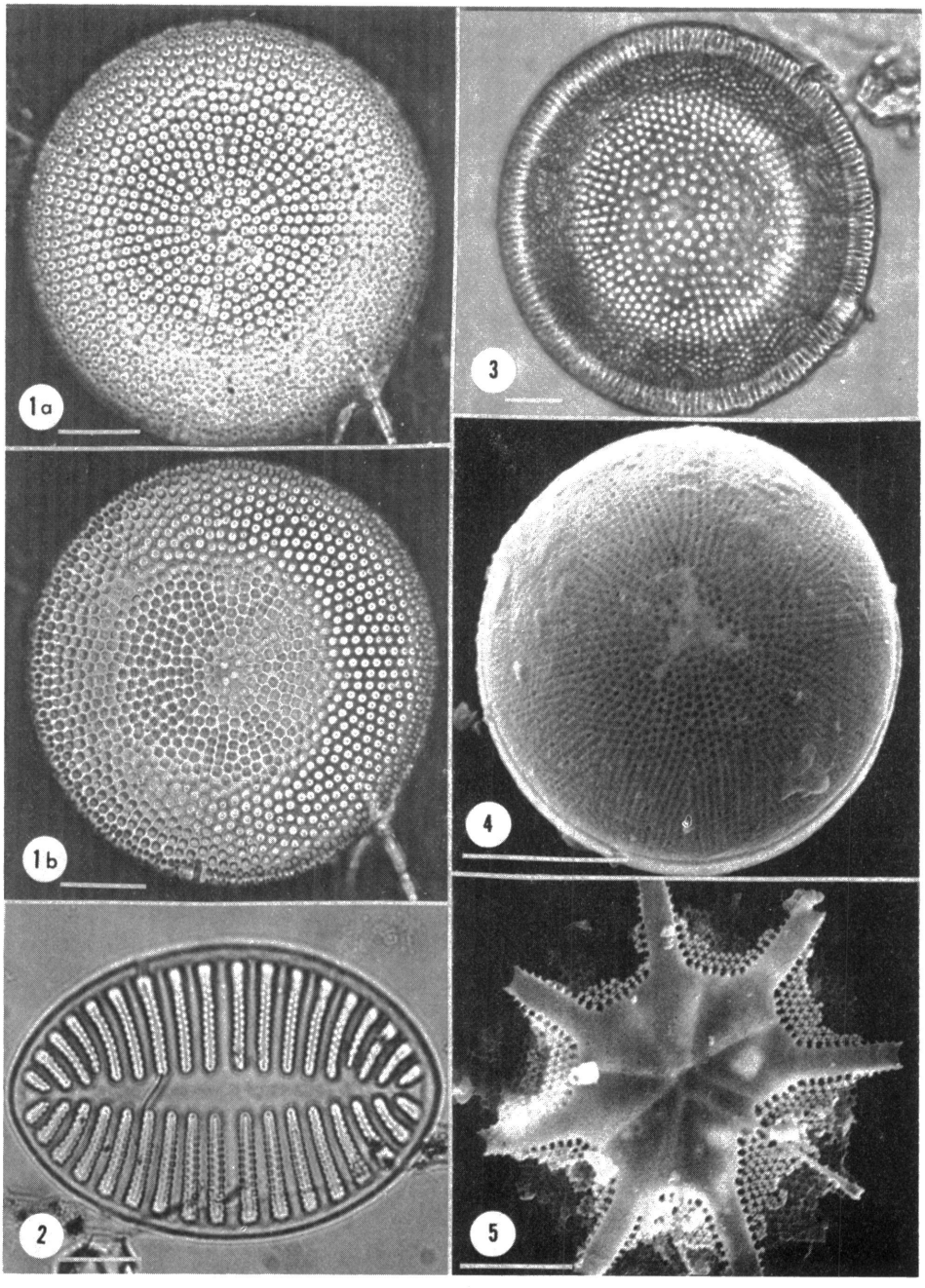

Figure 1. *Coscinodiscus lentiginosus,* phase contrast in light microscope (LM). a. High focus. b. Low focus. Note lighter "areolae" within radial rows that are really strutted processes, and also slit at 6 o'clock position on valve marking broken labiate process. Figure 2. *Cocconeis fasciolata* bright field in LM. Probably a benthic form. Figure 3. *Micropodiscus oliveranus* bright field in LM. Wide margin and areola pattern evident. Figure 4. *Coscinodiscus furcatus,* scanning electron microscope (SEM). The girdle bands still are in place on cell. Figure 5. *Asteromphalus hookeri,* SEM, central fragment of valve, showing hyaline rays and a few areolae. (Scale = 10 microns.)

fathoms in Cape Royds, Ross Island. The sample is now in the Smithsonian Institution. Although it was full of detritus, it was completely dried out and is quite well preserved. A portion was cleaned of organic matter so that the diatom morphology could be studied (Hasle and Fryxell, 1970) and examined in light and scanning electron microscopes. Permanent slides were mounted in Hyrax and are now in the Smithsonian Institution and on file at the Department of Oceanography, Texas A&M University. Another sample, in addition to the one from Cape Royds, was apparently taken during the *Nimrod*'s return to New Zealand, and at least one microscope slide is also at the Smithsonian Institution (Fryxell and Hasle, 1972.)

Cape Royds (77°33′S. 166°09′E.) is in McMurdo Sound on the flanks of Mount Erebus on Ross Island, and probably consists of three kenyte (alkaline lava) flows (Treves, 1962) that are partially covered with volcanic agglomerate and lithic tuff, which form a very rough surface when not covered with snow and ice. Starting on 12 August 1908, Shackleton and some of his men took a sledge trip across Winter Harbour, passing close around Cape

Armitage and getting back to Hut Point before a blizzard sprang up. The conditions they found convinced them that they could not rely upon motorcar as they had originally hoped. According to Shackleton's notes (Shackleton, 1909), they returned to Cape Royds on 22 August, the first day that the sun appeared above the horizon.

From its date, the sample under study must have been taken by the party that was left behind at Cape Royds during this time. Fuchs (1975, page 15) relates that Shackleton "chose men for their cheerfulness; he looked for a sense of adventure, and particularly for strength of mind. It was plain that during the expedition this then unusual way of selecting and employing his party was enormously successful." It is also plain that Shackleton and his men appreciated the value of scientific collections.

There is no note in the accounts we have studied concerning how this sample was taken, although the depth listed on the bottle suggests that it was either a net haul or a bottom sample. Because of the abundance of *Coscinodiscus lentiginosus* (figures 1a, 1b), it might be a bottom sample, or the net touched the bottom, in view of the findings of Kozlova (1966) that this antarctic species is more plentiful in the sediments than in the plankton. *C. lentiginosus* is misplaced in this genus and will be transferred to *Thalassiosira* elsewhere (Fryxell, in preparation). Carbon replica work done by Hargraves (1968) indicates clearly that the processes scattered over the valve within rows of areolae are strutted processes, which are not found in the genus *Coscinodiscus* (Fryxell and Hasle, 1974) but are typical of the genus *Thalassiosira* as well as some other centric genera.

Some of the species present (for example, *Thalassiosira tumida* and *Charcotia actinochilus)* are typical of the phytoplankton. Other species, including *Cocconeis fasciolata* (figure 2) and *Trachyneis aspera,* are usually not found in net hauls from antarctic cruises. It seems reasonable to assume that some sort of net or grab was fashioned from available material and dropped through a hole in the ice until it touched bottom. It was meritorious that the Shackleton Expedition, whose goals were mostly those of exploration, used some of the limited materials they could bring on the *Nimrod* and their time to take scientific samples.

The two most plentiful species in this sample are probably *Coscinodiscus lentiginosus* and *Micropodiscus oliveranus* (figure 3). Both species have valves showing considerable variation in structure, and the heavier frustules may well be resting states. *Coscinodiscus furcatus* (figure 4) is shown in excellent condition; some diatoms, such as *Asteromphalus hookeri* (figure 5) were broken or showed signs of dissolution. We cannot determine whether these incomplete valves resulted from the season of collection or from the years of preservation.

When this sample was taken the austral night was just drawing to an end. Most antarctic field work is done during the austral summer, and most of our collections therefore are summer samples. The problem of what phytoplankton are present and how they survive during the harsh winter is rarely explored. This winter sample, taken after months of darkness, thus has scientific as well as historic interest.

The following diatoms were found in the sample taken by the Shackleton expedition on 20 August 1908:

Acnanthes brevipes var. *angustata* (Grev.) Cleve
Asteromphalus hookeri Ehrenb.
Charcotia actinochilus (Ehrenb.) Hust.
Cocconeis fasciolata (Ehrenb.) Brown
Coscinodiscus furcatus Karst.
C. lentiginosus Jan.
C. oculoides Karst.
C. tabularis Grun.
Eucampia balaustium Castr.
Melosira sol (Ehrenb.) Kütz.
M. sol var. *omma* forma *polaris* (M. Per.) Mang.
Micropodiscus oliveranus (O'Meara) Grun.
Navicula criophila (Castr.) DeToni
N. subantarctica Freng.
N. lyra var. *dilatata* A.S.
Nitzschia curta (Van Heurck) Hasle
N. obliquecostata (Van Heurck) Hasle
N. ritscheri (Hust.) Hasle
Porosira pseudodenticulata (Hust.) Zhuse
Thalassionema capitulata (Castr.) Hust.
Thalassiosira oestrupii (Ostenf.) Hasle
T. tumida (Jan.) Hasle
Trachyneis aspera var. *intermedia* (Grun.) Cleve
Triceratium arcticum Brightw.

Also present was the silicoflagellate, *Distephanus speculum* (Ehrenb.) Haeckel, common in antarctic plankton.

We thank Paul S. Conger, Smithsonian Institution, for his aid in locating and obtaining the material for study, Leilani D. Creek for her careful preparation of the sample for microscopy, and Ann Dreyfus with her assistance with the plates.

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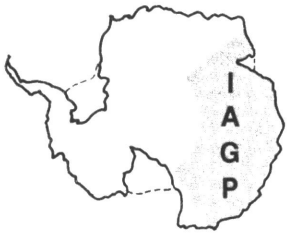
Newsletter 5

International Antarctic Glaciological Project

The International Antarctic Glaciological Project (IAGP) coordinating council held its sixth meeting 3-5 September 1975 at the Laboratoire de Glaciologie, Grenoble, France. C. Lorius (France) chaired the meeting; other council members present were W. Budd (Australia), J. Vaugelade (France), D. Drewry (for G. Robin, United Kingdom), C. Bentley and K. Moulton (United States), V. Kotlyakov (Soviet Union), and U. Radok (secretary). Observers were V. Morgan (Australia); J. Bloch, R. Delmas, F. Gillet, and L. Lliboutry (France); K. Kaminuma (Japan); R. Cameron and J. Kelley (United States); and M. Grossvald (Soviet Union).



The agenda included reports on 1974-1975 activities and plans for later field seasons. Reports were presented on related studies. The concept of IAGP was reviewed, and the date and place of the next meeting of the council were decided.

Australia. U.S. geoceiver measurements during the autumn 1975 traverse on and south of Law Dome (inland from Casey Station) indicate ice velocities of around 120 meters a year on the steepest part of the slope, zero at the saddle and on top, and 9 meters per year between the saddle and the top.

At least one of several internal echo layers near Cape Folger (66°08′S. 110°44′E.) coinciding with crystal and air bubble changes has been found to depolarize radar signals. Similar relationships between the oxygen-18/oxygen-16 ratio and temperature were found to hold for Law Dome and for the rise of the main ice sheet.

Survey of the 2,000-meter contour around the Lambert Glacier basin indicated positive mass balance values, increasing in magnitude toward the Amery Ice Shelf.

In the laboratory, studies of ice deformation and sliding and computer modeling of glaciers and ice sheets continued.

The International Antarctic Glaciological Project is a cooperative venture linking Australia, France, the Soviet Union, the United Kingdom, and the United States in a study of a large part of the east antarctic ice sheet. Publication of this newsletter series in *Antarctic Journal* is a U.S. contribution to the project.