



THE ANTARCTIC SOCIETY NEWSLETTER

P. O. Box 40122

Washington, D. C. 20016

Volume 1, Number 3

April, 1976

MEETING NOTICE

Annual Business Meeting Followed by a Lecture Entitled

DOME CHARLIE, HERCULEAN TASK

by

Commander Jerome R. Pilon

3:00 p. m., Wednesday

April 28, 1976

The President's Room, The George Washington University Faculty Club
The Marvin Center 800 21st Street, N. W.

Washington, D. C.

The Marvin Center, also called the University Center Building, is located on the west side of 21st Street between H and I Streets. A limited amount of parking is available on the adjacent streets. Parking is also available for a fee on the lower level of the Marvin Center. Enter the parking area from H Street.

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Commander Pilon, Assistant Manager of Polar Operations Section of the Office of Polar Programs, National Science Foundation, will tell about the recovery of two of the three C-130 Hercules airplanes that were damaged and temporarily abandoned on Dome C on the Polar Plateau of East Antarctica in January and November, 1975. Two of the planes were recovered in the past austral summer. The third is scheduled for recovery in the next summer season.

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AGENDA FOR THE ANNUAL BUSINESS MEETING

1. Minutes of the last annual meeting.
2. Report of the Secretary
3. Report of the Membership Secretary
4. Report of the Finance Committee
5. Report of the Program Committee
6. Election of Officers and Board of Directors

The Nominating Committee, consisting of Albert P. Crary (chairman), Peter F. Bermel, Louis DeGoes, and Gerald K. Pagano, have submitted following slate of candidates for election:

Officers: President: Kenneth J. Bertrand (Term 1 year)
 Vice President: Kendall N. Moulton
 Secretary/Historian: Charles E. Morrison
 Treasurer/Membership Secretary: William B. Cooke

Board of Directors: Robert J. Allen
 (Term of 3 years) Richard L. Cameron
 Mrs. Sophia R. Dales
 George E. Watson, III

Nominations will also be accepted from the floor.

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MEMBERSHIP CERTIFICATES

Membership certificates are still available from the Secretary for a fee of \$2 00. The certificate is artistically designed (black on white) and suitable for framing (11" x 14"). It makes an excellent wall decoration. When ordering make checks payable to the Antarctic Society. Please print your name as you want it inscribed, giving title, if any. Also indicate the date you wish to appear on the certificate.

REMAINING PROGRAMS FOR 1975-1976

8:00 p.m., Thursday, May 20. (In conjunction with the Audubon Society)

Lecture by Dr. George E. Watson, III, "Bird Life in the Southern Oceans"
Curator of Birds, National Museum of Natural History, Smithsonian
Institution

Decision pending on the meeting place.

4:00 p.m., Saturday, early in June (Date to be determined.)

Annual Garden Party at Stronghold, Sugarloaf Mountain

Notices will be sent at a later date, announcing each of the above events.

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Dues for 1975-76

Some members have not paid their dues for this year. If you are one of them, not do it now by using the blank provided below?

THE ANTARCTICAN SOCIETY
P. O. Box 40122
Washington, D. C. 20016

Enclosed is my check for \$3.00 to cover my dues for 1975-76.

Name: _____ Street: _____ Apt. _____
City: _____ State: _____ Zip Code: _____

THE SCOTIA ARC REGION UNLOCKS SOME SECRETS OF GONDWANALAND

By

Dr. Ian W. D. Dalziel

The conclusions expressed here are based on work which began in 1968 and has continued through the 1975-76 austral summer. It was undertaken from Lament-Doherty Geological Observatory of Columbia University and supported by the Office of Polar Programs of the National Science Foundation. The latter's research ship *Hero* transported the investigators to the various insular sites which they wished to study, sites which would have been otherwise inaccessible.

Geographically, the Scotia Arc consists of the island chain which loops around the Scotia Sea, linking Tierra del Fuego with the Antarctic Peninsula. It includes South Georgia, the South Sandwich Islands, the South Orkneys and the South Shetlands. In a broader geological sense, the Scotia Arc region extends from 46° S. in Chile to the base of the Antarctic Peninsula. It is this broader region which was the area of investigation. The region is of outstanding significance because it lies along the boundary between the American and Antarctic lithospheric plates. It has been an active plate boundary for at least 200 million years. While agreement has generally been reached on how South America and Africa and on how Australia and East Antarctica fit together in a reconstructed Gondwanaland, the manner in which the Scotia Arc regions matches is still uncertain.

There are two broad physiography provinces in southern South America. The first is represented by the lowland of Tierra del Fuego. The second is the Andean Cordillera. Within the Cordillera, there are three main geological provinces^{*} which are only partly represented in the Antarctic Peninsula. In Chile, the western geological province of the Cordillera consists of deep seated parts of old volcanoes, batholiths which were intruded into Paleozoic basement rocks. The latter consist mainly of highly distorted sediments in which purplish chert, massive, thick-bedded sandstones, and white limestones are prominent. The central province consists of mafic rocks, as though they came from the ocean floor. Great masses of mafic gabbro have been intruded into other volcanos. The eastern province consists of silicic volcanic rocks of Upper Jurassic age. The outer or western province of the Cordillera is similar in origin to the Japanese archipelago. It is an island arc, but unlike Japan, where the gap between the island arc and the continent is occupied by the Sea of Japan, in Chile the gap has been closed by the two parts having been jammed together again with the sea floor being compressed and pushed up.

The collision which closed the gap and raised the floor of the marginal sea resulted from the subduction of the Pacific plate beneath the South American-Antarctic plate. This also caused the eruptions which produced the Upper Jurassic silicic volcanic rocks of the eastern geological province.

The geology of the remainder of the Scotia Arc is consistent with this interpretation of the South American Cordillera. For example, the rocks of South Georgia, eastward on the Scotia Ridge, are similar to those of Navarino Island, off the southern coast of Tierra del Fuego. In South Georgia there are three major components. The first consists of the Lower Cretaceous Cumberland Bay sediments, derived from the

* This abstract of Dr. Dalziel's illustrated lecture before the Antarotican Society, February 25, 1976, was prepared by Kenneth J. Bertrand and reviewed by Dr. Dalziel. Readers are also referred to Ian W. D. Dalziel, "The Scotia Arc Tectonics Project, 1969-1975," *Antarctic Journal of the United States*, Vol. X, No. 3, May/June, 1975, pp. 70-79, for additional information, including illustrations and bibliography. See also articles by Dalziel and associates in *Antarctic Journal of the United States*, Vol. IX, No. 4, pp. 244-246, and Vol. X, No. 4, pp. 180-182.

island arc. The second, the Sandebugten sediments, were derived from the continent. The third component is an igneous complex that forms part of the mafic floor of the small ocean basin which was compared with the Sea of Japan. The interpretation is that as South America drifted away from Africa, South Georgia, a lump of continental material, was left behind, a long way from either of the larger land masses.

The South Orkneys consist of massive sandstones with big folds, the sediments are probably older than those in South Georgia, the marbles of Signy Island are equivalent to the limestones of the Paleozoic basement rocks of the island are geological province of Chile.

The rocks of the northernmost of the South Shetland Islands are also the same as the basement rocks of the volcanic island arc of South America. The Elephant Island group of islands consists of highly deformed rocks, old volcanics interbedded with mudstones deformed into black and green schists. Gibbs Island has purple Paleozoic sediments which appear to have been deposited on the deep sea floor. King; George Island includes younger volcanic necks which raises the possibility of the existence of copper deposits similar to those in the Andes. On Smith Island, however, there are highly compressed dark bluish schists as if formed from the metamorphism of sediments from an oceanic trench. One again, these probably represent part of the old basement rocks. They include thin rhythmically layered silicious ooze from the deep sea, very old and greatly altered.

The Antarctic Peninsula consists mostly of basement rocks intruded by igneous rocks and topped with rhyolite of Jurassic age. Together with the inshore islands, such as Anvers Island, the Peninsula belongs to the volcanic outer island arc province of South America, the rocks of that continent are, however, more deformed than those of the Antarctic Peninsula* probably due to the island arc being pushed back against the continent. The Antarctic Peninsula was not pushed back against East Antarctica.

Now around the Scotia Arc the South American Plate is going under the Scotia Platelet to form the South Sandwich volcanic chain. South Georgia is being pushed eastward. The volcanism in the Bransfield Strait is due to spreading on the continental side of the young arc, represented by the rocks of King George Island. The Strait of Magellan has been active as a fault zone for 100 million years. There is very slow strike slip movement. The South Sandwich Islands are a very primitive island arc, in the sense that the rocks there are only 4 to 8 million years old.

Some may be interested to know that Grytviken, South Georgia, is now a ghost town although the British Antarctic Survey has a base on one side of the harbor. The Whaling station was last occupied on a lease by the Japanese in 1968. A Norwegian caretaker stayed on a couple of years more to tidy up the property. No signs of Shackleton's party remain at Cape Vallentine or at Point Wild on Elephant Island.