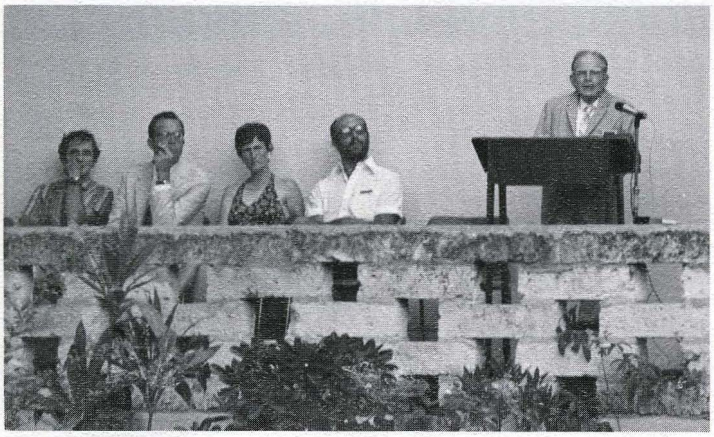
NEWSLETTER

BERMUDA BIOLOGICAL STATION FOR RESEARCH

VOL. 5 NOS. 2 and 3 SUMMER, FALL 1976

1926 - 1976 50th ANNIVERSARY OF INCORPORATION
1903 - 1976 73 YEARS OF SERVICE TO SCIENCE

SPECIAL 50th ANNIVERSARY ISSUE



Open House speakers, l. to r. Dr. I. W. Hughes, Dr. W. R. Wright, Ms. S. Schlee, Dr. W. E. Sterrer, & Dr. G. T. Scott.
Photo by G. Kris Jensen.

50th ANNIVERSARY OPEN HOUSE

An estimated 600 guests - a record number - turned out for this year's Open House celebration on July 17th. Festivities began with a champagne toast to the 50th Anniversary of BBS and an excellent address by Ms. Susan Schlee of the Marine Biological Lab in Woods Hole entitled "Dr. William Beebe & the Bermuda Biological Station -- A Love Affair? Or a Case of Mutual Distrust?" The guests then toured the laboratory exhibits and the electron microscope facility, enjoyed a buffet supper, and danced on into the night to the music of the Somer's Isles Jazz Band.

The summer meeting of the Trustees was held the following day. Two highlights were the announcements of another year of support for BBS oil pollution work by the Atlantic Richfield Company and of a $25,000 gift from the Kresge Foundation for construction of a dockside wet lab and storage facility. Further details on the construction will be included in the Newsletter when plans are finalized. Other business included the election of two new Trustees, Mr. Samuel Riker III and the Hon. John W. Swan.

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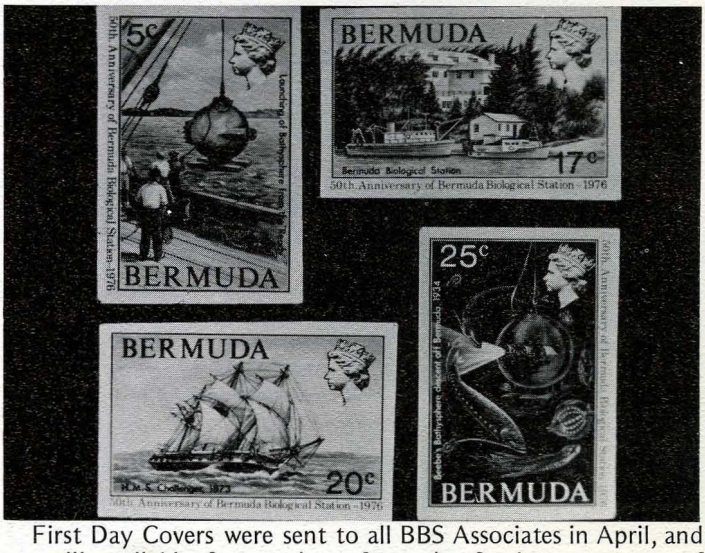
It is appropriate here to include a brief summary of the Annual Meeting of Trustees and Corporation Members, held on April 10th at the American Museum of Natural History in New York. President Dr. George T. Scott opened the meeting with a tribute to Life Trustee Dr. Louis S. Mowbray who died on March 15th. Bylaws were amended to enlarge the Board of Trustees from 28 to 36 members, and three Trustees were elected: Mr. Maxwell Bruce, Dr. Beth Burnside, and Dr. Talbot Waterman.

Dr. Redwood Wright, Secretary, reported there were 377 Corporation Members; Vice President Dr. I. W. Hughes announced continued support by the Bermuda Government; Treasurer Mr. E. Morton Holland presented the happy news that the Station had an excess of income over expenses during 1975 which would help replace funds borrowed in 1973; and BBS Director Dr. Wolfgang E. Sterrer in his report made a plea for a concerted effort to increase the endowment of the Station.

STAMPS COMMEMORATE BBS 50th ANNIVERSARY

Four commemorative issue stamps honoring the 50th Anniversary of the Bermuda Biological Station were put on sale on March 29th:

.05: The bathysphere, invented by William Beebe, Otis Barton and John Butler in 1929, and first tested several miles south of Nonsuch Island, Bermuda, in June of 1930.
.17: View of BBS from Ferry Reach, showing the R/V PANULIRUS II and the MICMAC at dockside, with part of the Main Building and lab wing in the background.
.20: The H.M.S. CHALLENGER, which circumnavigated the globe during the years 1872-1876, and whose collections marked the beginnings of modern oceanography. One of the original 50 volume sets of reports from the CHALLENGER expeditions is in the BBS Library.
.25: Animal life in the deep waters off Bermuda, as seen from Beebe's bathysphere in dives from 1930 to 1934. The deepest dive in these waters was to 3,028 feet, and the bathysphere's crew was amazed at the great wealth of animal life at such depths.



First Day Covers were sent to all BBS Associates in April, and are still available for purchase from the Station at a cost of $3.00 each.

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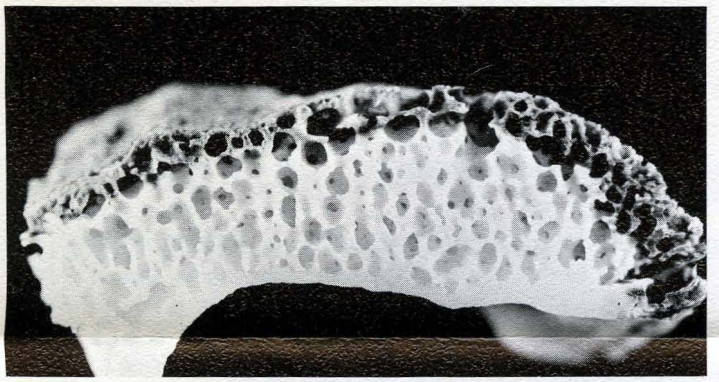
CLIONA, DARK FUTURE FOR AN OCEANIC ISLAND?

Dr. Klaus Rützler

BERMUDA GAZETTE **Summer, 2176**

A gigantic tremor cut through the wee hours of last night when several hundred square meters of the Paynter's Isle Golf Course slid into the submarine canyon, once known as Harrington Sound. The rumbling, contrasted by the dead calm air, could be heard on all four of our Islands. We awoke the Director of the Biological Station in St. David's Lighthouse, and he gave us the following statement via laserphone: "I am afraid that this incident confirms our recent observations that The Sponge, Cliona, has entered a new activity phase. We have records that about 200 years ago, when Bermuda consisted of 300 islands covering 53 square kilometers, Cliona went through a population explosion and, for several decades, converted all its energy into limestone eroding processes. Today's Gibb's (Tourist) Isle, Town (Government) Isle, Paynter's (Residential) Isle and Lighthouse (BBS) Isle used to be hills which resisted until The Sponge fell back into its inactive stage. A grant proposal for the study of the new situation has already been submitted."

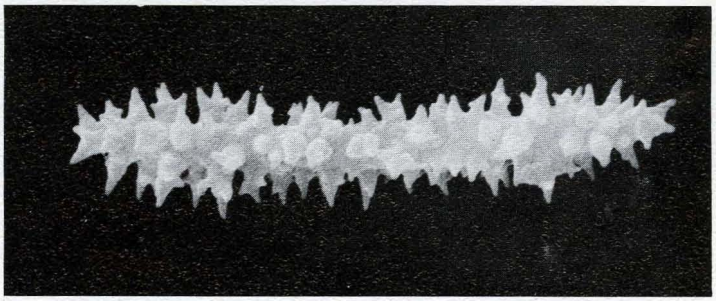


Galleries excavated by Cliona lampa in shell of Jewel Box clam. (2-3X).

Similar fiction was on my mind when I commenced a study of the world of limestone excavating sponges at Bermuda. In 1826, just 150 years ago, R. E. Grant described Cliona celata, a "zoophyte" that perforated oyster valves in the Firth of Forth. Today more than 100 species are known that share morphological characteristics and the ability to bore into limestone with this first Cliona. Only four of these had been observed in Bermuda, until 1974 when I added five species to the list, three of them new to science.

Most clionid sponges are difficult to detect because of their cryptic habit. The major part of the body is hidden in excavated galleries inside rock, coral or shell. Small isolated tissue areas at the substrate surface (papillae) bear contractile incurrent and excurrent openings (ostia, oscula). Water circulation is maintained by the beat of flagella bearing cells that are arranged in small spherical chambers (choanocyte chambers) scattered throughout the body. Minute attractive silicon spicules form an internal skeleton and are used as the main diagnostic feature in systematic study.

Yellow, orange and red are the most common colors of Cliona. Some greenish brown species (e.g., Cliona caribbaea) contain symbiotic algae (zooxanthellae), as reef-building corals do. A particularly conspicuous and pretty species, Cliona lampa, was first discovered in Bermuda. It is brilliant vermilion and forms extremely thin coatings on the substrate surface under which most of the sponge mass is hidden. This species is fast growing and very corrosive. It is abundant only in shallow bays and lagoons with frequent currents. Extended rock areas entirely covered and penetrated by Cliona lampa can be seen from the bridge crossing Flatts Inlet.



Silicon spicule of Cliona lampa. (scanning electron photomicrograph, 4,200X).

The question, "How do sponges excavate lime-stone?," had occupied biologists for almost a century. When I became interested in the subject, it had already been demonstrated repeatedly that minute particles of the calcium carbonate substrate are freed by etching, comparable to carving out rocks by acid dispensed from a pipette. The chips are expelled by the sponge through its oscula and form an important part of the mud-size fraction of reef sediments. As conventional light microscopy could not reveal much new information, my collaborator G. Rieger and I resorted to techniques of scanning and transmission electron microscopy. We could show how an amoeboid type of cell uses a wickerwork of exceedingly fine filamentous processes to etch a narrow circular crevice into the limestone, which is deepened until one characteristic chip has been freed. Although each particle measures no more than two billionths of a cubic inch, a one inch cube of coral rock can be riddled with sponge in a matter of months.

To study the destructive powers of Cliona I have carried on work pioneered, also in Bermuda, by my colleague C. Neumann. We have conducted experiments and calculated that Cliona at its best, and occupying an area exclusively, can erode as much as 1,000 tons of limestone per acre each year. Considering that the sponge faces heavy competition, that it occupies but a small percentage of available substrate space, that its peak activity is restricted to special stimuli and followed by long passive phases, and that much energy must be converted into reproduction, we can modify our figures to average a mere 2,300 lbs. per acre per year. Knowing that 90% of this amount remains in particulate form to be deposited and recemented, we can breathe a sigh of relief, I trust. The next 200 years will show.

EQUIPMENT PURCHASES

A considerable amount of equipment has been purchased within the last year, both by the Station itself and by BBS grants with the understanding that such equipment reverts to BBS at the termination of the grant. Such equipment includes time-lapse photography apparatus, 2 incubator ovens, 2 precision balances, 2 triple-beam balances, 16 student microscopes, a battery-powered pH meter, and Wild microscopes M-7 zoom, M-11 phase contrast, and M-40 inverted.

The 1975 Vollmer Foundation gift was used in the purchase of a new engine for the MicMac, for repairs to the engines of the R/V Panulirus II, for Library acquisitions, and for improvements to the laboratories and to lab equipment. We are most grateful to the Vollmer Foundation for its 1976 donation as well; these funds have not yet been allocated.