reference to the first official artist, he states: "Poor Earl has never been well since leaving England and now his health is so entirely broken that he leaves us—& Mr Marten, a pupil of C. Fielding & excellent landscape drawer has joined us".

Such indeed were his qualifications as revealed by the great majority of the illustrations, many in colour, that adorn this book. They mainly depict scenes around the southern coasts because, after nine months, Martens left at Valparaiso, FitzRoy without money to employ him longer. But in these beautifully reproduced sketches of Port Desire, in the Beagle Channel, at the Santa Cruz River, at Chiloe and elsewhere, we view scenes that Darwin and all aboard HMS *Beagle* must have gazed upon. The few pictures not by Martens include John Gould's painting of *Rhea Darwinii* and FitzRoy's sketch of Coquimbo in Chile, with the simple drawing of Napoleon's tomb at St Helena by Darwin's servant Symms Covington.

The skilfully edited text, aiming at a general narration of events, is a judicious blend of extracts from the *Diary*, with all of Darwin's letters to his father and sisters, together with those, largely on scientific matters, to Henslow. FitzRoy is represented by extracts from the second volume of the *Narrative* with letters, both official and personal, to Captain Francis Beaufort, Hydrographer to the Navy and under whose instructions the voyage was carried out. There are concluding passages from the *Narrative* in which he defends the biblical story with the record of the rocks—potent evidence for evolution in Darwin's hand—all explained as a result of the flood!

Charles Darwin has been well served by his family—first by his sons, then by his granddaughter; and now a great grandson has produced the culminating tribute. □

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Saga of a research vessel

George Deacon

On Almost Any Wind: The Saga of the Oceanographic Research Vessel "Atlantis". By S. Schlee. Pp301. (Cornell University Press: Ithaca and London, 1978.) £10.50.

THE *Atlantis* was built for the newly founded Woods Hole Oceanographic Institution in 1930–31, where, to begin with, most of the work was done in summer by scientists who held teaching appointments. Nevertheless the Trustees recognised that progress required a moderate sized ship, with reasonable living quarters, able to work in the deep oceans. H. B. Bigelow, Director of the Institution, and Columbus Iselin, general assistant and future master of the ship had much to do with her specification. She was a steel auxiliary, rigged as a ketch, with fore and aft sails, engined by a 280 hp diesel engine. Sail was chosen for economy, long range and steadiness, though it has often been suggested that yachtsman's preference for sail had something to do with it. It was, perhaps, something of an anachronism from the start. UK oceanographers had proved Captain Scott's square-rigged, coal-fired *Discovery* unsuitable for making widespread observations in

reasonable time, and had replaced her by a fully-powered vessel built for the same price as the *Atlantis*, though costing twice as much to run. But the *Atlantis* proved ideally suited for pioneering work with new techniques and ideas, and it was not until post-War expansion, involving multi-ship operations, and widening international activities, extended and tightened the work load that "slogging across the ocean at a walking pace" proved unacceptable. As time went on she used her engine more and sailed less, till in 1960, when her tail-shaft broke—after post-war fitting of a more powerful engine—she had to call for a tug.

By 1935 she had greatly extended

our knowledge of the water circulation in the north-western Atlantic Ocean and Caribbean Sea, of daily plankton migrations, nutrient cycles, bacterial populations in sediments, the Gulf Stream, Sargasso weed, and CO₂ in atmosphere and ocean, among other basic problems. She went on to make extensive biological and physical studies of the Georges Bank area. She had also taken part in the development of a large quantitative plankton net with a triangular opening, with 50 ft sides, and the Leavitt release gear for opening as well as closing. She began seismic exploration at sea with Maurice Ewing "who was constantly banging on the Institution's door" and was used for development of more efficient core-samplers and the bathythermograph.

She was laid up when America joined the war, and afterwards used extensively in studies of underwater acoustics and underwater explosions. Her coverage was extended to the mid-Atlantic ridge, the Mediterranean Sea, the South Atlantic, the deep trench west of Chile and Peru, and to the Red Sea which proved a severe test of her suitability. There were fairly hectic times when she cooperated with the *Vema*, Ewing's own converted yacht which is still at work though without her rigging. Progress was most rapid when specialists of different kinds worked together. "Hersey's gang . . . charged across the frontiers of acoustic technique and instrumentation . . . like an institution within the Institution". Cooperative studies of the Gulf Stream were also very effective.

Schlee's book gives a lively and realistic account of life at sea in a small ship, based on the journals of her scientists and officers as well as the Institution's archives. She was often uncomfortable, "most of one's existence is passed exchanging one small discomfort for another". Shortage of funds was an obvious as well as concealed cause of trouble. She had a deep-sea winch from the start and a precision echo sounder in 1953, but no powered windlass or freshwater showers till 1954. She is not the only small ship in which continued discomfort has led to bother at sea and trouble in foreign ports, but she had her share.

In 1957 most of the trans-Atlantic sections were worked by a larger fully-powered ship the *Crawford*, soon joined by the *Chain*, and in 1963 by the *Atlantis II*. The old 'A-boat' was going down hill, but still used for tasks that she could do as well as and sometimes better than larger ships. In 1966 she was sold at a nominal charge to the National Council for Scientific Investigation in Argentina. She was re-

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fitted in Boston "such care had not been lavished on the vessel since the end of World War II".

When she entered Woods Hole for the last time all the town turned out to greet her. She could not have continued so long or done such good work if long-serving captains and crew had not taken continuing pride in her, their unusual spirit and enthusiasm more

than making up for her old-fashioned design. She is still working from Buenos Aires, mainly for training cruises.

Her fine story is well told. ☐

Sir George Deacon was Director of the former National Institute of Oceanography. He joined the RRS Discovery on 28 January, 1979, for further study of the Antarctic Ocean.

Varnished tale of Scripps

Edward Bullard

Scripps Institution of Oceanography: Probing the Oceans, 1936 to 1976. By E. Noble Shor. Pp. 502. (Tofua Press: San Diego, California, 1978). Paperback \$5.95.

THE Scripps Institution of Oceanography was founded in 1903; in 1967 Helen Raitt and Beatrice Moulton published a history of its first fifty years. The present book starts in 1936, when Harald Sverdrup became Director, and brings the story up to 1976. It is a truly remarkable story. How did a small marine biological station grow to be the biggest oceanographic institute in the United States and, perhaps, in the world and then, in the 1960s, spawn a new campus of the University of California? The story is largely that of the three great Directors—Harald Sverdrup, Roger Revelle and Bill Nierenberg.

Sverdrup saw that the future of Scripps lay beyond the coastal waters of California. He obtained a ship, the beautiful schooner *E. W. Scripps*, built for racing and pleasure cruising, and converted her to a research vessel. It was Sverdrup who made Scripps a real oceanographic institute.

At the end of World War II he returned to Norway and, after a period of transition under Carl Eckart, Revelle became Director. Revelle had learnt during the War to 'think big'. He started a frantic race to raise money, hire people and build buildings. It was he who made Scripps larger and better and more fun than any other oceanographic institute. After a few years he grafted on to it a graduate school of science and engineering and turned this and Scripps into the University of California at San Diego, with himself as acting Chancellor. His strategy was original and brilliant. Most universities start with under-

graduate teaching and then, years later, develop a graduate school. This ensures a start with a rather pedestrian staff. Revelle's scheme enabled him to engage a prestigious staff from the start: among his early captures were Harold Urey and Maria and Joe Meyer. When the time came to choose a Chancellor for the new campus the Regents did not appoint Revelle. In 1964 he left California to become Director of the Population Studies Institute at Harvard.

It is a dramatic story and Betty Shor has told the part that concerns Scripps in meticulous and well documented detail; but somehow the realities of what happened have slipped away. Everything is so smooth, everyone behaves so well, everything succeeds, there are no rows and only the merest hint of the struggles that raged before Revelle was made Director and during his unsuccessful attempt to become Chancellor. We are told the names and deeds of all kinds of rather minor figures—for example, of the lady who presides so charmingly and efficiently over the aquarium bookstore—but the name of Edward Pauley who, as a Regent of the University, nearly wrecked the whole enterprise does not occur at all and, to come nearer home, no clue is given as to who at Scripps opposed Revelle's appointment as Director.

To be fair it must be said that Mrs Shor could hardly have told an unvarnished tale. She was asked by the Director to write the book and most of those mentioned in it are her friends. It would have been instructive to have reproduced some of the letters sent at that time to the President of the University and to see who said what and when; but it is clearly too much to expect.

After the turbulent reign and abdication of Revelle there was a short period during which Fred Spiess was Director. He picked up the pieces, smoothed the ruffled tempers and continued the building programme; he then handed over to Bill Nierenberg. Nierenberg had the difficult and unenviable task of maintaining and expanding Scripps in a time when the country had lost its belief in the worthwhileness of anything. For a

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while it looked as if Scripps would become 'Scripps rent-a-ship', an organisation that provided ships for anyone who could raise the money to run them. This has not happened; Scripps has remained what it was, an organisation practicing and encouraging all branches of oceanography; indeed it has taken on new responsibilities, such as the Deep-Sea Drilling Programme, and has built fine new buildings. Again the drama and the struggle are largely missing from the book. Again it all happens so smoothly and easily with no sense that, but for Nierenberg, it might have come out very differently.

In reading the book one does learn a lot about what happened and about who did what and went where. There are accounts of projects and expeditions with well chosen extracts from letters, ships' logs and radio signals. The facts are set out with great care and detail. It is clearly a book that everyone interested in oceanography and in Scripps should read. It is not the ultimate book on the personalities and the period, but it is an essential contribution to the writing of such a book in 50 years time. ☐

Sir Edward Bullard is Emeritus Professor at the Scripps Institution of Oceanography, La Jolla, California.