History of Oceanography

ISSN 1013-3917

No.5 September 1993

CONTENTS

NEWSLETTER of the COMMISSION of OCEANOGRAPHY
DIVISION of HISTORY of SCIENCE
INTERNATIONAL UNION of the HISTORY and PHILOSOPHY of SCIENCE

INTERNATIONAL UNION of the HISTORY and PHILOSOPHY of SCIENCE
DIVISION of HISTORY of SCIENCE
COMMISSION of OCEANOGRAPHY

EDITORIAL - *Nansen and Fram, 1893-1993*

> NANSEN was a great figure in the world. Sometimes a world-wide reputation only means that a man is known to all those of his own class or trade; but NANSEN was known to all sorts and conditions of men. What was it that made him great as well as famous? I do not think it was his eloquence or his learning or even his spirit of adventure, nor was it his political ambition nor his statesmanlike insight and skill. It was rather a certain quality of his, a force of character, an air of high distinction which he wore to a degree unmatched in all my experience of men. He came into a room and men gathered round him, he went out into the world and men followed him, he spoke and we all harkened to him! Moreover his courage never failed, his faith moved mountains out of his way, and his friendship was of the kind which lasts forever.
>
> D'Arcy W. Thompson, 1930. J. Conseil 5:148

D'Arcy Thompson's moving tribute to his friend Fridtjof Nansen (1861-1930) is one among many to a near mythic figure in polar exploration, humanitarian causes, and in science. Nansen's science is certainly the least known of his accomplishments. This is perhaps not surprising of a man who had crossed Greenland on skiis at the age of 27, and who could persuade a group of colleagues to lock themselves in the polar ice in 1893 for, it was hoped, a three-year drift from the East Siberian Sea across the North Pole to the Norwegian Sea. Failing to reach the pole on *Fram*, Nansen and his colleague Hjalmar Johansen set out across the ice for the Pole, had to turn back, and completed an epic journey across the sea ice to Franz Josef Land and eventually back to Norway. They returned only a day or two before Fram, released from the ice, arrived successfully in Trømso.

Nansen had chosen zoology as a career in the belief it would allow him a vigorous life of travel and exploration, but his inclination was toward physics and mathematics. In 1898, while he was working on the hydrographic results of the *Fram's* Norwegian North Polar Expedition, Nansen read the recently published circulation theorem of his countryman Vilhelm Bjerknes (then Professor of Mechanics in the Stockholm Polytechnic), devised to allow the circulation of baroclinic fluids to be calculated. Nansen approached Bjerknes with a problem: why a ship frequently had difficulty making way when a layer of fresh water overlaid salt. Bjerknes turned the problem over to a Swedish student, W.V. Ekman, who had been attending his lectures.

A year or so later, Nansen approached Bjerknes with the observation that ice, rather than drifting downwind, drifted at an angle to the wind. Somehow, the earth's rotation must be involved, but how could the relationship be demonstrated mathematically? Given this problem by Bjerknes, Walfrid Ekman solved it within a few hours in early November, 1901. This, along with the "dead water" problem and other investigations in fluid dynamics were the basis of Ekman's famous publication "On the influence of the earth's rotation on ocean-currents", published in 1905 (reprinted in 1963), which was the inauguration of his distinguished career in physical oceanography.

Bjørn Helland-Hansen had intended to be a physician, but when he lost several fingers due to frostbite during a northern expedition, he was forced to turn to zoology. Nansen, recognizing a kindred spirit, ensured that Helland-Hansen studied with Bjerknes in Stockholm. He returned to his home in Bergen with a knowledge of the circulation theorem, and with the acquaintance of Johan Sandström and Helland-Hansen adapted the circulation theorem for easy use with hydrographic data. Their work, published in English in 1905 (it was translated by D'Arcy Thompson) became the basis of dynamical physical oceanography.

Nansen, along with Johan Hjort, Otto Petterson, D'Arcy Thompson and others, had been one of the group promoting the establishment of the International Council for the Exploration of the Sea (ICES). When it was formally established in 1902, so was an ICES Central Laboratory, under Nansen's direction in Christiania, intended to standardize techniques used by the ICES nations in their surveys and to act as an arbiter when technical problems arose. Nansen, at that time Professor of Zoology in Oslo, turned his attention to instruments, insisting that the accuracy of reversing thermometers be increased so that dynamic calculation would improve correspondingly. The value of his work was demonstrated when Nansen and Helland-Hansen's great work, *The Norwegian Sea* was published in 1909. Using data from newly-refined instruments, they showed that the circulation of the Norwegian Sea was strikingly more complicated than Henrik Mohn had indicated in his monograph of 1887, The North Ocean, based on data from more primitive thermometers.

Curiously, we know more about some aspects of Nansen's personal life (see, for example, Karl Brox, 1991. *Eva og Fridtjof Nansen*. Oslo: Gyldendal) than we do about his science. Robert Friedman, in his book about Vilhelm Bjerknes, *Appropriating the weather* (1989. Cornell University Press) gives an indication of what the correspondence between Nansen, Bjerknes, Ekman, Helland-Hansen and others can reveal, but we do not have more than a tantalizing taste of the rich fare that is waiting in the first deep study of the late 19th century Scandinavian oceanographers and their associates. In September 1893, Nansen and *Fram* were crossing the Kara Sea, eastward toward their long Arctic drift. One hundred years later we know far too little of what Nansen represents - the network of ideas and personal associations, and the scientific aspirations that formed the basis of twentieth century oceanography.

Eric L. Mills

THE FIFTH INTERNATIONAL CONGRESS ON THE HISTORY OF OCEANOGRAPHY

"Oceanography: the Pacific perspective" was the theme of ICHO-V, held at the Scripps Institution of Oceanography, La Jolla, California, July 7-14, 1993. But the intellectual fare was varied and broader even than the Pacific, ranging from explorations to folkways, and from coral reefs to subduction zones. The venue, the Scripps Institution of Oceanography, was at its best. Every morning the overnight "June gloom", a coastal mist linked to the California Current upwelling, gave way to bright sunshine, 20°C+temperatures, and ocean breezes that made "Snackopolis", the beautiful surf-side lunch spot just below the lecture hall, a particularly attractive spot for a meal and conversations about the history of oceanography.

ICHO-V attracted more than 120 participants and accompanying persons from at least 24 nations. It was opened by Robert Friedman's keynote lecture on the career of Harald Sverdrup. Each day featured a plenary session, these being *Oceanography around the Pacific Rim; Archival resources for the history of oceanography; Pacific waters in motion; Beyond Darwin: coral reef research int he twentieth century; Continents vs. oceans in the earth sciences revolution; and Scripps at ninety*. Concurrent sessions, mainly int he afternoons, were made up of contributed papers on a wide variety of topics ranging from the history of ocean technology to aboriginal fisheries, and from ocean policy to historiography and bibliography.

Receptions and a barbecue, special lectures on U.S. naval oceanography after the Cold War (Dr. Tim Coffey) and on the next fifty years of oceanography (Dr. John Knauss), an evening at Sea World, visits to Scripp's new Stephen Birch Aquarium/Museum, and a fascinating but far too short glimpse of Ensenada and adjacent Baja California kept the "accompanying persons" and most of the ICHO-V participants form any chance of ennui. John Muir College of the University of California at San Diego, on the mesa-top to the north, served as a pleasant, congenial bedroom suburb of the Scripps campus for the ICHO-Vers.

Many of the papers presented during ICHO-V will be published by the University of Washington Press in a special volume *Oceanographic history: the Pacific and beyond*, which is likely to be available late in 1994 or in 1995. Information is available from Dr. Keith R. Benson, Dept. of Medical History and Ethics, University of Washington, Seattle, Washington 98195, USA.

The organization of an International Congress of the History of Oceanography is a major undertaking. Few have attended all, but we have been fortunate in the variety of places and of historical information during the preceding Congresses: Monaco in 1966, Edinburgh in 1972, Woods Hole in 1980, Hamburg in 1987. ICHO-V was the equal of its predecessors: outstandingly organized, well-attended and undoubtedly an intellectual sparkplug for those who attended. To Deborah Day (archivist of the Scripps Institution) who was in charge of local arrangements, to Philip F. Rehbock (University of Hawaii) and Keith Benson (University of Washington) (Co-chairs in charge of program and many other arrangements), congratulations for an outstanding accomplishment, ICHO-V in 1993.

Eric L. Mills

PROCEEDINGS OF THE INTERNATIONAL CONGRESSES ON THE HISTORY OF OCEANOGRAPHY I-IV: HOW TO ORDER

Premier Congrès international d'histoire de l'océanographie, Monaco, 12-17 décembre 1966, communications in *Bulletin de l'Institut Océanographique, Monaco*, No. spécial 2, 3 volumes (1968). Order from Service des Publications, Musée océanographique, Avenue Saint-Martin - MC 98000 MONACO. Pay 250 French Francs by bank transfer with no charges for the Museum to: Institut océanographique R1B 30002 03243 60036R 76 CREDIT LYONNAISE - Agence de Monte-Carlo, Avenue Princesse-Alice-MC 98000 MONACO.

Second International Congress on the History of Oceanography, Challenger Expedition Centenary, Edinburgh, September 12 to 20, 1972, *Proceedings - 2, in Proceedings of the Royal Society of Edinburgh, Section B (Biology)*, v.73 (1972). Send 12.50 pounds sterling to C.A.B. International, Wallingford, Oxon OX10 8DE UNITED KINGDOM.

M. Sears and D. Merriman, *Oceanography: The Past, Proceedings of the Third International Congress on the History of Oceanography held September 22-26, 1980 at the Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA on the occasion of the Fiftieth Anniversary of the Founding of the Institution*. NY: Springer-Verlag, 1980. ISBN #0-387-90497-2. Send $87.00 plus postage, plus tax to Springer-Verlag New York, Inc. P.O. Box 19386, Newark, N.J. 07195-9386 USA or fax 1 (210) 348-4505.

Walter Lenz and Margaret Deacon, eds., *Ocean Sciences: Their History and Relation to Man, Proceedings of the 4th International Congress on the History of Oceanography, Hamburg, 23-29 September 1987*. Deutsche Hydrographische Zeitschrift, Ergänzungsheft Reihe B., Nr. 22, 1990. Send DM 172 to: Deutsche Hydrographische Zeitschrift, Postfach 30 12 20, D-2000 Hamburg 36 GERMANY.

SOURCES FOR THE HISTORY OF OCEANOGRAPHY AT THE SMITHSONIAN ARCHIVES AND NATIONAL ARCHIVES

The *Guide to Smithsonian Archives*, which should be available in any university library, provides a good overview of our collections. The collections in the Smithsonian Institution Archives document several distinct phases of oceanographic research. Our earliest records

document the large scale nineteenth century exploring expeditions, notably the United States Exploring Expedition and the North Pacific Exploring Expedition. The first, 1832-1842, was commissioned to establish the United States as a major player in exploration and scientific research. In the course of their work, the expedition's naturalists collected the flora and fauna of each locality visited. The collections were transferred to the Smithsonian Institution after its establishment and these formed the nucleus of our natural history collections. Transferred with the biological specimens were original notebooks from the naturalists, manuscripts, published reports and illustrations, and these are now housed in the Smithsonian Archives. The Division of Transportation in the National Museum of American History contains information about the expedition's ships. The ships' journals and logs, correspondence, reports, and hydrographic survey notes are found in the National Archives in Record Group 37, Records of the Hydrographic Office, in the Records of the United States Exploring Expedition. Maps of the expedition are in the Library of Congress.

The Smithsonian was involved in the North Pacific Exploring Expedition of 1853-1856 from the outset. This expedition was organized by the U.S. Navy to prosecute "a survey and reconnaissance, for naval and commercial purposes, of such parts of the Bering Straits, of the North Pacific Ocean and the China Seas, as are frequented by American whale ships and by trading vessels." William Stimpson, an invertebrate zoologist, was one of three naturalists aboard. The Smithsonian Archives holds those of his research notes, manuscripts and drawings that were not destroyed in the Great Chicago Fire. We also hold general correspondence between the SI and the Navy about the expedition. At the National Archives, Record Group 45, Naval Records Collections houses the Navy's files on this expedition.

The Smithsonian Archives holds not only Spencer Fullerton Baird's official records as Assistant Secretary and Secretary of the Smithsonian and his personal papers, but also a collection of records documenting his tenure as Commissioner of Fish and Fisheries and the Commission's successor, the Bureau of Fisheries of the Department of Commerce. Included are research notes, Fish Commission vessel logbooks, correspondence and a charming set of photoengravings of Woods Hole scenes. The Smithsonian Archives records complement National Archives Record Group 22, Records of the Bureau of Fisheries. Other related materials include a collection of New England Fishing Schooner logbooks, 1851-1863; and information compiled for a Bulletin of the U.S. National Museum on *The Fisheries and Fishery Industries of the United States* published in 1887. The papers of J. Templeman Brown and George Brown Goode in Smithsonian Archives document that work.

Many of Baird's assistants at the U.S. Fish Commission also served as honourary curators of the National Museum. Some later joined the staff permanently. Their papers document the development of the Marine Biological Laboratory at Woods Hole and the growth of the national collections of marine specimens. Such individuals include Tarleton H. Bean, Barton A. Bean, Barton Warren Evermann, Frederick William True, James E. Benedict, Richard Rathbun and his sister, Mary Jane Rathbun, who began as a volunteer at Woods Hole. She was a self-educated carcinologist, the first woman curator at the Smithsonian, and the recognized authority in her field. Smithsonian Archives holds both the departmental records of these curators and collections of their personal papers.

Baird was also involved in the establishment of the U.S. Coast Survey and the Lighthouse Board. In addition to Baird's records and papers, the Smithsonian Archives holds small collections of materials of Alexander Dallas Bache, the Superintendent of the Coast Survey, and Robert Stanton Avery, who designed tide gauge equipment and compiled tide data. These complement NARA Record Group 23, Records of the Coast and Geodetic Survey, major portions of which have been microfilmed, as well as Record Group 26, Records of the U.S. Coast Guard, Records of the Bureau of Lighthouses and its Predecessors.

Baird also became involved in preparing the U.S. government exhibitions for a series of late nineteenth century international expositions, some devoted entirely to fisheries. Our exposition records detail the exhibits prepared for such events as the Philadelphia Centennial Exposition in 1876, Berlin International Fishery Exhibition of 1880, Great International Fisheries Exhibition in London in 1883, the World's Columbian Exposition in Chicago in 1893 and the International Maritime Exposition in Bordeaux, France, in 1907. Smithsonian exposition holdings are complemented by records of these expositions in NARA Record Group 22, Bureau of Fisheries Records.

As a result of Baird's work with the Fish Commission, the United States National Museum acquired extensive collections in ichthyology and marine invertebrates. After Baird's death, there was less focus on economic issues, as curators focused on the tasks of identifying, naming and classifying these specimens. Turn of the century curators in this category included the ichthyologist Barton Bean, malacologist William Healey Dall, and Austin H. Clark, a specialist on echinoderms. During the 1920's and the 1930's, several curators conducted field research and collecting trips under the auspices of the Carnegie Institution of Washington which had its own ships. Carnegie consistently funded the field work of Paul Bartsch, a Smithsonian malacologist, at Dry Tortugas Station.

T. Wayland Vaughan, a geologist and oceanographer, and director of Scripps from 1924-1936, was also an associate of the National Museum, especially during his years with the U.S. Geological Survey. He participated in joint Smithsonian, Carnegie and U.S. Navy Surveys of the West Indies and Puerto Rico during the 1930's. Our collection of his papers includes correspondence, notes and writings, and his notebooks from those cruises.

Mary Jane Rathbun's successor, Waldo LaSalle Schmitt, was an active field collector who took advantage of every opportunity to get aboard a ship. In addition to cruises aboard Bureau of Fisheries vessels such as the Albatross and the Carnegie's Anton Dohrn, Schmitt participated in the Presidential Cruise of 1938, the Alaska King Crab Investigations, U.S. Navy Galapagos Expeditions in 1941 and 1942, and the Palmer Peninsula Antarctica Survey of 1962-1963. Schmitt's Papers include correspondence, field notes, logbooks and photographs.

Ichthyology had gone into decline at the National Museum when Tarleton Bean's brother, Barton, assumed the curatorship of ichthyology. However, it was revitalized by George Sprague Myers and his successor, Leonard Peter Schultz, and we have fine collections of both of their personal papers. Schultz participated in several major government expeditions including the U.S. Navy Phoenix Expedition of the 1930's and Operation Crossroads, the survey and resurvey of Bikini before and after the atomic tests there. Several other SI curators, notably Joseph P.E. Morrison and Ted Bayer also went out on Operation Crossroads, and Morrison's papers include materials from Crossroads. The Smithsonian Archives also houses the personal papers of a U.S. Geological Survey geologist Harry S. Ladd, who, along with Joshua Tracey, conducted drilling experiments on Bikini. These papers are complemented by the official army, navy and air force records from Crossroads, especially Record Group 374, the Records of the Defence Atomic Support Agency, Records of Joint Task Forces, and Records of the Office of Naval Research.

Immediately pre and post World War II, the U.S. Navy sponsored a series of expeditions which included naturalists from the Smithsonian. The Phoenix Islands Expedition, Galápagos Island Expeditions on the eve of the war, the Operation Crossroads after the war brought large marine collections to the Smithsonian and made our Museum of Natural History a center for research on Pacific marine fauna. The Navy also sponsored such projects as the Shark Research Panel, which Leonard Schultz served on for many years; his papers contain an extensive set of files on that project. Along with the marine specimens acquired through these expeditions, the National Museum of Natural History also received fine collections of field notes which document the day to day activities aboard ship to ensure that colours were captured accurately.

The SI also developed its collections of marine mammals through the work of Leonhard Stejneger at the turn of the century. Stejneger's papers also contain information for a biography of Georg Wilhelm Steller and his files relating to the Alaska Fur Seal Controversy. These complement the Alaska File of the Secretary of the Treasury and Records of the Division of Alaska Fisheries in NARA Record Group 22, Records of the Fish and Wildlife Service. Later, A. Remington Kellogg, Clayton Ray, Douglas Emlong and James Mead continued to develop these collections.

Kellogg was involved in the International Conference on Whaling of 1937 and the subsequent International Commission on Whaling. Records of that group in Smithsonian Archives are complemented by U.S. Fish and Wildlife Service Records in the National Archives. Smithsonian interest in marine mammals continued when the U.S. Marine Mammal Program was headquartered at the Natural History Museum in 1967. Records of that program document daily activities, research proposals, international conferences and marine mammal protective legislation, as well as whaling statistics.

The post-Sputnik science boom led to expanded funding for oceanographic voyages, such as the International Indian Ocean Expedition. In 1962 an Oceanography and Limnology Program was established at the Smithsonian to coordinate oceanographic work. One of its prime responsibilities was establishment of the Smithsonian Oceanographic Sorting Center and the Mediterranean Marine Sorting Center in Tunisia to process and distribute the ever expanding flow of biological collections from these oceanographic expeditions. Although the Office of Oceanography and Limnology was abolished in 1976 in favour of the traditional organism divisions, the Sorting Center remains an active part of the National History Museum today. The archives hold records of the central office and the sorting centers.

Another large scale project of the post-Sputnik era was the Pacific ocean Biological Survey Program. Its scientific goal was to survey the fauna of the Pacific, especially birds, and to track migration patterns. Funded by the Department of Defense, it was eventually discontinued when questions were raised about the appropriateness of its location at the Smithsonian. Our records contain correspondence, field reports, photographs, administrative files, and "at-sea" observations and data.

In 1971, the Smithsonian established its own marine station at Fort Pierce, Florida. Curators from the National Museum of Natural History and visiting scholars conduct ongoing research programs in life histories, systematics and ecology, especially of marine invertebrates. Our documentation of this station includes files relating to the Johnson Sea Link explorations launched from there.

In recent years, the Smithsonian Tropical Research Institution in Panama has expanded its purview to include marine labs on both the Atlantic and Pacific Coasts. Biologists there study the behaviour and evolution of marine life, including the effects of oil spills on the marine environment. Records of those operations document their establishment, administration and research programs. For more recent researchers we have a collection of audiotaped and videotaped oral history interviews.

Of recent oceanographers, our most important collection is from Bruce Heezen, an oceanographer noted for his plate tectonic interpretation of the central rift valley of the Mid-Atlantic Ridge. The Heezen Papers is a large and rich collection documenting his work with Marie Tharp and includes correspondence, teaching and lecture notes, cruise logs, manuscripts, dive films, videotapes, photographs, and maps and globes of the ocean floor. Pacific rift valley research also has made its was to our archives. Smithsonian curators from a variety of departments have been involved in research on the marine life recently discovered around the vents along the Galápagos and north Pacific rifts. The Meredith Leam Jones Papers and oral history interviews, among others, document that research.

Smithsonian archival collections in the history of oceanography reflect our focus on the biological, rather than physical, aspects of this field of research. Major areas of focus include the early exploring expeditions, fisheries biology, taxonomic identification and classification of marine life, as well as biogeographic distribution and evolution. Much of this research was underwritten by the U.S. federal government, especially the Bureau of Fisheries and the U.S. Navy, thus, there are often complementary records in the National Archives. Smithsonian

archival collections run the gamut from routine correspondence to reports to field logs and notebooks to maps to technical specifications for equipment to data collected to wonderful scientific illustrations and photoengravings. This brief account of our collections has not touched on every relevant one; a more complete list of holdings is available upon request.

Pamela M. Henson, Institution History Division, Smithsonian Institution Archives, Washington, D.C. 20560, USA

SIR JAMES RAMSAY GIBSON MAITLAND 1848-1897 - PIONEER BRITISH (AND WORLD?) PISCICULTURALIST

Since the rapid development and application of artificial fish propagation in Europe and North America in the mid to late nineteenth century, those interested in the history of fisheries and fishery science have become well acquainted with various "Fathers of Modern Pisciculture" around the world. To name but a few, the Chinese have Fan Li, the American Theodatus Garlick and Spencer Fullerton Baird, the Canadians Samuel Wilmot, the Germans Stephan Ludwig Jacobi, the Irish Thomas Ashworth, and the French J.M. Coste. The leading light in nineteenth century British fish culture has traditionally been Frank Buckland (1826-1880), a multi-faceted naturalist and Inspector of Salmon Fisheries who spent years disseminating knowledge on salmonoid pisciculture hoping that it would be adopted as a remedy to a perceived decline in the produce of British salmon fisheries. While Buckland was undoubtedly a key figure in piscicultural popularisation, it is the intention of my work to bring to light another key figure in the field, Sir James Maitland, a Scottish landowner and Baronet of the Sauchie, Barnton and Bannockburn estates in central Scotland. While Buckland wrote and spoke about pisciculture, Maitland practised it on an extensive scale and I contend that he was ahead of others involved in salmonoid propagation at that time in Britain and elsewhere.

Maitland's piscicultural establishment, the Howietoun Fishery, situated about four miles from Stirling and close to the famous Bannockburn battleground, is the only British hatchery in continuous operation since the late nineteenth century. Owned and run by the University of Stirling since 1979, Maitland started it in 1873 with a simple open-air hatching box on a stream. By completion in 1886, Maitland believed Howietoun to be "the largest and most successful fishery the world has ever seen".

Was Maitland correct? In size alone, there is little doubt that, in Britain at least, Howietoun was unique. All existing and previous piscicultural establishments were largely hatching operations where ova were taken from wild fish, incubated then returned to the natural environment either on the point of hatching or as very young fry. Thus they required only an i ncubation/hatching house and, perhaps, one or two ponds in which to temporarily hold the spawning fish or to house the fry before setting them free. Howietoun, on the other hand, was a fully self-sufficient fish farm which supplied its own ova, incubated and hatched them, and then reared live fish or any age between one and ten years in captivity. The massive breeding stock of 282,672 fish by 1886, segregated according to age and sex, required extensive housing in a system of 33 ponds which covered 150 acres and required a water supply of three million gallons daily. At its prime the French piscicultural establishment at Huningue (which was lost to Germany after the Franco-Prussian war) had covered only 70 acres, while an earlier Scottish piscicultural operation, at Stormonfield on the River Tay, used only one or two ponds. The fishery was also different in its production capabilities; by 1885 Maitland utilised over 300 square yards of glass grilles to incubate 30 million Loch Leven trout ova per annum and to hatch about half that number. His principal hatchery covered 3000 square feet, which, I believe (I would be grateful for correction from North American readers) was twice the size of the largest hatchery operated by the U.S. Commission of Fish and Fisheries in 1886. In 1882/3 Howietoun produced a total of 6,600,000 trout fry, while 11 Canadian Government hatcheries combined produced 5,649,000. Likewise, by its completion in 1886, Howietoun's output was three times as great as the combined production of the other 10 trout hatcheries operating in Scotland. A correspondence of *The Times* noted that "Here we have a fish farm which certainly has no equal in the United Kingdom, while, from what I hear on good authority, I believe there is nothing to compare to it in the United States, in Canada, or on the Continent".

Nevertheless, size is not everything. The fishery's long term reputation must rest on the success of the work that it carried out. What made Howietoun different was Maitland's work in developing techniques that increased the quality of the product and thus its chances for long-term survival and successful restocking of depleted waters. Maitland discovered that, by careful selection of parent fish, fry could be produced that were superior to those naturally propagated in the wild and those that were produced by previous piscicultural practices of either taking ova from wild parents or procuring them from captive broodstock without any references to the quality of the progenitors. Maitland discovered a clear positive correlation between the age of the parent fish and the vitality of the embryo and resultant siblings. He went on from there to judiciously breed fish so that the quality of Howietoun's ova was greatly enhanced. While ova procured from wild spawners in Loch Leven ran at 40,000 to the gallon, the ova from Howietoun's captive broodstock of Loch Leven ran at 40,000 to the gallon, the ova from Howietoun's captive broodstock of Loch Leven trout were much larger (thus more healthy) and ran at 23,000 to the gallon. Almost all of Howietoun's programme of restocking of depleted waters proved eminently successful in the long term. The publication and dissemination of Maitland's work in the 1880's received praise from British fishery scientists and journalists and marked a turning point in British pisciculture. From that time on, all large hatchery establishments followed the Howietoun method of using a broodstock to selectively breed superior fish.

Selective breeding and its offshoot hybridisation (with which Maitland also experimented) are the core of modern salmonoid pisciculture. The evidence suggests that Maitland was indeed the "father" of such a technique, earlier British pisciculturalists, unaware of the need for scientific selection of parents, had often been disappointed when their attempts at restocking failed due to the death of sickly and weak fry. As Maitland's secretary, James Guy, noted, fish culture could be made a success but Howietoun had proved that it required "far more skill than growing hothouse flowers". While the period before Maitland's work had seen many small hatcheries come and go, the period thereafter saw the foundation of large and lasting fish farms around the country, several still in existence today. He laid the basis for the techniques of salmonoid propagation in use in British today, evidenced by simple comparison between fish cultural works published before his own book in 1886 and those published thereafter.

It is appropriate to place Maitland in an international context. On an international scale Maitland deserves remembrance (amongst others) for his work in acclimatising British trout and salmon in such places as Natal, the Antipodes and Canada. But the real question is whether he deserves as much praise for playing a role in the development of international pisciculture as he does for that in Britain. It is too soon to judge this, but his work in the field of selective breeding - the major component of modern pisciculture - does seem to have been revolutionary the world over. I would welcome any corrective advice but I have yet to find evidence of this technique being used elsewhere than Britain until after Maitland's death. This contention is based on North American sources (both primary and secondary) since the United States and Canadian governments funded huge national piscicultural programmes from the 1870's. In 1902, for example, a member of the American Fisheries Society complained that in North America "Much has been said and written about methods and results of propagation; but little thought, it seems, has been given to the foundation on which we work or the quality of the material of which it is composed, i.e., the potency and vigour of the parent fish and the embryo". He went on to quote Maitland's pronouncements on the subject and to recommend a more judicious approach to the selection of parent fish in pisciculture.

In conclusion, there must surely be a place in the piscicultural pantheon, previously largely populated by North American fish culturalists, for Sir James Maitland. There does not seem to be any evidence that Maitland's techniques were used by anyone before he developed them for himself, and the popular acclaim that he received when alive (such as gold medals from the International Fisheries Exhibitions at Edinburgh in 1882 and London in 1883) points to the original nature of his work. That the course of salmonid pisciculture, in Britain at least, changed dramatically from the 1880s onwards, and that Maitland's principles are still the basic tenets of modern pisciculture, are beyond doubt. It seems that this legacy has an international impact as well and I would be glad to hear from anyone who can offer any comments, whether in agreement or otherwise, with this contention. For the time being, I leave the final word to Maitland's obituarist in *The Times*: "I think, Sir, as the founder and director of, perhaps, the finest fish hatchery in the world, an establishment which, I venture to assert, would do credit to a well-subsidised government department, the good work performed by the late Sir James Maitland at Howietoun should receive every recognition and should not be forgotten."

Stephen A. Hill, Dept. of History, University of Stirling, Stirling, Scotland FK9 4LA

WHAT QUESTIONS ARE WORTH ANSWERING?

During ICHO V I often wondered about the proper foundations for writing history. What questions are really worth answering?

At the congress Eric Mills recommended *Science in Action* by Bruno Latour (1987) as a book worth reading. So I promptly bought it and began to read. To my astonishment Labour's ideas opened a fascinating avenue into this issue. I'll begin by asking a question which occurred to me during ICHO V. Then I'll tentatively defend its worth, to see how such a defense might proceed. Next I'll pause to offer a brief review of *Science in Action*, noting one troubling aspect of an otherwise stimulating book. Then, turning Latour's method to my question, I come to a rather surprising conclusion. Finally, almost as a postscript, I'll ask another question.

A Candidate

My question is this: What was the inner vision that sustained Harald Sverdrup and how did it influence his oceanography? The ICHO V keynote address by Robert Marc Friedman - "Contexts for Constructing an Ocean Science: The Career of Harald Ulrik Sverdrup (1888-1957)" - painted a striking picture of Sverdrup departing from a well travelled path (astronomy) to an unexplored path (geophysics), enduring years in the Arctic, participating in several conspicuously unsuccessful expeditions and spending years in voluntary exile from his home country. What kept him going in spite of so much hardship? How did it effect his view of the oceans?

But now suppose I were to ask myself why this question is worthwhile. Why should I care about Sverdrup's inner vision? The first thing that occurs to me is that Sverdrup was influential in the development of oceanography both as director of Scripps and as an author of *The Oceans: Their Physics, Chemistry and General Biology*. Therefore an attempt to articulate his vision of oceanography might show something about how the field developed...This isn't a line of argument I find very interesting. Maybe if I kept pushing, something would start to click but I'd prefer to try something else.

Next I remember a slide Friedman showed while narrating one of Sverdrup's exhausting Arctic cruises. The slide showed Sverdrup in

cramped crew quarters, looking blankly over his shoulder toward the camera. Friedman paused from his script, glanced over at the slide and quipped, "Now that is that face of a man who has taken 20,000 observations!" The audience laughed. So did I, but a sequence of questions also popped into my head: "How did Sverdrup keep going? I'd have curled up in a corner - probably seasick - and dreamed desperately of going home. He was human too and must have gotten very tired. Yet he somehow got beyond that...but to what? When he was taking wind measurements or reading the temperature of the surface waters, what was he thinking, what was he experiencing? This data had to mean something more to him than just numbers for future incorporation into some dynamical equation. But *what* did it mean? *What* was he learning about the ocean?"

Now this interests me; it reminds me of a quandary I felt in graduate school. As a student in geophysical fluid dynamics, I was up to my ears in mathematics and entranced by the almost godlike sense one gets moving symbols around on a blackboard; manipulating the essence of the ocean and the atmosphere - or so it seemed to me then. Yet it dawned on me that there was also something unreal about this; the squiggly lines on a piece of graph paper were all that was left of the ocean by the time it got to my desk at school. The only way I knew to understand the ocean was strictly reductionist, yet this was clearly leaving a lot out. Perhaps by studying Sverdrup carefully I could find another way of understanding the data.

By now, I'm really interested! The next step would be to go looking for somebody to share by enthusiasm. I'd try to make him or her feel the same urgency I felt about the relation between Sverdrup's experiences and his understanding of his data. If I detected interest in this person, my confidence in the value of my question would grow. If I got a skeptical response, I'd sigh and wonder if my idea was flawed after all. Perhaps the data are just the data, period. Perhaps oceanographic knowledge is in a totally separate compartment inside our heads from what drives us to endure hardships to get that knowledge.

So far all I've done is follow a hypothetical dialogue on whether a particular question was worthwhile. Nothing has really been said about whether it is worthwhile or not. No criteria have been suggested aside from hints conveyed by words such as "urgency", "enthusiasm" and "confidence." Yet this dialogue bears a striking resemblance to the sort of dialogue that Bruno Latour uses as a primary tool in his analysis of science. I'll halt my investigation here to examine Latour's ideas and resume it when I've finished.

Science in action: a brief review:
Bruno Latour wants to know how people come to accept a scientific theory as fact. For example, if we were to look in on Jim Watson and Francis Crick in 1951, we would see them struggling to figure out the structure of DNA. But if we were to move forward thirty years and look over the shoulder of biochemists hard at work in genetics, we'd find them accepting the basic structure of DNA as fact. What happened?

As Latour begins his pursuit of this question, though, his first injunction to the reader is to "abandon knowledge about knowledge all ye who enter here!" (p.7). The real heart of his book is a methodology: You must unfailingly follow the participants in the science fact-generating process, examining everything they say and do without any prejudice.

For example, when Watson and Crick heard that Linus Pauling had proposed a three-chain helix model for DNA, they were afraid they had lost the race. Watson recalled that they had already considered the three-chain helix and rejected it, "yet somehow Linus, unquestionably the world's most astute chemist, had come to the opposite conclusion. When Francis was amazed equally by Pauling's unorthodox chemistry, I began to breath easier" (Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*, 1968, p.103). As you follow Watson and Crick, you are to pay as much attention to words such as "amazed", "breath easier" and "the world's most astute chemist" as to "three-chain helix" without prejudice as to which are relevant to an investigation of scientific knowledge.

Science in Action is divided into three parts. In the first, the scientists themselves are tracked as they pursue scientific controversy in the literature and in the laboratory. The second part follows all those who are in come way related to science, such as laboratory administrators. The last part follows the scientific laity - literally everybody else.

Latour begins by trailing an imaginary dissenter who questions the assertions in the scientific literature. Watching the discussion from a distance and not getting involve din the controversy ourselves, the literature takes on a surprising rhetorical aspect. For example, references begin to feel like device to fend off dissenters.

If you were to read the reference-free sentence, "So-and-so is the case," you'd probably not hesitate to question it. Maybe you don't think that so-and-so is the case. Perhaps you're not convinced by the evidence that has been given. But suppose instead you read, "So-and-so is the case (Smith, 92)"; you might be a little slower to trust your instincts. Maybe Smith adds something this author has left out. Maybe the reservations that occur to you have long since been addressed. Even worse, "So-and-so is the case (Smith, 92: Jones, 91b; Wilson, et. al, 89; Davis and White, 75)." In addition to a whole lot more people and papers, you're now confronted by a reference from 1975. Think how much else might have been written in the paper trail already reaches back eighteen years. Seriously questioning this paper could turn into a career.

As Latour studies the evolution of a scientific claim in the literature, he comes to a conclusion "so important that this book is simply, I could argue, a development of this essential point: *The status of a statement depends on later statements*" (p.27). While this may at first sound peculiar, it is a direct consequence of Latour's method. You are to observe everything the scientists say and do without ever

becomming a scientist yourself. Thus, you do not decide whether something is or is not a fact, you only know what the participants say; you are not to decide whether the double-helix or the triple-helix is a better model of DNA, you are to study those who make the decision. Hence, the only way you can know the status of a statement is to wait and see what others will say. In thirty years, the scientists you observe will say that DNA is clearly a double helix. That's all you know.

Now, back to our dissenter. He or she has braved the literature and still does not think that "so-and-so is the case." We next follow this controversy into the laboratory, where the evidence can be seen first-hand. Nature will speak and it'll all be over, right?

Well, of course, we don't find Nature in the laboratory, we find lost of equipment and another scientist, whom I'll call the advocate. The controversy continues as our dissenter questions first the equipment and then the advocates' interpretation of the equipment's output. The dissenter leaves, unconvinced, to establish a counter-laboratory dedicated to showing that "so-and-so is definitely not the case." Our dissenter is clearly making a career decision here.

At some point, however, the contest ends. Why? Because our dissenter has either won or given up. Everyone may simply be satisfied that the truth won out in the end. Considering how much energy had to go into effective dissent, though, there may simply be nobody else around willing to pick up the fight. Indeed, the issues at stake are probably so arcane by now that nobody else even cares about the fight. By the time our dissenter is finished, all the other competitors have long since turned to other things.

Latour devotes a whole section to rejecting one possible explanation for the termination of this controversy, namely that "Nature has spoken." Presumably, this is based on years of experience as a historian; he has just never (or at least very rarely) come upon situations where everyone walked away saying anything like, "Well, Nature has spoken. Time to go home." The intrinsic scientific merit of a claim is never enough to explain why the winner won. "This notion of under-determination is also called the Duhem-Quine principle. It asserts that no one single factor is enough to explain the closure of a controversy or the certainty acquired by scientists. This principle forms the philosophical basis of most social history of sociology of science" (p.260).

I will interrupt my review of *Science in Action* here to comment on an aspect of this under-determination I find troubling. Now I grant that scientists are swayed by more than just the objective evidence. When you become a scientist, you don't have your emotions surgically removed. (You would be a weak scientist if you did; how could you care about your results?) So, I don't question that under-determination is real.

But I worry that this precept will temp historians of science to ignore the difficulties inherent in the very thing science studies - Nature! There is a real world, a real ocean out there! Whatever else may influence oceanographers, they are finally dedicated to finding out the truth about the ocean. However difficult this truth may be to articulate, however resistant this final dedication may be to social or philosophical analysis, to ignore the truth of science is to render science an exercise in illusion - just smoke and mirrors.

Indeed, this very difficulty may be the sign of something significant and genuinely worth thinking about. Latour wants to know why people accept a scientific fact. Well, how about *because it's true*! "Yes," Latour might say, "but how do these people know they're not mistaken?" Because it is TRUE, isn't it?...When we trip over such a simple question as this, it may be a clue that we have come upon an entanglement woven deeply in our culture. Edwin A. Burtt makes a similar point in *Metaphysical Foundations of Modern Physical Science* (2nd Edition, 1980).

To be sure, one may wisely elect not to tackle these difficulties head-on; "I think I'll forgo fundamental, culture-breaching analysis today and work on my little paper about Sverdrup." But to act as if truth and the dedication to truth were unimportant would be a serious mistake and ultimately enervating to the study of science. I'll return to this point later.

If the heart of *Science in Action* is Latour's methodology, then the body of the book is his portrait of the immense network of associations that emerge as we pursue scientists at work. As an association counts if it contributes meaningfully to the establishment of a new fact. One day, as Watson was studying picture of molecular structure in textbooks, he hit on an exciting idea. "I no sooner got to the office and began explaining my scheme than the American crystallographer Jerry Donohue protested that the idea would not work. [Several of the molecular structures in the textbooks were midleading.] Though my immediate reaction was to hope that Jerry was blowing hot air, I did not dismiss his criticism. ...Thoroughly worried I went back to my desk.." (Watson, 1968, pp.121-2). Watson's high opinion of Donohue was enough to weaken his confidence in his new idea. Thus his estimate of a fellow scientist was a crucial to his thought as his estimate of, say, some part of X-ray crystallography and therefore this estimate counts as a significant association.

Now, *every* association isn't significant. What Watson had for breakfast and the waiter who served it to him can be dismissed as irrelevant to his discovery of the double-helix that afternoon. (Though I can imagine future generations of graduate students meeting for breakfast at that very place and kidding one another as they order just the same breakfast.)

The power of Latour's method lies in raising a reasonable doubt in our mind about less farfetched associations we might otherwise uncritically reject. Now, some are obvious and need no protection from premature dismissal. For example, satellite-borne radiometers can detect the infrared radiation from the ocean's surface and hence estimate its temperature. This is obviously relevant to climate studies and any history of climate will certainly feature the role of satellite remote sensors. But what about the funding of these satellites?

Satellites are very expensive. Without substantial backing, they wouldn't exist. Without *them*, in turn, we'd probably never know about the ozone hole, and climate research today would be very different. this is starting to sound like an important association.

But let's go even further afield - Latour certainly does. What about the political conflicts that fuelled the arms race that made space flight possible? Is there any significant association between these and our knowledge of climate? Is the association as farfetched as Watson's breakfast? Perhaps the ability of a society to field a technologically sophisticated army is related to its ability to nurture science. Perhaps even our picture of the universe is subtly related to our membership in a certain sort of society. If we have any nagging sense that such relationships might be relevant, Latour would have us include them, suspend further disbelief and continue our tracking of these associations into ever-wider spheres.

Latour does exactly that in the last two parts of *Science in Action*, tracing out the networks within which scientific knowledge circulates. In part two he studies the non-scientists who are closely associated with science, such as the people who fund the laboratories. One of the most important roles these people play is helping create a place where science can work. If our imaginary dissenter had not been able to win some powerful allies, there would have been no counter-laboratory and no effective dissent. Ultimately, there would be no such thing as a professional scientist.

Part three is an embracing analysis of human interactions. Scientific networks, though extensive, are still small compared to the associative networks the rest of us use to learn about the world - what our parents tell us, what we read in the paper and so on. So Latour must now look at how scientific facts are perceived by average people outside these networks. The scope of the analysis is impressive.

In conclusion, Latour says that historians of science ought to be studied in just the same way he has studied scientists. One day we ought to follow a dissenting historian through the scholarly literature, see how and when issues are decided, look around to see who the non-historians are who make the profession of history possible and observe how average people become aware of science and its history.

But who knows?

Let me summarize Latour's inquiry of how scientists come to accept things. First, his method: Unfailingly follow the participants. Look for all the associations they develop that have any hint of relevance to why a fact is accepted, trusting that the truly irrelevant ones will eventually drop out. Results: A network of associations beginning with the references in the literature, including literature on instruments, and continuing out to the many supporting people whose interest is crucial to the viability of scientific debate.

To determine the status of a bit of knowledge within this network you discover that Nature is never enough, so you'll always find yourself looking to other locations in the networks. This network can interact with the associative networks of everybody else, since everybody has a conception of how the world works and thus could potentially have a conviction about the same piece of the world to which a scientific network has laid claim.

Latour's final comment - that we ought to study history of science the same way we study science - provides me with a way to resume my initial investigation: Is it worthwhile for me to search for Sverdrup's sustaining vision? I'll just invent a little observer who watches over my shoulder. I halted the investigation just as I was beginning to look for someone with whom to share my ideas. Since the seed of my question was planted while I was listening to Friedman's keynote speech at ICHO V, and since I had an interesting conversation with him at the reception afterwards, I could begin perhaps by calling him...

A sudden doubt crosses my mind. I turn around and ask my observer, "Hey, how are you going to know if my question is worthwhile?" The observer frowns. "Well, I'll just keep track of all your associations. If Friedman is encouraging, I'll note how you react. If he supports you I'll follow him a while too, to see what allies his support brings into your camp. And so on."

I'm not satisfied. "You didn't answer my question. I grant that if people like Friedman who know a lot about Sverdrup find my question interesting, I'll be more confident that it's worthwhile. I'm sure Friedman gets encouragement from his allies. But all that's happening here is that more and more of us are asking ourselves the same question. The essential decision is being made inside us - a place you, as an observer, can't see.

The observer's frown deepens. "Hmmm... This is something like the situation with Nature. An observer *in the role of observer*, seems to be cut off from Nature too!" There is evidently a whole class of questions, including the truth of assertions and the value of pursuing them, which is not accessible to the observer. If we follow Latour's lead and examine either science or the history or science from the viewpoint of an observer tracking associations we must forgo asking such questions. That's not really so surprising; we gain something by detaching ourselves and becoming observers but we lose something too.

That's the bad news. The good news is that there is nothing preventing our moving back and forth from participant to observer. Indeed, there are good reasons to do so. For one, it helps us resist the tendency as observers to explain away what scientists do as totally accountable in terms of associative networks; imagine someone explaining away a carefully built theory of yours as "just" due to associations. Such explanations are not only jarring, they are ultimately unsatisfactory. On the other hand, we learn from the perspective of observer just how important those associations are and how far they extend. That, in turn, will help us resist the tendency as participants to ignore the very real dependence we have on a wide variety of people.

I began this essay looking for somebody to tell me what historical questions are worth answering. To my amazement, I've come back full circle. Nobody else can answer this for me. I unquestionably need others, but as colleagues not gurus. I finally have to answer my own question.

So, is it worthwhile to discover the inner vision that sustained Harald Ulrik Sverdrup? Yes, I think it is. I want to know what gets lost in that trip from the ocean to squiggly lines on a piece of graph paper. What better way than to follow someone who actually took the trip? I'll assume the roles of observer (historian of oceanography) or participant (oceanographer) as the need arises. And you can bet that I'll read Friedman's book on Sverdrup when he finishes it.

A final question - As I read Latour, an image kept coming to me. I imagine an immense field of Jack-and-the-beanstalk vines, growing straight up out of the ground. Each vine is the life of one person. The network is now a network of lives and the countless associations we have with one another are represented by these vines cavorting around, alternately tying one another up in knots and then reinforcing each other.

This seems to me a deeply accurate way of showing how our lives move. The function of history is to draw these pictures. Now, according to my assertion that an observer of scientists can't see Nature itself, it must be impossible to include Nature in my drawing, which is drawn from the point of view of an observer. But, somehow, I can't quite accept this...Is there really no way to put Nature in this picture?

David Irvine, Hughes STX Corporation, 7701 Greenbelt Road, Greenbelt, MD 20770, USA

SOUVERAINS OCEANOGRAPHES - BOOK ANNOUNCEMENT AND REVIEW

Dom CARLOS I, Roi de Portugal, Albert 1er, Prince de Monaco, Souverains océanographes. Documents edited by Jacqueline CARPINE-LANCRE et Luiz Vieira Caldas SALDANHA

A 179 page oblong volume (size 24 x 30 cm). Numerous illustrations: portraits, reproduction of letters, photographs, sketches and watercolours by D. Carlos. Short biographies of the persons mentioned; name index, subject index.

Prince Albert 1 of Monaco (1848-1922) and the King of Portugal D. Carlos I (1863-1908) were enthusiastic oceanographic pioneers. Thorough searches were undertaken in the Archives of Monaco (Prince's Palace, Oceanographic Museum), of Portugal (Arquivo Nacional da Toree do Tombo, Museu Oceanográfico D. Carlos I/Aquário Vasco da Gama) and in Paris (Archives de la Maison de France, branche d'Orléans). They resulted in finding numerous documents written by both Sovereigns and their main assistants: Doctor Jules Richard, Albert Girard, Colonel Chaves. Ninety letters, most of them hitherto unpublished, were selected, transcribed and annotated in detail.

The correspondence between D. Carlos and Prince Albert, exchanged in French between 1894 and 1907, is mainly dedicated to scientific subjects: oceanographic cruises on board the yachts *Princess-Alice* and *Amelia*; scientific projects, ideas, and techniques; improvements in the use of gear and methods; study of the specimens and data; unrelenting efforts to set up and promote meteorological observatories in the Azores. Other topics (politics, diplomacy, music) are sometimes mentioned and add a human touch to the book.

True to its tradition of patron of arts and sciences, the Gulbenkian Foundation produced a handsome volume: careful typography and print, original make-up, lavish illustrations. The attractiveness of the presentation of this sophisticated and erudite book makes it into a document of an exceptional quality. It is available from: Bibliothèque, Musée océanographique, Avenue Saint Martin, MC98000 Monaco for 250 French francs, postage and packing included. Please pay by cheque or postal money order in French francs payable to "Institute océanographique" at no charge to Musée).

Souverains Océanographiques, Jacqueline Carpine-Lancre and Luiz Saldanha [Eds], Fondation Calouste Gulbenkian, Lisbon, 178pp., 1992 - The oceanographic interests of Prince Albert I of Monaco are well known. Few marine scientists, let alone oceanographic historians, can abe unaware of the extensive series of research cruises, undertaken by Albert between 1884 and the first world war and the lavishly produced *Résultats des campagnes scientifiques*...in which many of the results were published. In addition, the Institut océanographique, which he founded, is a lasting monument to his enthusiasm and vision. Finally, an even broader constituency, surely to counted in tens or hundreds of thousands, are aware of the Prince's marine scientific interests through the many monégasque stamps with an oceanographic scheme.

In contrast, the similar interests of a contemporary European monarch, Dom Carlos de Bragança, King of Portugal from 1889 to 1908, are not well known, at least outside Portugal. This is partly because the efforts of Dom Carlos were much less extensive and productive than those of Albert, but also because they were terminated abruptly when the King was cut down in his prime by an assassin's bullet.

I have to admit my own ignorance of Carlos' research until, only a few years ago, I changed upon an article about him in a TAP magazine during a flight from Lisbon to Madeira to join the RRS *Discovery*. From that short article I learned of his interest in oceanography,

inspired by Albert's example, of his series of cruises from 1896 onwards in a succession of yachts named *Amelia* after his Queen, and of his very considerable artistic talents in illustrating various aspects of these cruises. More recently, I was fortunate enough to receive from my friend Luiz Saldanha a copy of the superb facsimile of Dom Carlos' own journal of his 1897 cruise, originally published in 1979 and reissued in 1988. But I could do little more than admire the pictures and the quality of presentation. For although the book contains extensive notes placing the journal into its historical context it is, understandably, entirely in Portuguese and pretty inaccessible to me.

I was therefore quite unaware of the strength of the connection between Dom Carlos and Albert until I read this new book, lavishly produced and beautifully edited by Jacqueline Carpine-Lancre and Luiz Saldanha. It is based on transcripts of the extensive correspondence between the two monarchs and their respective oceanographic aides (Richard and Girard), mainly between 1894 and 1907, Jacqueline dealing with the archives in Monaco and France and Luiz with those in Portugal. Fortunately for me, and I suspect for many other potential readers, with the exception of a Portuguese version of the preamble, the book is entirely in French, for this was the correspondence language between the two groups.

The body of the text is arranged in yearly blocks, each section having a summary of the main events of the period written by the editors, followed by transcriptions of the correspondence and copious and extremely informative footnotes. Scattered throughout the text are numerous excellent illustrations, including contemporary photographs, and reproductions of some of the original letters and Dom Carlos' superb sketches and aquarelles, mainly from the 1897 *Amelia* journal.

The two men, then heirs to their respective thrones, apparently met for the first time in Lisbon in 1873, when Albert visited the Portuguese royal family in his recently purchased yacht, *Hirondelle*, only months after the *Challenger* had called in the early weeks of her circumnavigation. Albert was received very cordially, but he could hardly have had much rapport with Carlos, fifteen years his junior and only ten years old at the time. But by the time they acceded, within six weeks of one another in 1889, they were well acquainted and, like Albert, Carlos had become a keen sailor. Six years later, when Carlos decided to take up oceanography, prompted particularly by Albert's discovery of the Princesse Alice Bank to the south of the Azores in 1895, he could write for advice in very informal and friendly terms. Thus began a long, frank, and cordial exchange of information on all aspects of oceanography, including detailed accounts of gear, techniques and results.

Naturally, the information flow was mainly from Albert to Carlos, the latter's letters often having the tone of a student's enthusiastic progress report to a respected professor. But on at least one occasion the tables were turned. In 1900, Albert was frustrated by his limited success in deep water long-line fishing and asked for details of the much more successful technique that Carlos employed, an adaptation of the commercial gear used by Portuguese fishermen. This must have been a source of considerable pride to Carlos, for he was usually in the position of a poor relation. Albert seemed to have more or less unlimited resources to build and equip his yachts, to finance wide ranging cruises throughout the north Atlantic and polar seas, to publish the results and to establish his own museum. In contrast, as the monarch of a poor and disturbed country, Carlos had very limited funds, and the restricted time he could spare from affairs to state to devote to oceanography was mainly spent in Portuguese waters with the ultimate aim of improving knowledge of potential marine resources for the good of his subjects.

Dom Carlos occasionally grumbled mildly to Albert about his limitations, particularly the pressure of official duties keeping him from his beloved research. But otherwise the correspondence between the two monarchs was generally restricted to oceanography, with minor references to more social matters, including possibilities for meeting in the coming months. This pattern was broken dramatically in February 1907 when Dom Carlos wrote to Albert in quite different terms. The previous year he had felt constrained to break the unwritten rule of an alternational of political power between the two main parties within Portugal and installed his own man, an outsider, as Prime Minister. He had wished, he told Albert, to instigate a revolution from the top, producing a modern government of freedom and honesty. Otherwise he feared that there would be a revolution from the bottom, leading to the ruin of his country. As he wrote, things were not going too badly. But to secure the future he would be unable to do any oceanography in the coming year, for he would have to stay "always on the bridge and never abandon the command for one minute". He failed. In April, 1907 he dissolved the parliament and established a dictatorship. On 1 February 1908, as the Royal family was driving through Lisbon in an open carriage, Dom Carlos and his eldest son Luis Fillipe were assassinated.

The throne was occupied briefly by Carlos' second son, the 18-year-old Manuel. But, like his father, he was unable to hold the monarchy together and Portugal was declared a republic in 1910, Manuel and his mother going into exile in England. And this was more or less the end of the story, at least as far as Portugal's royal patronage of oceanography was concerned. While Albert's oceanographic work and legacy went from strength to strength, the story of Carlos' collection is a rather sad one. Manuel had neither the resources nor the inclination to support oceanography. He even toyed with the idea of ameliorating his dire financial situation by selling part of his father's marine collection, possible to Prince Albert. In the event, he bequeathed it to the *Liga Naval Portuguesa* in Lisbon who then handed it on to the Palais Castro Guimarães in Cascais before Manuel's death in 1932. Finally, in 1935, the collections moved once more, this time to the Aquário Vasco da Gama, founded in Lisbon in 1898, where they remain today. Unfortunately, during these peregrinations the collections were seriously depleted so that only a fraction survives.

Despite this rather sad ending, the overall story is fascinating. In combination with Fritz Rehbock's excellent treatment of Joseph Matkin's letters from the lower deck of HMS *Challenger*, this correspondence of a quite different social order makes 1992 a vintage year for previously unpublished oceanographic documents.

A.L. Rice, Institute of Oceanographic Sciences Deacon Laboratory, Wormley, Godalming, United Kingdom

SOCIETE D'OCEANOGRAPHIE DU GOLFE DE GASCOGNE

I am preparing a study on the "Société d'océanographie du golfe de Gascogne". This, consisting for the most part of laymen, was founded in Bordeaux in 1899. It published several pamphlets, an annual report from 1902 to 1909, meteorological charts and charts of the currents in the Bay of Biscay. Its two most important personalities were the President, Charles Bénard, the General Secretary, Nicolas Manley Bendall.

Charles Bénard played a great part in establishing the oceanographic section of the "Exposition coloniale" in Marseille in 1906, which included many international participants. Nicolas Manley Bendall made two research trips to North America to study the organization of oceanographic laboratories and the teaching of oceanography: to the United States in 1910 and to the United States and Canada in 1911 (or 1912).

The first World War put a stop to the activities of the "Société d'océanographie du golfe de Gascogne" which, once the war was over, transferred its head office to Paris and became the "Société d'oceanographie de France". Between 1900 and 1914, the Society exchanged publications with numerous institution in Europe and in America. Bénard and Manley Bendall wrote many letters to scientists all over the world and travelled extensively throughout Europe.

I am looking for all printed publications (books, articles, maps) and all the archives in relation to this subject. I would be very grateful to anyone who could give me the reference and the location of those documents and archives so that I could obtain photocopies or consult on the premises any items I do not yet have knowledge of.

Jacqueline Carpine-Lancre, Musée Océanographique, Avenue Saint-Martin, MC98000 MONACO

ICHO-VI: PROPOSALS INVITED

During an informal meeting held while ICHO-V was in progress, members of the Commission of Oceanography recommended that the International Congresses on the History of Oceanography, which in the past were at irregular intervals (1966, 1972, 1980, 1987), he held regularly at five year intervals. Accordingly, ICHO-VI should be held in 1988.

The Commission now invites proposals for ICHO-VI, recognizing that several years of preparation are necessary for such a complex meeting. To those considering proposals, the Commission will use a number of criteria in selecting the next location.

1. A suitable theme, centered on the history of oceanography, to help unify a programme.

2. A satisfactory location, with facilities for lectures, seminars and social gatherings.

3. Evidence or promise of financial support for logistics and organization.

4. The possibility of financial assistance for travel to some participants, particularly those from developing nations or others that do not offer grants for travel to conferences.

Proposals to organize ICHO-VI for 1998 should be sent to the Commission, c/o Eric L. Mills, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada, by 1 September, 1994.

NEWS AND EVENTS

RITTER FELLOWSHIP ANNOUNCEMENT. Scripps Institution of Oceanography has announced that the third W.E. and M.B. Ritter Memorial Fellowship in the History of Marine Sciences has been awarded to Naomi Oreskes of the Department of Earth Sciences, Dartmouth College, Hanover, N.H., USA. A historian of the earth sciences, Dr. Oreskes' most recent work, on the relevance of gravity surveys to debates about the permanence of continents and ocean basins, was presented at ICHO-V.

BENSON EXECUTIVE SECRETARY OF HSS. Dr. Keith Benson, Department of Medical History and Ethics, University of Washington, Seattle, USA, has been appointed Executive Secretary of the History of Science Society. Dr. Benson was a major organizer of ICHO-V and is a well known scholar of American biology and marine stations.

REHBOCK PROMOTED AT HAWAII. Dr. P.F. (Fritz) Rehbock, also a major organizer of ICHO-V, has been promoted to Professor in the Departments of History and General Science at the University of Hawaii. His most recent work (1992) is the book *At sea with the scientifics*, an edition of the letters of Joseph Matkin from HMS *Challenger*.

NEW BOOK: DIRECTORATE OF FISHERIES RESEARCH. Dr. Arthur Lee's new book, The Directorate of Fisheries Research: its origins and development, a history of the Fisheries Laboratory at Lowestoff, England, 1902-1980 is available for £15 + postage and packing from MAFF, DFR Origins Office, Fisheries Laboratory, Pakefield Road, Lowestoft, Suffolk NR33 OHT, England. It deals with the origin and development of this important laboratory and its context.

VOYAGES OF THE DISCOVERY. An Savours' new book, *Voyage of the Discovery. The illustrated history of Scott's Ship*, 1992, is available for US $49.95 + shipping from Parmer Books, 7644 Forrestal Road, San Diego, California 92120, USA. *Discovery* was used by R.F. Scott; later it had a varied career in oceanography and commerce, including the origins of the Discovery Investigation in the Southern Ocean 1925-1927.

CHALLENGER EXPEDITION PICTURES. Eileen V. Brunton's The Challenger Expedition, 1872-1876. *A visual index* lists and portrays photographs taken during the expedition. Includes history of the Natural History Museum's collection, location of other images, maps of the voyage and other features. £15.00 inclusive from Gail Fordham, Department of Library Services, Natural History Museum, Cromwell Road, London, SW7 5BD, England.

OCEANOGRAPHY IN THE DAYS OF SAIL. Ian Jones's book (1991) about 18th and 19th century work on the sea in Oceania is available for Australian $49.95/US$45.00 from Hale and Iremonger Pty Ltd., GPO Box 2552, Sydney, NSW 2001, Australia.

CURRENT BIBLIOGRAPHY OF THE HISTORY OF OCEANOGRAPHY
(1992-1993, with additions from earlier years)

Jacqueline Carpine-Lancre

AHLSTRAND (P.P.) & MORITZ (T.D.), 1993. Sources for the history of oceanography at California Academy of Science and in the Pacific Northwest, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 6-7. - La Jolla, California : Scripps Institution of Oceanography.

ALEEM (A.A.), 1993. Allan Hancock Pacific expeditions and contribution to marine biology, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 23-24. - La Jolla, California : Scripps Institution of Oceanography.

ALEKSEEV (A.), 1993. Pacific Ocean exploration and exploitation, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 4. - La Jolla, California : Scripps Institution of Oceanography.

ALLWARDT (A.O.), 1993. Evolution of the tectogene concept, 1930-1965, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 40-41. - La Jolla, California : Scripps Institution of Oceanography.

ANDERSON (R.Y.), 1992. Long-term changes in the frequency of occurrence of El Niño events, in *El Niño events, in : El Niño, historical and paleoclimatic aspects of the Southern Oscillation* / ed. H.F. Diaz & V. Markgraf, pp. 193-200, 2 fig. - Cambridge ; New York ; Victoria: Cambridge University Press.

ANNUTSCH (R.), 1993. Entwicklung des Gezeiten- und Windstau-Dienstes. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 115-126, 7 fig.

APPEL (T.), 1993. Marine biology/Biological oceanography and the Federal patron: the NSF initiative in biological oceanography in the 1960s, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 38. - La Jolla, California : Scripps Institution of Oceanography.

ATWATER (T.), 1993. The plate tectonic revolution: the San Andreas bridge between oceanic and continental tectonics, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 41. - La Jolla, California : Scripps Institution of Oceanography.

AVILA (E.), 1992. Um século de baleaçâo o Museu do baleeiros das Lajes do Pico. Açoreana, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 217-236.

BAHAMONDE (N.) & ANTEZANA (T.), 1993. Historical account of oceanography in Chile, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 1-2. - La Jolla, California : Scripps Institution of Oceanography.

BAKER (J.), 1992. *The Oceans* 50th anniversary. *Oceanography*, vol. 5, no. 3, pp. 154-155, 1 fig.

BARTHELMESS (K.), 1989. Walkinnladen in Wanten, Maritime Motivkunde als historische Datierungshilfe. *Deutsches Schiffahrtsarchiv*, vol. 12, pp. 243-264, 17 fig.

BARTSCHER (W.) & KETTLER (O.-J.) , 1993. Entwicklung der DHI/BSH-Flotte, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 179-184, 7 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

BENSON (K.), 1993. Early American adventures in marine sciences education, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 13. - La Jolla, California : Scripps Institution of Oceanography.

BENSON (K.), 1993. Marine biology or oceanography: early developments in marine science on North America's West coast, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 37-38. - La Jolla, California : Scripps Institution of Oceanography.

BERGER (A.), ELLMER (W.) & GENTZ (H.), 1993. Seevermessung, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 281-290, 7 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

BETHOUX (N.), 1992. Océanographie et météorologie, de S.A.S. le Prince Albert Ier à S.A.S. le Prince Rainier III. *Açoreana*, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 73-82.

BETTAC (W.), 1993. Das Seekartenwerk im Wandel der Zeiten, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 291-296. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

BOLOGA (A.S.), 1989. Developments of marine benthic algology in Romania. *Noesis*, vol. 15, pp. 79-86.

BOLOGA (A.S.), 1990. The Romanian Marine Research Institute at its 20th anniversary: tradition, status, perspectives. *Cercetari marine*, no. 23, pp. 7-13.

BOLOGA (A.S.) & MARINESCU (A.), 1993. Romanian developmental contributions from E. Racovitza and G. Antipa to scientific exploration of the Mediterranean Sea, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 44-45. - La Jolla, California : Scripps Institution of Oceanography.

BRANAGAN (D.F.), 1993. Samuel Stutchbury: a natural history voyage to the Pacific, 1825-27 and its consequences. *Archives of natural history*, vol. 20, no. 1, pp. 69-91, 2 fig.

BRUGGEN (A.C. van), 1992. Ferdinand Krauss and the Leiden Museum, with notes on his South African mollusc types, in : *Proceedings of the Ninth International Malacological Congress, Edinburgh, 31 August-6 September 1986* / ed. E. Gittenberger & J. Goud, pp. 77-96, 7 fig. - Leiden : Unitas malacologica.

CAMBRAY (E.), 1992. A portrait of JLB Smith and the founding of an Institute. *Ichthos, newsletter of Society of friends of the J.L.B. Smith Institute of Ichthyology*, no. 35, pp. 14-15, 3 fig.

CARPINE-LANCRE, 1992. L'*Hirondelle* aux Açores. *Açoreana*, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 22-49, 8 fig.

CARPINE-LANCRE (J.) & SALDANHA (L.V.C.), 1992. *Dom Carlos I, Roi de Portugal, Albert Ier, Prince de Monaco, Souverains océanographes*. - Lisbonne : Fondation Calouste Gulbenkian. - 178 p., fig.

CHAPPÉ (F.), 1992. Paimpol et la pêche d'Islande, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 130-135, 14 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.

CHARLIER (R.H.) & MENANTEAU (L.), 1993. The saga of the tide mills, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 11. - La Jolla, California : Scripps Institution of Oceanography.

CHARNOCK (H.), 1993. Secchi and his disc, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 21-22. - La Jolla, California : Scripps Institution of Oceanography.

CLARK (P.F.) & CROSNIER (A.), 1993. *Illustrations of the zoology of the R.I.M.S. Investigator*: authors, dates, issues, parts, plates and titles. *Archives of natural history*, vol. 19, no. 3, pp. 365-374.

CORBEL (B.), 1992. La pêche à Terre-Neuve en baie de Saint-Brieuc, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 124-129, 11 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.

COUPER (A.D.), 1992. History of ocean management, in : *Ocean management in global change* / ed. P. Fabbri, pp. 1-18. - London ; New York : Elsevier Applied Science.

DAVIS (A.E.), 1993. Caroline Islands native knowledge of marine animals and the ocean, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 56-57. - La Jolla, California : Scripps Institution of Oceanography.

DAY (D.), 1993. Resources for the study of oceanography at the Archives of the Scripps Institution of Oceanography, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 6. - La Jolla, California : Scripps Institution of Oceanography.

DAY (D.), 1993. Scripps benefactions: the role of the Scripps family in the founding of the Scripps Institution of Oceanography, *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 51. - La Jolla, California : Scripps Institution of Oceanography.

DEACON (M.B.), 1993. Crisis and compromise: the foundation of marine stations in Britain during the late 19th century. *Earth sciences history*, vol. 12, no. 1, pp. 19-47.

DEACON (M.B.), 1993. William Saville Kent, aquaria, and the Pacific: problems of professionalization in marine science in the late 19th century, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 26-27. - La Jolla, California : Scripps Institution of Oceanography.

DELLA CROCE (N.), 1993. Italian contribution to the knowledge of the South-East Pacific Ocean, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 32. - La Jolla, California : Scripps Institution of Oceanography.

DIAZ (H.F.) & PULWARTY (R.S.), 1992. A comparison of Southern Oscillation and El Niño signals in the tropics, in : *El Niño, historical and paleoclimatic aspects of the Southern Oscillation* / ed. H.F. Diaz & V. Markgraf, pp. 175-192, 7 fig. - Cambridge ; New York ; Victoria : Cambridge University Press.

DICKSON (A.G.), 1992. The development of the alkalinity concept in marine chemistry. *Marine chemistry*, vol. 40, no. 1-2 [Progress in marine chemistry, American Chemical Society 100th meeting in Washington, DC, 26-31 August 1990], pp. 49-63.

DICKSON (A.G.), 1993. The development of our understanding of the carbon dioxide system in sea water, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 42. - La Jolla, California : Scripps Institution of Oceanography.

DRACH (P.), 1989. La naissance de l'océanographie. *Cahiers pour l'histoire du CNRS*, no. 2, pp. 75-87.

DROGUET (A.), 1992. Les pêcheries de saumons de La Roche-Jagu dans la seconde moitié du XVIIIe siècle, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 110-111, 2 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.

DUCKER (S.C.), 1990. History of Australian marine phycology, in : *Biology of marine plants* / ed. M.N. Clayton & R.J. King, pp. 415-430, 2 fig. - Melbourne : Longman Cheshire.

DUENSING (G.), 1993. Das Seewetteramt des Deutschen Wetterdienstes, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 34-36. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

DU PASQUIER (J.-T.), 1991. Les baleiniers et la Révolution française. *Actes des 114e et 115e Congrès nationaux des sociétés savantes, Paris (3-9 avril 1989) et Avignon (9-15 avril 1990)*, Histoire maritime : thalassocraties et période révolutionnaire, pp. 108-117, 1 fig.

DYRSSEN (D.), 1993. Andreas Sparrman 1748-1820, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 21. - La Jolla, California : Scripps Institution of Oceanography.

EMERY (K.O.) & ROSS (D.A.), 1991. Past and future evolution of marine geology. *SEPM (Society for Sedimentary Geology) special publication*, no. 46 [From shoreline to abyss: contributions in marine geology in honor of Francis Parker Shepard / ed. R.H. Osborne], pp. 11-14.

ENFIELD (D.B.), 1992. Historical and prehistorical review of El Niño/Southern Oscillation, in : *El Niño, historical and paleoclimatic aspects of the Southern Oscillation* / ed. H.F. Diaz & V. Markgraf, pp. 95-117, 10 fig. - Cambridge ; New York ; Victoria : Cambridge University Press.

50 [Fifty] years in the silent world: a celebration of aqualung diving. *Diver*, vol. 38, no. 7, pp. 26-33, fig. (1993).

FISHER (R.L.), 1993. The innocents abroad early: Scripps Institution of Oceanography's 1950's exploration of the Pacific, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 53. - La Jolla, California : Scripps Institution of Oceanography.

FOGG (G.E.), 1992. *A history of Antarctic science*. - Cambridge ; New York ; Victoria : Cambridge University Press. - XXVI-483 p., fig. - (Studies in polar research).

FONDA UMANI (S.), GHIRARDELLI (E.) & SPECCHI (M.), 1989. *Gli episodi di "mare sporco" nell'Adriatico dal 1729 ai giorni nostri*. - Trieste : Regione autonoma Friuli-Venizia Giulia, Direzione regionale dell'ambiente. - 178 p., fig.

FONTAINE (M.), 1992. Le Prince Albert Ier de Monaco, les Açores et l'Institut océanographique. Açoreana, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 9-20.

FONTAINE (M.), 1993. The evolution of ideas on the mechanisms of amphihaline teleost migrations, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 34-35. - La Jolla, California : Scripps Institution of Oceanography.

FRIEDMAN (R.M.), 1993. Contexts for constructing an ocean science: the career of Harald Ulrik Sverdrup (1888-1957), in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 1. - La Jolla, California : Scripps Institution of Oceanography.

GARBER (J.B.), 1993. James Dwight Dana's principle of cephalization, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 55. - La Jolla, California : Scripps Institution of Oceanography.

GOY (J.), 1992. François Péron, Charles-Alexandre Lesueur and the first classification of Medusae. *Archives of natural history*, vol. 19, no. 3, pp. 401-405, 1 fig.

GOY (J.), BONNEMAINS (J.), BRETON (G.) & BARBICHE (J.-P.), 1993. Collections et classification : l'exemple des Méduses de Péron et Lesueur, in : *REMUS 91, 1er colloque sur la muséologie des sciences et des techniques, 12 et 13 décembre 1991*, pp. 206-218, 5 fig. - Paris : Palais de la découverte.

GRANDPERRIN (R.), DANIEL (J.), HENIN (C.) & ROUGERIE (F.), 1993. Half a century of ORSTOM oceanology in the South Pacific, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 2-3. - La Jolla, California : Scripps Institution of Oceanography.

GRAY (D.H.), 1992. Where has Sable Island been for the past 200 Years? *International hydrographic review*, vol. 69, no. 2, pp. 13-28, 3 fig.

GRAY (D.H.), 1992. Où donc était "Sable Island" au cours des 200 dernières années? *Revue hydrographique internationale*, vol. 69, no. 2, pp. 13-29, 3 fig.

GREENE (M.T.), 1993. - Oceanography's double life. *Earth sciences history*, vol. 12, no. 1, pp. 48-53.

GRIFFITHS (G.), 1993. James Rennell and British Arctic expeditions, 1818-1829. *Polar record*, vol. 29, no. 170, pp. 189-196, 3 fig.

GROEBEN (C.), 1993. The Stazione Zoologica: a clearing house for knowledge of marine organisms, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 5-6. - La Jolla, California : Scripps Institution of Oceanography.

HARPER (B.), 1992. British Admiralty small scale charts ancient and modern. *International hydrographic review*, vol. 69, no. 2, pp. 29-40.

HARPER (B.), 1992. Les cartes à petites échelles anciennes et modernes de l'Amirauté britannique. *Revue hydrographique internationale*, vol. 69, no. 2, pp. 31-43.

HASTINGS (W.H.), 1993. In search of history. *Aquaculture magazine*, vol. 19, no. 1, pp. 43-46, 1 fig.

HEDGPETH (J.W.), 1993. The rise and fall of the community paradigm, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 59. - La Jolla, California : Scripps Institution of Oceanography.

HEISE (G.), 1993. Wilhelm von Freeden und die Norddeutsche Seewarte, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 15-18, 1 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HEISE (G.), 1993. Strukturen und Aufgaben der Deutschen Seewarte als Reichsinstitut, in: *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 19-21, 2 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HEISE (G.), 1993. Hydrographischer Dienst und Marineobservatorium, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 28-29, 2 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HEISE (G.), 1993. Das Deutsche Hydrographische Institut, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 30-33. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HEISE (G.), 1993. Frühe Beteiligung an Expeditionen, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 160-162, 1 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HEMPLEMAN (H.V.), 1989. History of MOD diving. *Journal of naval science*, vol. 15, no. 3, pp. 139-152, 9 fig.

HENSON (P.M.), 1993. Sources for the history of oceanography at the Smithsonian Institution and National Archives, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 7. - La Jolla, California : Scripps Institution of Oceanography.

HEPPENHEIMER (T.A.), 1992. To the bottom of the sea. *American heritage of invention & technology*, vol. 8, n° 1, pp. 28-31, 34-38, 7 fig.

HERRING (P.J.) & PARTRIDGE (J.C.), 1992. Light and life on RRS 'Discovery'. *Journal of the Marine biological association of the*

United Kingdom, vol. 72, no. 1, pp. 1-4, fig.

HISARD (P.), 1993. Duperrey's 1831 chart of oceanic currents in the Pacific and the first reports of the Equatorial counter-current during the first half of the 19th century, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 15-16. - La Jolla, California : Scripps Institution of Oceanography.

HISARD (P.), 1993. Mise en évidence du contre-courant équatorial dans l'océan Pacifique et l'océan Atlantique au cours de la première moitié du XIXe siècle. *Oceanis*, vol. 19, no. 1, pp. 1-56, 12 fig.

Historia (la) Antartica. *Antartida*, no. 18 [= Antartida Argentina, 4a. ed.], pp. 82-96, fig. (1992).

HOLTHUIS (L.B.), 1991. Marcgraf's (1648) Brazilian Crustacea. *Zoologische verhandelingen*, no. 268, 123 p., 43 fig.

HOLZKAMM (F.) & MOLLNHAUER (K.), 1993. Ozeanographische Geräte, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 242-247, 6 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

HOUVENAGHEL (G.T.), 1993. The development of the oceanography in the E.T.P. and the understanding of biogeographic isolation and evolution in the Galapagos Islands, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 54-55. - La Jolla, California : Scripps Institution of Oceanography.

HSÜ (K.J.), 1992. *Challenger at sea, a ship that revolutionized earth science.* - Princeton, New Jersey : Princeton University Press. - XXXI-417 p., fig.

HUBBARD (J.M.), 1993. Huxley's red herring: T.H. Huxley and early twentieth-century fisheries biology, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 35-36. - La Jolla, California : Scripps Institution of Oceanography.

IGNATJEV (S.M.) & PETROV (A.N.), 1993. Some historical aspects of development of the researches in the Institute of biology of the Souterhn seas, made by A. Kovalevsky (IBSS), in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 49-51. - La Jolla, California : Scripps Institution of Oceanography.

INGMANSON (D.E.) & WALLACE (W.J.), 1993. Whaling and the American colonies, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 25-26. - La Jolla, California : Scripps Institution of Oceanography.

IRVINE (D.), 1993. The role of spectral representations in ocean wave physics, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 38-39. - La Jolla, California : Scripps Institution of Oceanography.

JOHNSTON (A.J.B.), 1991. The early days of the lobster fishery in Atlantic Canada. *Material history review - Revue d'histoire de la culture matérielle*, no. 33, pp. 56-60, 2 fig.

JOKIEL (P.L.), 1993. Ocean current patterns and dispersal of coral reef fauna: changing historical perspectives, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 54. - La Jolla, California : Scripps Institution of Oceanography.

JONES (I.) & JONES (J.), 1992. *Oceanography in the days of sail.* - Sydney : Hale & Iremonger. - 288 p., fig.

JONES (J.E.) & JONES (I.S.F.), 1993. The Western boundary currents of the Pacific: the development of our oceanographic knowledge, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 16. - La Jolla, California : Scripps Institution of Oceanography.

KAWAGUTI (S.), 1993. Pre-war researches in biology of reef corals in Japan, especially in Palau and Formosa, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 28. - La Jolla, California : Scripps Institution of Oceanography.

KAYOMBO (N.A.), 1993. Oceanographic expedition records of the West Indian Ocean up to 1965, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 61-62. - La Jolla, California : Scripps Institution of Oceanography.

KIMOR (B.), 1993. Deep-sea plankton exploration in historical perspective, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 60. - La Jolla, California : Scripps Institution of Oceanography.

KINZIE (Robert A.) III, 1993. Caribbean contribution to coral reef research, big fish - small pond, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 29. - La Jolla, California : Scripps Institution of Oceanography.

KNAUSS (J.A.), 1993. Oceanography: the next fifty years, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 39. - La Jolla, California : Scripps Institution of Oceanography.

KORTUM (G.), 1992. Frühe russisch-deutsche Zusammenarbeit auf alten Forschungsschiffen. *Mitteilungen - Deutsche Gesellschaft für Meeresforschung*, 1992, no. 3, pp. 6-10.

KORTUM (G.), 1993. Otto Krümmel an der Deutschen Seewarte Hamburg. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 63-76, 2 fig.

KORTUM (G.), 1993. Germania in Pacifico: early German contributions to Pacific research (1741-1876), in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 33. - La Jolla, California : Scripps Institution of Oceanography.

KORTUM (G.), 1993. - Scientists and the sea -1650-1980- the German perspective, in : *Aquatic information resources tools of our trade, proceedings of the 18th Annual IAMSLIC Conference* / ed. E. Fuseler & S. Wüst, pp. 21-33, 2 fig. - [S.l.] : International Association of Aquatic and Marine Science Libraries and Information Centers.

KORTUM (G.) & ULRICH (J.), 1993. Otto Krümmel (1854-1912) als »Hilfsarbeiter« an der Deutschen Seewarte, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 185-188, 1 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

KOULBANIS (G.) & GARRIGUES (C.), 1993. Le scaphandre autonome a 50 ans. *Calypso log*, no. 125, pp. 4-13, fig.

KRAUSE (R.A.), 1992. Die Gründungsphase deutscher Polarforschung, 1865-1875 = The period of founding of the German polar research, 1865-1875. *Berichte zur Polarforschung = Reports on polar research*, vol. 114, X-375-64 p., fig.

KRAUSE (R.), 1993. Zur Gründungsphase der deutschen Polarforschung in den Jahren 1865 bis 1875. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 35-61, 14 fig.

KRAUSE (R.A.), 1993. Georg v. Neumayers Einfluss auf die deutsche Polarforschung, in: *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 163-167. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

KRISHNAMURTHY (K.), 1993. The Indo-Pacific imprints on oceanographic history, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 13-14. - La Jolla, California : Scripps Institution of Oceanography.

LaFOND (E.C.) & LaFOND (K.G.), 1993. - Recollections of people and activities at Scripps during the 1930's, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 52. - La Jolla, California : Scripps Institution of Oceanography.

LAMB (H.) & FRYDENDAHL (K.), 1991. *Historic storms of the North Sea, British Isles and Northwest Europe*. - Cambridge ; New York; Port Chester : Cambridge University Press. - XI-204 p., fig.

LEE (A.J.), 1992. *The Ministry of Agriculture, Fisheries and Food's Directorate of Fisheries Research: its origins and development*. - Lowestoft: Directorate of Fisheries Research for England and Wales. - 332 p., fig.

LeGRAND (H.), 1993. The history of the terrane concept: continental geologists strike back, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 41-42. - La Jolla, California : Scripps Institution of Oceanography.

LENZ (W.), 1992. Die Überfischung der Nordsee - ein historischer Überblick des Konfliktes zwischen Politik und Wissenschaft. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 87-108, 4 fig.

LENZ (W.), 1993. The approach of Alfred Merz (1880-1925), Georg Wüst (1890-1977), and Albert Defant (1884-1974) to Pacific oceanography, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 33-34. - La Jolla, California : Scripps Institution of Oceanography.

LEVASSEUR (O.), 1992. Pêcheries des Côtes-d'Armor. Notions générales et droits de pêche au XVIIIe siècle, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp.106-109, 7 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.

LOHFF (B.), 1992. Die Entdeckung der Welt des Planktons. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 35-44.

LÜDECKE (C.), 1992. Die erste deutsche Südpolarexpedition und die Flottenpolitik unter Kaiser Wilhelm II. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 55-75, 3 fig.

LYONS (S.L.), 1993. Sea monsters: myth or genuine relic of the past, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 26. - La Jolla, California : Scripps Institution of Oceanography.

MACKNESS (B.), 1993. From Satan to Shamu: the making of the killer whale, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 58-59. - La Jolla, California : Scripps Institution of Oceanography.

MAJEWSKI (A.), 1991. *Zarys historii oceanografii*. - Gdansk : Wydawnictwo morskie. - 212 p., pl. - (Bibioteka oceanologii ; 4).

MAKARENKOVA (H.P.), 1993. The White Sea oceanography and role of the cloisters in marine studies and fisheries, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 48-49. - La Jolla, California : Scripps Institution of Oceanography.

MARKHAM (J.W.), 1993. University of Washington oceanography: history in the Archives, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 7-8. - La Jolla, California : Scripps Institution of Oceanography.

MARSDEN (R.R.G.), 1993. Investigation of the Humboldt current following a long series of misadventures. The voyage of the R.R.S. William Scoresby May-August 1931, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 34. - La Jolla, California : Scripps Institution of Oceanography.

MATHER (P.), 1993. The biology of coral reefs from 1969 - renaissance or revolution?, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 28-29. - La Jolla, California : Scripps Institution of Oceanography.

MATSUDA (Y.), 1993. History of fisheries science, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 4-5. - La Jolla, California : Scripps Institution of Oceanography.

MATSUMOTO (G.I.), 1993. Molecular biotechnology and oceanography - diamonds in the rough, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 60. - La Jolla, California : Scripps Institution of Oceanography.

McCONNELL (A.), 1993. L.F. Marsigli's visit to London in 1721, and his report on the Royal Society. *Notes and records of the Royal Society of London*, vol. 47, no. 2, pp.179-204.

McEWAN (A.D.) & WOOD (E.A.), 1993. Australian boundary currents: an historic handicap and a modern scientific challenge, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 3. - La Jolla, California : Scripps Institution of Oceanography.

McGRAW (D.J.), 1993. On the nature of final proof in biology: hadal bacteria and the "Azoic zone", in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 59. - La Jolla, California : Scripps Institution of Oceanography.

McMANUS (D.A.), 1992. *The Oceans*: the geological bookends. *Oceanography*, vol. 5, no. 3, pp. 160-162, 2 fig.

McTAGGART (A.), 1993. The history of chemical oceanography in Australasian waters, in : Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993, pp. 43-44. - La Jolla, California : Scripps Institution of Oceanography.

MERTINS (H.O.), 1993. Bordwetterdienst, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 104-111, 9 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

MIDDELDORF (S.), 1993. »Gleichschaltung« und Militarisierung der Deutschen Seewarte im »Dritten Reich«, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 24-27, 2 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

MIKULSKI (Z.), 1993. The oldest oceanography textbook: in the 350th anniversary of "Hydrographie..." by Georges Fournier publication in Paris, 1643, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 8. - La Jolla, California : Scripps Institution of Oceanography.

MILLS (E.L.), 1993. The history of oceanography: introduction. *Earth sciences history*, vol. 12, no. 1, p. 1.

MILLS (E.L.), 1993. A handlist of printed sources on the history of oceanography. *Earth sciences history*, vol. 12, no. 1, pp. 2-4.

MILLS (E.L.), 1993. The historian of science and oceanography after twenty years. *Earth sciences history*, vol. 12, no. 1, pp. 5-18.

MILLS (E.L.), 1993. Pacific waters and the POG: the origin of physical oceanography on the West coast of Canada, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 16-17. - La Jolla, California : Scripps Institution of Oceanography.

MILLS (E.L.), 1993. *The Scripps Institution: Origin of a habitat for ocean science*. - La Jolla, California: Scripps Institution of Oceanography - 27 pp.

MORCOS (S.), 1993. Educational mission of marine science: a case study of East Africa, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 11-12. - La Jolla, California : Scripps Institution of Oceanography.

MUKERJI (C.), 1992. Scientific techniques and learning: laboratory "signatures" and the practice of oceanography, in : *Invisible connections: instruments, institutions, and science* / ed. R. Bud, S.E. Cozzens, pp. 102-129. - Bellingharn, Washington : SPIE Optical Engineering Press.

MÜLLER-NAVARRA (S.), 1993. Ozeanographie und Zweiter Weltkrieg. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 147-165, 11 fig.

MÜLLER-NAVARRA (S.), 1993. Ozeanographische Forschung im Dienste der Kriegsmarine, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 22-23, 1 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

MUNK (W.), 1992. *The Ocean "Bible"*: reminiscences. *Oceanography*, vol. 5, no. 3, pp. 155-157, 1 fig.

MUNK (W.), 1993. Sverdrup years, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 52-53. - La Jolla, California : Scripps Institution of Oceanography.

NELLEN (W.), 1993. Der Fischereiforscher Dr. Sigismund Strodtmann (1868 bis 1946). *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 89-101, 10 fig.

NEUBERT (H.-J.), 1993. 99 Jahre Biologische Anstalt Helgoland. Ein Überblick. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 77-87, 8 fig.

NEUSHUL (P.) & BADASH (L.), 1993. Ocean food and energy from California mariculture: an evaluation of the U.S. marine biomass project from 1972 to 1986, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 36. - La Jolla, California : Scripps Institution of Oceanography.

NICHOLLS (N.), 1992. Historical El Niño/Southern Oscillation variability in the Australasian region, in : *El Niño, historical and paleoclimatic aspects of the Southern Oscillation* / ed. H.F. Diaz & V. Markgraf, pp. 151-173, 2 fig. - Cambridge ; New York ; Victoria : Cambridge University Press.

NIERENBERG (W.A.), 1993. Mohole to the Deep Sea Drilling Program, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 20. - La Jolla, California : Scripps Institution of Oceanography.

OJO (S.O.), 1993. Trends in ocean-climate services in West and Central Africa, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 61. - La Jolla, California : Scripps Institution of Oceanography.

OMORI (M.), 1993. One hundred years of the sergestid shrimp fishery in Suruga Bay - development of jurisdiction and social policy, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 30-31. - La Jolla, California : Scripps Institution of Oceanography.

ORESKES (N.), 1993. Gravity surveys in the "permanent" ocean basin: an instrumental chink in a theoretical suit of armor, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 40. - La Jolla, California : Scripps Institution of Oceanography.

ORLIC (M.), 1993. Four centuries of physical oceanography in Croatia, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 45. - La Jolla, California : Scripps Institution of Oceanography.

PALLIER (Y.), 1992. Les algues : de l'usage local à l'exploitation industrielle, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 116-117, 7 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.

PARKER (B.B.), 1992. Oceanographic data archeology. Finding historical data for climate and global change research. *Oceanography*, vol. 5, no. 2, pp. 124-125.

PARSONS (G.), 1993. The uses and abuses of scientific expertise in English inshore oyster fishery, 1860-1900, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 35. - La Jolla, California : Scripps

Institution of Oceanography.
PETERS (G.), 1992. Zwei Hamburger, ein Barbier (1675) und ein Bürgermeister (1746), erkunden und beschreiben die Wale des Nördlichen Eismeers. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 9-34, 16 fig.
PETERS (G.), 1993. Hamburg und die Wale im Nördlichen Eismeer. Eine Cetologische Betrachtung. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 15-33, 16 fig.
PETERSON (R.G.), 1993. The nineteenth-century charting of currents in the Pacific Ocean, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 17-18. - La Jolla, California : Scripps Institution of Oceanography.
PETROV (A.N.), 1993. Underwater landscape mapping of the seashores, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 48. - La Jolla, California : Scripps Institution of Oceanography.
PIETERS (F.F.J.M.) & VISSER (J. de), 1993. The scientific career of the zoologist Max Wilhelm Carl Weber (1852-1937). *Bijdragen tot de dierkunde*, vol. 62, no. 4, pp. 193-214, 20 fig.
PIETSCH (T.W.), 1993. On the three editions of Louis Renard's *Poissons, Ecrevisses et Crabes: Histoire naturelle des plus rares curiositez de la Mer des Indes. Archives of natural history*, vol. 20, no. 1, pp. 49-68, 7 fig.
PIETSCH (T.W.) & HOLTHUIS (L.B.), 1992. Lamotius and his marine marvels. *Natural history*, vol. 101, no. 10, pp. 34-39, fig.
POTEMRA (T.A.), 1991. The Arctic explorations of Fridtjof Nansen. *Johns Hopkins APL technical digest*, vol. 12, no. 3, pp. 275-283, fig.
PRESTON (M.), 1993. A brief history of oceanography at the University of Liverpool. *Ocean challenge*, vol. 3, no. 2-3, p. 15, 1 fig.
PRIGENT (G.), 1992. Pêches côtières et d'estran, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 112-115, 11 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.
PRIGENT (G.), 1992. Un épisode de courte durée : la pêche à la sardine en baie de Lannion, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, p. 121, 2 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.
PRIGENT (G.), 1992. Dragues et chaluts : de nouveaux outils pour la pêche côtière, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, p. 120, 2 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.
PRIGENT (G.), 1992. L'épopée des Loguiviens au XIXe siècle, in : *La mer et les jours, XVe siècle - 1940, 5 siècles d'arts et cultures maritimes en Côtes-d'Armor, Château de la Roche-Jagu, 20 juin - 1er novembre 1992 : catalogue de l'exposition*, pp. 118-119, 4 fig. - [Saint-Brieuc] : Conseil général des Côtes d'Armor.
QUINN (W.H.), 1992. A study of Southern Oscillation-related climatic activity for A.D. 622-1900 incorporating Nile River flood data, in : *El Niño, historical and paleoclimatic aspects of the Southern Oscillation* / ed. H.F. Diaz & V. Markgraf, pp. 119-149, 4 fig. - Cambridge; New York ; Victoria : Cambridge University Press.
RARATY (M.M.), 1993. Some aspects of early 20th century oceanography: the first German Antarctic Expedition, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 46-47. - La Jolla, California : Scripps Institution of Oceanography.
REHBOCK (P.F.), ed., 1992. *At sea with the scientifics: the Challenger letters of Joseph Matkin.*- Honolulu: University of Hawaii Press. - XII-417 p., fig.
REID (J.L.), 1993. The NORPAC Expedition of 1955, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 18. - La Jolla, California : Scripps Institution of Oceanography.
RICHTER (K.), 1993. Seegang, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 203-213, 3 fig. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.
RITCHIE (G.S.), 1992. *No day too long - an Hydrographer's tale.* - Edinburgh ; Cambridge; Durham : Pentland Press. - XIV-250 p., fig.
ROBISON (B.H.), 1993. Submersibles in oceanographic research: six decades of discovery, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 10-11. - La Jolla, California : Scripps Institution of Oceanography.
RÖHR (A.), 1981. *Bilder aus dem Museum für Meereskunde in Berlin, 1906-1946.* - Bremerhaven: Deutches Schiffahrtsmuseum. - 72 p., fig.
ROIGNANT (J.), 1992. *Le quartier maritime de Lannion, contribution à l'histoire des pêches en baie de Lannion.* - Spezed : Nature et Bretagne. - 160 p., fig.
ROSENHAGEN (G.), 1993. Überseeklimatologie, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 125-126. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.
SAHRHAGE (D.) & LUNDBECK (J.), 1992. *A history of fishing.* - Berlin ; Heidelberg ; New York : Springer-Verlag. - VIII-348 p., fig.
SALDANHA (L.), 1992. Le Prince Albert Ier de Monaco et le Colonel Afonso Chaves. *Açoreana*, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 51-56.
SALDANHA (L.), 1993. Prince Albert of Monaco and King Carlos of Portugal: their contribution to the knowledge of the Atlantic deep-sea fauna, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 22. - La Jolla, California : Scripps Institution of Oceanography.
SALVAT (B.), 1993. Coral reefs, science and politics: links and criteria for decisions since two centuries. A French case history, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 29-30. - La Jolla,

California : Scripps Institution of Oceanography.
SANCHEZ (R.P.) & ANGELESCU (V.), 1993. Early exploratory voyages and Antarctic expeditions: the local perspective, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 47. - La Jolla, California : Scripps Institution of Oceanography.
SAVOURS (A.), 1992. *The voyages of the Discovery: the illustrated history of Scott's ship*. - London : Virgin. - XVI-384 p., pl.
SAVOURS SHIRLEY (A.), 1993. The oceanographic work of the *Discovery*, 1901-1931, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 19. - La Jolla, California : Scripps Institution of Oceanography.
SCHEIBER (Harry N.), 1993. Scientific management, occupation policy, and the postwar revival of Japan's fisheries, 1945-53, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 31. - La Jolla, California : Scripps Institution of Oceanography.
SCHIFFNER (S.), 1993. Der Seehydrographische Dienst der DDR, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 49-51. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.
SCHIOTTE (T.), 1992. Forsskål and Niebuhr: their expedition and collections, in : *Proceedings of the Ninth International Malacological Congress, Edinburgh, 31 August-6 September 1986* / ed. E. Gittenberger & J. Goud, pp. 353-356, 2 fig. - Leiden : Unitas malacologica.
SCHWARTZLOSE (R.A.) & ALVAREZ-BORREGO (S.), 1993. The history of oceanography along the Mexican coast, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 5. - La Jolla, California : Scripps Institution of Oceanography.
SERPOIANU (G.), 1993. The pioneers of oceanographic research in Romania, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 44. - La Jolla, California : Scripps Institution of Oceanography.
SHOR (E.N.), 1992. *Walking about Scripps, a tour of UCSD's Scripps Institution of Oceanography (and a bit of history)*. - 2nd edition. - La Jolla : Scripps Institution of Oceanography. - 20 p.
SHOR (G.G.) Jr., 1993. Development of research vessel design, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 9-10. - La Jolla, California : Scripps Institution of Oceanography.
SIVKOVA (S.S.), 1993. Memorial research vessel Vityaz: contribution in oceanography (1949-1979), in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 19-20. - La Jolla, California : Scripps Institution of Oceanography.
SLOTTEN (H.R.), 1993. The dilemmas of science in the United States. Alexander Dallas Bache and the U.S. Coast Survey. *Isis*, vol. 84, no. 1, pp. 26-49, 4 fig.
SMED (J.), 1992. Early discussion and tests of the validity of Knudsen's Hydrographical Tables. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 77-86, 1 fig.
SMED (J.), 1993. Early attempts at determination of the salinity of seawater from measurements of its electric conductivity, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 43. - La Jolla, California : Scripps Institution of Oceanography.
SMITH (S.L.), 1992. The Oceans - its relevance today in biological oceanography. *Oceanography*, vol. 5, no. 3, pp. 159-160.
SPEAK (P.), 1992. William Speirs Bruce: Scottish nationalist and polar explorer. *Polar record*, vol. 28, no. 167, pp. 285-293, 4 fig.
SPENCER (L.T.), 1993. Samuel Stillman Berry and the R/V Albatross, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 24. - La Jolla, California : Scripps Institution of Oceanography.
SPIESS (F.N.), 1993. C.A. Kofoid's role in the origin of Scripps Institution of Oceanography, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 51-52. - La Jolla, California : Scripps Institution of Oceanography.
SRIVASTAVA (P.S.), 1993. Socio-economic impact of the seas around India: a historical review, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 14-15. - La Jolla, California : Scripps Institution of Oceanography.
STODDART (D.R.), 1993. A new kind of expedition: Stanley Gardiner and Maurice Yonge in coral reef studies - and their successors, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 27. - La Jolla, California : Scripps Institution of Oceanography.
STODDART (D.R.), 1993. H.B. Guppy: a reef fish out of water in the late nineteenth century, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 55-56. - La Jolla, California : Scripps Institution of Oceanography.
STUDENETSKY (A.), 1993. Oceanographic research of the first Russian Antarctic Expedition, 1819-1821, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 46. - La Jolla, California : Scripps Institution of Oceanography.
SVANSSON (A.), 1993. Swedish oceanographic instruments up to 1950, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 10. - La Jolla, California : Scripps Institution of Oceanography.
THIVAKARAN (G.A.) & RAJAMANICKAM (G.V.), 1993. An account of traditional oceanographic knowledge prevailing among the tribes of Andaman and Nicobar Islands, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 57. - La Jolla, California : Scripps Institution of Oceanography.
TIRMIZI (N.M.), 1993. Development of oceanography in Pakistan, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 14. - La Jolla, California : Scripps Institution of Oceanography.
TORO (A.L.), 1993. William C. Herrington and the evolution of ocean management, in : *Final program and abstracts for the Fifth*

International Congress on the History of Oceanography, July 7-14, 1993, pp. 31-32. - La Jolla, California : Scripps Institution of Oceanography.

TRACEY (J.I.), Jr., 1993. Operation Crossroads and the drilling at Bikini and Enewetak, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 28. - La Jolla, California : Scripps Institution of Oceanography.

TREGUBOV (A.V.), 1993. Bibliography of North-Western Pacific oceanography, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 8-9. - La Jolla, California : Scripps Institution of Oceanography.

UTIN (G.N.), 1992. Russian cartography of the Baltic Sea (18th-19th centuries). *International hydrographic review*, vol. 69, no. 2, pp. 7-11.

= UTIN (G.N.), 1992. La cartographie russe de la mer Baltique (18e-19e siècles). *Revue hydrographique internationale*, vol. 69, no. 2, pp. 7-11.

VAN KLAVEREN (P.J.), 1992. Le Prince Albert Ier et le Prince Rainier III, un souci commun : préserver l'environnement. *Açoreana*, 1992, suplemento [Centenaire de la dernière campagne océanographique du Prince Albert de Monaco aux Açores à bord de l'*Hirondelle*, communications, Açores, 1988 / ed. L. Saldanha, P. Ré & A. Frias Martins], pp. 83-98.

VASILE (R.S.), 1993. William Stimpson and Pacific Exploration, 1854-1865, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 24-25. - La Jolla, California : Scripps Institution of Oceanography.

VOPPEL (D.), 1993. Erdmagnetische Messungen auf See. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 103-114, 5 fig.

WALKER (J.M.), 1993. School and popular marine science education in the United Kingdom, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 12-13. - La Jolla, California : Scripps Institution of Oceanography.

WALLACE (W.J.), 1993. The history of chemical determinations of salinity, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 43. - La Jolla, California : Scripps Institution of Oceanography.

WARREN (B.A.), 1992. Physical oceanography in *the Oceans*. Oceanography, vol. 5, no. 3, pp. 157-159, 1 fig.

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 109-138, 13 fig.

[= WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 127-146, 13 fig.]

WEBER (J.R.) & ROOTS (E.F.), 1990. Historical background: exploration, concepts, and observations, in : *the Arctic Ocean region* / ed. A. Grantz, L. Johnson & J.F. Sweeney, pp. 5-36, 7 fig. - Boulder, Colorado : Geological Society of America. - (The geology of North America ; 50).

WEGNER (G.), 1993. Ein Hamburger Bürgermeister und eine Heringstheorie (1746). *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 1-14, 8 fig.

WEIDEMANN (H.), 1993. Forschung und Forschungsreisen nach 1945, in : *Schiffahrt und Meer, 125 Jahre maritime Dienste in Deutschland* / ed. P. Ehlers, G. Duensing & G. Heise, pp. 168-178. - Herford ; Berlin ; Bonn : E.S. Mittler & Sohn.

WEINBERG (S.), 1993. La storia delle immagini subacquee è lunga un secolo. *Airone*, vol. 13, no. 148, pp. 34-37, fig.

WEINBERG (S.), DOGUÉ (P.L.J.) & NEUSCHWANDER (J.), 1993. *100 ans de photographie sous-marine*. - Saint-Chéron : A. Schrotter éditions. - 188 p., fig.

WEIR (Gary E.), 1993. Selling Bellevue: the emergence of naval oceanography in the United States, 1914-1924, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 37. - La Jolla, California : Scripps Institution of Oceanography.

WERNER (P.), 1992. Anton Dohrn und die Gründung der Biologischen Anstalt Helgoland. *Historisch-meereskundliches Jahrbuch*, vol. 1, pp. 45-54.

WILSON (J.B.) & NORMARK (W.R.), 1993. Sonar investigations of the geology of the ocean floor off the Hawaiian Islands, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 20-21. - La Jolla, California : Scripps Institution of Oceanography.

WOLFF (T.), 1993. Major results of the investigations of the Danish Expedition (1928-30) in the Indo-Pacific, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 25. - La Jolla, California : Scripps Institution of Oceanography.

WU (B.), 1993. The history of oceanographic studies in China, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 3-4. - La Jolla, California : Scripps Institution of Oceanography.

WYRTKI (K.), 1993. Reflections on my research in the Indo-Pacific, 1954 to 1992, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 18-19. - La Jolla, California : Scripps Institution of Oceanography.

XU (Q.), 1993. Brief history of marine development in ancient China, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, p. 58. - La Jolla, California : Scripps Institution of Oceanography.

YAYANOS (A.A.), 1993. George Wallace Melville: his influence in polar exploration and in ship design, in : *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 22-23. - La Jolla, California : Scripps Institution of Oceanography.

YE (L.), SONG (Z.) & LENZ (W.), 1993. The voyages of Zheng He before Colombus, in: *Final program and abstracts for the Fifth International Congress on the History of Oceanography, July 7-14, 1993*, pp. 58-59. - La Jolla, California : Scripps Institution of Oceanography.

YINYI (N.), 1989. The four decades of marine science in China. *Collected oceanic works*, vol. 12, pp. 152-166.

ZEI (M.), 1989. Ob dvajsetletnici Morske bioloske postaje v Piranu = On the occasion the 20th anniversary of the Marine biological station in Piran. *Bioloski vestnik*, vol. 37, no. 4, pp. 3-8.

ZYSBERG (A.), 1992. Pêche et commerce maritime sur les côtes de Poitou, Aunis et Saintonge, au cours de la seconde moitié du XVIIe siècle, in : *Rochefort et la mer, 7 : Journées d'histoire et d'archéologie maritime*, pp. 53-70. - Jonzac : Université francophone d'été.

BIOGRAPHIES
Jacqueline Carpine-Lancre

ALINAT Jean [21.VI.1917, Agde, Hérault
KOULBANIS (G.), 1993. Captain Jean Alinat. *Calypso log*, vol. 20, no. 2, p. 20, portrait.

ARNDT Walther [8.I.1891, Landshut - 26.VI.1944, Berlin]
WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 111-114, portrait].
WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 128-131, portrait].

BAIRD Spencer Fullerton [3.II.1823, Reading, Pennsylvania - 18.VIII.1887, Woods Hole, Massachusetts]
RIVINUS (E.F.) & YOUSSEF (E.M.), 1992. *Spencer Baird of the Smithsonian.* - Washington ; London : Smithsonian Institution Press. - X-228 p. portraits.

BATTAGLIA Bruno [8.I.1923, Catania
FAVA (G.), 1993. Bruno Battaglia. *Monoculus, Copepod newsletter*, no. 25, pp. 16-18, portrait.

BATURIN Gleb Nikolayevich [14.XII.1930
Gleb Nikolayevich Baturin, on the occasion of his sixtieth birthday. *Oceanology*, vol. 30, no. 6, pp. 774-775, portrait (1991).

BISHOP Richard Evelyn Donohue [1.I.1925 - 12.IX.1989, Portsmouth]
PRICE (W.G.), 1991. [Professor Richard Evelyn Donohue], in : *Dynamics of marine vehicles and structures in waves, proceedings of an International Union of Theoretical and Applied Mechanics Memorial symposium on the dynamics of marine vehicles and structures in waves held at Brunel University, Uxbridge, U.K., 24-27 June, 1990* / ed. W.G. Price, P. Temarel & A.J. Keane, p. VI, portrait.

BREKHOVSKIKH Leonid Maksimovich [6.V.1917
Leonid Maksimovich Brekhovskikh (on the 75th anniversary of his birth) [in Russian]. *Okeanologiya*, vol. 32, no. 3, pp. 617-618, portrait (1992).

BRUCE William Speirs [1.VIII.1867, London - 28.X.1921, Edinburgh]
SPEAK (P.), 1992. William Speirs Bruce: Scottish nationalist and polar explorer. *Polar record*, vol. 28, no. 167, pp. 285-293, portrait.

BUDDENBROCK Wolfgang von [25.III.1884, Bischdorf - 11.IV.1964, Mainz]
WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 129-133, portraits].
WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 141-144, portraits].

BUDKER Paul [12.X.1900, Boulogne-sur-Seine - 10.IX.1992, Adge]
ROUX (C.), 1992. Paul Budker (1900-1992). *Cybium*, vol. 16, no. 4, pp. 265-266.

CAMPBELL William J. [- 20.XI.1992, Gig Harbor, Washington]
WADHAMS (P.), 1993. William J. Campbell. *Polar record*, vol. 29, no. 169, pp. 168-169.

COLLETTE Bastiaan Jacob [13.X.1930, Netherlands - 11.XI.1991]
SIBUET (J.-C.), VERHOEF (J.) & ROEST (W.), 1992. Professor Bastiaan Jacob Collette, 1930-1991. *Marine geophysical researches*, vol. 14, no. 2, pp. 88-92, portrait.

CONTI Anita
GOUJON (E.), 1993. La dame de mer. *Thalassa*, no. 68, pp. 58-61, portraits.

COUSTEAU Jacques-Yves [11.VI.1910, Saint-André-de-Cubzac
VIOLET (B.), 1993. *Cousteau, une biographie.* - Paris : Fayard. - 318 p., portraits.
MUNSON (R.), 1991. *Cousteau, The captain and his word.* - New York: Paragon. - 316 p., figs.

COUSTEAU Jean-Michel [6.V.1938, Toulon
KOULBANIS (G.), 1993. Jean-Michel Cousteau on diving. *Calypso log*, vol. 20, no. 2, pp. 14-17, portrait.

COX Charles Shipley.[11.IX.1922, Hawaii
Cox receives Ewing medal. *Eos, transactions - American Geophysical Union*, vol. 74, no. 28, p. 315, portrait (1993).

CRISP Dennis John [29.IV.1916, London - 18.I.1990]
FOGG (G.E.) & SOUTHWARD (A.J.), 1992. Dennis John Crisp [in Russian]. *Biologiya morya*, 1992, no. 1-2, pp. 101-109, portrait.
SCHELTEMA (R.S.) & SHUMWAY (S.E.), 1990. Dennis J. Crisp, C.B.E., F.R.S., Professor Emeritus University of Wales, Bangor. Journal of shellfish research, vol. 9, no. 1, pp. I-IX, portrait.

CUTRESS Charles E. [8.III.1921, Calgary, Canada - 17.I.1992, Mayaguez, Porto Rico]
LARSON (R.), 1992. Obituary: Charles E. Cutress 1921-1992. *Bulletin of marine science*, vol. 51, no. 3, pp. 480-481, portrait.

DANA James Dwight [12.II.1813, Utica, New York - 14.IV.1895, New Haven, Connecticut]
DAMKAER (D.), 1993. James Dwight Dana, 12 February 1813-14 April 1895. *Journal of crustacean biology*, vol. 13, no. 3,

pp. 617-618, portrait.

DAY John Hemsworth Osborn [25.VIII.1909, Sussex, England - 24.IV.1989, Knysna, South Africa]

BROWN (A.C.), 1991. Reminiscences of John Day. *Transactions of the Royal Society of South Africa*, vol. 47, no. 4-5, pp. 779-783, portrait.

DEGENS Egon Theodor [16.IV.1928, Inden, Germany - 18.II.1989]

HILLMER (G.) & ITTEKKOT (V.), 1990. In memorium Egon Theodor Degens. *Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg*, vol. 69, pp. [I-III], portrait.

SPRINGER (K.F.), 1990. Egon T. Degens - Autor und Freund. Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg, vol. 69, pp. 1-2, portrait.

DELAUZE Henri-Germain [17.IX.1929, Cairanne, Vaucluse

DUNOYER de SEGONZAC (A.), 1992. *Un conquérant sous la mer : Henri-Germain Delauze.* - Paris : Buchet-Chastel. - 224 p., portrait.

FRASSON-BOTTON (C.), 1993. Henri-G. Delauze, repousser les frontières de l'extrême. Océanorama, no. 20, pp. 3-12, portraits.

DOBROVOL'SKIY Aleksey Dmitriyevich [4.VII.1907 - 19.XII.1990]

Aleksey Dmitriyevich Dobrovol'skiy, 4 July 1907-19 December 1990. *Oceanology*, vol. 31, no. 2, pp. 255-256, portrait (1991).

DOLOTOV Yuriy Sergeyevich [28.II.1931

Yuriy Sergeyevich Dolotov (on his 60th birthday). *Oceanology*, vol. 31, no. 4, pp. 517-518 (1992).

DÖRJES Jürgen [12.XII.1936, Bremen - 7.V.1991, Jever, Friesland]

TÜRKAY (M.), 1992. Dr. Jürgen Dörjes, 1936-1991. *Senckenbergiana maritima*, vol. 22, no. 1-2, pp. 1-9, portrait.

DRAPER Laurence [7.VIII.1929

RATCLIFFE (R.A.S.), 1993. Profile of an oceanographer and meteorologist - Laurence Draper. *Weather*, vol. 48, no. 6, pp. 185-187, portrait.

EDWARDS Eric [1935, Wales

EAS honorary life member 1991, Dr. Eric Edwards, OBE, in : *Aquaculture and the environment, reviews of the International Conference Aquaculture Europe '91, Dublin, Ireland, June 10-12, 1991* / ed. N. De Pauw, J. Joyce, pp. 19-20, portrait. - Gent : European Aquaculture Society, 1992. - (*European Aquaculture Society special publication* ; 16).

EHRENBAUM Ernst [20.XII.1861, Perleberg - 6.III.1942, Marburg]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 122-125, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. Deutsche hydrographische Zeitschrift, Ergänzungsheft, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 137-138, portrait].

FALCO Albert [17.X.1927, Marseille

KOULBANIS (G.), 1993. Captain Albert Falco. *Calypso log*, vol. 20, no. 2, p. 11, portrait.

FISCHER Bernhard [19.II.1852, Coburg - 2.VIII.1915, Flanders]

KREDEL (G.), 1991. Bernhard Fischer (1852-1915), Marinearzt, Hygieniker und Meeresmikrobiologe. *Wissenschaftliche Beiträge aus Europäischen Hochschulen*, vol. 14 (Biologie, 2), 204 p., portraits.

FISCHER-PIETTE Edouard [3.VII.1899, Paris - 6.IV.1988, Bourg-la-Reine]

BACKUYS (W.), 1990. *Edouard Fischer-Piette (1899-1988) : biography, bibliography, new taxa.* - Oegstgeest : Universal book services, Dr. W. Backuys. - 48 p., portraits.

FONSELIUS Stig Henrik Johannes [29.IV.1921

DICKSON (R.R.), 1992. Hydrobiological variability in the ICES area, 1980-1989: papers to celebrate the 70th anniversaries of Stig Fonselius, Arthur Lee, Lars Midtun, Odd Sælen, and Warren Wooster. *ICES marine science symposia*, vol. 195, [pp. 8-9, portrait].

FOSBERG F. Raymond [20.V.1908, Spokane, Washington

STODDART (D.R.), ed., 1992. F. Raymond Fosberg and the Atoll research bulletin 1951-1991. *Atoll research bulletin*, no. 355, 24 p., portraits.

FREY David Grover [10.X.1915, Hartford, Wisconsin - 1.IV.1992, Bloomington, Indiana]

ANON, 1992. In memoriam, David G. Frey. *Transactions of the American Microscopical Society*, vol. III, no. 4, p.372.

BRAKKE (D.F.), 1993. David G. Frey (1915-1992). *Limnology and oceanography*, vol. 38, no. 2, pp. 475-477, portrait.

LIEDER (U.), 1993. David G. Frey. *Internationale Revue der gesamten Hydrobiologie*, vol. 78, no. 2, pp. 173-175, portrait.

WHITEHEAD (D.R.), 1993. In memoriam: David Grover Frey. *Journal of Paleolimnology*, voll. 8, pp.1-2.

GELDIAY Remzi [1919, Köstence, Roumania - 1989]

Professor Dr. Remzi Geldiay (1919-1989). *Collected reprints - Section of hydrobiology, Ege university, Faculty of science, Department of biology*, vol. 14, [9] p., portrait (1988-1990).

GILBERT Perry Webster [1.XII.1912, North Branford, Connecticut

Dr. Perry Gilbert. *Mote news*, summer 1992, p. 12, portrait.

GOLDBERG Edward D. [2.VIII.1921, Sacramento, California

CHURCH (T.M.), 1992. Tribute to Edward D. Goldberg. Geochemistry Division, American Chemical Society August 1990. Marine chemistry, vol. 40, no. 1-2 [Progress in *marine chemistry*, American Chemical Society 100th meeting in Washington, DC, 26-31 August 1990], pp. 3-4.

GON Ofer [1949, Haifa, Israel

BAXTER (M.), 1992. Ichthyologist Ofer Gon. *Ichthos, newsletter of Society of friends of the J.L.B. Smith Institute of ichthyology*, no. 35, p. 20, fig.

GOODE George Brown [13.II.1851, New Albany, Indiana - 6.IX.1896, Washington, D.C.]

KOHLSTEDT (S.G.), 1991. George Brown Goode, 1851-1896, in : *The origins of natural science in America, the essays of George Brown Goode* / ed. S.G. Kohlstedt, pp. 1-21, portrait. - Washington ; London : Smithsonian Institution Press.

GOSNER Kenneth L. [1925 - 3.IV.1992]

MOUNTFORD (K.), 1992. Kenneth L. Gosner 1925-1992. *Underwater naturalist*, vol. 21, no. 2, pp. 18-19, portrait.

HASLE Grethe R. [3.I.1920, Horten, Norway

SCHMID (A.-M.), 1990. Preface [Special volume in honour of Grethe R. Hasle on the occasion of her 70th birthday], in : *Contributions to the knowledge of microalgae particularly diatoms* / ed. U. Geissler, H. Hakansson, U. Miller & A.-M. Schmid, January 3rd, 1990, pp. VII-XV, portrait. - (*Nova Hedwigia* ; Beiheft 100).

HENSCHEL Johannes [2.III.1905, Grunfier (Posen) -]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 133-134].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [p. 144].

HOWSE Harold Darrow [8.XI.1928, Poplarville, Mississippi - 9.XI.1992]

McILWAIN (T.D.), 1992. Dr. Harold Darrow Howse, November 8, 1928 - November 9, 1992. *Gulf research reports*, vol. 8, no. 4, p. 331, portrait.

HULSEMANN Kuni

BÖTTGER-SCHNACK (R.), 1993. Kuni Hulsemann. *Monoculus, Copepod newsletter*, no. 25, pp. 18-22, portrait.

HUTCHINSON George Evelyn [30.I.1903, Cambridge, England - 17.V.1991, London]

EDMONDSON (W.T.), 1991. Homage to G. Evelyn Hutchinson (1903-1991). *Memorie dell'Istituto italiano di idrobiologia Dott. Marco de Marchi*, vol. 49, pp. 1-2, portrait.

SLOBODKIN (L.B.), 1993. An Appreciation. George Evelyn Hutchinson. *Journal of Animal Ecology*, vol. 62, pp.390-394.

HYMAN Libbie Henrietta [6.XII.1888, Des Moines, Iowa - 1969]

WINSTON (J.), 1992. Great invertebrate zoologists: Libbie Henrietta Hyman (1888-1969). *Echinoderm newsletter*, no. 17, pp. 129-130.

ISAACS John Dove [28.III.1913, Spokane, Washington - 6.VI.1980, Rancho Santa Fe, California]

BEHRMAN (D.) & ISAACS (J.D.), 1992. *John Isaacs and his oceans*. - Washington, D.C. : American Geophysical Union ; ICSU Press. - [VII-]233 p., portraits.

KAMENKOVICH Vladimir Moiseyevich [22.XII.1931

Vladimir Moiseyevich Kamenkovich (on the occasion of his 60th birthday). *Oceanology*, vol. 31, no. 6, pp. 807-808, portrait (1992).

KIRPICHNIKOV Valentin Sergeevich [14.VIII.1908, Kineshma - 14.XI.1991, St. Petersburg, Russia]

SCHRÖDER (J.H.), CHERFAS (N.B.), ALTUKHOV (Y.P.) & GALL (G.A.E.), 1993. First Honorable Member of IAGA: Valentin Sergeevich Kirpichnikov, 1908-1991. *Aquaculture*, vol. 111, no. 1-4 [Genetics in aquaculture IV, proceedings of the Fourth International Symposium on Genetics in Aquaculture held in Wuhan, China, 29 April to 3 May 1991 / ed. G.A.E. Gall & Hongxi Chen], pp. 3-5, portrait.

KOSHLYAKOV Mikhail Nikolayevich [29.XI.1930, Leningrad

Mikhail Nikolayevich Koshlyakov, on his sixtieth birthday. *Oceanology*, vol. 30, no. 6, pp. 772-773, portrait (1991).

KREFFT Gerhard [30.III.1912

STEHMANN (M.), 1993. Dr. Gerhard Krefft zum 80. Geburtstag am 30. März 1992. *Archiv für Fischereiwissenschaft*, vol. 41, no. 3, pp. 167-168, portrait.

KULLENBERG Börje [1906, Uppåkra, Sweden - 1.XII.1991]

Börje Kullenberg. *IMS [International Marine Science] newsletter*, no. 62, p. 8 (1992).

Börje Kullenberg. *Bulletin international des sciences de la mer*, no. 62, p. 8 (1992).

WALLIN (G.) & OLSSON (I.), 1993. Professor Börje Kullenberg, 1906-1991. ICES journal of marine science, vol. 50, no. 1, pp. 101-102, portrait.

LAM WAN YING Catherine [29.XII.1945, Hong Kong - 22.IX.1990]

HODGKISS (I.J.), 1991. Obituary - Catherine Lam Wan Ying, 29 December 1945-22 September 1990. *Asian marine biology*, vol. 8, pp. 1-4, portrait.

LANGDON Jeremy

HUMPHREY (J.), 1992. Dr. Jeremy Langdon. *Bulletin of the European association of fish pathologists*, vol. 12, no. 5, p. 145.

LEE Arthur James [17.V.1920, Leicester

DICKSON (R.R.), 1992. Hydrobiological variability in the ICES area, 1980-1989: papers to celebrate the 70th anniversaries of Stig Fonselius, Arthur Lee, Lars Midtun, Odd Sælen, and Warren Wooster. *ICES marine science symposia*, vol. 195, [p. 4, portrait].

LEIBLE DIAZ Mario [1934 - 1991]

OYARZUN G. (C.), 1991. Mario Leible Diaz (Q.E.P.D.) (1934-1991). *Biología pesquera*, no. 20, pp. 3-4.

LISSNER Helmut [8.XII.1895, Thorn - 15.II.1951, Caesarea]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 116-118, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 132-133, portrait].

LÜBBERT Hans [20.VIII.1870, Hamburg - 22.XI.1951, Hamburg]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 126-129, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 139-141, portrait].

LYSANOV Yuriy Pavlovich [23.II.1922

The seventieth birthday of Yuriy Pavlovich Lysanov. *Oceanology*, vol. 32, no. 1, pp. 129-130, portrait (1992).

MAGNE Francis

PENOT (M.), 1993. Hommage à Francis Magne à l'occasion de son départ à la retraite. *Cryptogamie-algologie*, vol. 14, no. 2-3, pp. 79-82, portrait.

MARGALEF Ramon [16.V.1919, Barcelona

ROS (J.), 1992 (1991). Ramon Margalef, limnologist, marine biologist, ecologist, naturalist. *Oecologia aquatica*, vol. 10 [Homage to Ramon Margalef or Why there is such pleasure in studying nature], pp. 412-423, portrait.

MIDTUN Lars Sudmann [16.VI.1920

DICKSON (R.R.), 1992. Hydrobiological variability in the ICES area, 1980-1989: papers to celebrate the 70th anniversaries of Stig Fonselius, Arthur Lee, Lars Midtun, Odd Sælen, and Warren Wooster. *ICES marine science symposia*, vol. 195, [p. 6, portrait].

MIELCK Wilhelm [24.XI.1878, Hamburg - 5.X.1933, Helgoland]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 125-126, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 138-139, portrait].

MILLOTT Norman [1912 - 24.II.1990]

NICHOLS (D.), 1991. Professor Norman Millott. *Echinoderm newsletter*, no. 16, pp. 202-204.

MONIN Andrey Sergeyevich [2.VII.1921, Moscow

Seventieth birthday of Andrey Sergeyevich Monin. *Oceanology*, vol. 31, no. 3, pp. 383-384, portrait (1991).

MOYSE Alexis [2.X.1912, Arcueil, Val-de-Marne - 18.XI.1991, Sceaux, Hauts-de-Seine]

DELAVEAU (P.), 1992. Alexis Moyse (1912-1991). *Comptes rendus des séances de la Société de biologie et de ses filiales*, vol. 186, no. 1-2, pp. 10-11.

THELLIER (M.), 1992. La vie et l'oeuvre de Alexis Moyse. Comptes rendus de l'Académie des sciences, série générale : la vie des sciences, vol. 9, no. 5, pp. 439-443, portrait.

NEIMAN Viktor Grigorjevich [27.II.1933

Viktor Grigorjevich Neiman (on the 60th anniversary of his birth) [in Russian]. *Okeanologiya*, vol. 33, no. 1, pp. 159-160, portrait (1993).

NEU Wolfgang [26.VIII.1907, Leipzig - 13.III.1947, Berlin]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 120-122, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 135-136, portrait].

PARENZAN Pietro [- XI.1992]

BOERO (F.), 1992. Ricordo di Pietro Parenzan. *Notiziario S.I.B.M. [Società italiana di biologia marina]*, no. 22, p. 13.

PARIN Nikolay Vasilyevich [21.XI.1932

Nikolay Vasilyevich Parin (on the 60-th anniversary of his birth) [in Russian]. *Okeanologiya*, vol. 32, no. 5, pp. 974-975, portrait (1992).

PASTEELS Jean-Jules [1906 - 24.VIII.1991]

HERLANT MEEWIS (H.), 1992. Jean-Jules Pasteels (1906-1991). *Belgian journal of zoology*, vol. 122, no. 2, pp. 135-137, portrait.

MULNARD (J.), 1993. Le Professeur Jean-Jules Pasteels (1906-1991). *Bulletin de la Société zoologique de France*, vol. 118, no. 1, pp. 5-6.

PENNIKET J.R. [1917, Auckland - 1991]

TAVIANI (N.), 1992. J.R. (Bob) Penniket (1917-1991). *Bollettino malacologico*, vol. 28, no. 1-4, pp. 96-97.

PETERS Gabriele [29.III.1936, Salzwedel in der Altmark, Germany - 25.III.1992]

BERGHAHN (R.), WATERMANN (B.) & WEGNER (G.), 1992. Gabriele Peters. *Mitteilungen - Deutsche Gesellschaft für Meeresforschung*, 1992, no. 4, pp. 15-16, portraits.

FAISAL (M.), 1993. In the memory of Professor Gabriele Peters 1936-1992. *Annual review of fish diseases*, vol. 3, pp. V-VI, portrait.

SCHRECK (C.B.), 1992. In memoriam Professor Gabriele Peters. *Diseases of aquatic organisms*, vol. 14, no. 3, p. 161, portrait.

PETIPA Tamara Sergeevna [1927 - 13.III.1992]

PAVLOVA (E.V.) & SAZHINA (L.I.), 1992. Tamara Sergeevna Petipa (1927-1992) [in Russian]. *Gidrobiologicheskii zhurnal*, vol. 28, no. 5, p. 110, portrait.

PICCARD Jacques [28.VII.1922, Bruxelles

PADIRAC (D.), 1992. Le Pr. Piccard, prestigieux plongeur en eau douce. *Le monde de la mer*, no. 68, pp. 14-21, portraits.

PROVASOLI Luigi [1908 - 30.X.1992]

LEHMAN (J.T.), 1993. Luigi Provasoli, naturalist: 1908-1992. *Limnology and oceanography*, vol. 38, no. 1, pp. 250-252, portrait.

REVELLE Roger Randal Dougan [7.III.1909, Seattle, Washington - 15.VII.1991, San Diego, California]

MUNK (W.H.) & FRIEMAN (E.A.), 1992. Let Roger Revelle speak for himself. *Oceanography*, vol. 5, no. 2, p. 125.

ROCHE Jean [14.I.1901, Sorgues, Vaucluse - 24.V.1992, Paris]

POLONOVSKI (J.), 1992. Jean Roche (1901-1992). *Comptes rendus des séances de la Société de biologie et de ses filiales*, vol. 186, no. 4, pp. 309-313, portrait.

SÆLEN Odd Hendrik [8.VI.1920

DICKSON (R.R.), 1992. Hydrobiological variability in the ICES area, 1980-1989: papers to celebrate the 70th anniversaries of Stig Fonselius, Arthur Lee, Lars Midtun, Odd Sælen, and Warren Wooster. *ICES marine science symposia*, vol. 195, [p. 5, portrait].

SAGER Günther [4.VI.1923, Rostock - 27.XII.1991]

MATTHÄUS (W.), 1992. In memoriam Günther Sager. *Beiträge zur Meereskunde*, no. 63, pp. 137-138.

MATTHÄUS (W.) & LANGE (D.), 1992. In memoriam Günther Sager. *Mitteilungen - Deutsche Gesellschaft für Meeresforschung*, 1992, no. 2, p. 19.

SARS Georg Ossian [20.IV.1837, Floro, Norway - 9.IV.1927, Oslo]

DAMKAER (D.M.), 1993. Georg Ossian Sars (20 April 1837-9 April 1927). *Journal of crustacean biology*, vol. 13, no. 2, pp. 398-399, portrait.

SARS Michael [30.VIII.1805, Bergen - 22.X.1869, Christiania]

FAUCHALD (K.), 1992. Michael Sars and the naturalist tradition in Norway. *Echinoderm newsletter*, no. 17, pp. 131-132a.

SCACCHI Arcangelo [8.II.1810, Gravina di Puglia, Bari - 11.X.1893, Napoli]

CRETELLA (M.), CROVATO (C.), FASULO (G.) & TOSCANO (F.), 1992. L'opera malacologica di Arcangelo Scacchi (1810-1893). Parte I : biografia e bibliografia. *Bollettino malacologico*, vol. 28, no. 5-12, pp. 225-228, portrait.

SCHOLANDER Per Fredrik [29.XI.1905, Orebro, Sweden - 13.VI.1980, La Jolla, California]

SCHOLANDER (P.F.), 1990. *Enjoying a life in science, the autobiography of P.F. Scholander*, with foreword by R. Elsner and afterword by S.I. Scholander. - Fairbanks : University of Alaska Press. - X-226 p., portraits.

SCHREIBER Bruno [19.II.1905, Trieste - 31.VIII.1992, Parma]

GANDOLFI (G.), 1992. Bruno Schreiber. *Notiziario S.I.B.M. [Società italiana di biologia marina]*, no. 22, pp. 4-12, portrait.

SCOTT Thomas [2.XII.1849 - 25.II.1929]

DAMKAER (D.M.), 1993. Thomas Scott (2 December 1849 - 25 February 1929). *Journal of crustacean biology*, vol. 13, no. 2, pp. 400-401, portrait.

SHEPARD Francis Parker [10.V.1897, Brookline, Massachusetts - 25.IV.1985, La Jolla, California]

RUSNAK (G.A.), 1991. Afoot and afloat along the edge: adventures of an ingenuous beachcomber - a tribute to Francis Parker Shepard (1897-1985). SEPM (*Society for Sedimentary Geology*) *special publication*, no. 46 [From shoreline to abyss: contributions in marine geology in honor of Francis Parker Shepard / ed. R.H. Osborne], pp. 1-7, portrait.

SMITH James Leonard Brierley [26.IX.1897, Graaf Reinet, Cape, South Africa - 8.I.1968]

CAMBRAY (E.), 1992. A portrait of JLB Smith and the founding of an Institute. *Ichthos, newsletter of Society of friends of the J.L.B. Smith Institute of Ichthyology*, no. 35, pp. 14-15, portrait.

SMITH Margaret Mary Macdonald [26.IX.1916, Indwe, Cape, South Africa - 8.IX.1987, Grahamstown]

POTE (J.), 1992. The first director. *Ichthos, newsletter of Society of friends of the J.L.B. Smith Institute of Ichthyology*, no. 35, pp. 15-16, portrait.

STOMMEL Henry Melson [27.IX.1920, Wilmington, Delaware - 17.I.1992, Boston, Massachusetts]

A tribute to Henry Stommel. *Oceanus*, vol. 35, special issue, 132 p., fig., portraits (1992).

CULLEN (V.), 1992. An author is missing. *Oceanus*, vol. 35, no. 2, p. 5.

Death of Henry Stommel. *Currents*, spring 1992, p. 7.

Henry Stommel. IMS *[International Marine Science] newsletter*, no. 62, p. 8 (1992).

Henry Stommel. *Bulletin international des sciences de la mer*, no. 62, p. 8 (1992).

LUYTEN (J.R.) & SCHMITZ (W.J.), jr., 1992. Henry Melson Stommel. Deep-sea research, (A) vol. 39, no. 7-8, pp. I-II, portrait.

MAMAEV (O.I.), 1992. Memory of Henry Stommel (1920-1992) [in Russian]. *Okeanologiya*, vol. 32, no. 3, pp. 621-623, portrait.

TABA (H.), 1991. The Bulletin interviews: Dr Henry Stommel. WMO [World Meteorological Organization] bulletin, vol. 40, no. 2, pp. 81-92, portraits.

STRODTMANN Sigismund [1868, Niebüll - 1946]

NELLEN (W.), 1993. Der Fischereiforscher Dr. Sigismund Strodtmann (1868 bis 1946). *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], pp. 89-101, portrait.

SUDJASTANI Tatang [14.VIII.1940 - 28.VIII.1992]

MARTOSUBROTO (P.), 1992. Tatang Sudjastani, M.Sc., 14 August 1940 - 28 August 1992. *Naga, the ICLARM quarterly*, vol. 15, no. 4, p. 44, portrait.

TAILLIEZ Philippe [1905, Malo-les-Bains, Nord

KOULBANIS (G.), 1993. Captain Philippe Tailliez. *Calypso log*, vol. 20, n° 2, pp. 10-11, portrait.

MOUTON (P.), 1993. Philippe Tailliez, mousquemer et humaniste. Thalassa, no. 69, pp. 56-58, portrait.

TETRY Andrée [5.VII.1907 - 11.III.1992]

HONDT (J.-L. d'), 1993 (1992). Andrée Tetry (05.07.1907 - 11.03.1992). *Bulletin de la Société zoologique de France*, vol. 117, no. 4, pp. 347-349.

THOMPSON J. Dana [10.VIII.1948, Rutherfordton, N.C. -]

O'BRIEN (J.), 1993. Some remarks about Dana. *WOCE [World ocean circulation experiment] notes*, vol. 5, no. 1, p. 3.

TOMICIC KARZULOVIC Jorge Juan [3.I.1940, Antofagasta, Chile - 1992, Bahia de Ite, ciudad de Nuevo Ilo, Peru]

CASTILLA (J.C.), 1992. Jorge Tomicic Karzulovic, 1940-1992. *Revista de biología marina*, vol. 27, no. 1, pp. 1-3, portrait.

Jorge Juan Tomicic Karzulovic (1940-1992). Estudios oceanológicos, vol. 11, no. 1, portrait (1992).

TOMLIN John Read le Brockton [15.VIII.1864, Stoke Field, Elston, Nottighamshire - 24.XII.1954]

TREW (A.), 1990. John Read le Brockton Tomlin 1864-1954, in : *John R. le B. Tomlin's new molluscan names*, pp. 6-10, portraits. - Caerdydd : Amgueddfa genedlaethol cymru.

TORTONESE Enrico [10.III.1911, Torino - 25.IV.1987, Genova]

MANELLI (H.), 1992. Enrico Tortonese et son oeuvre, in : *Echinoderm research 1991, proceedings of the Third European Conference on Echinoderms, Lecce, Italy, 9-12 September 1991* / ed. L. Scalera-Liaci, C. Canicatti, pp. 1-7. - Rotterdam ; Brookfield : A.A. Balkema.

TRINCHESE Salvatore [4.IV.1836, Martano, provincia di Lecca - 11.I.1897]

STOMEO (A.), 1989. La vita e l'attività scientifica, in : *Salvatore Trinchese, Opere*, pp. 11-24, portrait. - Roma : Napoli : Edizioni Theoria.

TRUSCOTT J. Beryl [- 9.II.1990]

IDLER (D.R.), 1991. In memory of J. Beryl Truscott, in : *Proceedings of the Fourth International Symposium on the Reproductive Physiology of Fish, University of East Anglia, Norwich, U.K., 7-12 July 1991* / ed. A.P. Scott, J.P. Sumpter, D.E. Kime & M.S. Rolfe, p. XIV.

USHAKOV Pavel Vladimirovich [27.VI.1903, St. Petersburg, Russia - 25.II.1992]

KHLEBOVICH (V.V.), 1992. Pavel Vladimirovich Ushakov (1903-1992) [in Russian]. *Zoologichesky zhurnal*, vol. 71, no. 11, p. 159.

VACQUIER Victor [13.X.1907, St. Petersburg, Russia

VACQUIER (V.), 1993. Many jobs. *Annual review of earth and planetary sciences*, vol. 21, pp. 1-17, portrait.

VATOVA Aristocle [1897, Capodistria -]

DALLA VENEZIA (L.), 1993. Ricordo di Aristocle Vatova. *Notiziario S.I.B.M. [Società italiana di biologia marina]*, no. 23, pp. 3-10, portrait.

VEVERS Henry Gwynne [13.XI.1917 - 24.VII.1988]

ZUCKERMAN (Lord), (1991). Dr Henry Gwynne Vevers, 13 November 1917-24 July 1988. *Echinoderm newsletter*, no. 16, pp. 198-199, portrait.

WALDICHUK Michael [23.X.1923, Mitkau, Roumania - 4.V.1991, Vancouver, B.C.]

DAVIS (J.C.), 1992. Michael Waldichuk, 1923-1991. *Marine pollution bulletin*, vol. 25, no. 1-4 [Progress and trends in marine environmental protection, in memory of Dr. Michael Waldichuk], pp. 1-2, portrait.

WALKER John Malcom [3.IV.1942

Meteorologist's profile - Malcom Walker. *Weather*, vol. 47, no. 11, pp. 437-440 (1992).

WEBER Max Wilhelm Carl [5.XII.1852, Bonn, Germany - 7.II.1937]

PIETERS (F.F.J.M.) & VISSER (J. de), 1993. The scientific career of the zoologist Max Wilhelm Carl Weber (1852-1937). *Bijdragen tot de dierkuknde*, vol. 62, no. 4, pp. 193-214, portraits.

WEISSENBERG Richard [1882, Breslau - 1969, Philadelphia]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches Jahrbuch*, vol. 1, [pp. 114-116].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 131-132].

WHITEHEAD Peter [24.VI.1930, Nairobi - 1992]

BAUCHOT (M.L.), 1992. Peter Whitehead (1930-1992). *Cybium*, vol. 16, no. 2, p. 103.

WILSON John Tuzo [24.X.1908, Ottawa - 1993]

VINE (F.), 1993. John Tuzo Wilson (1908-1993). *Nature*, vol. 363, no. 6428, p. 400, portrait.

WOLTERECK Richard [6.IV.1877, Hannover - 23.II.1944, Seeon]

WATERMANN (B.), 1992. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Historisch-meereskundliches*

Jahrbuch, vol. 1, [pp. 118-120, portrait].

WATERMANN (B.), 1993. Zum Schicksal einiger Meeresbiologen im Nationalsozialismus. *Deutsche hydrographische Zeitschrift, Ergänzungsheft*, (Reihe B) n° 25 [Meeresforschung in Hamburg von vorvorgestern bis übermorgen / ed. G. Wegner], [pp. 134-135, portrait].

WOOD Forrest Glenn [13.IX.1918, South Bend, Indiana - 1992]

EVANS (W.E.), 1992. Forrest Glenn Wood, 1919 [i.e. 1918]-1992. *Marine mammal science*, vol. 8, no. 3, pp. 324-325, portrait.

WOOSTER Warren [20.II.1921, Westfield, Massachusetts

DICKSON (R.R.), 1992. Hydrobiological variability in the ICES area, 1980-1989: papers to celebrate the 70th anniversaries of Stig Fonselius, Arthur Lee, Lars Midtun, Odd Sælen, and Warren Wooster. *ICES marine science symposia*, vol. 195, [p. 7, portrait].

WRIGHT Kenneth A. [1936 - 6.VII.1992]

HOPE (W. D.), 1992. Kenneth A. Wright, 1936-1992. *Psammonalia*, no. 98, p. 7.

YASTREBOV Vyacheslav Semenovich [20.V.1932

Vyacheslav Semenovich Yastrebov (on the 60th anniversary of his birth) [in Russian]. *Okeanologiya*, vol. 32, no. 3, pp. 619-620, portrait (1992).

YONGE Sir Maurice [9.XII.1899, Wakefield, Yorkshire - 17.III.1986, Edinburgh]

ALLEN (J.A.), 1990. Sir Maurice Yonge, C.B.E., D.Sc., F.R.S., P.P.R.S.E., 1899-1986, in : *The Bivalvia, proceedings of a Memorial symposium in honour of Sir Charles Maurice Yonge (1899-1986) at the IXth International Malacological Congress, 1986, Edinburgh, Scotland, U.K.* / ed. B. Morton, pp. 4-7, portrait. - Hong Kong : Hong Kong University Press.

MEETINGS

15-17 OCTOBER 1993. HISTORY OF SCIENCE & TECHNOLOGY EDUCATION IN CANADA. 8th Kingston Conference of Canadian Science and Technology Historical Association, Kingston, Ontario. Contact: Dr. Marianne Ainley, Simone de Beauvoir Institute, 1455 de Maisonneuve Blvd W., Montreal, Quebec, H3G 1M8, Canada. Fax: (514) 848-2370.

4-6 NOVEMBER 1993. LONGITUDE SYMPOSIUM, Harvard University, organized by the Harvard Collection of Scientific Instruments and the National Association of Watch & Clock Collectors to commemorate the 300th anniversary of the birth of John Harrison, an inventor of the marine chronometer. Contact: Longitude Symposium, Harvard University, Science Center B6, Cambridge, MA 02138, USA. Fax: (617) 495-3344.

11-14 NOVEMBER 1993. Annual meeting of History of Science Society, Santa Fe, New Mexico, USA. Contact: Paul L. Farber, Dept. of History, Oregon State University, Corvallis, OR, USA. Fax: (503) 737-2434.

20 FEBRUARY 1994. PACIFIC MARINE SCIENCE AT CENTURY'S CLOSE: ACHIEVEMENTS AND PROSPECTS. Part of AAAS*94, San Francisco, California, USA. Contact: P.F. Rehbock, Dept. of General Science, University of Hawaii, Honolulu, Hawaii 96822, USA.

19-21 MARCH 1994. FROM THE INSIDE AND THE OUTSIDE: INTER-DISCIPLINARY PERSPECTIVES ON THE HISTORY OF THE EARTH SCIENCES. San Diego, CA., a Penrose Conference of the Geological Society of America. Contact: Leo F. Laporte, Earth Sciences, University of California, Santa Cruz, CA 95064, USA.

28-30 MARCH 1994. MAKING SPACE: TERRITORIAL THEMES IN THE HISTORY OF SCIENCE. University of Kent at Canterbury, England. Boundaries around and between disciplines, laboratories & sites; spatiality & representations, context and politics of knowledge, etc. Contact: Crosbie Smith, History of Science Unite, University of Kent, Canterbury, Kent CT2 7NR, England.

6-8 JULY 1994. SCIENCE AND BRITISH CULTURE IN THE 1830's. Trinity College, Cambridge. Celebrates the bicentenary of the birth of William Whewell. Contact: Geoffrey Cantor, Dept. of Philosophy, University of Leeds, Leeds LS2 9JT, England.

7-9 SEPTEMBER 1994. ORIGINS AND EVOLUTION OF COLLECTING SCIENTIFIC INSTRUMENTS. Museum Boerhaave, Leiden. To examine changing patterns of collecting scientific instruments, why they interest collectors, etc. Contact: Peter de Clercq, Museum Boerhaave, PB11280, 2312EG Leiden, The Netherlands.