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Editorial – Some new directions

With this issue of *History of Oceanography* the Commission of Oceanography ventures into new waters – the publication of its newsletter on the World Wide Web rather than in hard copy print. This was made necessary by the increasing cost of producing the newsletter, but especially by the regular increase of postal costs. Both could not long be covered by the Commission's sole source of income, its annual grant (very gratefully received, withal) from the Division of History of Science. The opportunity to go online was made possible by a generous offer from Dr Gary Weir, the editor of the *International Journal of Naval History*, to host *History of Oceanography* on his web site. And although one of the proximate stimuli for the move was financial stringency, there are great advantages in moving away from print, including increased flexibility in publication such as the inclusion of colour figures, the ability to edit and correct more easily, the easy access that nearly everyone in the world now has to the internet, and the possibility (once the bugs have been worked out of the system) of producing more than one newsletter a year. Plans are also afoot to have past issues archived on the same site. We ask you to comment on this new venture, with suggestions for its improvement – and we ask especially that you contribute material on the history of marine science to be included in future issues.

New ventures are seldom entirely new. This has been borne out to me this year not just because of the new direction taken by *History of Oceanography* but also because of the sudden attention in 2004 to polar oceanography in both Antarctic and Arctic. In particular, two symposia focused attention on marine studies in polar regions – the first *A Century of Discovery. Antarctic Exploration and the Southern Ocean*, commemorating the return of Robert F. Scott to England after his first Antarctic expedition in 1904, held in Southampton in late June, and the second the Maury IV Workshop *History of Polar Oceanography* held in Barrow, Alaska in early September. Both gave very welcome attention to the scientific side of polar exploration rather than the more frequent emphasis on adventures (and in many cases misadventures) at high latitudes. We can learn a lot by examining the contribution of high latitude oceanography to our modern knowledge – and the need for knowledge – of the links between ocean, atmosphere and climate. We learn too how contingent our current knowledge is upon the unpredictable.

These thoughts were certainly not on the mind of George Deacon when he left his job as a chemistry teacher in England to join the fledgling *Discovery* Investigations in 1927. The Investigations themselves, dating from the foundation of the *Discovery* Committee in 1923 to investigate the biological foundations of the burgeoning whale fishery centered at South Georgia (and to contribute to Great Britain's political interests in the area), first used Scott's ship *Discovery* (hence the name) and the new research vessel *William Scoresby*, on which Deacon spent his first years at sea. Transcending his role as a chemist, Deacon soon began to use the chemical data – particularly salinity and oxygen, along with temperature, to develop a scheme of meridional deep water circulation in the South Atlantic sector of the Southern Ocean.

A background of knowledge existed about Southern Ocean circulation dating mainly from German investigations on a series of expeditions between 1898 and 1911, associated with the names of Gerhard Schott, Erich von Drygalski, Wilhelm Filchner and Wilhelm Brennecke. Much of this was published late, largely due to the First World War, so that by the time George Deacon's interests turned to physical oceanography extensive new monographs, particularly from the hands of Brennecke, also the Berlin oceanographers Alfred Merz and Georg Wüst, were available. All of them showed the prevalence of geographically-extensive meridional deep circulation, now given the names of Antarctic Bottom Water, North Atlantic Deep Water, and

Antarctic Deep Water, and a zonal current system now called the Antarctic Circumpolar Current. In Deacon's early days at sea, details of these current systems were known only from the South Atlantic Sector. But were they more widespread, forming a truly global system of circulation?

The answer came from one of the greatest cruises in the history of oceanographic investigation. Leaving Cape Town in April 1932, *Discovery* and its oceanographers, including George Deacon, circumnavigated Antarctica, much of the first few months at sea the Antarctic winter, completing the long series of sections in April 1933 before returning to England. On the basis of this remarkable achievement, incorporating all the earlier work, Deacon was able to show in his monograph *The hydrology of the Southern Ocean*, published in 1937, that the system of circulation around Antarctica (with the exception of Antarctic Bottom Water formation) was a truly global one, resulting in all the oceans being filled with deep water almost exclusively formed originally in the North Atlantic and in high latitudes of the Southern Hemisphere.

Deacon's synthesis was rapidly incorporated into general knowledge because of the publication in 1942 of the first general textbook of oceanography, Sverdrup, Johnson and Fleming's *The Oceans*. Harald Sverdrup, who was responsible for the physical oceanography chapters, used Deacon's work to create a scheme of Southern Ocean circulation – and the resulting global deep ocean circulation – that became part of the received wisdom of oceanographers to this day. And it is this global scheme that lies behind the idea of a global ocean conveyor of salt and especially heat, associated first in the 1980s with the names of Arnold Gordon and later Wallace Broecker. George Deacon certainly did not set out to create a scheme of climate and climate change dependent on global patterns of oceanic circulation, but his new venture into physical oceanography led, not inevitably, but as the result of a series of contingencies – the most important of them being Sverdrup's promotion of his work in *The Oceans*. In 2004 his great work on the Southern Ocean is as important – perhaps more important – than it was when it was published nearly seventy years ago.

Eric Mills

A TRIBUTE TO DAVID VAN KEUREN (28.X.1950, Wisconsin – 26.III. 2004, Washington, D.C.)

David van Keuren, a friend to many historians of oceanography, was killed tragically on 26 March 2004. He lived in Washington, DC, where he served for many years as an historian at the Naval Research Laboratory (NRL). The accident occurred as David was riding his bicycle to work, his usual mode of transportation not just during his working week but when he vacationed and attended conferences.

David completed his graduate training at the University of Pennsylvania in 1982. Most of his early work and his early interests involved the history of anthropology, especially investigating cultural anthropology. But after moving to D.C. and taking his position at NRL, his focus shifted to the history of oceanography, especially aspects of oceanography that involved deep-sea drilling. David was best-known, however, not so much for his scholarship as for his mentoring and encouraging of younger scholars. There are dozens of young historians of science who recall David as the first person who sought them out at a History of Science Society meeting or who suggested ideas of areas to investigate or who closely kept track of their progress on a dissertation or first book project. While he did not hold an academic appointment, he truly was a mentor to many historians.

Another major contribution David made to the history of oceanography was the formation of the Maury Workshops. Shortly after ICHO-V in La Jolla (1993), David began convening small groups of historians at the History of Science Society annual meetings to discuss their common interest in the history of ocean science. From these annual gatherings and because of increasing interest, David convened the first Maury Workshop in 1997 to determine if history of oceanography represented a viable specialty area in the history of science and technology. The results of that workshop and the three that have followed bear testimony to David's diligence. In fact, the first volume to emerge from the workshops (Maury III), *The Machine in Neptune's Garden*, came out in galley proofs to receive David's careful attention just before he was killed.

David will be sorely missed. Colleagues from throughout the world sent messages of condolences to his family, the second volume from the Maury workshops will be dedicated to his memory, a reading room named after him will soon be open in Kaliningrad, and there is a small secondary school program near Barrow (Alaska) that bears David's name. But all of us would trade any of these wonderful projects for just one more day with David.

ICHO members who would like to make a contribution to honor David, we are still collecting books in the history of oceanography for the reading room in Kaliningrad. You may send your contributions to:

Keith R. Benson
Green College, UBC
6201 Cecil Green Park Rd.
Vancouver, BC V6T 1Z1, Canada

A special bookplate honoring David has been designed by his sister, Marina, and will be placed in each book indicating the name of the donor.

Keith Benson, Green College, University of British Columbia, Vancouver, B.C. V6T 1Z1, Canada

CENTENARIO DE LA BASE ORCADAS – A HISTORIC CELEBRATION OF A SCOTLAND-ARGENTINA COLLABORATION IN ANTARCTICA

Geoff Swinney
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‘Scotia Bay.

...I took some lemons ashore, and the 25-inch chart of Scotia and Jessie Bays. The Union Jack and Argentine flags were flying. We got anchor up, and started steaming out of Scotia Bay at 11.30 A.M....’

So wrote William Speirs Bruce in the log of the Scottish National Antarctic (*Scotia*) Expedition on 22 February 1904. As the Scottish expedition left Scotia Bay on Laurie Island in the South Orkneys a new phase of Antarctic scientific research began. The work of the meteorological station that the expedition had established was to be continued by Argentina.

One hundred years later, shortly after 11.30 am on 22 February 2004, we were gathered on the beach separating Scotia Bay and Uruguay Bay, to celebrate the centenary of Argentine involvement in Antarctic research. Following speeches by representatives of the various government agencies now responsible for Antarctic research a monument was unveiled overlooking the bay which Bruce named Jessie Bay in honour of his wife, but which is now known as Uruguay Bay. Base Orcadas, established by the Scots, is now the longest continuously inhabited site in Antarctica (Figures 1, 2; Figure 3 upper). Argentina had the foresight to recognise the potential of maintaining a fixed base at a time when the British Government was unprepared to entertain the prospect of funding its continued operation. Thus a Scotland-Argentina collaboration initiated the modern means of studying Antarctica – from permanently-manned fixed bases rather than from short-term expeditions.

Actually, when *Scotia* left Laurie Island in 1904, she left behind the expedition's meteorologist, Robert Mossman, and a cook/steward, Bill Smith. They transferred from the expedition to the staff of the Argentinian Meteorological Service and along with three Argentinian meteorologists, Hugo Acuña, Edgar Szmula and Luciano Valette, were to operate the base until they were relieved the following summer. Thereafter Argentina has operated the base but, in the early years, several of the staff were Scots who had received their meteorological training under the near-polar conditions of the Ben Nevis Observatory.

I felt deeply honoured to have been invited by the Dirección Nacional del Antártico of the Ministerio de Relaciones Exteriores, Comercio Internacional y Culto, as the representative of the Royal Scottish Geographical Society, to be a guest at the centenary celebrations (my employer, the National Museums of Scotland, having kindly allowed me to take annual leave at short notice to enable me to accept the invitation). In the event, I found myself also to be the representative of the charity Ciencias y Artes Patagonia which had liaised with the Argentine government authorities over my visit. Last year I had assisted the charity in developing its touring exhibition *Perito Moreno – William Bruce: two patriots – one world* exploring the links between Bruce and the eminent Argentinian polymath Francisco 'Perito' Moreno, who through President Roca had been instrumental in arranging for Argentina to continue the meteorological work begun in the Antarctic by the Scottish expedition.

As well as attending the ceremony I also enjoyed the opportunity to present a talk on Bruce and the *Scotia* expedition's role in establishing Base Orcadas to the government representatives, representatives of the armed services, other distinguished guests and members of the press who had been taken to the base aboard the Argentine Navy icebreaker *Almirante Irizar* (Figure 3, lower). Regrettably, I was unable to give my talk in Spanish but it was a particular thrill that Noemi Acuña kindly agreed to translate – Noemi is the granddaughter of Hugo Acuña, the only native-born Argentinean in the team that operated the base over its first winter (Szmula was German and Valette was born in Uruguay, although he became an Argentinean citizen). With several teams of journalists aboard the icebreaker the celebrations received prominent coverage in the media and the post office produced special commemorative stamps. One of these features a photograph taken in 1904 showing the Scottish and Argentinian scientific team flying not only the Argentine flag and the Union Jack, but also the Lion Rampant, outside Omond House, the dry-stone hut in which they were to live for a year. The hut, now a ruin, stands next to the modern research station.

We remained at Orcadas for about 24 hours. Shortly before we sailed out of Scotia Bay there was a party aboard the *Almirante Irizar* to welcome the aboard the scientific team who had been at Base Orcadas 2003-2004 and to say farewell to the team who were about to leave the ship to man the base for the year 2004-2005. I could not help feeling that Bruce would have been delighted to

see a new generation of scientists going off with such enthusiasm and passion to continue the work which he had begun just over a century ago.



Figure 1. Base Orcadas with Mount Ramsay, named for Allan Ramsay, chief engineer of Scotia who died and is buried on the island, in the background (Photo Geoff Swinney).



Figure 2. Base Orcadas viewed from Scotia Bay with icebergs in Uruguay Bay (Jessie Bay) beyond and the Mossman Peninsula to the left. The Scotia expedition established its base on this beach in 1903 (Photo: Geoff Swinney).



Figure 3. (Above) S.Y. *Scotia* overwintering in Scotia Bay, South Orkney Islands in (photo with permission of the Royal Scottish Geographical Society). (Below) A R A *Almirante Irizar* in Scotia Bay with the ruin of Omond House in the foreground (photo: Geoff Swinney).

MR HODGES' ACCUMULATOR

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When trying for deep soundings during the 1840s and 1850s it was often practicable to wait for calm weather and transfer the sounding reel and gear into a small boat, as illustrated in James Clark Ross's *Voyage... in the Southern and Antarctic regions* 1847), 2.355. This diminished the risk of the ship's motion jerking the line and causing it to break, since a small boat gave way to passage of waves, and put less strain on the line. With the sounder weight detached, the boat's crew could easily haul in the thin line and sampler tube. But the operation of dredging from a boat was impossible; time and a powerful motive force were necessary for the tow, and a man-powered capstan or donkey engine was needed to haul in the heavy loaded dredge bag.

Accounts of the development of deep-sea sounding and dredging have described the apparatus lowered into the sea, but generally ignore the device, clearly shown in the famous picture of HMS *Porcupine* (see below), referred to simply as Hodges' accumulator. This vital piece of gear made it possible to tow and haul in deep-sea dredges from a line fastened on board, with less risk of the rope breaking if the dredge snagged or the ship rolled or pitched.

Richard Edward Hodges (1797-1873) was born in Bromfield, Shropshire and lived for nearly 20 years in Haiti, where he was a merchant and British Vice-Consul at the southern port of Jacmel. Mahogany was a valuable export from Haiti, and whereas the richer timber merchants employed gangs of men to fell and transport the trunks to the ports, Hodges observed that small groups of what he describes as poor Africans manhandled the great trunks by employing creepers and the springy branches of trees to accumulate the power needed to raise them onto cutting frames. The widowed Hodges returned to England with his young son Thomas, where he realised that vulcanised rubber could be employed for exactly the same accumulative power. His UK patent for his accumulator was filed in 1849.

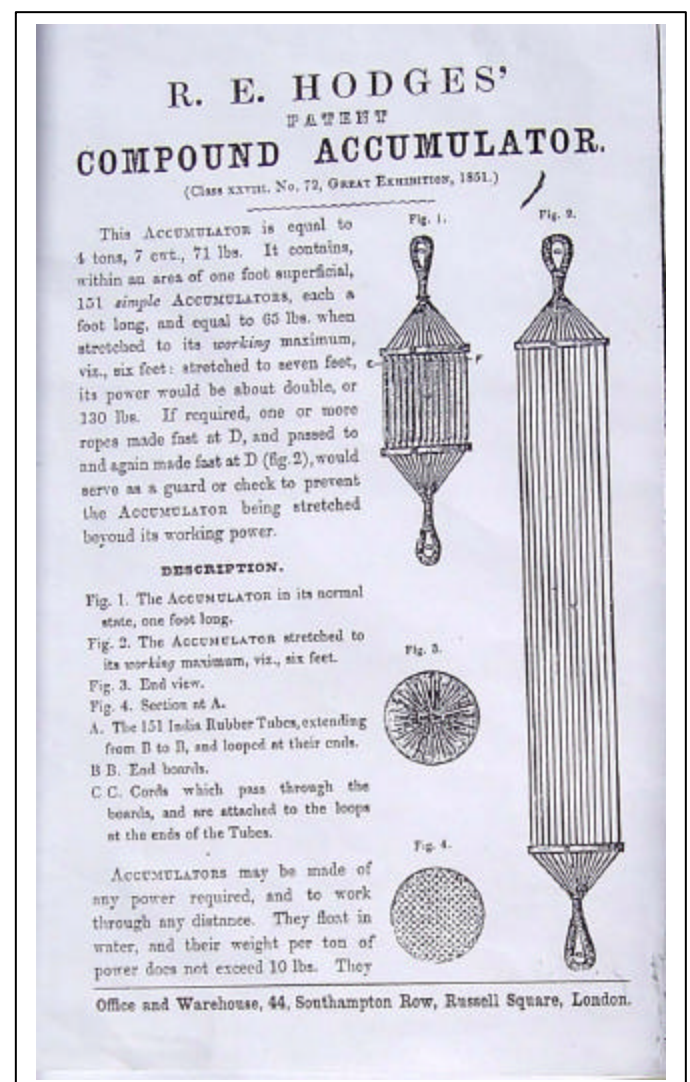
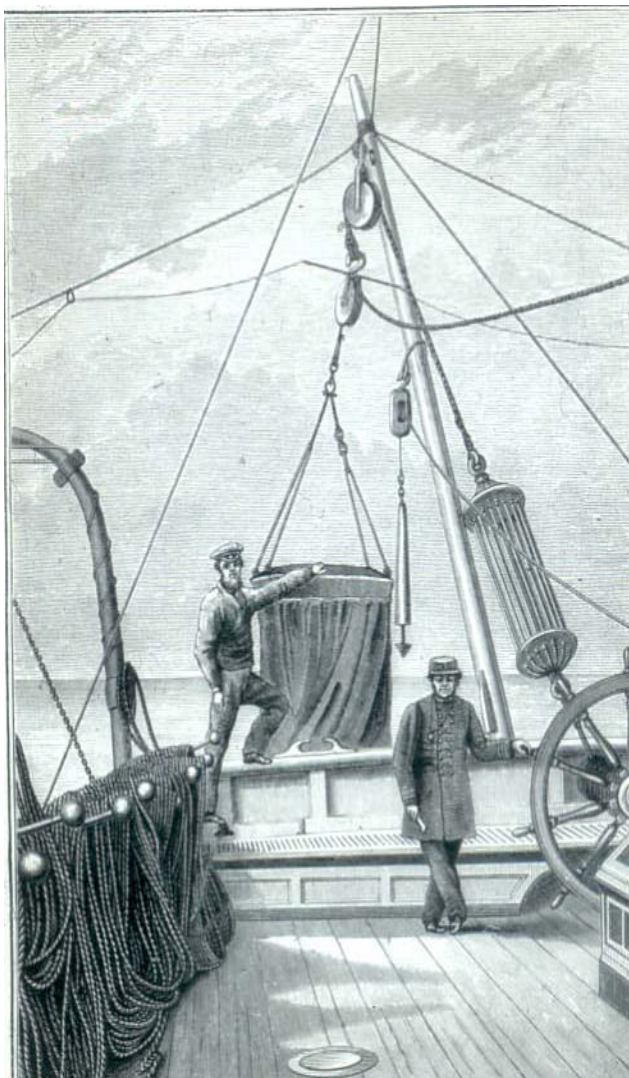
Vulcanisation - the processing of rubber to render it stable, involved combining it with sulphur, then heating it; the addition of salts of lead accelerated the process and needed less heat. UK patents were filed by Thomas Hancock and the American Charles Goodyear in 1844, and vulcanised rubber instantly found a multitude of uses such as waterproofing garments, in tension to propel various projectiles and, as discs interleaved with steel discs, compression springs for railway buffers. Unharmful by normal temperatures or immersion in water (where it floated), vulcanised rubber was damaged only by oil and grease, or abrasion while under tension. The processing factories were outside central London, requiring as they did a source of power and considerable space to accommodate the raw and processed rubber. But the manufacture of the vulcanised rubber could be done in towns, and most of the manufactories opened wholesale and retail showrooms in London.

One such was Hodges' office and warehouse, situated by 1852 at 44, later 89 Southampton Row, Holborn, until 1872. His rubber was obtained from factories elsewhere for assembly into his advertised products. He exhibited at the 1851 and 1862 Exhibitions in London, and in associated pamphlets illustrated and gave technical details for accumulators suitable for moving heavy bodies – such as a stranded or sunken ship – erecting machinery, propelling harpoons etc. He

also writes 'The strain, or rather jerk, on ships' cables, standing rigging, and tow-lines, can be rendered harmless by the insertion of an accumulator as a spring in any part of the said cable, rigging, or tow-line, or by the cable or tow-line being made fast to an accumulator fixed on the deck or to some part of the vessel'. The accumulator shown contained 151 rubber cords, was one foot long at rest, extending to a working maximum of six feet. Its total power was equal to 4 tons, 7 cwt, 71 lbs (see figure below). Given Hodges' 1849 patent and his subsequent publicity at Exhibitions and his central warehouse, it seems possible that the British Army or Navy might have adopted his accumulators, and that it was in use at dockyards, but I have been unable to discover any mention of it prior to the *Hydra* sounding voyage of 1868 and the *Porcupine* voyages of 1869.

Refs: UK Patent 12,623 of 1849, Accumulator etc.

Hodges, R.E. *R. E. Hodges patent india-rubber accumulators: new mechanical power, applicable also to projectile purposes* (London, 1852) BL callmark 8765.c.40 (6).



THE *FLYE* REVISITED

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A sixteenth century piece of hydrography has been lost. The last recorded existence of the *Flye*, in 1937, was when Eustace Bosanquet brought attention to it.¹ Nowadays, requesting the British Library for the document results in the explanation that it can not be found. A similar circumlocution is found in the Short Title Catalogue. Repeated non production means that the document is essentially lost. Fortunately, Bosanquet published a good reproduction.

The *Flye* is a beautiful diagram of tidal information for North West Europe. The *Flye* was made by Philip Moore in 1569. The diagram is complex, and requires an interpretation as to its usage; beyond the title, it is without any accompanying text. In the same year, William Bourne published *A Regiment for the Sea*.² Bourne sets out some of the same material as the *Flye* and indicates how the diagram might be used; importantly he showed how to calculate the moon's age.

Both diagram and text deal with the direction of the syzygy moon to predict high water. The syzygy moon is when it is either new or full. The mariner had to consider a notional or mean moon. The direction of the syzygy moon was used to indicate the moment of high water; this could also be expressed in time as well as with the reciprocal direction. Thus: at the Lizard, high water will come when the full moon bears west; notionally this will be at six in the evening. It will also be high water when bearing east, at six in the morning. The diagram unusually sets out the direction of the moon in the quarters. The title of the *Flye* indicates that the tabulation was called by some mariners – the flye.

































The *Flye* does not give an actual rectangular table. What it does give is a diagram of concentric circles. Tidal information is then contained within segments of the diagram. The word *Flye* was contemporaneously used to indicate a compass card.³ The diagram does not have an explicit, direct orientation; although it is set north-up. It also sets out the tides around a rose of thirty-two points. The places are superficially set around the rose in geographic order; but closer inspection reveals they are in an order representing the advancement of the tide along the coasts. The three coasts are: the English east coast from north to south, the corner of France from Belle Isle around Ushant and the English south coast from west to east. Clockwise, they represent the conventional progress of the flood, and anti-clockwise the ebb. Therefore, the diagram basically considers the tidal stream. The diagram also gives symbols requiring further interpretation.

¹ Eustace Bosanquet, *The flye*, The Library, Fourth series XVIII, 1938, 194-200.

² Eva Germaine Rimington Taylor, *A regiment for the sea*, Hakluyt Society 2nd CXXI (Cambridge, 1963).

³ Leonard Digges, *Panometria*, 1571; S.T.C. 6858.

The following list is comprised of: an implied direction; the place⁴, symbol and time from the *Flye*; and three instantaneous states of the stream.⁵ The list, taken from a circular presentation, begins with Berwick because that is how the table begins in Bourne.

Hours before and after Dover			-1	HW	+1
NNE Berwick		id	Eb	Eb	Fd
NExN Holy Island		ii	Eb	Eb	S
NE R. Tyne		iii	Eb	Eb	S
NExE R. Tees		iiii	Eb	Eb	S
ENE Bridlington		iiiid	Eb	Eb	Eb
ExN Spurn Head		iiiid	Eb	Eb	Eb
E Blakeney		vi	S	Eb	Eb
ExS Cromer		vii	S	Eb	Eb
ESE Winterton		viid	Fd	S	Eb
SExS Yarmouth		viii	Fd	S	Eb
SE Lowestoft		ix	Fd	S	Eb
SExS Orford Ness		x	Fd	S	Eb
SSE Walton Naze		xd	Fd	Fd	S
SxE Sunk Head		xi	Fd	Fd	S
S Southend		xii	Fd	Fd	S
SxW Shivering Sand		i	Fd	Fd	S
SSW Harwich		iii	Fd	Fd	S
SWxS Belle Isle		iii	Fd	Fd	Fd
SW Pen March		iii	Fd	Fd	Fd
SWxW Fountnes		iii	Fd	Fd	Fd
WSW St. Mathieu		iiiid	S	Fd	Fd
WxS Portsall		iiiid	S	S	S
W Lizard Point		vi	Eb	Eb	Eb
WxN Start Point		vi	Fd	Eb	Eb
WNW Portland		vi	Fd	Eb	Eb
NWxW Bembridge		x	Fd	Eb	Eb
NW Eastbourne		x	Fd	Fd	Eb
NWxN Rye		x	Fd	Fd	Fd
NNW Folkestone		xd	Fd	Fd	Fd
NxW Herne Bay		xi	Fd	Fd	S
N Faversham		xii	Fd	Fd	S
NxE Sheerness		i	Fd	Fd	S

⁴ The places named in the *Flye* have been substituted with suitable places extracted from the current Admiralty tide table.

⁵ Basil D'Oliveira, *The Macmillan Reeds Nautical Almanac*, 2002.

The *Flye*'s explicit purpose, as stated in the title, was to give the ebb and flood. The state of slack water is always difficult to determine. Only recently has there been any real facility in making tidal measurements in the offing. At any given instant, the moment of slack water is a rare event. Therefore the fewest symbols, the six bisected ovals, may be thought of as representing slack – or high water. This is borne out by their then being an equal thirteen representations each, of either flood or ebb, with the other two symbols. The plain oval is taken to be for flood, the trisected oval for ebb.

The purpose of the diagram was also to give the time, at which the state of the stream was in. An almanac, slightly earlier than the *Flye*, set out tidal information in repetitive sheets for each compass point. A modern and much used extension of this concept can be found in a tidal stream atlas; which is a series of pictures, of the coast under consideration, related to each tidal hour at a control point – such as Dover.⁶ One of these atlases has been used to extract the streams represented in the above list. There is a good fit for the streams when the coasts are seen at the moment of high water Dover.

The *Flye* has been interpreted as being for the establishment of each port. That is not its primary purpose. The symbols are given in a higher order of importance to the establishment. The earlier commentators were unable to come to an interpretation of the symbols.⁷ The explicit establishments are given in lower case Roman numerals, with a d for dimidia, or half-hour. Whilst, on each coast, the establishments are contiguous, they do not run onwards from the first numeral. Clearly Harwich and Shivering Sand are out of sequence in the above list. Their change of sequence would appear to be contrived to maintain the time continuity. Further contrivance is then exhibited in that the French coast, with times of iii and iiid, is inserted between Harwich and the Lizard, at iii and vi respectively.

The extent of the representative sheet of the *Flye* is heavily curtailed in the best surviving reproduction. On the left, out of alignment with the west point is a small mark; on the right, in line with the east point is a cut off word. At the bottom, in line with the south point, is the inverted word *South*. It could suggest that the diagram expresses a state of the stream. Implicitly it would have to be for some control point, such as Dover. More probably, as the above list terminates in the Nore (Sheerness), that would have been the point. There may then have been other similar sheets; each of which would have had the symbols slightly shifted for each of the remaining tidal hours.

One can only speculate on for whom the *Flye* was intended. Clearly, written in English, it is for the English. The dominance of eastern rather than southern ports would suggest a greater interest in the east. That it presents information skirting Ushant indicates its use to access Biscay. The omission of other French information in the Narrow Seas, combined with the presence of some southern English data, suggests the route adopted.

On the other hand it easy to see the value of the information that the diagram provides. On a power driven ship, the mariner still navigates with a stream atlas open on the chart table. The information conveyed would have been even more vital on a ship under sail. At its crudest, the *Flye* tells the mariner if the tide will push him shorewards. It also tells him when he most risks the strand.

⁶ See: Anonymous, *Brown's Tidal streams in twelve charts*, 17th edition 1972.

⁷ See: David W. Waters, *The art of navigation in England in Elizabethan and early Stuart times*, 1958, p129 & H. Derek Howse, *Some early tidal diagrams*, Revista da Universidade de Coimbra, **33** 1985, p380.

Whichever interpretation one takes, the *Flye* holds a bird's eye view extending across several hundred miles of ocean. Whilst the basic tidal cycle runs for a mean twelve hours and twenty-five minutes, its ordinary variance is from about twelve to thirteen hours. Additionally, the difference of longitude engaged with covers a local time difference of half an hour. The diagram succeeds well in coping with the, as then, undefined globe. The *Flye*, when it existed, appears to have represented a more advanced state of hydrographic knowledge than has so far been expressed.

A. A. ALEEM: ARAB MARINE BOTANIST/OCEANOGRAPHER EXTRAORDINAIRE

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Anwar Abdel Aleem was born in 1918 in Alexandria, Egypt, where he received his formal Primary and Secondary education at Government schools. He graduated at the top of his class at both schools. He received his B.Sc. degree (with Honours) at the University of Cairo; he then joined the Faculty of Science at the newly established Farouk I University (now Alexandria University), where in 1945 he received his Master's degree. He was sent on a government mission to England where in 1949 he received his Ph.D. from London University, while working with the famed British phycologist, F.E. Fritsch (Aleem was later to receive, in 1970, a D.Sc. from the same University). Upon his return to the University of Alexandria, he joined the Faculty of the Department of Oceanography, and rose through the academic ranks until his appointment in 1959 as Professor and Chairman of that Department. He retired in 1986, and held the position of Professor Emeritus till his death in 1996.

Beside his many contributions to the Department of Oceanography (by developing a new interdisciplinary curriculum in oceanography; acquiring a new research boat, to mention only two), he is credited with establishing the Department of Oceanography (later, the Institute of Marine Science on the Red Sea), King Abdel Aziz University, Jeddah, Saudi Arabia. In the early 1970s, he was sent on a UNESCO mission to the University of Sierra Leone, West Africa, where

he was charged with developing a curriculum in Marine Biology, and establishing a Diploma-track degree in Marine Sciences, as well as founding a Marine Science Library. During his academic tenure at the universities he was affiliated with, he taught courses in Marine Biology, Marine Ecology, Marine botany, Algology and General Oceanography.

He was known among his colleagues as " Peripatetic Aleem," for he always had an itch to travel abroad, mostly in pursuit of his academic goals. He was indefatigable in applying for (and successfully receiving) grants, fellowships, and scholarships to visit the leading oceanographic institutions the world over. For instance, after receiving his Ph.D., he sought further training at some of the leading marine laboratories in Europe. Among these were the Marine Biological Association of the U.K. (Plymouth Lab) where he worked with both Dr. H.W. Harvey and Dr. W.R.G. Atkins; the Marine Station at Port Erin on the Isle of Man; the Dove Marine Laboratory on the Northumberland coast of England; the Marine Botanical Institute in Gothenburg, Sweden; the Den Helder institute in Holland; the Kiel and Hamburg Marine Institutes and the Institute of Limnology, Max-Planck-Gesellschaft, in Plön, Germany, where he worked with the great German diatom specialist Friedrich Hustedt , and where he co-authored with him three papers. He also visited the Laboratoire Arago at Banyuls-sur-Mer, France, where in later years Aleem would take his students to be trained at the famed laboratory - a novel approach in educating Egyptian students. He likewise visited and had relationships with several Mediterranean stations such as Naples, Monaco, Villefranche-sur-Mer and Marseille. He soon became known for his habit of working long hours past midnight; his colleagues in the Mediterranean stations jokingly called him by the nickname "Aleem the nocturne."

His research prowess in the field of marine botany covered a wide spectrum of organisms ranging from the microscopic Cyanobacteria and diatoms to the giant kelps of southern California. He was equally at home doing research on marine fungi (especially in mangrove swamps), sea grass ecosystems, and the algae of lakes. He even delved into marine archaeology in his study of the paleoecology of ancient Fayoum Lake (in the Western Desert, south of Cairo). He published extensively, with more than 120 publications to his credit (mostly in English, some in French and a few in German). With A. A. A. as his initials, Aleem's publications came always at the top of any bibliographical list, a fact that he cherished discretely.

Aleem also wrote numerous articles and authored several books in Arabic in an effort to introduce to his Arab audience such subjects as "The Voyage of HMS Challenger," "Nansen and the Polar Regions," "the John Murray Expedition for the Exploration of the Indian Ocean," "The Theory of Evolution," and many others. However the subject that held a great fascination for him was the history of marine science and in particular the history of Arab navigation and Arab navigators. In this regard he has made several seminal contributions to the latter subject by presenting papers at the first five meetings of the International Congresses on the History of Oceanography, and attending many of them. Notable among his contributions: "Ahmed Ibn Magid, an Arab navigator of the XV Century and his Contributions to Marine Sciences"; and "Concepts of Currents, Tides and Winds Among Medieval Arab Geographers in the Indian Ocean." (See below a list of his historical contributions in English in ICHO proceedings and other publications)

It is gratifying to note that Aleem was well recognized and honored for his many and valuable contributions to marine science by not only his native country, but by other Arab countries. Among the honors were the Egyptian State Prize in Biological Sciences (1953), the Kuwait Prize for the Advancement of Science (1984) and their Gold Medal in Biological Oceanography, the Certificate of Merit of the Golden Jubilee of the University of Alexandria, and the Certificate of Merit from King Abdul Aziz University in Jeddah (1985).

The contributions of Aleem were made amidst a host of personal difficulties and family tragedies including the untimely loss of his wife and son. He is survived by two research scientists, a son Hosam in engineering and a daughter Eiman in biological sciences.

Having just read (for the second time) his most absorbing autobiography "Memoirs of a Marine Scientist" (published in Arabic the year he died, 1996), it's difficult to find a word or a short sentence that would aptly describe the rich life of this remarkably productive, energetic, algologist, gifted educator, noted historian and engaging raconteur; so perhaps one could settle for the title chosen for this short article: Aleem: the Arab Marine Botanist/ Oceanographer Extraordinaire!

Publications by A. A. Aleem on History of Marine Sciences and Navigation In the First Five International Congresses on History of Oceanography (ICHO):

Aleem, Anwar Abdel .1968. Concepts of marine biology among Arab writers in the middle ages. In: *Premier Congrès International d' Histoire de l'Océanographie, Monaco 1966* (First International Congress on History of Oceanography, Monaco 1966), Communications Vol 2 *Bull. Inst. Océanogr. Monaco*. Numéro Spéc.2, 359-367.

Aleem, Anwar Abdel. 1968. Ahmad Ibn Magid, Arab navigator of the XVth century and his contribution to marine sciences. In: *Premier Congrès International d' Histoire de l'Océanographie, Monaco 1966* (First International Congress on History of Oceanography, Monaco 1966), Communications Vol. 2, *Bull. Inst. Océanogr. Monaco*. Numéro Spéc.2, 565-580.

Aleem, A. A. 1972. Fishing industry in Ancient Egypt. In: *Proceedings of the Second International Congress on the History of Oceanography*, Challenger Expedition Centenary, Edinburgh, 1972, *Proceedings of the Royal Society of Edinburgh*, Section B, Vol 73, Part 2, No. 33. 333-343.

Aleem, A. A. 1980. On the history of Arab navigation. In: *Oceanography: the Past*, eds. M.Sears and D. Merriman, Proceedings of the Third International Congress on History of Oceanography, Woods Hole, Mass., USA, 1980, pp. 582-595, Springer-Verlag, New York.

Aleem, A.A.1990. German contributions to marine biology in the Red Sea during the 19th century In *Ocean Sciences: Their History and Relations to Man*, eds. W. Lenz and M. Deacon, Proceedings of the Fourth International Congress on the History of Oceanography, Hamburg, Germany, 1987, *Deutsche Hydrographische Zeitschrift*, Erg. -H.B, Nr.22, 109-113.

Aleem, A.A.1990. Teaching marine science in Arab universities. In *Ocean Sciences: Their History and Relations to Man*, eds. W. Lenz and M. Deacon, Proceedings of the Fourth International Congress on the History of Oceanography, Hamburg, Germany, 1987, *Deutsche Hydrographische Zeitschrift*, Erg. -H.B, Nr.22, 550-556.

Aleem, Anwar Abdel. 2002.The Allan Hancock Pacific Expeditions (1931-1962) and their contributions to marine biology. In *Oceanographic History: the Pacific and beyond*, eds. K. R. Benson and P. F. Rehbock, Proceedings of the Fifth International Congress on History of Oceanography, La Jolla, Calif., USA, 1993 pp. 316-319, University of Washington Press. Seattle and London.

In Marine Science Journals:

Aleem, A. A. 1967. Concepts of currents, tides and winds among Medieval Arab geographers in the Indian Ocean, *Deep-Sea Research*, 14: 459-463.

Aleem, A. A. 1973. History of the Arab Navigation in the Indian Ocean, In commemoration volume dedicated to N. Panikar, *Marine Biol. Ass. of India*, Special Publication, pp. 255-270.

Aleem, A. A. and Morcos, S. A. 1984. John Murray/Mabahiss Expedition versus the International Indian Ocean Expedition in retrospect. In: *Marine Science of the North-West Indian Ocean and Adjacent waters*, Proceedings of the Mabahiss/John Murray. International Symposium., Alexandria, Egypt, September 1984, Ed. Martin V. Angel, *Deep-Sea Research*, Part A, 31, Nos 6-8A: 583-588.



Professor Anwar Aleem (right) aboard the German research vessel *Meteor* during the International Indian Ocean Expedition, ca. 1964 (photo courtesy of Ragaab Saad).



Professor Anwar Aleem in Alexandria, 1991 (photo courtesy of Ragaab Saad, right)

At Sea with *Vøringen* [*Voeringen*] 1876–1878. An overview of primary sources on the history of the first Norwegian North Atlantic Expedition.

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The first oceanographic Norwegian expedition to North Atlantic waters is frequently named the *Vøringen*-expedition after the steam vessel *Vøringen* hired for the voyages. This expedition consisted of a number of cruises in the summers of 1876, 1877 and 1888 to the ocean stretching between Norway north of Stad (on the western coast), the Faeroe Islands, Iceland, Jan Mayen and Spitsbergen (Svalbard). The North Atlantic constitutes a wide basin, in which the warm water of the Atlantic meets the cold water leaving the Arctic Ocean. The mapping of the Norwegian territory and “its waters” as well as requirements for forecasting stormy weather and understanding the migration of fishes constituted the intellectual and political background. Exploring the continental shelf in the North Atlantic off the Norwegian coast, as well as the physical conditions of the waters and the polar areas, were considered important for solving both the enigmas of storms and of fluctuations in the catches of herring and cod.

The primary sources for documenting and analysing the *Vøringen*-expedition are plentiful, but they all require a good knowledge of 19th century Norwegian orthography and handwriting. The reasons for historical studies of this costly public financed undertaking could be many. Some historians might want to study the vital scientific content of the investigations for the emerging fields of physical oceanography, marine zoology and fisheries biology. Others might see in the voyages of *Vøringen* an expression of (national) scientific entrepreneurship and achievements. A different view would be the linkage of natural research, nationalism and modernisation in Norway and *Vøringen* is a good vehicle for demonstrating this.

The marine zoologist Georg Ossian Sars (1837–1927) and the meteorologist Henrik Mohn (1835–1916) were in charge of the undertaking. Sars was in 1876 newly appointed professor of zoology of the Kongelige Frederiks Universitet (The Royal University of King Frederik (now Universitetet i Oslo). He had headed the scientific fisheries investigations (De praktisk videnskabelige fiskeriundersøgelser) in Norway for a number of years. On board *Vøringen* he held the responsibility of marine zoological research and fisheries investigations. Henrik Mohn had been since 1865 the first director of the Norwegian Meteorological Institute (Meteorologisk institutt). He was responsible for the fields of physical oceanography and meteorology. The other participants on the cruises, notably D.C. Danielssen (1815–1894) and Hermann Friele (1838–1921), were both affiliated with Bergens Museum and did their work in the field of marine zoology.

Sars and Mohn edited the publications from of the expedition, and the results were made available gradually from 1880 to 1901.¹ All seven volumes were printed in Norwegian and English simultaneously. A popular book from the expedition seems never to have been planned.

Archival files

The Norwegian National Library, Department of Manuscripts, (Nasjonalbiblioteket, håndskriftsamlingen) keeps a collection from the expedition handed over from the Norwegian

Meteorological Institute. It includes 17 files and is named: “Den norske Nordhavs-expedition 1876–78”, Ms.fol.3666 [The Norwegian North Atlantic Expedition 1876–1878, Ms.fol. (collection of manuscripts) 3666]. The Department of Manuscripts at the Norwegian National Library (hereafter NB) is located in Oslo, and information on the library is available in English on the Web at: www.nb.no. Unfortunately the catalogue for the collection is not available on the Web, but a detailed list is kept at the NB. The collection encompasses various documents and correspondence about issues concerning the editing of the reports. Drafts of the volumes of the expedition report are also kept there. Unfortunately the documents only date to 1876 and later, so this collection does not give the historian any information concerning intentions, plans and preparations.

The files reflect the variety of work done, but investigations in the field of physical oceanography are dominant. The neatly organised folders comprise log-books and journals from the surveys, along with schemes for various observations on meteorology such as temperature and air-pressure, also the depth of the sea bed, definitions of geographical positions, and magnetic measurements.

The Ms. Fol. 3666, folder A1, contains letters from the scientific members, for example 25 letters from D.C. Danielssen to H. Mohn written in the years 1865–1884, and 17 letters from Herman Friele sent to Henrik Mohn from 1873–1878. For those interested in the “daily life” of an oceanic expedition, Captain Carl Wille’s 33 letters to Henrik Mohn, 1876–1878, may provide some insight.

One private collection worth mentioning is NB, “Brev til G. O. Sars” Bs. 233 (Letters to G.O. Sars, collection of letters, number 233). In private letters to G.O. Sars from his colleagues, friends and family the *Vøringen*-expedition is mentioned frequently. Historians may take a particular interest in 151 letters from D.C. Danielssen to G.O. Sars 1877–1891 and 22 from Herman Friele 1880–1901.

NB also keep a box of unprocessed documents, named “Ubehandlet [unprocessed] 72. Here I found two small combined logbook/diaries, the daily notes done by G.O. Sars during the cruises of *Vøringen* in 1877 and 1878. The rest of the box is full of drafts for assorted manuscripts.

Indredepartementet (the Ministry for Home Affairs) held the administrative responsibility for the *Vøringen*-expedition, and ministerial documents concerning administrative and financial matters are kept in The National Archive in Norway (Riksarkivet). The National Archive is located in Oslo, and information in English is available on the Web at www.riksarkivet.no. Unfortunately a detailed catalogue for Indredepartementet, (the Ministry for Home Affairs) is not available on the Web, but a detailed list is kept at the National Archive. The reference to the collection is: Indredepartementet, 1. Indrekontor D, “Nordhavsekspedisjonen 1876–1878”, Pakkesaker [folders] number 0012, 0013 and 0014. These files also contain drafts and manuscripts later published in the *Stortingsforhandlinger* [Proceedings from the Norwegian Parliament].

Printed documents

For a more complete understanding of the first Norwegian ocean-going expedition historians ought to take into account *Stortingsforhandlinger* as a precious source for the *Vøringen*-expedition. Here the historian will find the government’s proposals to parliament (Stortinget) for the expedition, the budgets, and accounts for all expenses. The proceedings also include stenographical minutes from the debate in parliament, written statements, and comments from individual citizens, institutions and organisations involved in the issue of *Vøringen* and/or

those who wanted their voices to be heard. G.O. Sars also wrote reports to the Ministry for Home Affairs about the special fisheries investigations done on board *Vøringen*.ⁱⁱ

Beside the voluminous report *Den Norske Nordhav-Expedition 1876–1878 (The Norwegian North Atlantic Expedition 1876–1878)* historians will find articles published in scientific journals and proceedings from the Scandinavian Association for Natural Science Researchers (De skandinaviske naturforskermøtene). The participants also sent articles to newspapers and popular scientific magazines. Many of the newspaper articles and notices are gathered at NB, “The Norwegian North Atlantic Expedition 1876–1878”, Ms. 3666, folder A2. Documents on cultural aspects as distinct from politics and economy are provided by occasional poems written for dinners where the scientific crew of *Vøringen* were celebrated.ⁱⁱⁱ

Scholarly literature about the expedition

So far three works include aspects of the *Norwegian North Atlantic Expedition*. Eric Mills studied the scientific content of the research in the emerging fields of physical oceanography and meteorology in his article: “Mathematics in Neptune’s Garden: Making the Physics of the Sea Quantitative 1876–1900”. Mills examined Henrik Mohn’s circulation model, which had its origin in data collected during the surveys in the summers of 1876 to 1878.^{iv} A somewhat different view was presented by the historian Vidar Bjørnsen in his thesis for the master degree: “Naturvitenskap og politikk. Den norske Nordhavsekspedisjonen 1876–1878” [Natural Research and Politics. The Norwegian North Atlantic expedition 1876–1878].^v Bjørnsen focussed on the relationship of natural research, nationalism and modernisation in Norway, and he found that *Vøringen* is a good example demonstrating their connections. Bjørnsen gave an overview of the expedition and focussed on the role of the state as a source of patronage, exemplified in the intense debate in the Norwegian Parliament concerning the societal value of an expansive expedition before the appropriation finally was given. He analysed in particular Mohn’s storm studies, and achievements in the field of meteorology.

An attempt to place the *Vøringen*-expedition within a national context, the intellectual and institutional building of marine sciences in Norway, is in Vera Schwach’s history of the Norwegian scientific fisheries investigations.^{vi}

ⁱ G. O. Sars and H. Mohn (ed.): *Den Norske Nordhav-Expedition 1876–1878 = The Norwegian North Atlantic Expedition 1876–1878* (Grøndahl) Kristiania.

ⁱⁱ Indberetninger til Departementet for det Indre fra Professor Dr. G. O. Sars om de af ham i Aarene 1864–1878 anstillede Undersøgelser angaaende Saltvandsfiskerierne [[Report to the Ministry for Home Affairs about his investigations undertaken in the years 1864–1878 concerning the saltwaterfisheries], Christiania (Bergh og Steffens Bogtrykkeri) 1879.

ⁱⁱⁱ Anonymous: Viser skrevet i anledning forskjellige fester avholdt til ære for Nordhavsekspedisjonen og overlæge D.C. Danielssen 1877–1878 [Songs written to celebrate the North Atlantic expedition and in honour to the physician D.C. Danielssen], texts printed in Bergen 1877–1878.

^{iv} Eric Mills. 2004. Mathematics in Neptune’s Garden: Making the Physics of the Sea Quantitative 1876–1900, in H. M. Rozwadowski and D. v. Keuren: *The Machine in Neptune’s*

garden. *Historical Perspective on Technology and the Marine Environment*, Science History Publications (Watson Publishing International), Sagamore Beach, USA: 39–63.

^v Vidar Bjørnsen: *Naturvitenskap og politikk. Den norske Nordhavsekspedisjonen 1876–1878* [*Natural Research and Politics. The Norwegian North Atlantic expedition 1876–1878*], Hovedoppgave i historie, Institutt for historie, Universitetet i Tromsø 2003 [Master thesis in history, Department of History, University of Tromsø, autumn 2003].

^{vi} Vera Schwach: *Havet, fisken og vitenskapen. Fra fiskeriundersøkelser til havforskningsinstitutt 1860–2000* [*The Sea, the Fish and the Science. From Fisheries Investigations to an Institute of Marine Research 1860-2000*], Bergen (Havforskningsinstituttet) (2000): 38–44.P

CONFERENCE REPORTS

Environmental History of the Oceans. The beautiful Carlsberg Academy in Copenhagen provided the setting for a workshop from June 2-5, 2004, on “Environmental History of the Oceans.” The brainchild of Frank Zelko, then a postdoctoral fellow at the German Historical Institute in Washington, D.C., the workshop brought together about a dozen scholars to present work that represents environmental history applied to the oceans. The Centre for Maritime and Regional Studies in Odense, Denmark, co-sponsored the meeting, which included participants from the fields of history of science and technology, environmental history, environmental activism, historical geography, maritime history, and military history. The papers included:

- Poul Holm (University of Southern Denmark), “A Drop in the Ocean, a Plentiful Sea? Human Impact on Marine Life.”
- David Helvarg (Blue Frontier Campaign), “Enclosing the Ocean Commons.”
- Karen Oslund (John W. Kluge Center, Library of Congress), “Protecting Fat Mammals or Carnivorous Humans? An Environmental History of Whales and Whaling.”
- Kurk Dorsey (University of New Hampshire), “Pelagic Whaling and the Challenge of International Conservation, 1930-1965.”
- Phil Steinberg (Florida State University) “When Overuse meets Underexposure: Placing Marine Environmentalism in Context.”
- Frank Zelko (German Historical Institute), “Greening the Oceans: Environmental Activism on the High Seas.”
- Richard Grove (Australian National University and University of Sussex), “Pioneering Marine Environmental Concerns: Petrel, Whale and Fishing Legislation in the Seas off Bermuda and Antigua, 1615-1775.”
- Michael Reidy (Montana State University), “The Spaces in Between: British Science and the Imperial Oceans.”
- Julia Lajus (European University at St. Petersburg), “Changing Attitudes: From ‘Nature’s Economy’ to ‘Calculable Resources’ in Fisheries Science and Management.”
- Gary Weir (United States Naval Historical Center), “From Surveillance to Global Warming: John Steinberg and Ocean Acoustics.”
- Helen Rozwadowski (University of Connecticut, Avery Point), “Knowing the Ocean through Work: Models for Marine Environmental History.”
- David J. Starkey (University of Hull), “From Maritime History to Marine Environmental History: Why and How?”

(Helen Rozwadowski, Maritime Studies, University of Connecticut, Avery Point)

A Century of *Discovery*. Antarctic Exploration and the Southern Ocean. At the Southampton Oceanography Centre, 29-30 June 2004. Robert F. Scott's British National Antarctic Expedition returned to England in 1904, bringing back new geographical information and a modest scientific lode, much of which bore little direct relationship to the sea. Nonetheless, the example set by Scott and the distinguished contribution made by his ship a generation later, when in 1925 it became the first research vessel of the *Discovery* Investigations, whose influence on knowledge of the Southern Ocean has been profound, led to this celebration of the expedition, the ship, and its distinguished scientific heritage.

Organized largely by Professor Gwyn Griffiths and associates at the Southampton Oceanography Centre, University of Southampton and British Antarctic Survey, the audience of some 200 attendees included scientists, historians of science, and a distinguished group of descendants of notable British polar explorers and scientists. Rather than a formal dinner, the organizers opted for an evening dinner cruise on the Solent, an event that was thoroughly enjoyable, admirably catered, favoured by the weather, and included a trip into Lewes harbour about as far as a cruise vessel could go.

The first day of talks included an introduction to the history of Antarctic science by G.E. Fogg, a review of various *Discoverys* by Ann Savours, the background of the *Discovery* Investigations by Rosalind Marsden, reflections on the life at sea by Tony Rice, a history of cognition and landscape in polar regions by William Fox, a review of information sources on polar science and exploration by Robert Headland, and a description of the new Charles Darwin Centre for Biodiversity at the Natural History Museum by Philip Rainbow. Old film clips of *Discovery* and *Discovery II* were shown in breaks between talks.

The second and last day of talks was devoted to what one commentator called "the hard, gritty center" of the symposium, mainly scientific talks ranging from glaciology and meteorology to marine biology and biological oceanography. Richard Cameron and David Vaughan spoke, respectively, on the background of and modern glaciology in Antarctica. Eric Mills described the significance of George Deacon's studies of the physical oceanography of the Southern Ocean, and Stuart Cunningham outlined the very latest in interpretations of the Antarctic Circumpolar Current. Michael Thompson and Alan Vaughan described interpretations of Antarctic geology before and after plate tectonics. Inigo Everson outlined the often convoluted development of management and conservation regimes in the Southern Ocean region, and Martin Angel discussed pelagic ecosystems. Malcolm Walker and John Turner, in turn, outlined the background of meteorological investigations in the Antarctic and modern work on the continent. Finally, Anita McConnell described, as "the search for the invisible," the history of investigation of the south magnetic pole, Alan Rodger outlined the relation between the magnetic pole and the upper atmosphere, and David Walton summarized what had been a highly varied two days of science and history.

Plans have already advanced to have papers from the *Discovery* Symposium reviewed and published in *The Annals of Natural History*, likely in 2005.
(Eric Mills)

Circulating Knowledge. The theme for the Fifth British-North American Joint Meeting of the BSHS, CSHPS, and HSS was "Circulating Knowledge," a particularly appropriate theme for the history of oceanography. This periodic meeting, held in August 2004 in Halifax, brings together members of the British Society for the History of Science, the Canadian Society for the History and Philosophy of Science, and the History of Science Society. Sessions focusing on the imperial context of science, the Atlantic world, and international cooperation explored themes of interest for oceanography. A session titled "Science from the Fringe" included a contribution by Sherrie Lyons with a marine topic: "Swimming at the Edge of Scientific Respectability: Sea Serpent Investigations

in the Victorian Era.” Another session focused on ocean science, titled “Knowing the Oceans.” Papers in this session explored the production of knowledge about the ocean through maritime work, exploration, and fisheries science: Matthew McKenzie (Sea Education Association), “Sounding the Banks: Fishermen as Marine Scientists and Ecological Indicators on the Scotian Shelf, 1800-1860”; Dane Morisson (Salem State College), “Conflating the Pacific: Captain Edmund Fanning’s Construction of Peoples and Oceans in Voyages Round the World (1833)”; and Jennifer Hubbard (Ryerson University), “The ‘Ayes’ of Fisheries Science: Fishermen and their Relations with Scientists.” McKenzie organized the session and the commentator was Helen Rozwadowski (University of Connecticut, Avery Point).
(Helen Rozwadowski, Maritime Studies, University of Connecticut, Avery Point)

The Fourth Maury Workshop, Barrow, Alaska 1-3 September 2004. The Fourth Maury Workshop on History of Oceanography, titled “History of Polar Oceanography,” convened in Barrow, Alaska in early September. Funded generously by the National Science Foundation, Barrow Arctic Science Consortium, the North Slope Borough, and Education through Cultural and Historical Organizations, the workshop brought fifteen scholars from Germany, Norway, Canada, and the United States to the farthest extension of the United States.

Several participants arrived in Barrow a few days before the conference as volunteers to deliver school talks to schools in the native communities of Point Lay, Wainwright, and Point Hope. Other participants took part in similar outreach activities when they arrived in Barrow, including a presentation by Mott Greene at the local cultural heritage center and interview sessions over the local public radio station. Everyone who experienced these opportunities expressed enthusiasm for the outreach work, claiming it provided an excellent “bonding” experience and an excellent way actually to understand better the environment in which the workshop was held.

The actual workshop began on Wednesday, 1 September, with the presentation of papers by Michael Robinson, Vera Schwach, Conny Luedecke, Eric Mills, and Peter Neushul. On Thursday, following a morning of outreach in Barrow, Jake Hamblin, Walter Lenz, Zuoyue Wang, and Mott Greene presented their work and a paper submitted by Ron Doel was discussed. The meeting concluded on Friday with talks from Fae Korsmo, Ron Rainger, and Deborah Day. The major theme behind all of the papers was polar oceanography, with many exciting and provocative discussions ranging from how polar oceanography is defined to the importance of place in studying oceanography at the Earth’s poles. No less exciting for many participants was the presence for two days of a somnolent polar bear within easy eyeshot of the symposium accommodations.

Another aspect of the workshop was the commemoration of the life of David van Keuren. David was one of the major organizers of the meeting, but was killed in March before the workshop occurred. To honor him, the participants donated enough funds to support a high school history project in Wainwright, which now bears David’s name. Additionally, the workshop was dedicated to his memory and the volume that will be produced early in 2005 will be in David’s honor.
(Keith Benson, Green College, University of British Columbia)

NEWS AND EVENTS

RITTER FELLOWSHIP TO RAINGER. Professor Ron Rainger, a distinguished historian of science in the Department of History, Texas Tech University, Lubbock, Texas, has been awarded the William E. and Mary B. Ritter Fellowship in the History of the Marine Sciences at the Scripps Institution of Oceanography for 2004. His Ritter Fellowship Lecture, “Roger Revelle, World War II, and the transformation of American oceanography,” will be presented at SIO in La Jolla on November 4.

VIRTUAL HISTORY OF OCEANOGRAPHY. History of oceanography played the lead role in a virtual workshop organized in April and May 2004 by the College of Exploration, a not-for-profit educational organization with headquarters in Virginia, U.S.A. "Ocean Exploration: H.M.S. *Challenger* and Beyond" aimed to tie together past, present, and future ocean exploration of the kind taking place within the National Oceanic and Atmospheric Administration (NOAA) today. The College of Exploration designs, develops and delivers educational programs and workshops, primarily Web-based courses, geared primarily to high school and middle school educators in the United States and elsewhere. The "Ocean Exploration" workshop consisted of on-line keynote presentations that included one full week each of on-line discussion between the keynote presenters and workshop participants. For the first week of the workshop, which focused on the past, Eric L. Mills, of Dalhousie University, contributed a keynote titled, "An Icon for Oceanography: The Voyage of HMS *Challenger*," Helen M. Rozwadowski, of the University of Connecticut, Avery Point, offered, "Salty Dogs and Philosophers": Mid-Nineteenth Century Origins of Oceanography," and David Bossard contributed, "What We Can Learn from the Reports of The Exploratory Voyage of H.M.S. *Challenger*." Dr. Bossard's presentation was based on his experience with the H.M.S. Challenger Volumes Digitization Project (www.hmschallenger.org). Subsequent weeks of the workshop included presentations on current ocean expeditions by Gwyn Griffiths, of the Southampton Oceanography Centre, UK ("Ocean Instruments and Technology: From Challenger to Europa") and on the future of ocean exploration: John Orcutt, of Scripps Institution of Oceanography ("Ocean Observatories - A Paradigm Shift in Ocean Exploration"); Steve Miller, of UNCW Center for Marine Science ("The Future of Coral Reefs in Florida"); and Richard A. Cooper, of Ocean Technology Foundation ("Undersea Systems of the Future"). (Helen Rozwadowski)

RESOURCES ON THE HISTORY OF OCEANOGRAPHY. Several books on the history of oceanography or important in its history are now available electronically.

1) *Scripps Institution of Oceanography; First Fifty Years*

Helen Raitt and Beatrice Moulton, 1967

<http://ark.cdlib.org/ark:/13030/kt2b69q0kn/>

2) *Scripps Institution of Oceanography: Probing the Oceans 1936 to 1976*

Elizabeth Noble Shor, 1978

<http://ark.cdlib.org/ark:/13030/kt109nc2cj/>

3) *Exploring the Deep Pacific*

Helen Raitt, 1956

<http://ark.cdlib.org/ark:/13030/kt6b69q3vg/>

4) *The Sea Acorn*

Peter Sargent, 1979

<http://ark.cdlib.org/ark:/13030/kt4f59q1qv/>

5) *The Oceans, Their Physics, Chemistry and General Biology*

H.U. Sverdrup, Martin W. Johnson & Richard H. Fleming, 1942

<http://ark.cdlib.org/ark:/13030/kt167nb66r/>

6) *Scientific Results of the Voyage of H.M.S. Challenger ...*

<http://www.hmschallenger.org>

XXIInd INTERNATIONAL CONGRESS OF HISTORY OF SCIENCE. This major international congress will be held in Beijing, China from 24-30 July 2005. It's main theme is Globalization and Diversity: Diffusion of Science and Technology throughout History, although other topics will be dealt with also. The official languages are English and French. Abstracts should be sent to the Congress secretariat up to 15 April 2005. Registration before 20 December

2004 is US \$185, thereafter US \$215. The deadline for symposium proposals was 30 June 2004; the Commission of Oceanography will not have a formal symposium, but its Secretary, Deborah Day of Scripps Institution of Oceanography Archives, is planning on representing the Commission and will take part in an organizational session for the preparation of an international bibliography of the history of science.

For information on ICHS XXII:
Secretariat of the 22nd ICHS
Institute for the History of Natural Science
Chinese Academy of Sciences
137 Chao Nei Street
Beijing 100010, China

BOOK REVIEWS

S.Morcos, S. M. Zhu, Roger Charlier, M. Gerges, G. Kullenberg, W. Lenz, Z. Pan and E. Mei (editors; coordinator and English editor G. Wright). 2004. *Ocean Sciences Bridging the Millennia. A Spectrum of Historical Accounts* [Proceedings of the 6th International Congress on the History of Oceanography]. Paris & Qingdao: UNESCO Intergovernmental Oceanographic Commission & China Ocean Press – First Institute of Oceanography of the P. R. of China. xv + 516pp, hardbound; illustr., color plates, tables; 30x31cm.; no price shown; ISSN pending.

This might be perhaps the best and most attractive published proceedings book of the series, nearly forty years after the first congress was held in Monaco-Ville. Although this reviewer is one of the editors, he keeps wondering whether these are “Proceedings” masquerading as a book or inversely a book masquerading as “Proceedings”. Indeed there are papers inside this cover that were never presented at the Congress and authors that never came to the event. Strangely furthermore, it is necessary to read the “Preface” to become aware that this volume is “The Proceedings of ICHO-6”

The articles selected for inclusion from those actually read in Qingdao were also severely tailored for content, to be politically correct on the one hand and to avoid flag waving on the other. Nevertheless this richly illustrated volume opens a wide porthole on achievements and information on oceanography in China - past and present - and equally contributes to the overall knowledge of the development of ocean sciences and enlightens us on the lives of pioneers of the discipline.

Reassembled in an entirely different order from the conference papers, the contributions are grouped under seven headings, the eighth one delivering the messages sent by the various international community organizations that provided logistical and/or financial support. There are also some “Appendices” that include amongst others a subject index and announcements. Authors are listed with the page number of their article that appears in the book, the first article for those with multiple contributions.

Lives and Achievements make up the first “section. One finds biographical sketches of Gay-Lussac, Pettersson, Hennen and Zobell. Section 2 takes a look at Expeditions and Explorations re-visiting the *Discovery*, John Murray, Zheng He and several Russian expeditions. Regional and bilateral cooperation events are grouped in the following section; attention is here invited to ICES (International Council for the Exploration of the Sea), endeavours in the North Atlantic,

Mediterranean and Black seas. Qingdao, formerly Tsingtau, was for many years a German “concession” on the coast of Northern China, hence it was thus most appropriate that the influence of German marine research be discussed, as well as the Tsingtau German observatory and current Chinese-German marine cooperation.^{vi}

Man and the Sea, section 4, covers the history of coastal protection against the sea, Chinese nautical inventions, and a bird’s eye view of tide mills’ ups and downs throughout history. Ocean resources, technology and management are focused upon in section 5. In this widely diverse part of the book, lighthouses of China are passed in review with emphasis on the role some Englishmen played, the offshore oil industry and the development of submarine cables of China are reviewed, and the important role played by Zhejiang Province is brought forth.

Eight national contributions are grouped in section 6. Thirteen decades of biological oceanography in Belgium include the *Belgica* expedition to the Antarctic, the fossil troves discovered near Antwerp and specific topics, while in a companion paper the less well known role of Belgians as whalers is highlighted. Storm surges and tidal phenomena in China are discussed, and in the biological domain due credit is given China’s plankton research. Biological research and offshore oil deposits in India are perhaps too little known and the *ad hoc* paper provides a little more information.

Finally China contemporary issues get due attention in section 7; they include hazards (the Chinese had organized a conference on that topic in 1999), marine biodiversity, and last but not least Qingdao itself is reviewed.

Several interesting papers presented at the Congress were left out. They threw some light on the spectrum of the current Chinese efforts in the area of paleo-oceanography. However, though of scientific interest, they were more historical geological oceanography than history of oceanography, and this volume is indeed *sensu stricto* a spectrum of *historical accounts*.

A remarkable selection of colour photographs has been inserted in the book. It is for practical reasons that all such illustrations have been placed together but it is a bit cumbersome for the reader to have to thumb through many pages to find a figure relating to the article he/she is reading. On the other hand the technical editing is outstanding and the papers have been often transposed into such language that not only the specialist but also any adept of the lore of the ocean will read this book with fascinated delight.

(Roger H. Charlier, Free University of Brussels (V. U. B.))

Speak, P. 2003. *William Speirs Bruce. Polar Explorer and Scottish Naturalist*. Edinburgh: National Museums of Scotland. 144 pp. ISBN 1-901663-71-X

Peter Speak tells us that “although the achievements of William Speirs Bruce rank high in the Heroic Age of Polar Exploration, he is now a forgotten hero.” His attractive and important book resurrects Bruce, who was unusual among British polar explorers of his era in placing science on an equal footing with geographical exploration. His accomplishments included eleven Arctic Expeditions and two to the Antarctic. W.S. Bruce (1867-1921) was born in London of a Scots father and a Welsh mother, but he identified himself with Scotland throughout his varied career, which was greatly influenced by his university student days in Edinburgh, the inspiration of Patrick Geddes, and his friendship with H.R. Mill. Bruce’s introduction to the Antarctic came in 1892-1893 on a Dundee whaler, but his greatest influence came through the Scottish National Antarctic Expedition of 1902-1904, which resulted in the establishment of a research station in the South Orkney Islands (see Geoff Swinney’s account of its modern descendant earlier in this

newsletter) and to the establishment of the Scottish Oceanographical Laboratory in Edinburgh in 1907. Bruce had great hopes for his laboratory, but like many of his ventures, which included whaling in the Seychelles and mining on Spitsbergen, it did not succeed and closed in 1919. Bruce had the misfortune to antagonize the powerful and influential Clements Markham, President of the Royal Geographical Society, who regarded Bruce's organization of the Scottish Expedition as malicious competition to the cash-strapped British National Antarctic Expedition that took place from 1901-1904 under Markham's protégé Robert F. Scott. Speak's book, based largely on archival sources, is an important contribution to the literature of polar science, bringing Bruce's life and accomplishments into the foreground where they surely belong. In addition it is an evocative biographical sketch of a man who was a prickly, single-minded and creative failure in the annals of marine science. Bruce reminds us that science and exploration are built more by obsession and stubbornness than by the more frequently invoked flashes of brilliance.

(Eric Mills)

Gary E. Weir. 2001. *An Ocean in Common: American Naval Officers, Scientists, and the Ocean Environment*. College Station: Texas A & M University Press. 403 + xix pp.

In his *An Ocean in Common*, U.S. naval historian Gary Weir has provided a tremendous addition to the field of the history of oceanography for the important period between 1918 and 1960. This study gives new dimension to our understanding of how the new marine sciences were developed and nurtured in the United States. Central to this story was a network of strong individuals who bridged two communities, each mutually distrustful of outside influences - the U.S. Navy and the fledgling American oceanographic community. Beginning early in the inter-war period, Weir documents the first tentative contacts and growth of what he calls the "common practice": the informal but influential networks among scientists and their institutions, and naval personnel, that allowed oceanographers to gain some naval sponsorship for oceanographic research. These networks led to closer ties during and after the Second World War, and enabled motivated individuals like Frank R. Lillie and Thomas Wayland Vaughan to found new oceanographic research laboratories, such as the Woods Hole Oceanographic Institution in 1930. The Institution's first director, Henry B. Bigelow, strove to make the institution useful to the navy; for example, he offered to train naval personnel in the use of scientific equipment required for naval surveys. Oceanographers realized they needed the funding that only the navy could provide, to carry out increasingly expensive deep-sea research programs. The problem was that few naval officers and leaders realized that supporting oceanographic science would offer even greater advantages to the U.S. Navy.

With the beginning of World War II, Weir's history gains a momentum and interest that only intensifies as he covers the increasing entanglement of naval and oceanographic programs during the Cold War. The National Defense Research Committee, and a host of naval and university-based war research laboratories created in 1940, enabled civilians to help coordinate the wartime scientific effort, and wring out research funding from the still reluctant navy. As defense-oriented oceanography progressed, oceanographers even managed to change the navy's front-line practices. Woods Hole Oceanographic Institution now emerged as the premier site for naval-oceanographic research, under the enlightened guidance of Bigelow's successor, WHOI's new director Columbus O'Donnell Iselin. Iselin emerges in Weir's history as an extraordinary leader. With a clear vision of how oceanography could transform and improve U.S. anti-submarine warfare, he gathered around him an outstanding team of researchers, including the highly individualistic Maurice Ewing (who went on to found Columbia University's Lamont Geological Observatory) and Allyn Vine. Their work on thermoclines and the properties of

ocean waters at different depths led to the discovery of the “deep sound channel” which later opened up new methods for detecting the presence of hostile submarines hundreds of miles away. Allyn Vine’s improvements of the bathythermograph, to create a sturdy instrument for regular naval use (even on submarines) enabled the navy for the first time to use the ocean as a three-dimensional environment in order to gain tactical advantages. For example, U.S. submarines could now locate thermoclines and then, with stilled engines, rest on the denser, colder waters to evade detection by hostile vessels, and to precisely locate enemy submarines using passive sonar, another idea originating within the oceanographic community.

Weir’s descriptions of how scientists developed and deployed new scientific instruments make this book of great interest to anyone interested in the history of technology. But his real intent is to document the important personal relationships that allowed oceanography to garner national support as an essential new science. Certain individuals who were able to understand the different needs and “cultures” of both communities, acted as “translators” between the navy and the oceanographic community. These translators realized oceanographers needed to learn to appreciate the navy’s needs, and, more importantly, they helped influential individuals within the navy to understand that an intimate knowledge of the ocean was key to its military operations. The navy was educated by oceanographers even in the most fundamental sense: during the second world war research scientists spent months training uncomprehending officers and sailors in the use of the essential new scientific instruments.

That American oceanography flourished was due to the efforts of translators such as Iselin, oceanographer Lt. Mary Sears, and Richard Fleming, the director of the Hydrographic Office’s Oceanographic Division. Networks of trust between the two communities -- bridged by these translators, and enlightened naval personnel and a few sympathetic admirals -- convinced the naval establishment to engage with oceanography and to fund new laboratories and research initiatives. One of the leading translators was Roger Revelle – a lieutenant at the Hydrographic Office and the Bureau of Ships’ Oceanographic section, and later director of Scripps Institution of Oceanography. The dynamic Revelle was able to convince the navy to include scientists in exercises such as Crossroads, the Bikini post-war atomic tests. In so doing he carved out a new research niche for oceanographers.

But Weir also describes the soul-searching arising from the compromises oceanographers had to make as they subsumed their research preferences to the naval agenda. American oceanographers had challenged themselves to make oceanography an applied science, and moreover, to find military as opposed to general applications for their discoveries. They then faced the even greater challenge of retrieving basic research from the ensuing research agenda. Columbus Iselin was especially aware of the dangers inherent in oceanography’s dependence upon naval patronage. He spent sleepless nights worrying about how oceanography could emerge as an independent discipline, with respectable research norms that would be recognized by the larger scientific community. Although the Woods Hole Oceanographic Institution, Scripps, and others benefited from joint research initiatives, Iselin knew that oceanography’s needs were not the same as the navy’s. Iselin’s reflections, shared in much of his scientific correspondence, drew oceanography’s leading scientists to the problem of defining a new basic research agenda -- through conferences and organizations that encouraged the formation of new university programs and training initiatives, and encouraged setting new goals for basic science. By 1960 they had succeeded so well that oceanography was on its way to becoming part of the American national science agenda with Congressional support for the first National Oceanographic Program.

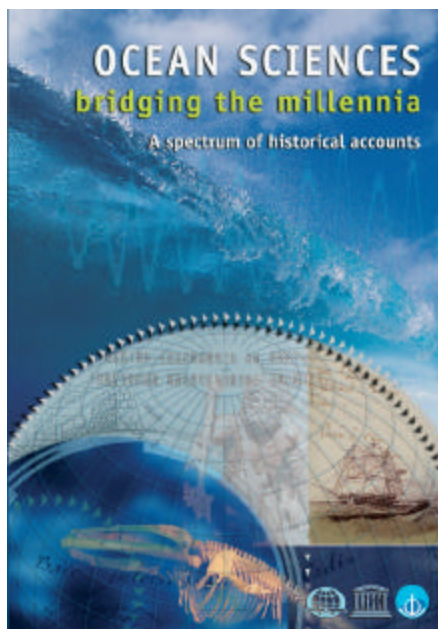
Naval support had often been gained by scientists raising the threat that the enemy, be it Nazi Germany or the Soviet Union, was probably already in possession of or developing new technologies or strategies based on oceanographic research. Although Weir satisfies his readers that applied German ocean science lagged behind that of the Allies, the question of the state of Soviet oceanography during the Cold War is left open. Weir himself, at the outset, acknowledges and regrets the lack of international context. Because of this, his book succeeds in raising a host of important questions. Were oceanographers in Europe and elsewhere also struggling to define the future of oceanography in this period? What were their priorities? Did they face similar problems to the American scientists?

Weir's book succeeds on many fronts. Using extensive archival research, he brings to light the thoughts and actions of an impressive network of influential individuals who shaped American oceanography and, at the same time, the American navy. He highlights the essential role of the navy, and shows sympathy for both the scientific and the naval cultures and their agendas. One weakness of the book is an abundance of acronyms, usually appearing at a rate of a new one every two pages. A glossary to help the reader keep track of what is meant by ONI or UCDWR would have been helpful, but the index can be used instead, although it does not contain all the acronyms given in the text. This feature aside, *An Ocean in Common* is an important book that will be of great interest to historians of technology, to historians of science interested in the role scientific instruments play in scientific theory, and to historians fascinated by the problem of how scientists reconcile applied and basic science and relate their science to the larger non-scientific community.

(Jennifer Hubbard, History of Science and Technology, Ryerson University, Toronto, Ontario, Canada)

BOOK ANNOUNCEMENT

Now in print!



(Selected and augmented proceedings of ICHO VI; book cover [above] designed by Eric Loddé)
Edited by: S. Morcos, M. Zhu, R. Charlier, M. Gerges, G. Kullenberg, W. Lenz, M. Lu, E. Zou
and G. Wright

*Published in 2004 under joint imprint by UNESCO (for its IOC), Paris, France
and China Ocean Press (COP), Beijing (for FIO, Qingdao), PR China;
507 pages (+ xxi introductory pages and a colour section of eight plates).*

ISBNs are:

UNESCO: 92-3-103936-9

COP: 7-5027-6119-5/P · 792

An announcement by Selim Morcos and Gary Wright

As indicated by its title, this long-awaited publication, scheduled to go on sale in autumn of this year, deals with a broad spectrum of domains, with articles sampling mankind's efforts – in various eras, regions and disciplines – to understand and manage the marine environment. Topics range from early Chinese nautical inventions and tidal observations to scientific expeditions organized and carried out under various flags, and finally to some twentieth century efforts to organize and advance national and multi-national ocean-related research.

The book is based on papers, selected from those presented at the Sixth International Congress on the History of Oceanography (ICHO VI). The congress, held in August 1998 in Qingdao, PR China, was hosted by the First Institute of Oceanography (FIO) of China's State Oceanic Administration (SOA).



Chinese children present giant T-shirt at ICHO VI (August 1998, Qingdao), one of numerous activities commemorating the 1998 International Year of the Ocean. (Similar to Plate I [a] of the book.)

The selected papers were carefully reviewed, edited and augmented, as was deemed appropriate, by an international multi-disciplinary editorial panel, appointed by the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in consultation with FIO. The panel comprised senior scientists working under the chairmanship of Egyptian physical oceanographer Selim Morcos. Gary Wright was responsible for the English-language editing and coordination of the final manuscript production.

A long process

The ground-laying work included the establishment of an agreement between FIO and IOC on the terms of the eventual co-publication, plus a lengthy campaign to seek funding for the project. Once these tasks were accomplished, the next step was the nomination of an Editorial Panel and Chairman, Co-chairman and Project Coordinator/English Editor (S. Morcos, M. Zhu and G. Wright, respectively) as well the organization of the Panel's work. Then followed the long and painstaking preparation and finalizing of the manuscript, which included reviewing and editing papers, checking content, English language and references, as well as identifying and obtaining permission to use the many illustrations.

As has been surely the case for other colleagues who have embarked on similar projects, all of this did not make for an easy job! One can understand why multi-author book projects sometimes take much longer than anticipated. We are pleased, however, to confirm that the collective efforts of the authors, the Editorial Panel, the reviewers and the IOC mini-team of colleagues working on the final copy have resulted in a vastly improved book that has progressed a long way from the original collection of submitted papers.



Two views of Qingdao:

Upper: Old photo showing the site of a German naval observatory, early 20th century. (From p. 253 of the book.)

Lower: The present-day city as a thriving modern port. (Similar to plate II [d] of the book.)

Book description:

We feel that we now have an impressive yet easy-to-use-and-carry volume, the basis being 507 pages (i.e. the main body, paginated with Arabic numerals), plus an additional 21 introductory pages (designated with Roman numerals) and a separate eight-page section of colour plates, making a grand total of 536 printed pages. The “millennia” book is enlivened by 142 illustrations (figures, photos and maps) and encased in a colourful soft binding. The main text is divided into eight sections. The appendices include a list of acronyms (five pages), an index of 11 pages, a one-page author index and a page acknowledging those who helped in reviewing or improving the manuscript or who provided other forms of assistance to the project. (The appendices are

included within the total of 536 pages.) Section 8 contains special messages from the major co-sponsors, whose support helped make possible the publication of the manuscript.

From a difficult beginning to a successful conclusion

Before Patricio Bernal, the IOC's Executive Secretary, approved our request to help shoulder the responsibility of co-publishing the book, the Chief Editor and other colleagues had been in contact with several other well known publishers, only to be told that the publication of scientific proceedings is neither in vogue nor profitable. The reason given was that many proceedings collections apparently are not attractive candidates for marketing, being sometimes monotonous and rather unfocused.

We are grateful for the fact that neither UNESCO (including its IOC) nor SOA (including FIO) are profit-driven. Nonetheless, within our limited financial and other resources, we have endeavoured to overcome this negative, pre-conceived notion. We hope our readers will agree that we have succeeded in producing a book that is attractive, focused and marked by a sense of purpose. Instead of simply rubber-stamping a scattered collection of papers, an effort was made to organize them into a logical structure and establish links between related articles. In a few cases, where there was a need for complementary information, other specialists were invited to contribute concise introductory or explanatory notes concerning the selected papers. These, in some cases, evolved into independent articles that were developed in collaboration with the authors of the specific or related themes. As a result, rather than settling for a string of texts on isolated topics, we believe we have come up with a framework based on more coherent building blocks – such as Russian exploration, Mediterranean oceanography, Black Sea institutions etc. – as well as twinned texts on historic personal contributions such as biological productivity and Victor Hensen, or chemical oceanography and Gay-Lussac. There are also clusters of articles concentrating on topics such as ICES and Scandinavian contributions or German research and its connections with China and South Africa.



*Painting of Vostok during Russian Antarctic discovery cruise.
(From next to the last page of the book.)
Courtesy of Alexei Suzyumov.*

These features enhance the various sections and weave a stronger historical thread throughout the book. The seven scientific sections of the book deal with main subject areas under the headings: lives and achievements, expeditions and explorations, regional cooperation, man and the sea, ocean resources, national contributions and contemporary issues of China. The book thus became a more tightly integrated “spectrum of historical accounts”. Although based on the selected contributions to the Qingdao congress, it is vastly enriched with relevant iconography, supplemented by editors’ notes and complemented by a few invited papers. We hope that this approach, which perhaps will be adopted by editors of future ICHO volumes, has successfully addressed the requirements of publishers for more inviting proceedings that can attract readers and encourage book sales.

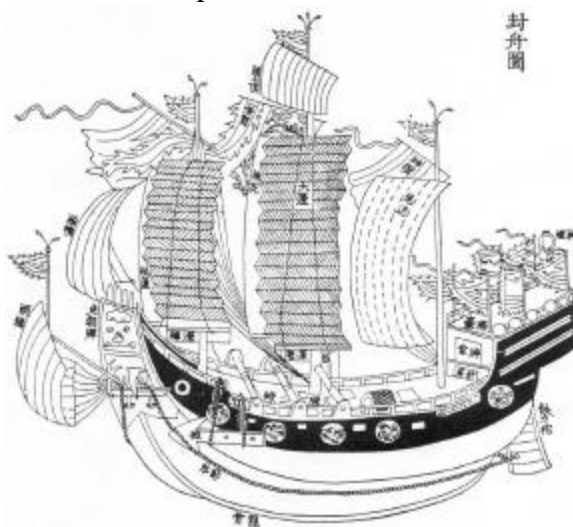
For more details, please see the attached list of articles taken from the book’s table of contents.

Innovations

One new feature is the full-colour soft cover that gives the book a light, youthful and inviting appearance, departing from the classical hard cover of the three immediately preceding volumes of this series. (The first two volumes were given the standard cover of the periodicals in which they appeared as special issues). Another innovation is the colour section of eight plates – providing interesting illustrations that relate to topics discussed in the introductory Editor’s Note or in the eight sections of the book.

New information technology provided the editors with an unprecedented advantage over our earlier colleagues (the editors of the preceding volumes of ICHO proceedings). A wealth of information and images was obtained from the Internet and other electronic facilities, in addition to material from traditional libraries and museums. These abundant sources enabled us to make of this book what we project will be appreciated as one of the (thus far) best-illustrated volumes on the history of oceanography.

Through the Internet, we were also able to be in virtually instant (and sometimes sustained) contact with many of our authors, exchanging versions of manuscripts and asking questions to ensure the integrity of the texts and completeness of the



Drawing of vessel, an example of those probably used in early Chinese voyages. (From p. 106 of the book.)

reference lists. The laborious task of indexing was greatly aided by computer technology, which enabled us to more easily produce a reliable and detailed index as well as a list of acronyms. For all of the afore-mentioned computerized work, we acknowledge our good fortune in securing the collaboration of Michael Tran, a young university graduate from Australia who offered his computer savvy and other talents in exchange for the experience of working in the international environment afforded by UNESCO.

Acknowledgements

We would like to take advantage of this occasion to express our appreciation of the authors and other editors for their patience over the past three years or so that have transpired since the launching of the IOC-FIO joint project to edit and publish this book. In addition to Michael Tran's versatility and assistance in various aspects, the IOC technical mini-team included Eric Loddé, the designer responsible for the attractive layout and cover of the book. Our UNESCO colleague Alexei Suzyumov, in addition to providing sound scientific advice, assisted by drawing from his storehouse of knowledge and experience in certain fields of ocean science, particularly concerning early investigations and explorations of Russia and neighbouring Eastern European countries.

To attempt to name, in this brief article, all those who helped along the way would be rather difficult. In the section entitled 'Major players' (below), the main sponsors and other supporters are listed. The book contains a fairly complete list of those individuals and entities that assisted in one way or another, but even that list does not pretend to be exhaustive. Where possible and appropriate in the book, credit is given to the sources of the illustrations, references etc.

Major players (organizations, agencies etc.)

This co-publication was primarily the product of cooperation between the:

- First Institute of Oceanography (FIO, Qingdao);
- Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO); and the
- Commission of Oceanography (of DHS/ IUHPS) and its President, Professor Eric Mills, who assisted in managing the production operation.

It also benefited from the financial support of the:

- State Oceanic Administration (SOA, PR China);
- International Ocean Institute (IOI, Gzira, Malta);
- UNESCO (besides its IOC, also through its Venice Office and its Coastal Regions and Small Islands [CSI] platform)
- Germany's Federal Ministry of Education and Research;
- Government of Flanders (Belgium);
- Regional Organization for the Protection of the Marine Environment (ROPME, Headquarters in Kuwait);
- Office of Naval Research (ONR, USA);
- Marine Policy Center, Woods Hole Oceanographic Institution (USA); and
- Chelsea Technologies Group (UK, see announcement on last page of book).

Distribution of the book

China Ocean Press (COP) was designated in 2002 by FIO (of SOA) as the official publishing partner of UNESCO's IOC for the joint project. More recently, UNESCO Publishing evaluated the composed manuscript and, appreciating its quality, decided to purchase and include a limited

number of copies in the Organization's catalogue of official sales publications. It is estimated that this will heighten the visibility of the publication, especially as UNESCO will display it in the coming years at major book fairs and other similar events involving UN participation. However, COP will carry out the greater part of the sales distribution.

In addition to the sales by both partners, UNESCO's IOC will carry out its normal worldwide free distribution. Thus a complimentary copy will be sent to each designated IOC depository library and to other addresses on the IOC standard distribution list in Member Countries (at present 129) around the world – totalling several hundred copies to key libraries and documentation centres of entities interested and/or involved in the marine sciences and related fields. The International Ocean Institute (IOI, Gzira, Malta) will also receive 100 copies for free distribution to their addresses.

Article submitted by:

Selim Morcos, *former professor of oceanography, Alexandria University, Egypt, and (retired) senior programme specialist in marine science and*
Gary Wright, *(retired) marine science editor, UNESCO*

Also see the ICHO website (<http://ioc.unesco.org/icho>) for updated information.

How to obtain

Ocean Sciences Bridging the Millennia: A spectrum of historical accounts will be available in autumn 2004, for purchase either from UNESCO Publishing (Paris, France) or from China Ocean Press.

From UNESCO:

Price: 45 Euros, not including postage

UNESCO ISBN: 92-3-103936-9

Full purchasing details can be found on the website: <http://www.unesco.org/publishing>

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France

Fax: 33-1-45 68 57 35

E-mail: upo.vente@unesco.org

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Price: US\$65, not including postage.

COP ISBN: 7-5027-6119-5/P · 792

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Note: Discounts may be available in certain special cases (authors of the book, bulk purchases etc.). Interested parties should contact one of the above-mentioned sales outlets for details.

Articles and authors

(*Ocean Sciences Bridging the Millennia*)

1. Lives and achievements

Gay-Lussac – The first chemical oceanographer?

William J. WALLACE

Gay-Lussac, Joseph Louis (1778-1850)

A biographical note

Alain POISSON

Otto Petterson the oceanographer (1848-1941)

Extracts from a biography in preparation

Artur SVANSSON

Victor Hensen (1835-1924)

Founder of quantitative plankton research

Jürgen LENZ

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Patricio A. BERNAL, IOC Executive Secretary

Yeli YUAN, Director, FIO

Eric L. MILLS, President, Commission of Oceanography, DHS/IUHPS

Gunnar KULLENBERG, (Former) Executive Director, IOI

Howard MOORE and Dirk TROOST, UNESCO (Director, Venice Office, and Chief, CSI)

Gary WRIGHT and Alexei SUZYUMOV, From the early years on: UNESCO and ocean sciences

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CALL FOR PROPOSALS FOR THE NEXT INTERNATIONAL CONGRESS ON THE HISTORY OF OCEANOGRAPHY (ICHO-VIII)

International Congresses on the History of Oceanography are normally held every five years. The last, ICHO-VII, was held in Kaliningrad, Russia, in September 2003. The next, ICHO-VIII should be held in 2008 if at all possible.

The Commission of Oceanography solicits proposals for ICHO-VIII, first informally by e-mail, telephone or letter, then as a formal proposal, including the following information:

- the proposed dates
- detailed information on the location, including facilities for lectures, seminars, social gatherings, and accommodation
- the central theme of the congress
- information on financing, i.e. evidence and promise of financial support
- information on how the proceedings will be published.

Following the receipt of detailed proposals, the officers of the Commission of Oceanography will make a decision as soon as possible.

Please send detailed proposals to Eric Mills, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada (e-mail: E.Mills@Dal.Ca) or fax to (902) 494-3437.

ANNUAL BIBLIOGRAPHY AND BIOGRAPHIES 2004

(Compiled by Deborah Day, Scripps Institution of Oceanography Archives)

BIBLIOGRAPHY

Barth, Kai-Henrik. 2003. The politics of seismology: nuclear testing, arms control, and the transformation of a discipline. *Social Studies of Science* 33, no. 5: 743-782.

Brunner, K. und C. Lüdecke. 2002. Kartographische Ergebnisse der ersten Deutschen Südpolar-Expedition 1901-1903. *Kartographische Nachrichten* 52, no. 4: 143-148.

Carpine, Christian. 2002. *La Pratique de l'Océanographie au Temps du Prince Albert 1er*. Monaco: Musée océanographique, 331 pages.

Carpine, Jacqueline. 2003. *The history of GEBCO 1903-2003: the 100-year story of the General Bathymetric Chart of the Oceans*. Lemmer, The Netherlands : GITC bv, 2003, 140 pages.

Carpine, Jacqueline. 2003. Origins of a lasting bathymetric endeavour. *International Hydrographic Review* 4 (new series), no. 2: 6-16 and 4, no. 3: 96.

Carpine, Jacqueline. 2004. La Carte générale bathymétrique des océans. In : *La mer, terreur et fascination*, dir. Alain Corbin et Hélène Richard. Paris : Bibliothèque Nationale de France; Seuil, 48-49.

Carpine, Jacqueline. 2004. La Carte générale bathymétrique des océans. In: *Album, La Mer, Terreur et Fascination*. Paris : Bibliothèque Nationale de France, page 14.

Cermak, Vladimir. 2004. International Heat Flow celebrates 40 years. *EOS: Transactions of the American Geophysical Union* 85, no. 2: 13, 19.

Charlier, R. 2003. Sustainable co-generation from the tides: a review. *Renewable and Sustainable Energy Reviews* 7: 187-213.

Charlier, R. 2003. Sustainable co-generation from the tides: bibliography. *Renewable and Sustainable Energy Reviews* 7: 215-247.

Charlier, R. 2003. A “sleeper” awakes: tidal current power. *Sustainable and Renewable Energy Reviews* 7: 515-529.

Cherkashin, Nikolay Andreyevich. 2003. *The commanders of the polar seas*. [Komandory polyarnykh morey.] Moskva: Veche, 480 pages.

Cohen, Howard J., 2003. *Matthew Fontaine Maury :pathfinder of the seas*. [Bethesda, Md.?]: U.S. National Imagery and Mapping Agency, 14 pages.

Currie, L.A. 2004. The remarkable meteorological history of radiocarbon dating. *Journal of Research of the National Institute of Standards and Technology* 109, no. 2: 185-217.

Cushman, Gregory T. 2004. Choosing between centers of action: instrument buoys, El Nino and scientific internationalism in the Pacific, 1957-1982. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 133-182.

Deacon, Margaret B. 2003. The origins of the Challenger Society. *Ocean Challenge* 13, no. 1: 25-31.

Densmore, C. Dana. 2000. *An Irregular Sort of Life*. Falmouth, Mass.: Village Printer, 309 pages.

Doel, Ronald E. 2003. Constituting the postwar earth sciences: the military's influence on the environmental sciences in the USA after 1945. *Social Studies of Science* 33, no. 5: 635-666.

Ehlers, Peter and Klaus Kremb. 2002. Georg von Neumayer: reflections about a predecessor. *Proceedings of the 4th International POLLICHIA Symposium 24-26 June 2001: Perspectives of Modern Polar Research and 175th Anniversary of Georg von Neumayer*. Bad Durkheim, Germany: POLLICHIA-Museum, pp. 13-22.

50th Anniversary FERHRI [Far Eastern Regional Hydrometeorological Research Institute]. Vladivostok: Dalnauka, 2000, 257 pages. [In Russian.]

Fisher, Robert L., Edward D. Goldberg and Charles S. Cox, editors. 2003. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 213 pages.

Glover, W. (editor). 2004. *Charting Northern Waters. Essays for the Centenary of the Canadian Hydrographic Service*. Montreal and Kingston: McGill-Queen's University Press, xvii + 275pp.

González, Alicia Ma. Tamara Otero and Argelia Fernández Márquez . 1985. *Memoria, XX aniversario del Instituto de Oceanología*. Ciudad de La Habana :Academia de Ciencias, 98 pages. [In Spanish, includes bibliography.]

Harper, Kristine C. 2003. Research from the boundary layer: civilian leadership, military funding and the development of numerical weather prediction (1946-1955). *Social Studies of Science* 33, no. 5: 667-

Hayes, Derek. 2003. *Historical Atlas of the Arctic*. Vancouver, British Columbia: Douglas & McIntyre; Seattle, WA: University of Washington Press, 208 pages.

Hoehler, Sabine. 2002. Depth records and ocean volumes: ocean profiling by sounding technology, 1850-1930. *History and Technology* 18, no. 2: 119-154.

Hoehler, Sabine. 2002. Profilgewinn. Karten der Atlantischen Expedition (1925-1927) der Notgemeinschaft der Deutschen Wissenschaft. In: *NTM* 10, pp. 234-246.

Keiner, Christine. 2004. Modeling Neptune's Garden: the Chesapeake Bay hydraulic model, 1965-1984. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 273-314.

Kjellström, Rolf. 2003. Expedition I liten båt. Om en tysk expedition 1912-1913. In: *Breven från arktis*. Stockholm: Carlsson, 79-100. [In Swedish. Expedition in a little boat. On a German expedition to the Arctic, 1912-1913.]

Kobylnsky, L.V. 2003. Beginning of the hydrometeorological observations in Vladivostok. *Pacific Oceanography* 1, no. 2: 198-200.

Koehler, Robert E. 2002. *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology*. Chicago; London: University of Chicago Press, 326 pages.

Korsmo, Fae L. and Michael P. Sfraga. From interwar to cold war: selling field science in the United States, 1920s through 1950s. *Earth Sciences History* 22, no. 1: 55-78.

-
- Laughton, Anthony S. 2003. IIEO: Recollections of the International Indian Ocean Expedition. *Ocean Challenge* 13, no. 1: 18-24.
- Lawrence, David M. 2002. *Upheaval from the Abyss: Ocean Floor Mapping and the Earth Science Revolution*. New Brunswick, N.J.: Rutgers University Press, vii, 284 pages.
- Lentz, John W. 2003. The Fox expedition in search of Franklin: A documentary trail. *Arctic* 56, no. 2: 175-184.
- Lüdecke, Cornelia. 1999. Problems for further research on the history of science of the Polar Regions, in: *The Centennial of S.A. Andrée's North Pole Expedition. Proceedings of a Conference on S.A. Andrée and the Agenda for Social Science Research of the Polar Regions*, Urban Wrakberg (ed.), Royal Swedish Academy of Sciences, Stockholm, *Bidrag till Kungl. Svenska Vetenskapsakademiens Historia*, No. 29, p. 154-177
- Lüdecke, Cornelia. 2001. Universitas Antarctica - centennial of the first German Antarctic Expedition (1901-03). *Terra Nostra. Schriften der Alfred-Wegener-Stiftung* 01/1, 38-39.
- Lüdecke, Cornelia. 2002. German marine weather stations of World War II in Spitsbergen. In: *International Council of Monuments and Sites, 13th General Assembly, Scientific Symposium*, Madrid, Spain 1-5 December 2002, 39-41. [In English.]
- Lüdecke, Cornelia. 2003. Scientific collaboration in Antarctica (1901-04): a challenge in times of political rivalry. *Polar Record* 39, no. 208: 35-48.
- McConnell, Anita, 2004. L.F. Marsigli (1658-1730): Early contributions to marine science and hydrography. *International Hydrographic Review*, 5 (new series), no. 2: 6-15.
- McGhee, Robert. 2001. *The Arctic voyages of Martin Frobisher: An Elizabethan Adventure*. Montreal: Canadian Museum of Civilization/ McGill-Queen's University Press, 210 pages.
- McGowan, John A. 2004. Sverdrup's biology. *Oceanography* 17: 106-112.
- Mikhailov, N.N. 2002. *Russian Marine Expeditionary Investigations of the World Ocean*. Silver Spring, Md.: U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, [National Oceanographic Data Center, Ocean Climate Laboratory] ; Obninsk : Russian Federal Service for Hydrometeorology and Environmental Monitoring, All-Russian Institute for Hydrometeorological Information ; World Data Center - B, 2002, 184 pages. [English and Russian pdf available at: <http://www.nodc.noaa.gov/OC5/PDF/PAPERS/atlas56.pdf>]
- Mills, Eric L. 2004. Mathematics in Neptune's Garden. Making the physics of the sea quantitative, 1876-1900. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications,
- Morcos, Selim. 2003. 70 Years on. The John Murray Mahabiss Expedition to the Indian Ocean, 1933-34. *Ocean Challenge* 13, no. 1: 11-14.
- Morcos, Selim. 2003. The Saga of Seymour Sewell and the scientific reports of the John Murray Expedition. *Ocean Challenge* 13, no. 1: 15-16.

Munk, Walter and Deborah Day. 2004. Ivy-Mike. *Oceanography* 17: 97-105.

Norton, David W. 2003. *Fifty More Years Below Zero: Tributes and Meditations for the Naval Arctic Research Laboratory's First Half Century*. Calgary, Alberta; Fairbanks, Alaska: The Arctic Institute of North America, 576 pages.

Oreskes, Naomi, 2003. A context of motivation: U.S. Navy oceanographic research and the discovery of sea-floor hydrothermal vents. *Social Studies of Science* 33, no. 5: 697-742.

Pettersson, Otto. 2003. *Neptun och Mammon: Otto Petterssons brev till Gustaf Ekman, 1884-1929*, sammanställda av Elisabeth Crawford och Artur Svansson; sammanbindande texter av Artur Svansson; förord av Elisabeth Crawford. Göteborg: Tre Böcker, 221 pages.

Philbrick, N. 2003. *Sea of Glory. America's Voyage of Discovery, the U.S. Exploring Expedition, 1838-1842*. New York: Viking, xxv + 452 pages.

Pilson M.E.Q. 2003. A correction concerning Marsigli. *Journal of Navigation* 56, no. 3: 505-507.

Pool, Beekman H. 2002. *Polar Extremes: The world of Lincoln Ellsworth*. Fairbanks: University of Alaska Press, 311 pages.

Rainger, Ronald. 2003. Adaptation and the importance of local culture: creating a research school at the Scripps Institution of Oceanography. *Journal of the History of Biology* 36: 461-500.

Rainger, Ronald. 2004. 'A wonderful oceanographic tool.' The atomic bomb, radioactivity and the development of American oceanography. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 93-131.

Rainger, Ronald. 2004. Oceanography and field work. Geopolitics and research at the Scripps Institution. *Proceedings of the California Academy of Science* 55, no. 8, supplement 1: 185-208.

Reidy, Michael S. 2004. Gauging science and technology in the early Victorian era. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 1-38.

Rice, Tony. 2000. *Deep Ocean*. London: Natural History Museum, 96 pages.

Rozwadowski, Helen M. 2004. Engineering, imagination and industry: Scripps Island and dreams for ocean science in the 1960's. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 315-353.

Rozwadowski, Helen M. Internationalism, environmental necessity, and national interest: marine science and other sciences. *Minerva* 42: 127-149.

Rozwadowski, Helen M. and David K. van Keuren, editors. 2004. *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*. Sagamore Beach, Massachusetts: Science History Publications, 371 pages.

Safier, Neil Franklin. 2004. *Writing the Andes, Reading the Amazon: Voyages of Exploration and the Itineraries of Scientific Knowledge in the 18th century*. Johns Hopkins University, doctoral dissertation, 476 pages.

Schaelchlin, Patricia A. 2003. *The Newspaper Barons: A Biography of the Scripps Family*. Foreword by Neil Morgan. San Diego, California: San Diego Historical Society; Carlsbad, California: Kales Press, 251 pages.

Schwach, Vera. 2004. An eye into the sea: the early development of fisheries acoustics in Norway, 1935-1960. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 211-241.

Scripps Institution of Oceanography *Explorations* 10, no. 1. Centennial Issue, 2003.
[This magazine republished in this one special issue all of the historical articles published throughout its centennial year.]

Shragge, Abraham and Kay Dietz. 2004. Character, vision and creativity: the extraordinary confluence of forces that gave rise to the Scripps Institution of Oceanography. *Journal of San Diego History* 49, no. 2: 71-86.

Sorrenson, Richard. 1996. The ship as scientific instrument in the eighteenth century. In: *Science in the Field*, edited by Henrika Kuklick and Robert E. Kohler. Chicago; London: University of Chicago Press, *Osiris*, 221-236.

Stryuk, V.L. 2001. *Istoriia otechestvennoi okeanologii: sbornik nauchnykh trudov, sotvetstvennyi redaktor V.L. Striuk*. Kaliningrad: Kaliningradskii gos. universitet, 222 pages.
[Text in Russian and English; summary and table of contents also in English]

Svansson, Artur. 2003. Otto Pettersson and the birth of ICES. *ICES Cooperative Research Report* 260: 41-44.

van Keuren, David K. 2004. Breaking new ground: the origins of scientific ocean drilling. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 183-210.

Wiegel, Robert L. 2004. *Bolsa Chica Estuary/Bay and Beach, Orange County, California, A Bit of History*. Berkeley: University of California Department of Civil and Environmental Engineering, Hydraulic Engineering Laboratory Technical Report UCB/HEL 2004-1, 34 pages and maps.

Williams, Kathleen, Broome. 2004. From civilian planktonologist to navy oceanographer: Mary Sears in World War II. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 243-272.

Williams, Roger L. 2003. French botany in the enlightenment: The ill-fated voyages of La Pérouse and his rescuers. Dordrecht: Kluwer Academic; *International Archives of Ideas* 182, 240 pages.

Weir, Gary E., 2004. At sea with Hydro: William Metcalf and USS Edisto's Arctic cruise, spring 1951. In William Glover (editor), *Charting Northern Waters. Essays for the Centenary of the Canadian Hydrographic Service*. Montreal & Kingston: McGill-Queen's University Press, pp. 201-223.

Weir, Gary E. 2004. Fashioning naval oceanography: Columbus O'Donnell Iselin and American preparation for war, 1940-1941. In: *The Machine in Neptune's Garden: Historical Perspectives on Technology and the Marine Environment*, edited by Helen M. Rozwadowski and David K. van Keuren. Sagamore Beach, Massachusetts: Science History Publications, 65-91.

BIOGRAPHIES

Aimé, Georges (27.I.1810, Metz, France - 9.IX.1846, Alger, Algérie)

Carpine-Lancré, Jacqueline. 2004. Georges Aimé (1810, Metz - 1846, Alger). *Chronique d'histoire Maritime*, 55: 60-76.

Albert I, Prince of Monaco (13. XI. 1848, Paris - 26.VI. 1922, Paris)

Carpine, Christian. 2002. *La Pratique de l'Océanographie au Temps du Prince Albert 1er*. Monaco: Musée océanographique, 331 pages.

Bramlette, Milton Nunn (4.II.1896, Bonham, Texas-30.III.1977, La Mesa, California)

Winterer, Edward L. 2003. Milton Nunn Bramlette, 1896-1977. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 1-12.

Bullard, Edward Crisp (21.IX.1907, Heigham, Norwich, England-3. IV.1980, La Jolla, California)

Bullard, E.C. 2003. Sir Edward Bullard, 1907-1980, with added remarks by A.E. Maxwell, W.H. Munk, F. Gilbert, and C.S. Cox. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 13-20.

Crane, Jocelyn (11.VI.1909 – 16.XII.1998)

Boyko, Christopher B. 2000. Jocelyn Crane (11 June 1909 - 16 December 1998): a biography and bibliography. *Journal of Crustacean Biology* 20, no. 2: 415-419.

Engel, Albert Edward John (16.VI.1916, St. Louis, Missouri-31.III.1995, Montana)

Stern, Robert J. 2003. Albert Edward John Engel, 1916-1995. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 22-30.

Fager, Edward William (2.IV.1917, Monterey Park, California-4.XI.1976, La Jolla, California)

Enright, J.T. 2003. E.W. Fager, 1917-1976. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 31-44.

Field, William Osgood, 1904-

Field, William O., as told to C. Suzanne Brown. 2004. *With a Camera in My Hands: A Life History*. Fairbanks : University of Alaska Press, 2004, 184 pages. [Autobiography of the glaciologist.]

Fofonoff, Nicholas P. (18.VIII.1929, Queenstown, Alberta-18.XII.2003, Falmouth, Massachusetts)

www.whoi.edu/media/obits/n_fofonoff_obit.html

Franklin, John, Sir (1786,Spilsby, Lincolnshire –VI.1847, Arctic)

Beardsley, Martyn. 2002. *Deadly Winter: The Life of Sir John Franklin*. Annapolis, Maryland: Naval Institute Press, 272 pages. [First published in UK 2002 by Chatham Publishing, Rochester, Kent.]

Heron-Allen, Edward (1861-1943)

Gregory, R.A. 1943. Edward Heron-Allen 1861-1943. *Obituary Notices of Fellows of the Royal Society of London* 12: 446-454.

Hodgkinson, R.L. and J.E. Whittaker. 2004. Edward Heron Allen (1861-1943): a review of his scientific career, with an annotated bibliography of his foraminiferal publications. *Archives of Natural History* 31, no. 1: 6-29.

Thomas, H.D. 1944. Edward Heron-Allen (obituary). *Proceedings of the Linnean Society of London* 155, no. 3: 300-302.

Hubbs, Carl Leavitt (18.X.1894, Williams, Arizona-30.VI. 1979, La Jolla, California)

Rosenblatt, Richard H. 2003. Carl Leavitt Hubbs, 1894-1979. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD,45-55.

Isaacs, John Dove III (28.III.1913, Spokane, Washington-6.VI.1980, Rancho Sante Fe, California)

Seymour, Richard and Paul Dayton. 2003. John Dove Isaacs III, 1913-1980. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 57-63.

Johnson, Martin Wiggo (30.IX.1893, Chandler, South Dakota-28.XI.1984, Snohomish, Washington)

Brinton, Edward and John A. McGowan. 2003. Martin W. Johnson, 1893-1984. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 65-77.

Maidell, Edward Vladimirovich (8.XI.1842, Nemirov, Podolsk, Russia-12.VI.1918, Gelsingfors, Finland)

Danchenkov, M.A. and A.A. Bobkov. 2003. The forgotten names. *Pacific Oceanography* 1, no. 1: 82-83.

Mayr, Ernst (5.VII.1904, Kempten, Germany-)

Hoelldobler, Bert. 2004. Ernst Mayr: the doyen of twentieth century evolutionary biology. *Naturwissenschaften* 91, no. 6: 249-254.

Menard, Henry William (10.XII.1920, Fresno, California, USA -9.II.1986, La Jolla, California)

Chase, Clement. 2003. Henry William (Bill) Menard, 1920-1986. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 79-86.

Namias, Jerome (19.III. 1910, Bridgeport, Connecticut, USA- 10.II. 1997, La Jolla, California)

Cayan, Daniel R. 2003. Jerome Namias, 1910-1997. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 87-98.

Nasu, Noriyuki (27.II.1924, Fukuoka, Japan)

Nasu, Noriyuki. 2004. *Half Century Being Enchanted by the Ocean*. [Autobiography, in Japanese]

Parker, Frances Lawrence (28.III.1906, Brookline, Massachusetts, USA-21.III.2002, La Jolla, California)

Berger, W.H. 2003. Frances Lawrence Parker, 1906-2002. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 99-106.

Racovitza, Emil (15.VI.1868, Iassy, Romania-15.XI.1947, Cluj-Napoca, Romania)

Bologa, A. and A. Marinescu. 2002. Romanian developmental contributions of Emil Racovitza and Grigore Antipa to the scientific exploration of the Mediterranean. In: Benson, K.R. and P.F. Rehbock (editors), *Oceanographic History: the Pacific and Beyond*. Seattle and London: University of Washington Press, 275-279.

Rafinesque, Constantine Schmalz (22.X.1783, Constantinople-18.IX.1840, Philadelphia)

Boewe, C. (editor). 2003. *The Eccentric Naturalist" and Other Tales. Profiles of Rafinesque*. Nashville, Tennessee: University of Tennessee Press.

Raitt, Russell Watson (30.IX. 1907, Philadelphia, Pennsylvania-6.III. 1995, La Jolla, California)

Lawver, Lawrence A. and Robert M. Kieckhefer. 2003. Russell Watson Raitt, 1907-1995. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 2003, 107-118.

Revelle, Roger Randall Dougan (7.III.1909, Seattle, Washington, USA-15.VII.1991, San Diego, California)

Knauss, John A. 2003. Roger Revelle, 1909-1991. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 119-137.

Scholander, Per Fredrik Thorkelssohn (29.XI.1905, Orebro, Sweden-13.VI.1980, La Jolla, California)

Hemmingsen, Edvard A. and Andrew A. Benson. 2003. Per F. Scholander, 1905-1980. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 139-155.

Shepard, Francis Parker (10.V.1897, Brookline, Massachusetts-25.IV.1985, La Jolla, California).

Curry, Joseph R. 2003. Francis Parker Shepard, 1897-1985. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 157-167.

Sladen, Walter Percy (30.VI.1849, Halifax, Yorkshire-11.VI.1900, Florence)

Nichols, D. 2003. A biography of Percy Sladen (1849-1900). *The Linnean* (Special Issue) No. 4, 29 pp.

Ricketts, Edward Flanders Robb (31.X.1896, Chicago-11.V.1948, Pacific Grove, California)

Tamm, E.E. 2004. *Beyond the Outer Shores. The Untold Story of Ed Ricketts, the Pioneering Ecologist who inspired John Steinbeck and Joseph Campbell*. Vancouver, B.C.: Raincoast Books, xvi + 365 pp.

Suess, Hans Eduard (1909, Vienna-1993)

Arnold, James. 2003. Hans Suess, 1909-1993. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 169-175.

Sverdrup, Harald Ulrik (15.XI. 1888, Sogndal, Norway -21.VIII. 1957, Oslo)

Munk, Walter and Deborah Day. 2003. Harald U. Sverdrup, 1888-1957. In: Robert L. Fisher, Edward D. Goldberg and Charles S. Cox, editors. *Coming of Age: A Centennial Volume*. La Jolla: Scripps Institution of Oceanography UCSD, 177-201.

Sylva, Donald Perrin de (1929, Rochester, New York – 28.I.2004, Brooksville, Florida)

Richards, William J. 2004 Donald Perrin de Sylva (1929-2004). *Bulletin of Marine Science* 74, no. 1: 1-2.

Tharp, Marie (30.VII.1920, Ypsilanti, Michigan-)

Barton, Cathy. 2002. Marie Tharp, oceanographic cartographer, and her contributions to the revolution in the Earth Sciences. In: *Earth Inside and Out: Some Major Contributions to Geology in the Twentieth Century*. London: Geological Society Publishing House, pp.215-228.
