

Science Across the Seas: Ships, Islands, and Knowledge

HOS 599/HIS 599

Special Topics in the History of Science

Autumn 2002; Thursdays, 1:30-4:20

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This course examines the sea as both historical object and object of knowledge. How do the oceans take shape in the European imagination from the early modern period to the end of the nineteenth century? How does one “know” the oceanic world? Its physical character and dynamics? Its denizens? Its shores and depths? How has “being at sea” affected the thinking and practice of natural philosophers and voyaging naturalists? Answering these questions will deepen our awareness of the ocean environment in history, and prime our thinking about knowledge of, and on, the seas.

Books to consider buying:

- Steinberg, Philip E. *The Social Construction of the Ocean*. Cambridge: Cambridge University Press, 2001.
- Rediker, Marcus. *Between the Devil and the Deep Blue Sea: Merchant Seamen, Pirates, and the Anglo-American Maritime World*. Cambridge: Cambridge University Press, 1987.
- Dening, Greg. *Mr. Bligh's Bad Language: Passion, Power and Theatre on the Bounty*. Cambridge: Cambridge University Press, 1992.
- Dening, Greg. *Islands and Beaches: Discourse on a Silent Land, Marquesas 1774-1880*. Honolulu: University of Hawaii Press, 1980.
- Corbin, Alain. *Le Territoire du Vide*. Paris: Aubier, 1988. (NB: Available in a translation by Jocelyn Phelps: *The Lure of the Sea* [London: Penguin, 1995]).

Relevant Reference Books and Anthologies:

- Kemp, Peter, ed. *The Oxford Companion to Ships and the Sea*. London: Oxford University Press, 1976.
- Fernández-Armesto, Felipe, ed. *The Times Atlas of World Exploration*. New York: Harper-Collins, 1991.
- Leier, Manfred, ed. *World Atlas of the Oceans*. Buffalo, NY: Firefly, 2001.
- Couper, Alastair, ed. *The Times Atlas of the Oceans*. New York: Van Nostrand, 1983.
- Earle, Sylvia, ed. *National Geographic Atlas of the Ocean*. Washington, DC: National Geographic, 2001.
- Deacon, G.E.R., ed. *Seas, Maps, and Men: An Atlas-History of Man's Exploration of the Deep*. London: Cresset, 1962.
- Hendrickson, Robert. *The Ocean Almanac*. New York: Doubleday, 1978.
- Coote, John O., ed. *The Norton Book of the Sea*. Two Volumes. New York: Norton, 1989, 1991.
- Raban, Jonathan, ed. *The Oxford Book of the Sea*. Oxford: Oxford University Press, 1992.

WEEK 1:
Introductory and Organizational Meeting
(no reading)

WEEK 2:
The Ocean as Space and Place
(with an introduction to the historiography of ocean science)

In "The Comedian as the Letter C" Wallace Stevens depicts the sea as the devastating dialectical inversion of all that is human, social, legible, conformable to voice and law. This is a durable theme not only in Stevens, but in the whole literary and intellectual tradition from which he hails (not to mention plenty from which he doesn't). Is the sea "behind God's back"? What has this meant, and how? Do the seas, as Stevens suggests, unravel "knowing man" — the natural philosopher, the "Socrates of snails"? How have the oceans yielded to "Ideas of Order"?

Read:

Steinberg, Philip E. *The Social Construction of the Ocean*. Cambridge: Cambridge University Press, 2001.

An ambitious recent essay to get us started.

Idyll, C.P. "The Science of the Sea." Chapter 1 in *The Science of the Sea: A History of Oceanography*, edited by C.P. Idyll. London: Thomas Nelson, 1970. (Also published in a revised edition two years later under the title: *Exploring the Ocean World*).

A "potted" history of ocean science, to sketch the terrain in 20 pages; this whole book (which captures the sea-enthusiasms of the late 1960s) is worth a quick review.

Burstyn, Harold L. "The historian of science and oceanography." *Bulletin de L'Institut Océanographique, Monaco*, Special Issue 2 (volume separately titled *Communications—Premier Congrès International D'Histoire de L'Océanographie*) (1966 [1968]): 665-675.

This older piece is revisited by Eric Mills in the review essay below; the pair offer useful historiographical bookends.

Mills, Eric L. "The History of Oceanography: Introduction" and "The Historian of Science and Oceanography after Twenty Years." *Earth Sciences History* 12 (1993): 1-18.

Review/examine:

Gordon, Bernard, ed. *Man and the Sea: Classic Accounts of Marine Explorations*. Garden City, NY: The American Museum of Natural History, 1970.

A collection of primary sources, heavily weighted on the twentieth-century side; focus on the first 133 pages.

WEEK 3: Sciences of the Sea (an overview)

And yet, pace Crispin, knowledge of the oceans and knowledge on the oceans are both possible. How have the seas become objects of scientific inquiry? What has been distinctive about trying to do science at sea? This week we'll take a stab at answering these questions in a general way, while seeking a synoptic view of the period we are examining in this class.

Read:

Deacon, Margaret. *Scientists and the Sea 1650-1900: A Study of Marine Science*. Aldershot: Ashgate, 1997 (revision of 1971 first edition).
This remains the most comprehensive treatment of the subject.

Review/examine:

Deacon, Margaret, ed. *Oceanography: Concepts and History*. (Volume 35 in the series "Benchmark Papers in Geology"). Stroudsburg, PA: Dowden, Hutchinson & Ross, 1978.
Another primary source reader, this one considerably more technical, and arranged thematically, not chronologically.

WEEK 4: Historians and Oceans*

If the seas have become objects of scientific knowledge, they have also become (increasingly?) objects of historical investigation, and historians have worked to see these regions as something more than the dead zone between peoples. How does one write the history of an ocean? Is it to be treated as a stage space for human pageants? A dynamic geophysical character in its own right? An elaborated trope for the connectedness of diverse cultures? Is the sea-approach to history more than a heuristic?

Read:

Braudel, Fernand. *La Méditerranée et le monde méditerranéen à l'époque de Philippe II*. Paris: Armand Colin, 1966 (1949). (NB: Available in a translation by Siân Reynolds: *The Mediterranean* [Berkeley: University of California Press, 1995]).
If you are a first-year graduate student in History, you will have read some of this last week for History 500; in this class let's look at Braudel on the sea itself, Part One, Section 2, "The Heart of The Mediterranean: Seas and Coasts," pages 103-167 in the Reynold's translation.

Williams, Glyndwr. *The Great South Sea: English Voyages and Encounters 1570-1750*. New Haven: Yale University Press, 1997.
English pre-Cook seafaring in the Pacific; a recent work that draws on (but does not merely recapitulate) the classic historiographical tradition for dealing with the sea, maritime history.

* NOTE: This Friday and Saturday, October 4th and 5th, Princeton will host a conference jointly sponsored with the National Maritime Museum, Greenwich (UK), entitled *The History of the Maritime Book*; this event will probably be of interest to all of us.

Mollat du Jourdin, Michel. *Europe et la mer*. Paris: Editions du Seuil, 1993 (NB: Available in a translation by Teresa Lavender Fagan: *Europe and the Sea* [Oxford: Blackwell, 1993]).
A more EU-esque history of Europe? By means of a focus on the un-national realm of sea space?

Review/examine:

Butel, Paul. *Histoire de l'Atlantique: de l'antiquité à nos jours*. Paris: Perrin, 1997. (NB: Available in a translation—rumored to be less than ideal—by Iain Hamilton Grant: *The Atlantic* [London: Routledge, 1999]).

The first book in a new series on the "Seas in History."

François, Luc, and Ann Katherine Isaacs, eds. *The Sea in European History*. Pisa: PLUS, 2001.

This volume is a little bit all over the place (and oriented toward pedagogy), but you might take a look at the last two pieces, by Bialuschewski and Witt.

WEEK 5:

Lives at Sea, Cultures of the Ship

Rosalind Williams begins her cultural history of subterranean technologies, Notes on the Underground (Cambridge: MIT Press, 1990), with a compelling question: "What are the consequences when human beings dwell in an environment that is predominantly built rather than given?" Though she is interested in the terrestrial "underworld," the oceans present much the same problem. Life at sea is life in a "craft." What are the constraints of such a world? What distinctive cultures arise? And, looking forward, what difference does this unique social and material environment make to the history of cross-cultural encounter? To the history of science at sea?

Read:

Rediker, Marcus. *Between the Devil and the Deep Blue Sea: Merchant Seamen, Pirates, and the Anglo-American Maritime World*. Cambridge: Cambridge University Press, 1987.

A labor history of the lower decks; you may want to take a look at Rediker's more recent book, co-authored with Peter Linebaugh, The Many Headed Hydra: Sailors, Slaves, Commoners, and the Hidden History of the Revolutionary Atlantic (Boston: Beacon, 2000), particularly chapters 2 and 5.

Dening, Greg. *Mr. Bligh's Bad Language: Passion, Power and Theatre on the Bounty*. Cambridge: Cambridge University Press, 1992.

Dening's Islands and Beaches will be our main text for next week, but read the Prologue and Act I of this later book for his "ethnohistory" of shipboard life.

Review/examine:

- Lamb, Jonathan. *Preserving the Self in the South Seas, 1680-1840*. Chicago: University of Chicago Press, 2001.
Sophisticated look at travel narratives, imperial expansion, and the emergence of a political "self"; look particularly at Chapter 3.
- Chappell, David A. *Double Ghosts: Oceanian Voyagers on Euroamerican Ships*. London: M.E. Sharpe, 1997.
Who was Queequeg? Chappell tells this story in considerable detail; there are a number of recent books that try to recover the ethnic diversity of 18th and 19th century ships; see below for a related project.
- Bolster, W. Jeffrey. *Black Jacks: African American Seamen in the Age of Sail*. Cambridge: Harvard University Press, 1997.
- Hattendorf, John B., ed., *Maritime History Volume 2: The Eighteenth Century and the Classic Age of Sail*. Malabar, FL: Krieger Publishing, 1997.
Contains a number of different interesting essays, including several pieces on navigation and charting, subjects we are not covering in detail.
- Nelson, Stewart B. *Oceanographic Ships: Fore and Aft*. Washington, DC: Oceanographer of the Navy, 1971.
Since this is the ship week, I have included these two reference books on oceanographic vessels themselves; see below.
- Rice, A.L. *British Oceanographic Vessels, 1800-1950*. London: The Ray Society, 1986.
- Sorrenson, Richard. "The Ship as a Scientific Instrument in the Eighteenth Century." *Osiris* 11 (Volume separately titled *Science in the Field*, edited by Henrika Kuklick and Robert E. Kohler) (1996): 221-236.
This essay is less relevant to our theme for this week than the title might suggest, but worth a look.
- Kellman, Jordan. "Discovery and Enlightenment at Sea: Maritime Exploration and Observation in the 18th-Century Scientific Community." Ph.D. Dissertation, Princeton University, 1998.
Again, our focus is not really on the classic history of scientific exploration in the later 18th century, but if that is an interest, then this provides a useful counterbalance to the emphasis on Cook in the English literature.

WEEK 6: Crossing the Beach

*In his suggestively titled *Out of Our Minds: Reason and Madness in the Exploration of Central Africa* (Berkeley: University of California Press, 2000), Johannes Fabian argues that scientific explorers worked overtime to elaborate and disseminate a particular and powerful image of what science had to be: a victory over self and nature. And yet dramatizing this victory, he suggests, consistently demanded a sleight of hand on their part, since, in distant and strange places, among unfamiliar people, self preservation and the pursuit of knowledge both depended on moments of "ecstasis" — the experience of being "beside oneself," being a familiar (unnervingly) to the alien. Could we press this point, and claim that the spaces of encounter (what Mary Louise Pratt calls the "contact zone," what Denning calls "the beach") demand distinctive ways of knowing? Is there a theory of knowledge in the contact zone? What does reason look like "on the beach"? Can these questions help us to understand science in the field and overseas?*

Read:

- Dening, Greg. *Islands and Beaches: Discourse on a Silent Land, Marquesas 1774-1880*. Honolulu: University of Hawaii Press, 1980.
A classic ethnohistory of cross-cultural encounter. You might also want to go ahead and read "The Beach," Act Two of Mr. Bligh's Bad Language.
- Latour, Bruno. "Centres of Calculation." Chapter 6 of *Science in Action*. Cambridge: Harvard, 1987. pp. 215-257.
This account of how science works trades very heavily on a story about the beach; read it with Dening in the back of your mind, and then take a look at the rejoinder offered below.
- Bravo, Michael. "Ethnographic Navigation and the Geographical Gift." Chapter 7 of *Geography and Enlightenment*, edited by David N. Livingstone and Charles W. J. Withers. Chicago: University of Chicago, 1999. pp. 199-235.

Review/examine:

- Cook, James. Excerpt from his "Endeavour Journal," March to June of 1769. From *The Journals of Captain James Cook on his Voyages of Discovery*, edited by J.C. Beaglehole. London: Hakluyt Society, 1954. pp. 62-98
We are not spending a great deal of time on Cook, but this passage (and the one cited below) describe an archetypal instance of science on the beach in the Pacific.
- Banks, Joseph. Excerpt from his "Endeavour Journal," March to June of 1769. From *The Endeavour Journal of Joseph Banks*, edited by J.C. Beaglehole. Sydney: Angus and Robertson, 1962. pp. 235-283
- Turnbull, David. "Cook and Tupaia, a Tale of Cartographic *Méconnaissance*?" In *Science and Exploration in the Pacific*, edited by Margarette Lincoln. Woodbridge (UK): Boydell Press, 1998. pp. 117-131.
Turnbull here offers a sense of what a Dening-esque sensibility might bring to the history of scientific exploration.
- Herbert, T. Walter. *Marquesan Encounters: Melville and the Meaning of Civilization*. Cambridge: Harvard University Press, 1980.
Makes a very interesting companion volume to Dening; definitely worth some time.
- Ralston, Caroline. *Grass Huts and Warehouses: Pacific Beach Communities of the Nineteenth Century*. Honolulu: University of Hawaii Press, 1978.
Not cited in Dening, but relevant.
- Branagan, David, ed. *Science in a Sea of Commerce*. Northbridge (Australia): D.F. Branagan, 1996.
A curious (but atmospheric and useful) critical edition of a primary source, a journal kept by the naturalist Samuel Stutchbury during a pearling venture in the South Pacific circa 1825.
- Lamb, Jonathan, Vanessa Smith, and Nicholas Thomas, eds., *Exploration and Exchange: A South Seas Anthology 1680-1900*. Chicago: University of Chicago Press, 2000.
More primary source material on Pacific encounters.
- Calder, Alex, Jonathan Lamb, and Bridget Orr, eds., *Voyages and Beaches: Pacific Encounters, 1769-1840*. Honolulu: University of Hawaii Press, 1999.
There is an enormous secondary literature on Pacific encounters; if you get interested, you might look at this, as well as the volume below.
- Miller, David Philip, and Peter Hans Reill, eds., *Visions of Empire: Voyages, Botany, and Representations of Nature*. Cambridge: Cambridge University Press, 1996.

WEEK 7: The Strand Transformed, the Sea Brought Home

Not all beaches ringed exotic islands; there were encounters to be had at Brighton and Marseille as well. The same period we looked at last week (1770-1850) saw a remarkable change in European perceptions of the beach "at home": the seaside went from being thought of as a kind of cacotopia to being understood as a place of health and leisure; at the same time, the mid-century "aquarium craze" brought oceanic environments into the parlor. One might call this entire process a "domestication of the sea." What caused these developments? What effects did they have on ocean science?

Read:

Corbin, Alain. *Le Territoire du Vide*. Paris: Aubier, 1988. (NB: Available in a translation by Jocelyn Phelps: *The Lure of the Sea* [London: Penguin, 1995]).

A cultural history of the seaside, 1750-1840.

Rehbok, Philip. "The Victorian Aquarium in Ecological and Scientific Perspective." In *Oceanography: The Past*, edited by Mary Sears and Daniel Merriman. New York: Springer-Verlag, 1980. pp. 522-539.

This article has a considerable bibliography; you might also take a look at the volume from which it comes, which is the published proceedings of the Third International Congress on the History of Oceanography.

Allen, David Elliston. *The Naturalist in Britain*. Princeton: Princeton University Press, 1976.

This is a classic work in the history of natural history; read Chapter Six, "Exploring the Fringes."

Hedgpeth, Joel W. "De Mirabili Maris: Thoughts on the Flowering of Seashore Books." *Proceedings of the Royal Society of Edinburgh* (B) 72 (volume separately titled "Proceedings of the Second International Congress on the History of Oceanography") (1971/2): 107-114.

I have included below some of the primary sources discussed here.

Review/examine:

Stilgoe, John R. *Alongshore*. New Haven: Yale University Press, 1994.

Lyrical "landscape history" of the New England coast.

Lenčėk, Lena, and Gideon Bosker, *The Beach: The History of Paradise on Earth*. New York: Viking, 1998.

Cult. Stud. treatment, but you might want to take a look.

Gosse, Philip Henry. *A Naturalist's Rambles on the Devonshire Coast*. London: J. Van Voorst, 1853.

*Gosse is a curious Victorian character—a science popularizer, pulpit-thumping opponent of Darwin, and (according to his son's memoir) a borderline insane authoritarian; if you get interested, you might also want to consult his earlier work, *The Ocean*.*

Gosse, Philip Henry. *The Aquarium: An unveiling of the wonders of the deep sea*. London: J. Van Voorst, 1856.

Taylor, *The Aquarium: Its inhabitants, structure and management*. London: Hardwicke, 1876.

Gifford, Isabella. *The Marine Botanist: An introduction to the study of the British seaweeds*. Brighton: R. Folthorp, 1853.

Sheffield, Suzanne Le-May. *Revealing New Worlds: Three Victorian Women Naturalists*.
London: Routledge, 2001

I haven't seen this yet, or read a review, but part one, dealing with Margaret Gatty, would seem be relevant to this week's discussion of the Victorian seaside sensation.

Fall Break

WEEK 8: Science and Circumnavigation*

In the first two-thirds of the 19th century, research circumnavigations were an essential dimension of scientific practice, as well as a significant rite of passage/initiation for many traveling naturalists — from Darwin, Hooker, and Huxley, to Dumont d'Urville, von Kotzebue, and Dana. Their work is inseparable from the names of the ships that served them as mobile laboratories for years of study: not just the Beagle, but the Erebus and the Terror, the Astrolabe and the Zélée, the Vincennes and the Peacock. These expeditions, particularly the U.S. Ex. Ex. (1838-1842), represented unprecedented national investments in science: global hydrographic investigation, charting, collecting, and publishing. The presence of "scientifics" aboard survey and navy ships created distinctive exchanges, both on the beaches and on the decks. There are a number of ways we might approach this large topic, so I have decided to leave this week's readings somewhat open. We probably know the most about Darwin's ship-board experiences, and that may be the best way into this material. Let's see where our interests take us.

Possible readings/material to review:

Raby, Peter. "Scientists of the Survey." Chapter 1 from *Bright Paradise: Victorian Scientific Travellers*. Princeton: Princeton University Press, 1996.

This is not a scholarly book, but it is synthetic, and this chapter briskly introduces the circumnavigating triumvirate of Darwin, Huxley, Hooker.

Browne, Janet. *Charles Darwin: Voyaging*. Princeton: Princeton University Press, 1995.
Some of you may have read this first volume of the emerging biography; Part II deals with the Beagle in some detail.

Darwin, Charles. *Voyage of the Beagle*. Edited by Janet Browne and Michael Neve.
London: Penguin, 1989(1838).

If we decide to focus on Darwin this week, it would be worth pairing this with a few of the classic articles by Frank Sulloway on the voyage.

Larson, Edward J. *Evolution's Workshop: God and Science on the Galápagos Islands*.
New York: Basic, 2001.

Again, if we go the Darwin route this week, it might be worth looking at this, which I have not yet read. Given our Denning readings, it might be interesting to see a set of islands treated as the subject of a book in the history of science.

MacLeod, Roy, and Rehbock, Philip F., eds. *Darwin's Laboratory: Evolutionary Theory and Natural History in the Pacific*. Honolulu: University of Hawaii, 1994.

Before Larson did Darwin on the Galápagos, this edited volume looked at Darwin and Darwinism in the Pacific; several of the essays in here

* NOTE: This will be the week of HSS (in Milwaukee), so we may need to switch times.

would probably make sense for this week, particularly the pieces by Stoddart, Kay, and Gunson.

Viola, Herman J. and Carolyn Margolis, eds. *Magnificent Voyagers: The U.S. Exploring Expedition, 1838-1842*. Washington, DC: Smithsonian, 1985.

Well illustrated overview of the U.S. Ex. Ex.

Stanton, William. *The Great U.S. Exploring Expedition*. Berkeley: University of California Press, 1975.

*Remains the standard treatment of the expedition; though for those with a particular interest in the human sciences, the new book by Barry Allen Joyce, *The Shaping of American Ethnography* (Lincoln: University of Nebraska, 2001), would be relevant.*

Goetzmann, William H. *New Lands, New Men: America and the Second Great Age of Discovery*. New York: Viking, 1986.

Book two, "The Book of the Oceans," is relevant to this seminar, and chapters 6 and 7 deal with the U.S. Ex. Ex. (chapter 8 takes up Maury, next week's subject).

Hooker, Joseph Dalton. *The Botany of the Antarctic Voyage of H.M. Discovery Ships Erebus and Terror in the years 1839-43*. London: Reeve, 1847-60.

This is a multiple-volume botanical treatise (with remarkable plates); the ten-page introduction offers a summary of the voyage under Captain James Clark Ross; I include a few additional relevant primary sources below.

J. MacGillivray, *Narrative of the Voyage of H.M.S. Rattlesnake, ... during the years 1846-1850*. London: T. and W. Boone, 1852 (there is a 1967 reprint).

Huxley, Julian, ed. *Thomas Henry Huxley's Diary of the Voyage of H.M.S. Rattlesnake*. Garden City: Doubleday, 1936 (there are several other editions).

Dumont d'Urville, Jules-Sébastien César, *Voyage de la corvette l'Astrolabe*. (NB: There is an edition translated by Helen Rosenman: *An account in two volumes of two voyages to the South Seas* [Carlton: Melbourne University Press, 1987]).

WEEK 9:

Maury, Hydrography, and *The Physical Geography of the Sea*

C.P. Idyll, in the thumbnail history that we read in week two, declared that the science of oceanography had two "founding fathers": Edward Forbes and Matthew Fontaine Maury. We will take up Forbes next week, when we look at the scientific "discovery" of the bottom of the sea. This week we look at Maury, who is a controversial figure in several respects. Abandoning his post in the Navy (as the first director of the U.S. National Observatory) to take up the Confederate cause on behalf of his native Virginia, Maury torpedoed his scientific career, and left a legacy embroiled in the apologetics and factionalism of the great conflict. Among historians of science in general (and ocean-science in particular), revisionist accounts since the late 1960s have mostly devalued his stock. At the same time, he presents, I think, not only an interesting case-study for the relationship between the naval "sciences" (hydrography, navigation, etc.) and the emerging professionalized study of the sea, but also a telling instance of the importance of natural theology in the history of 19th century science. Moreover, the history of his publishing success leads to some interesting questions about print-politics and discipline formation.

Read:

- Goetzmann, William H. *New Lands, New Men: America and the Second Great Age of Discovery*. New York: Viking, 1986.
If you didn't read chapter 8 last week, use it as an introduction to Maury; notice that Goetzmann takes Maury's Humboldtian work more seriously than does Leighly or Reingold, below.
- Schlee, Susan. "Oceanography in 19th Century America." Chapter 1 of *The Edge of An Unfamiliar World: A History of Oceanography*. New York: E.P. Dutton, 1973.
We will be returning to this book for the next few sessions, since it remains the best general survey of the history of oceanography in the more recent period; the first chapter offers some context for Maury.
- Maury, Matthew Fontaine. *The Physical Geography of the Sea*. Edited by John Leighly. Cambridge: Harvard, 1963.
This is Maury's major work, arguably the "first textbook of oceanography"; there is no variorum edition, and yet the changes through the dozen-plus editions are significant; be sure to read Leighly's critical introduction (which is "critical" in more ways than one...) along with the summary piece below.
- Leighly, John. "M.F. Maury in his time." *Bulletin de L'Institut Océanographique, Monaco*, Special Issue 2 (volume separately titled *Communications—Premier Congrès International D'Histoire de L'Océanographie*) (1966 [1968]): 147-159.
- Reingold, Nathan. "Two Views of Maury...and a Third." *Isis* 55, no. 3 (1964): 370-372.
A review of Leighly's edition, and the Williams biography listed below.

Review/examine:

- Peterson, R.G., L. Stramma, and G. Kortum. "Early Concepts and Charts of Ocean Circulation." *Progress in Oceanography* 37 (1996): 1-115.
This is really a monograph on the pre-20th century history of ocean dynamics; useful for understanding where Maury fits, although the authors follow Leighly's line on Maury's importance.
- Williams, Francis Leigh. *Matthew Fontaine Maury, Scientist of the Sea*. New Brunswick: Rutgers University Press, 1963.
Despite Reingold's rather grim review, I sort of liked this hyper-detailed (and somewhat partisan) life.
- Maury, Matthew Fontaine. *Sailing Directions* (or, sometimes, *Explanations and Sailing Directions to Accompany the Wind and Current Charts*). Philadelphia: E.C. & J. Biddle, 1854.
The volume from which The Physical Geography of the Sea was culled; see William's bibliography for the publication history.

WEEK 10: Discovering the Bottom of the Sea

If the beach underwent a striking transformation in the first half of the 19th century, the depths of the seas were the subject of a comparably profound re-invention in the fifty years that followed. In certain ways, Maury's work on the transatlantic telegraph cables in the 1850s marks the emergence of the deep sea-floor as a hotly contested zone, a place of military, industrial, and commercial (as well as scientific) significance. How did the bottom of the sea become a space for science in the later 19th century? Why? What were the larger cultural implications of a growing fascination with the oceanic underworld?

Read:

- Schlee, Susan. "British Oceanography Before 1870." Chapter 2 of *The Edge of An Unfamiliar World: A History of Oceanography*. New York: E.P. Dutton, 1973.
This lays out the pre-Challenger British exploration, and discusses Forbes; we move on to the Challenger next week.
- Rozwadowski, Helen M. "Fathoming the Ocean: Discovery and Exploration of the Deep Sea, 1840-1880." Ph.D. Dissertation, University of Pennsylvania, 1996.
This week's theme is best addressed by this thesis, written by one of the speakers who will be presenting work at the spring Workshop; she has a new book on 20th century oceanography, a history of the International Council for the Exploration of the Sea entitled The Sea Knows No Boundaries (Seattle: University of Washington Press, 2002).

Review/examine:

- McConnell, Anita. *No Sea Too Deep: The History of Oceanographic Instruments*. Bristol: Adam Hilger, 1982.
Chapters 4-7 are particularly relevant, but there is much useful material in this book.
- Thomson, C. Wyville. *The Depths of the Sea*. London: Macmillan, 1873.
An account of the dredging expeditions of the Porcupine and the Lightning; a significant primary text to peruse in conjunction with the Rozwadowski.
- Verne, Jules. *Vingt mille lieues sous les mers*. Paris: J. Hetzel, 1871. (NB: There are many English translations, and the Butcher version for Oxford is the best to date, but for *Pale Fire* pleasures do not miss the heavily annotated edition by Walter James Miller).
I include this for fun, in part, but it is a rich text for this week's themes; note the Maury references, discussed in the article below.
- Kylstra, Peter H. and Arend Meerburg. "Jules Verne, Maury and the Ocean." *Proceedings of the Royal Society of Edinburgh* (B) 72 (volume separately titled "Proceedings of the Second International Congress on the History of Oceanography") (1971/2): 243-251.

Thanksgiving Break

WEEK 11: The Challenger Expedition *

Most authors end the “pre-history” of oceanography with the expedition of the HMS Challenger, 1872-1876. In what way do this investigation and its publications mark a new era in the study of the sea? In what ways did the invention of an oceanographic pre-history originate in the historical self-consciousness of the expedition and its primary amanuensis, John Murray?

Read:

- Schlee, Susan. “Naturalists Explore the Deep Sea,” and “Reefs, Rocks, and Oozes,” Chapters 3 and 4 of *The Edge of An Unfamiliar World: A History of Oceanography*. New York: E.P. Dutton, 1973.
An introduction to the work of the expedition.
- Burstyn, Harold L. “Science and Government in the Nineteenth Century: The Challenger Expedition and its Report.” *Bulletin de L’Institut Océanographique, Monaco*, Special Issue 2 (volume separately titled *Communications—Premier Congrès International D’Histoire de L’Océanographie*) (1966 [1968]): 603-613.
Burstyn revisits the themes presented here in two later pieces, one given below, and another in the volume edited by Deacon, Rice, and Summerhayes.
- Burstyn, Harold L. “Pioneering in Large-scale Scientific Organization: The Challenger Expedition and its Report.” *Proceedings of the Royal Society of Edinburgh* (B) 72 (volume separately titled “Proceedings of the Second International Congress on the History of Oceanography”) (1971/2): 47-61.
This whole volume was occasioned by the Challenger centenary, so it contains a number of other relevant articles.
- Deacon, Margaret, Tony Rice, and Colin Summerhayes, eds. *Understanding the Oceans: A Century of Ocean Exploration*. London: UCL Press, 2001.
This recent book also took rise out of a Challenger commemoration conference; read the introduction and Part I.

Review/examine:

- Merriman, Daniel. “Challengers of Neptune: The Philosophers.” *Proceedings of the Royal Society of Edinburgh* (B) 72 (volume separately titled “Proceedings of the Second International Congress on the History of Oceanography”) (1971/2): 15-45.
Primarily a compilation of some difficult-to-access primary source material written by the scientifics.
- Thomson, C. Wyville. *Voyage of the Challenger*. London: Macmillan, 1877.
A two-volume narrative of the voyage, by the director of the civilian staff of the expedition.
- Rehbock, Philip F., ed. *At Sea with the Scientifics: The Challenger Letters of Joseph Matkin*. Honolulu: University of Hawaii Press, 1992.
Provides an alternate account of the expedition, written from the lower decks; Rehbock’s appendices (particularly E, on the shipboard library) are helpful.

* NOTE: The first of the 2002-2003 History of Science Workshops, on “Science Across the Seas: Global Knowledge and Comparative History,” will meet this Friday, December 6th. The theme for this session is Jesuit science in China and Europe, 1550-1850.

Murray, John. *Report on the Scientific Results of the Voyage of H.M.S. Challenger*.
London: Eyre and Spottiswoode, 1895.

This is the summary of the 40-odd volumes of the Challenger Reports, which are on reserve for you to browse; the "Historical Introduction" makes an interesting read, and seems a fitting way to wind this course down.

WEEK 12:

Review, Conclusion, Other Things?

*I have left us an open week at the end, on the grounds that it will be nice to have some flexibility for how we wrap things up. I have a few ideas, but I think it makes sense to wait and see the course that we take through the material. Among the topics we might take up: a session on navigation and charting; a session on fish, whales, and biological oceanography; a session on ocean conservation (which would be a nice excuse to close with Rachel Carson's 1950 classic *The Sea Around Us* [Oxford: OUP, 1989]). Regardless of what else we decide to do, it would make sense to finish up the Schlee book, to look ahead a bit into the 20th century.*