

Exploration and Early American Culture

WILLIAM H. GOETZMANN

RECENTLY we have begun to notice a stampede of authors, publishers, and publicists making ready for the 500th anniversary of the landing of Christopher Columbus somewhere in what he failed to recognize as 'a new world.' Joseph Judge and Luis Marden, in the November 1986 issue of the *National Geographic Magazine*, have already made a strong case for changing our ideas as to the place of Columbus's first New World landing. Modern scientific measurements of the ocean's currents and lateral drift have indicated that Columbus's San Salvador was actually Samana Cay in the Bahamas, instead of Watling's Island, as we have traditionally believed.¹ In the years to come, down through 1992, we must expect a great many retellings and revisions of the Columbus story, including both fiction and nonfiction or a mixture of both. Some of these accounts may well be from the point of view of the American natives whom Columbus mistakenly called 'Indians.' Moreover, in the modern day, the reassessing of the Columbus voyages and subsequent voyages and continental entradas of the Renaissance will undoubtedly deem the voyages of Columbus and other European explorers of the period 'tragic'

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1. Joseph Judge and Luis Marden, map, 'Where Did Columbus Discover America?' to accompany 'Where Columbus Found the New World,' *National Geographic Magazine* 170 (1986). See also session 1 of the Society for the History of Discoveries, annual meeting, October 13-15, 1988, which was devoted to a reassessment of Columbus and his landfall.

WILLIAM H. GOETZMANN is Dickson, Allen, and Anderson Centennial Professor in American studies and history at the University of Texas at Austin.

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invasions of otherwise peaceful lands by disease-carrying freebooters and religious fanatics.² It is certainly clear that the European voyagers did not 'discover,' strictly speaking, any lands that were not already known to some human culture—usually native cultures that called these lands home. Thus, the stirring stories of heroic exploration by such as Columbus, Da Gama, Magellan, and others of the time, are really stories of invasion. They begin an ongoing moral drama, or melodrama, as the case may be, that reaches from the age of Columbus to about the First World War, when nearly all the lands and seas and polar regions seemed to have found places on European and American maps, as well as in the popular imagination.³

I do not see this process of voyaging and invasion as either a single, or a simple, linear progression. Rather, it seems clear that there have been at least *three* Ages of Discovery, the third one of which is our own age—a time primarily of planetary and undersea exploration. It is an exciting time where the 'moral drama' is largely supplied by the space race between the two superpowers of the day, the United States and the Soviet Union. Eventually, as we reach out into space, the exploratory probes will be larger, more elaborate, and very probably will require the participation of most of the peoples of planet Earth. This will surely change life on Earth in the next millennium, if we are not to fall into what one recent commentator has called 'the vulgarization into self-absorption and solipsism' now so closely identified with the mindset of Modernism that has not yet had its private meanings spelled out by any newfound 'others' of modern exploration.⁴

Before all the space exploration lingo of retrorocketry and in-

2. Alfred Crosby, *The Columbian Exchange, Biological and Cultural Consequences of 1492* (Westport, Conn.: Greenwood Press, 1973), passim. Wilbur R. Jacobs, *Dispossessing the American Indian: Indians and Whites on the Colonial Frontier* (New York: Charles Scribner's Sons, 1972), passim. Francis Jennings, *The Invasion of America: Indians, Colonialism, and the Cant of Conquest* (Chapel Hill: University of North Carolina Press, 1975).

3. Stephen Pyne, 'A Third Great Age of Discovery,' in Carl Sagan and Stephen Pyne, *The Scientific and Historical Rationales for Solar System Exploration*, Space Policy Institute, Elliott School of International Affairs, The George Washington University (Baltimore: George Washington University, 1988), pp. 29-31, 36 ff.

4. *Ibid.*, p. 35.

sentient biota destroys the integrity of our minds and thought patterns, I want to make clear that humanity has survived not *one* but *two* ages of discovery. The age of Columbus is usually attributed to a search for glory, God, and gold, as Christian Europe somehow found the technology and the ideologies to reach out across the oceans and around the world. Seldom is it pointed out that a rediscovery of ancient science and a more powerful sense of man's domination over nature called 'humanism' lay behind the first modern age of exploration. A rather crude earth science, based largely on Ptolemaic geography, spawned a sense of adventure, conquest, and greed. This scientific and technological underpinning is often forgotten in the joys inherent in the pure description and narration of the explorer's experiences themselves.⁵ By the end of the First Great Age of Discovery, the world's oceans had largely been charted, though the age of circumnavigation had only just begun.⁶ Indeed, some of the continents also had been penetrated by adventurers like Cortez, Coronado, the Pizzaro brothers, and Orellano, who miraculously made his way down the entire length of the Amazon.

But in the late seventeenth century, Europe spawned a second major cultural revolution. This revolution so firmly established the empirical scientific rules of discovery that it produced a Second

5. J. H. Parry, *The Age of Reconnaissance: Discovery, Exploration, and Settlement* (New York: Mentor Books, 1963), *passim*. Collections of explorers' accounts addressed both a popular audience and an audience of specialists, who have always been abundant. The most famous of these are Richard Hakluyt, *Divers Voyages* (1582), *Principall Navigations* (1589), and his final work, *Principall Navigations* (1598-1600). No better current example can be found of the English-speaking peoples' fascination with the stories of the voyages and expeditions than the long series of modern published accounts produced by the Hakluyt Society, centered in the British Museum. Also see Samuel Eliot Morison, *The European Discovery of America, The Northern Voyages A.D. 500-1600* (New York: Oxford University Press, 1971), and *The European Discovery of America, The Southern Voyages 1492-1616* (New York: Oxford University Press, 1974); and David Beers Quinn, *England and the Discovery of America 1481-1620* (New York: Alfred Knopf, 1974).

6. See Jacques Brosse, *Great Voyages of Discovery: Circumnavigators and Scientists, 1764-1843* (New York: Facts on File Publications, 1983), and William H. Goetzmann, *New Lands, New Men: America and the Second Great Age of Discovery* (New York: Viking Penguin, Inc., 1986). (There are no page numbers cited here, since the entire book was written expressly to postulate the principles of a Second Great Age of Discovery. See my 'Note on the Conceptualization of the Ages of Discovery,' pp. 243-45, below.)

Great Age of Discovery, in the midst of which the United States was born and, we might even say, 'raised.'⁷ My own research interests have largely been directed at the nature and impact of that Second Great Age of Discovery upon Euro-American, and especially United States, culture. I see exploration as a very central and special human cultural process.⁸ No one has yet fathomed the reasons why Euro-American culture, and only a few others, has had such a strong impulse to explore, to discover, and eventually to invent the technological culture in which we now live as we look outwards towards space and unmanned vehicles as the source of our newest 'adventures.' Nonetheless, it does seem clear that the basis for each new age of discovery has been some sort of scientific revolution in which a new epistemology and a new sense of what exists has taken place and has set the agenda for exploration. The Second Great Age of Discovery had its roots in the scientific revolution of the late seventeenth century, just as the present age seems to have its roots in Modernism, which to date has spawned relativity, cultural relativism, the exploration of the subconscious, and a self-conscious preoccupation with self-reflection. We have transcended the laws of common sense, but now we have no 'significant other' with which to enter into cultural dialogues as explorers of an earlier age had done.

Now let us turn to the more familiar terrain of the previous or Second Great Age of Discovery. Clearly, it is in the search for and postulation of the laws of *common* or universal sense that we must find the link between exploration and the development of the United States. For much of its early years, North American European culture was rooted in the tenets of the Enlightenment, which, since Sir Isaac Newton's great work and, a little later, that of Karl Linnaeus, presumed to depend on laws that governed nature and man. That is the larger meaning of the 'common sense' to which

7. Goetzmann, *New Lands, New Men*, passim.

8. Ibid. Also see Goetzmann, *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West* (New York: Alfred A. Knopf, 1966).

both Tom Paine and Thomas Jefferson appealed, and upon which their beliefs depended. The Constitution was deemed to be 'a machine that runs by itself' because it obeyed the laws of nature—particularly, the human gravities of checks and balances. There were many other laws that governed nature and, for a time, philosophes like Jefferson and Buffon and the great Alexander von Humboldt believed that one day, thanks to scientific investigation, all of these laws, both of men and nature, would be known. Jefferson's friend, Charles Willson Peale, even established a museum on the second floor of Independence Hall in Philadelphia, where he fitted the curiosities of nature into a 'Great Chain of Being.'⁹ The sciences of the day became those that charted the varieties of rock formations, the spread of nature's flora and fauna species, and the types of mankind over the face of the earth.

Jefferson's instructions to Lewis and Clark most clearly reveal that mindset. They were first ordered to locate 'the most direct and practicable water communication across this continent for purposes of commerce.' In addition, they were to 'fix' geographical positions on the earth by astronomical observations so that they could make an accurate map of the trans-Mississippi region, the extent of which Jefferson grossly underestimated. Beyond this, Lewis and Clark were to study the numbers, territorial extent, and customs of the Indian tribes that they chanced to meet. Native laws, customs, and ceremonies were important, as was a close observation of the Indians' sexual proclivities and frequencies of suicides. All of these inquiries aimed at something more than trade relations, i.e., the extent to which Indians or Native Americans were equal participants with the white man in the 'common sense.' Then, of course, Lewis and Clark were to note carefully the 'soil and face of the country'—its vegetation, animals, minerals of value, volcanoes, the daily vicissitudes of the weather, and the prevailing

9. Edgar P. Richardson, Brooke Hindle, and Lillian Miller, *Charles Willson Peale and His World* (New York: Harry N. Abrams, Inc., 1982), pp. 113–20. Also see Arthur P. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (New York: Harper & Row, 1933), *passim*.

climates in the continental subregions, from the Great Plains, across the 'Stoney Mountains,' and onward to the Pacific.¹⁰

Jefferson himself believed in the fixity of species, and a static world machine. He believed no species was extinct and that mammoths still roamed somewhere in the West.¹¹ He never suspected that some of the great European savants, like the Comte de Buffon, secretly believed in a kind of evolution.¹² Jefferson did, however, believe in history, as his book *Notes on Virginia* indicates.¹³ And, if that weren't enough, he and his friend Albert Gallatin studied Indian ethnology, collected tribal vocabularies, and, in Jefferson's case, even began digging into burial mounds. He also believed in mapping and, to this end, sent several expeditions out along the Red River of Louisiana to chart the southern boundaries of the United States. Most of these, like the Freeman, Custis, and Sparks expedition, were turned back by Spanish soldiers in 1806, and the one expedition that did get through the initial Spanish barrier, that of Zebulon Pike, was eventually captured north of Taos and imprisoned by the Spanish.¹⁴

All of Jefferson's expeditions were multipurpose; they had as much to do with science as with commerce and diplomatic relations. The same applied to the Stephen H. Long expedition of 1819-20 that went out across the Great Plains from the Missouri River to the front range of the Rockies and thence south along the mountain chain to what Major Long took to be the Red River but which was actually the Canadian River. Long, too, failed to draw a true map of the Louisiana Purchase, but following Pike's lead, he labeled the Great Plains the 'Great Desert.' Interestingly

10. Donald Jackson, ed., *The Letters of the Lewis and Clark Expedition* (Urbana, Ill.: University of Illinois Press, 1962), pp. 10-13.

11. Daniel Boorstin, *The Lost World of Thomas Jefferson* (Boston: Beacon Press, 1948), p. 36.

12. Loren Eiseley, *Darwin's Century* (Garden City, N. Y.: Doubleday, 1958), pp. 35-40.

13. Thomas Jefferson, 'Notes on Virginia,' in Adrienne Koch and William Peden, eds., *The Life and Selected Writings of Thomas Jefferson* (New York: The Modern Library, 1944), pp. 187-288.

14. Goetzmann, *Exploration and Empire*, pp. 42-56. Also see Dan L. Flores, ed., *Jefferson and Southwestern Exploration: The Freeman and Custis Accounts of the Red River Expedition of 1806* (Norman, Okla.: Oklahoma University Press, 1984), *passim*.

enough, the scientific appendices and illustrations to Long's narrative (which had actually been written by Dr. Edwin James) contradicted the 'Great Desert' idea.¹⁵

Following the Long expedition, and before 1860, the United States government, under the aegis of the secretary of war and the Army's Corps of Topographical Engineers, sent roughly fifty exploring expeditions into the western United States in what amounted to a grand scientific reconnaissance.¹⁶ Of these, the Explorations and Surveys for a Transcontinental Railroad Route to the Pacific Ocean produced the greatest scientific results. Four exploring parties moved west along the 42d, 38th, 35th, and 32d parallels to the Pacific Ocean. Each of these parties was accompanied by contingents of scientists and artists who pictured the country and its Indian inhabitants in various bizarre ways that still left much to the imagination of the American people. The most important result of the Pacific railway expeditions was Lt. Gouverneur Kemble Warren's master map of the whole West.¹⁷

It is equally noteworthy, however, that Jefferson's early reconnaissances, and then these later pre-Civil War expeditions, were all government-sponsored scientific endeavors. As much as 25 to 33 percent of the federal budget was spent on science and art between 1840 and 1860.¹⁸ In earlier days, during the conquest of the Cis-Mississippi country, this was not the case. There were few, if any, federally sponsored expeditions. Most of the exploration of that region was done by long hunters like Daniel Boone, as well

15. *Ibid.*, pp. 58-64.

16. See Goetzmann, *Army Exploration in the American West, 1803-1863* (New Haven: Yale University Press, 1959), *passim*.

17. *Ibid.*, p. 313.

18. This estimate is based on information compiled by Ann Graham from extensive printed sources such as the total U.S. budget and the funds appropriated for scientific expeditions on land and sea, for the art that stemmed from the expeditions, and funds appropriated for the art in the Capitol and other public structures. It does not include the funds appropriated for the Smithsonian Institution, and our research was not refined down to the manuscript ledgers of the Auditors of the Treasury or the Library Committee of the U.S. House of Representatives. A critically important document—the annual budgets from 1840 to 1860—can be found in 'Statistical Appendix,' *Annual Report of the Secretary of the Treasury on the State of Finances for the Fiscal Year Ended June 30, 1970* (Washington, D.C., Government Printing Office, 1971), pp. 8-16.

as traders, naturalists (like Thomas Nuttall and John James Audubon), and land speculators like the scouts for the Ohio Company of Virginia. Clearly, the Cis-Mississippi lands looked more immediately inviting, despite the ferocious attempts by patriot Indian chiefs like Pontiac and Tecumseh to defend their lands in the Ohio region.

In the Far West, legions of fur hunters or mountain men did as much or more than the U.S. Army to explore the country, get closely acquainted with the Indian tribes, and locate routes west over the continental divide, routes that they hoped settlers would follow while playing out their dreams of Manifest Destiny.¹⁹ Among them were some brave, antiexpansionist explorers like the great artist George Catlin who, by 1840, had visited and painted some forty-eight Indian tribes in a series of 510 oil paintings, in an effort to salvage the memory of the Indians before the 'jugger-naught of civilization' ground them into the earth forever.²⁰

Exploration, particularly continental exploration, during this period of the 1830s had relatively little institutional support beyond that supplied by the military and the fur companies, particularly John Jacob Astor's giant combine, the American Fur Company. The military backing for pre-Civil War exploring expeditions, of course, brought with it the apparatus of conquest. While the mountain men 'went native,' so to speak, and worked with the Indians—some even married into the very tribes that George Catlin was painting—the military explorers were really engaged in a post-Mexican War conquest; or else, through their elaborate scientific reports and maps, they were engaged in a massive federal planning program looking toward the settlement and development or exploitation of lands already settled and 'developed' by Indian tribes. Washington's 'planning' for the Far West was a great deal more flexible and even more sophisticated than that of the Native Americans, however. Perhaps, as Peter

19. Goetzmann, *Exploration and Empire*, pp. 3–180.

20. George Catlin, *Letters and Notes on the Manners, Customs, and Conditions of the North American Indians*, 2 vols., (New York: Dover Publications, 1973), p. 4.

Farb argues, this is because most of the Indians of North America were not interested in *changing* their ways, or in any cultural evolution beyond adopting the horse and the gun. Since they were not scientific cultures, they had no rage for novelty. Farb contends that Native American tribes had evolved to their limit, which was far more sophisticated than we imagine, but that their cultures were also more set and more brittle rather than flexible.²¹ For the most part, these were highly developed *folk cultures*, a form of social organization that screens out more information than it lets in.²² Social anthropologists fail to distinguish this structure from the flexible, permeable, syncretic social organization that we have called civilization—a constantly changing construct made up of many cultures that, as in science, values novelty as a sign of 'progress,' perhaps, to date, America's most cherished value. Nonetheless, it bears repeating that Euro-American exploration, even in the interests of science (itself becoming a universal culture) was the cutting edge of imperial conquest, not unlike that in some far distant, millennial past, when Asian cultures crowded over the Siberian-Alaskan land bridge to replace their more primitive, scattered ancestors in the frozen age of the woolly mammoth. Exploration, migration, and the moral dramas of hegemony are inevitable, and most often are tragic comrades that go far back—so far into prehistory that the majority are now beyond cultural memory. Looted tombs and a thousand red-ochre burials are all that remain.²³

The exploration and occupation of North America by Euro-Americans does not begin to tell half the story of the process of exploration as it related to early American culture. While trappers and soldiers and wagon trains were overrunning the West, Amer-

21. Peter Farb, *Man's Rise to Civilization as Shown by the Indians of North America from Primeval Times to the Coming of the Industrial State* (New York: E. P. Dutton & Co., Inc., 1968), passim. The whole book deals with variations of this phenomenon.

22. See footnote 8.

23. William N. Goetzmann and Ted Timreck, 'The Mysterious Red Paint People,' WNET-TV, New York City, *Nova*, PBS, 1988.

ican scouts of the sea were reaching out across the world in still another aspect of the scientifically oriented Second Great Age of Discovery. The first wave of oceanic explorers was made up of multinational whaling and sealing ventures, a number of which sailed under flags of convenience for the Nantucketeers Francis and William Rotch and thus avoided being taken as prizes by the British in the American Revolution and the War of 1812.²⁴ Although there were some fifteen official oceanic exploring expeditions undertaken by the United States Navy before the Civil War, some of the earliest feats of discovery were made by whalers, sealers, and fur-trading vessels.²⁵ Perhaps the most famous of the latter was the *Columbia*, skippered by Capt. Robert Gray, who discovered the mouth of the Columbia River in 1792, thus making a feasible destination for Lewis and Clark's overland expedition.

Whaling ships scoured the Atlantic and the Pacific in fierce competition with British and French whalers. The Pacific was especially productive for the freelance whalers. Dr. Charles Townsend, in an incredible study, calculated that American whaling ships had taken some 53,877 whales in the Pacific alone.²⁶ As early as 1792 some thirty-nine whaleships were scouring the Pacific.²⁷ In the course of their voyaging they located many remote islands such as the Kerguelen Islands, far south in the Indian Ocean. Tierra del Fuego became as familiar as Boston Harbor, and one stretch of its beach was dubbed the 'New Haven Green.'²⁸

Capt. William Scoresby, a veteran of many whaling voyages, pointed out that, on several occasions, whales taken near Baffin Island and the Greenland Sea or in the North Pacific bore har-

24. Goetzmann, *New Lands, New Men*, p. 238. Also see Edouard S. Stackpole, *The Sea Hunters: The New England Whalers during Two Centuries 1635-1835* (New York and Philadelphia: J. B. Lippincott, 1953) and Edouard S. Stackpole, *William Rotch (1734-1828) of Nantucket, America's Pioneer in International Industry* (New York: Newcomen Society in North America, 1950).

25. Goetzmann, *New Lands, New Men*, pp. 237-46, 249-58.

26. Charles W. Townsend, 'The Distribution of Certain Whales as Shown in Logbook Records of American Whaleships,' *Zoologica, Scientific Contributions of the New York Zoological Society* 19 (1935): 1-50.

27. Goetzmann, *New Lands, New Men*, p. 238.

28. *Ibid.*

poons that had been plunged into them on the other side of North America. Scoresby thus inadvertently resurrected the myth of an 'open polar sea' at the top of the globe. He went on, however, in his classic 1820 account of the Arctic regions and the Northern Whale Fishery, to label the 'open polar sea' concept as a 'chimera.'²⁹ Many brave explorers of the Second Great Age of Discovery, misinterpreting Scoresby, died in the frozen Arctic while searching for the nonexistent polar sea.³⁰ And even today myth surrounds the discoveries allegedly made in the Arctic; the British adventurer Wally Herbert has suggested that even Robert Peary faked his discovery of the North Pole in 1909.³¹

The most famous American circumnavigation in the early years of the Republic was undertaken in 1798 by Capt. Edmund Fanning aboard the sealing vessel *Betsy*. Fanning sailed around the world five times, but his voyage aboard the *Betsy* was the most dramatic.³² He rescued a thoroughly terrified British missionary in the Marquesas Islands, later made famous in Herman Melville's novel *Typee*. He also rescued the widow of a British captain and her child, plus the Anglo-Saxon half of the crew of a British Indiaman in the Tinian Islands. As a kind of grand finale, he defeated a whole fleet of Malay pirate vessels in the Sunda Straits, employing a novel 'crossing the T' strategy that was later used by Horatio Nelson in the Battle of Trafalgar. Captain Fanning's chief importance lay in his advocacy of an official American exploring expedition to the Antarctic Seas and through the Pacific to demonstrate America's economic interest in these regions. He was very much a true believer in America's oceanic Manifest Destiny, a theme that we will return to later.

Unfortunately, despite the backing of former president John

29. See William Scoresby, *An Account of the Arctic Regions with a History and Description of the Northern Whale Fishery*, 2 vols. (London: Religious Tract Society, 1820, 1848; reprint, New York: Augustus M. Kelley, Publishers, 1969), 1: 8-10, 46.

30. Goetzmann, *New Lands, New Men*, pp. 359-62.

31. See footnote 1.

32. Edmund Fanning, *Voyages round the World; with Selected Sketches of Voyages to the South Seas, North and South Pacific Oceans, China, etc. . . . between the Years 1792 and 1832* (New York: Collins & Hannay, 1833).

Quincy Adams—or perhaps because of it—the strict constructionist Jacksonian government would not support an official United States exploring expedition. So, in 1829, Capt. Benjamin Pendleton and Capt. Nathaniel Palmer, commanding three ships—the *Seraph*, the *Annawan*, and the *Penguin*—undertook a private exploring expedition to the southern latitudes and the South Pacific. By the time they reached Tierra del Fuego, it soon became apparent that they were more interested in seal hunting than exploration and the discovery of new lands for their own sake.³³

American interest in the Antarctic region was largely stimulated by the presence of huge numbers of fur seals. The pursuit of these valuable animals led to the discovery of the Antarctic continent by Capt. Nathaniel Palmer aboard the *Hero*, on November 17, 1820.³⁴ A bit later, in January of 1821, Palmer, together with Benjamin Pendleton, met Capt. Fabian Gottlieb Benjamin von Bellinghausen of the Imperial Russian Navy. In command of two vessels, the *Vostok* and the *Mirny*, the Russian captain had sailed all around the Antarctic continent, but he never saw it as he made his way through blinding snowstorms and sleet-filled fog at the bottom of the world, out of which suddenly appeared the American explorers in an incredibly small boat.

Even with Palmer's information, Bellinghausen could not find Antarctica. Another American captain did, however. On Wednesday, February 7, 1821, Capt. John Davis, aboard the *Huron*, out of New Haven, Connecticut, lowered a boat to look for seals and, heading for the nearest land, his men first set foot on the Antarctic continent—a feat that even the mighty Captain Cook could not accomplish.³⁵

In the years 1820–22, fleets of sealing vessels from both Britain

33. Goetzmann, *New Lands, New Men*, pp. 261–64.

34. Kenneth J. Bertrand, *Americans in Antarctica, 1755–1948* (New York: American Geographical Society, 1971), passim. Also see Edouard Stackpole, 'The Voyage of the "Huron" and the "Huntress": The American Sealers and the Discovery of the Continent of Antarctica,' *Maritime History Association*, publication no. 29 (Mystic, Conn., 1955). Palmer's meetings with Bellinghausen are recounted in Edmund Fanning, *Voyages and Discoveries in the South Seas 1792–1832* (Salem, Mass.: Marine Research Society Reprint, 1924), pp. 307–9.

35. Stackpole, 'The Voyage of the "Huron" and the "Huntress."'

and the United States congregated in the Antarctic Seas killing seals. In all, they managed to dispatch over three million of the valuable animals.³⁶ From our ecological perspective today, feats like this serve to heighten even more the 'moral drama' of the Second Great Age of Discovery. For the sea-going entrepreneurs of the early nineteenth century, the only tragedy involved was the virtual disappearance of the seals from what had been a happy, though hazardous, hunting ground. Like the buffalo on the western plains, the fur-bearing seal was threatened with extinction from the face of the earth.

The competition for oceanic resources such as the seals, the whales, and even remote islands covered with bird guano (widely used as fertilizer in the nineteenth century) drew Europe and the United States into a global competition in which control of the seas became as important as the control of distant lands and peoples. This, in turn, sponsored not only an oceanic imperialism, but also a whole new science—oceanography.

Though earlier geographers, including Britain's Alexander Keith Johnston, with his *Physical Atlas of Natural Phenomena* (1848), and Mary Fairfax Somerville, with her *Physical Geography* (1848), at first glance appeared to have preceded his work, Lt. Matthew Fontaine Maury, head of the United States Naval Observatory, really invented oceanography as a science.³⁷ Beginning in 1843, he began publishing *Winds and Currents Charts* of the world's oceans, based on data from official logbooks that he had caused to be passed out to every vessel that left American shores. With a staff of young midshipmen and some notable civilian scientists, Maury annually updated his volumes of *Winds and Current Charts* and *Sailing Directions*. So helpful were these that American clipper ships became the fastest vessels afloat, carrying mail from the U.S. Pacific Coast to Hong Kong in thirty-seven days or less. Maury's other notable success was in encouraging young Lt. John Mercer

36. Goetzmann, *New Lands, New Men*, p. 240.

37. Alexander Keith Johnston, *The Physical Atlas of Natural Phenomena*, American ed. (Philadelphia: Lea and Blanchard, 1849), pp. 31–62. Mary Fairfax Somerville, *Physical Geography*, 2d American ed. (Philadelphia: Lea and Blanchard, 1850).

Brooke in the development of a deep-sea sounding device that made it possible to map the ocean floor to depths as far down as three miles. With this capability, Maury and Brooke were able to produce the first maps of the ocean floor, thus making a trans-oceanic telegraph possible.³⁸ This began a process of undersea and oceanic exploration that has, by today, changed our entire view of the globe. (The Robinson Map Projection, for example, shows 71 percent of the earth covered by water and shrinks the land mass of Greenland, the U.S., Russia, and Antarctica.) Ocean-floor exploration has caused a plate-tectonics revolution in geology that was almost foretold by Prof. James Dwight Dana's observations of the sequence and direction of volcanic islands in the Pacific, as he sailed with Lt. Charles Wilkes on the Great United States Exploring Expedition of 1838-42.³⁹ For most scholars, Maury's reputation rests upon his best-selling book, *The Physical Geography of the Sea* (1855), which is a confused set of facts, and even more dizzying speculations, brought together in one volume.⁴⁰ *The Physical Geography of the Sea* is a tangible symbol of Maury's accomplishments, but it is not the work upon which his importance as the pioneer of oceanography truly rests. It is interesting to note, however, that even such recent and distinguished works as Robert

38. See Matthew Fontaine Maury, *Explanations and Sailing Directions to Accompany the Winds and Current Charts* (Washington, D.C.: William A. Harris Printer, 1858). But also for informed secondary works see Francis Leigh Williams, *Matthew Fontaine Maury, Scientist of the Sea* (New Brunswick, N.J.: Rutgers University Press, 1963), chaps. 9-13; George M. Brooke, *John M. Brooke, Naval Scientist and Educator* (Charlottesville, Va.: University Press of Virginia, 1980) and Edward Leon Towle, 'Science, Commerce, and the Navy on the Seafaring Frontier (1842-1861)—The Role of Lt. M. F. Maury and the U.S. Naval Hydrographic Office in the Naval Exploration, Commercial Expansion and Oceanography before the Civil War' (Ph.D. diss., University of Rochester, 1965). Also see John Dryden Kazar, 'The United States Navy and Scientific Exploration, 1837-1860' (Ph.D. diss., University of Massachusetts, 1973).

39. Daniel E. Appleman, 'James Dwight Dana and Pacific Geology,' in Herman Viola and Carolyn Margolis, eds., *Magnificent Voyagers: The U.S. Exploring Expeditions, 1838-1842* (Washington, D.C.: Smithsonian Institution Press, 1985), pp. 89-117.

40. Matthew Fontaine Maury, *The Physical Geography of the Sea* (New York: Harper & Brothers, 1855). For a characteristic assessment of Maury's work based solely on *The Physical Geography of the Sea*, see John Leighly's introduction to the Harvard University Press reprint of *The Physical Geography of the Sea* (Cambridge, Mass., 1963). Harold Burstyn's entry on Maury in the *Dictionary of Scientific Biography* is largely based on Leighly's introduction. A far better assessment is in Kazar, 'The United States Navy and Scientific Exploration.'

Bruce's *The Launching of Modern American Science* (1987) evaluate Maury's achievements in terms of his book *The Physical Geography of the Sea* and the unpublished correspondence of Maury's enemies and archrivals, Alexander Dallas Bache of the U.S. Coast Survey and Joseph Henry of the Smithsonian Institution.⁴¹ Thus, Maury's importance, already overshadowed by his joining the Confederacy in the Civil War, remains obscure even today, since few have bothered to analyze his work.

As I mentioned previously, in the Second Great Age of Discovery, the United States government sent some sixteen naval exploring expeditions out across the world, from Lieutenant Lynch's strange search for the Garden of Eden, near the Jordan River and the Dead Sea, to Lt. Charles Wilkes's round-the-world Great United States Exploring Expedition of 1838-42.⁴² Though many of the minor expeditions were important, three stand out. Lieutenant Wilkes's expedition, consisting of six ships, made the greatest impact upon American and world culture.⁴³ Besides charting with extreme accuracy, for the first time, most of the islands of the Pacific, Wilkes's expedition also sailed along and mapped 1,500 miles of Antarctica's white and menacing shores, thus, for the first time, proving it was a continent. In addition, Wilkes and his men mapped the northwest coast of North America and explored the route from the upper Columbia River to California. The accurate maps and lavishly illustrated scientific reports from Wilkes's expedition, especially those by the Yale geologist James Dwight Dana and the linguist Horatio Hale had far-reaching consequences for geology and the newly emergent science of anthropology.⁴⁴ Hale, in fact, proved to be the anthropological godfather of Franz

41. Robert Bruce, *The Launching of Modern American Science* (New York: Alfred A. Knopf, 1987), pp. 173, 175, 181-83, 185, 218, 265, 296.

42. Towle, 'Science, Commerce, and the Navy,' p. viii.

43. Goetzmann, *New Lands, New Men*, pp. 265-97. Also see William Stanton, *The Great United States Exploring Expedition* (Berkeley and Los Angeles, Calif.: University of California Press, 1975), passim, and Herman Viola and Carolyn Margoles, eds., in their foreword to *Magnificent Voyagers*, pp. 9-23.

44. Stanton, *The Great United States Exploring Expedition*, pp. 373-74, and Appleman, 'James Dwight Dana and Pacific Exploration.'

Boas, who is widely credited with formulating modern, cultural-relativistic anthropology.⁴⁵ Perhaps the most noticeable result of the Wilkes expedition was the creation of the Smithsonian Institution as an ongoing, growing, national museum, created at first to house the thousands of natural history specimens brought back by Lieutenant Wilkes's 'magnificent voyagers.'⁴⁶

The second important U.S. Naval expedition of the period was that of Commodore Matthew Calbraith Perry to Japan in 1853.⁴⁷ Perry's expedition clearly had global implications that went far beyond securing open ports in Japan. The initiative for the expedition was provided by a group of New York merchants, newspapermen, and politicians, including William Henry Seward, Henry Grinnell, who sponsored expeditions in search of the 'open polar sea,' and Matthew Calbraith Perry himself, who created a lyceum in Brooklyn dedicated to geographical exploration by sea.⁴⁸ Some of these men formed the American Geographical and Statistical Society of New York. They met frequently, out of interest in things geographical but also with an eye to geopolitics.

Perry's mission to Japan owed much to the lobbying of New York merchants and the vision of William Seward, but it also received strong support from the New England whaling and merchant interests—especially since U.S. vessels frequently were wrecked off the Japanese coast, and the survivors were offered no aid by the xenophobic Japanese. Perry's mission as commander of the Far Eastern Squadron was not only to open up Japan to U.S. sailors and U.S. trade. He also wished to establish a strong American presence in China's ports and to locate island coaling stations

45. Stanton, *The Great United States Exploring Expedition*, pp. 376–77.

46. *Ibid.*, pp. 357. Also see Nathan Reingold and Marc Rothenberg, 'The Exploring Expedition and the Smithsonian Institution,' in Viola and Margolis, eds., *Magnificent Voyagers*, pp. 243–53.

47. The original narrative of Commodore Perry's expedition to Japan was written by his friend Francis L. Hawks of New York City. It is entitled *Narrative of the Expedition of an American Squadron to the China Seas and Japan* (New York: D. Appleton, 1856).

48. Towle, 'Science, Commerce, and the Navy,' pp. 144–45, 158, 185, 194. Kazar, 'The United States Navy and Scientific Exploration,' p. 158.

for the new steam navy.⁴⁹ He himself sailed (or steamed) to Japan aboard the paddle-wheel steamship U.S.S. *Mississippi*.

Perry's mission, and later that of United States Consul Townsend Harris, helped to establish a strong U.S. presence on the far side of the Pacific, just as the U.S. Army Corps of Topographical Engineers was exploring the West for a railroad route to California, specifically, the port of San Francisco. In terms of global geopolitics, the settlement of the American Far West was at last to complete the global population circle as it looked out to regularized transpacific traffic with links to Japan and China. These links Perry believed he made possible when he sailed into Edo (Tokyo) Bay and negotiated the Treaty of Kanagawa in March of 1854, opening to U.S. vessels the ports of Shimoda, on the south shore of Honshu Island, and Hokodate on the north shore. To some mystical supporters of Manifest Destiny it seemed that everything from the biblical return to the Garden of Eden to the prophecy of the great geographer von Humboldt that mankind would eventually link up with its beginnings via what he called 'an isothermal zodiacal belt' (i.e., the temperate zone) had come true. The Japanese almost instantly became fascinated with American technology, samples of which Perry brought along. The miniature steam railroad and particularly the camera, as demonstrated by Eliphalet Brown, were intriguing, so much so that, only forty years later, Japan hosted the World Photographic Exposition.⁵⁰ Perry had helped initiate the Meiji Emperors' modernization of Japan—also making it, in those days, a market for American goods.

The Far Eastern strategy did not end with Perry's expedition. America's scientific lobby, which found Bache, Henry, and Maury on the same side for a change, demanded that a scientific expedi-

49. Samuel Eliot Morison, 'Old Bruin,' *Commodore Matthew Calbraith Perry* (Boston: Atlantic Monthly Press, 1967), chap. 20. Also see chapter 5 in Kazar, 'The United States Navy and Scientific Exploration,' pp. 153-85.

50. Hawks, *Narrative of the Expedition of an American Squadron*, passim. Also see Clark Worswick, *Japan, Photographs 1854-1905* (New York: Pennwick/Alfred A. Knopf Books, 1979), p. 139, and Kazar, 'The United States Navy and Scientific Exploration,' p. 169.

tion be sent to map and collect specimens from Japan and other little-known parts of the Far East. On June 11, 1853, Comdr. Cadwalader Ringgold and his squadron of five ships sailed out of Chesapeake Bay for the Far East. His ships included the *Vincennes* and the *Porpoise*, veterans of the Wilkes expedition, the tender *John Kennedy*, the tiny sloop *Fenimore Cooper*, and a rattletrap New York harbor steamer, the *John Hancock*.⁵¹ Modern technology, as represented by the *Hancock*, proved to be an ambiguous blessing. When the sails were up and the engine was running, one pulled against the other; in addition, the propeller served as a drag when not in use; and further, due to the placement of the coal bunkers, the *Hancock* sailed low in the water and threatened to tip over in heavy seas.⁵² Amazingly enough, according to its chronicler, Lt. A. W. Habersham, in *The North Pacific Surveying and Exploring Expedition or [significantly] My Last Cruise* (1857), the steamer *Hancock*, which Habersham called 'Old John,' wallowed its way successfully through the China Sea, around Formosa and the huge sea of Okhotsk, and the Russian Siberian ports. Indeed, the 'Old John' survived to take part in the wars against the Cayuse Indians in Oregon in the later 1850s.⁵³

Aboard Ringgold's ships was a scientific contingent personally selected by the nation's leading men of science. This contingent included Louis Agassiz's assistant William Stimpson, Asa Gray's assistant, the Texan Charles Wright, who had been a principal plant collector on the U.S. Mexican Boundary Survey. Ned Kern, a veteran of John C. Frémont's expeditions, served as artist and photographer, and Maury's favorite, Lt. John Mercer Brooke, was the hydrographer. In all, there were eleven men of science on the

51. The only contemporary printed account in English of the North Pacific Exploring Expedition is Lt. A. W. Habersham's *The North Pacific Exploring Expedition, or My Last Cruise* (Philadelphia, J. B. Lippincott & Co.; London: Trubner & Co., 1857). However, key portions of the records of the North Pacific expedition are printed in Allan B. Cole, *Yankee Surveyors in the Shogun's Seas* (Princeton: Princeton University Press, 1947).

52. Letter from Engineer David B. Macomb to Lt. John Rodgers, U.S. Steamer *John Hancock*, Simons Bay, South Africa, September 21, 1853, ms., roll 6, frame 13, microcopy 88, *Records Relating to the United States Surveying Expedition to the North Pacific Ocean, 1852-1863*, National Archives. (Hereafter cited as microcopy 88, *Records, No. Pac. Exp., N. A.*)

53. Habersham, *My Last Cruise*, pp. 317-92.

expedition—more than on any other U.S. naval exploring expedition. The whole flotilla was termed the ‘Second Great United States Exploring Expedition.’⁵⁴

The *Vincennes* and the *Porpoise*, after rounding the Cape of Good Hope, headed for Sydney, Australia. After taking on supplies, both ships made their way north to a Hong Kong rendezvous with the other three ships of the squadron. As the *Vincennes* made its way north past the dangerous Vanikoro Reef off New Guinea, where La Perouse’s ship went down, the *Vincennes* fired a salute to the great eighteenth-century French navigator whose tragedy had long since become part of the mythic lore of exploration, along with Captain Cook’s murder and consumption by the cannibals of Hawaii.⁵⁵ Exploration had, by this time, become a creation myth as well as a process of corruption, if not consumption, and heroes of all nations were saluted and honored by the various practitioners of the explorer’s profession.

On the voyage out, Lieutenant Brooke had been full of enthusiasm for Commander Ringgold, but by the time the *Vincennes* reached Hong Kong, Ringgold had had a strange personality change.⁵⁶ He either existed in a kind of torpor or became frantically active. He spent two months polishing and repolishing his ships in Hong Kong harbor, even ordering the *Fenimore Cooper* cut in two and rebuilt.⁵⁷ Then he violated his orders by sending the *Porpoise* off to assist H.M.S. *Rattler* in a battle with Chinese pirate junks.⁵⁸ The *Vincennes* he sent to Canton to help put down the T’ai

54. See Brooke, *John M. Brooke, Naval Scientist*, for details of Lt. John M. Brooke’s spectacular expedition work. Also see Kazar, ‘The United States Navy and Scientific Exploration,’ pp. 196–98.

55. Journal of Frederick Donald Stuart, U.S.S. *Vincennes*, February 3, 1854, ms., roll 7, frame 78, microcopy 88, *Records, No. Pac. Exp.*, N.A. Ringgold, in his demented state, threatened to court-martial Lieutenant Rodgers and the gunners of the *Vincennes* for firing a salute to La Perouse without obtaining his permission.

56. This was reported as early as August 1, 1854, by Fleet Surgeon William Grier, Passed Assistant Surgeon S. L. Williams, and George Alexander, Assistant Surgeon, ms. LS, Macao, August 1, 1854, roll 6, frame 47, microcopy 88, *Records, No. Pac. Exp.*, N.A.

57. Item 150, ‘Synopsis of the Case of Commander Cadwalader Ringgold,’ from ‘Record of Court of Inquiry Convened under the Act of Congress, January 16, 1857, in the Case of Comdr. Cadwalader Ringgold, Oct 17–Nov. 27, 1857’ (hereafter cited as ‘Record of Court of Inquiry’) ms., roll 27, frame 17, items 151–53, microcopy 88, *Records, No. Pac. Exp.*, N.A.

58. Kazar, ‘The United States Navy and Scientific Exploration,’ p. 204. Peter Parker,

P'ing rebellion.⁵⁹ On this occasion, chronicler Habersham became fascinated with Manchu justice and illustrated his account of the venture by picturing a swordsman lopping off the heads of prisoners.⁶⁰ Charles Wright, the Texas botanist, came away with a different feeling. He was disgusted with Ringgold for defending the 'dime-grasping Anglo-Saxons' in China.⁶¹

Then Commodore Perry returned to Hong Kong from his second voyage to Japan. At the insistence of Lieutenant Rodgers and the other officers in Ringgold's fleet, the commodore held a court of inquiry dealing with Ringgold's strange behavior. The fleet surgeon, Dr. Grier, flatly declared that Ringgold was 'completely unfit' for the performance of his duty. He added that the commander's 'illness has assumed very decidedly the form of mental alienation in which the mind is enfeebled and wandering and incapable of correct judgement.'⁶² The surgeon could not diagnose the ailment (malaria, fever, opium, too much morphine, exhaustion, alcohol, manic depression — take your choice), but his recommendations were followed. Ringgold was relieved of his duties and sent home by the next available vessel.⁶³ By the time Ringgold reached the United States, he had returned to normalcy, and preferred charges against Commodore Perry.⁶⁴ The trial dragged on until the Civil War, where the reinstated and promoted Ringgold went on to distinguish himself, receiving a special commendation from Congress and promotion to captain. He died a rear admiral.⁶⁵

Secretary of the United States Legation, to Cadwalader Ringgold, Canton, June 6, 1854, roll 2, frame 281, and Testimony of Lt. Comdr. H. K. Stevens, 'Record of Court of Inquiry,' roll 27, frame 246, microcopy 88, *Records, No. Pac. Exp.*, N.A. Also, Goetzmann, *New Lands, New Men*, p. 351.

59. Goetzmann, *New Lands, New Men*. Also see Vice-Consul D. W. Spooner to Lt. John Rodgers, Canton, July 21, 1854, ms., roll 6, frame 32, microcopy 88, *Records, No. Pac. Exp.*, N.A.

60. Habersham, *My Last Cruise*, pp. 122-25. See especially the picture opposite p. 124.

61. Quoted in Robert Hine, *Edward Kern and American Expansion* (New Haven: Yale University Press, 1962), p. 109. The original is a letter from C. A. Wright to Asa Gray, August 12, 1854, Gray Herbarium, Harvard University.

62. William Grier, Fleet Surgeon to Lt. John Rodgers, ms., roll 6, frame 71, microcopy 88, *Records, No. Pac. Exp.*, N.A.

63. Hine, *Edward Kern*, p. 108.

64. *Dictionary of American Biography*, s.v. 'Ringgold, Cadwalader.'

65. *Ibid.*

Lt. John Rodgers, the son of one of America's most distinguished naval heroes, assumed command of the North Pacific Expedition.⁶⁶ In September he dispatched the *John Hancock* and the *Fenimore Cooper* north to survey the entire China coast as far as Korea. They also surveyed Formosa and the Pescadores in the Formosa Straits.⁶⁷ In fact, the *Hancock* and the *Cooper* surveyed the huge area of the China Sea. Meanwhile, the *Vincennes* and the *Porpoise* headed east toward the Bonin Islands and Okinawa. Somewhere in the China Sea the *Vincennes* caught a good breeze and pushed out toward the Pacific, while the *Porpoise* disappeared into mist and fog, never to be heard from again.⁶⁸

In the spring and summer of 1855, the remaining ships of the fleet surveyed the entire island of Honshu, despite protests by the Japanese. Lieutenant Brooke and Ned Kern, with eleven other sailors, bravely coasted 450 miles up the typhoon-exposed eastern shore of Honshu in the *Vincennes*'s tiny launch.⁶⁹ Kern took photos and made drawings, but only a few of these have survived.⁷⁰ The photos are principally of the *Fenimore Cooper*, a much bigger vessel than a ship's launch but still an incredibly small ship.⁷¹ This phase of the expedition required the utmost heroism, due to exposure to possible typhoons and the intermittent hostility of the Japanese on shore.

Meanwhile, the *John Hancock* chugged all the way around the giant Sea of Okhotsk, surveying the Sakhalin Islands and the delta of the Amur River. The crew of the *Hancock* met emissaries of the Russian czar, who partied with them and congratulated them for breaking the British blockade. It seems that, as part of the Crimean War, the British had landed at Petropavlovsk and blown up its fort and public buildings.⁷² While the *Hancock* was in the Sea of

66. Ibid.

67. Habersham, *My Last Cruise*, passim.

68. Hine, *Edward Kern*, p. 112.

69. Ibid., pp. 113-18. Also see Habersham, *My Last Cruise*, pp. 256-57.

70. Hine, *Edward Kern*; see pictures at the back of the book. Also see Brooke, *John M. Brooke, Naval Scientist*, pp. 60-75.

71. See especially photos in Brooke, *John M. Brooke, Naval Scientist*.

72. Habersham, *My Last Cruise*, pp. 343-496.

Okhotsk and the *Cooper* was surveying the Aleutian Islands in search of a lost whaling ship—the *Monongabela*—the *Vincennes* turned north to the Bering Strait so that Rodgers could sail above the Arctic Circle and through the ice floes to the ‘open polar sea’ that Maury had assured him was there. Instead, all he met was the ice-bound infinity of the Beaufort Sea.⁷³

Lieutenant Brooke and a band of men were stationed at Glasnop Harbor at the Russian shore of the Bering Strait among the Chukchi natives. Despite the fact that the Chukchi appeared friendly, Lieutenant Brooke built a stout fort manned with cannons.⁷⁴ Soon, the *Vincennes* returned and the whole flotilla headed for San Francisco. In the very last phases of the expedition, two startling breakthroughs were made. Lieutenant Brooke sounded the depths of the ocean for a record three and one-half miles and still brought up fossil infusora, suggesting that a much larger connection between Asia and North America had existed eons ago.⁷⁵

The second important discovery was even more momentous. Charles Wright’s field books and plants had been sent to Asa Gray at Harvard, who was by this time a correspondent and confidant of Charles Darwin. In looking through Wright’s field notes, Gray noticed that Wright had discovered two species of the barberry shrub in northern Japan, a species that was known to exist in eastern North America as well. Gray declared that the species were so closely related that they might be ‘lineal descendants from a pristine stock.’⁷⁶

In the spring of 1859, Gray confronted Louis Agassiz, his rival

73. Hine, *Edward Kern*, pp. 119–24. Also see Allan B. Cole, *Yankee Surveyors in the Shogun’s Seas* (Princeton: Princeton University Press, 1947), pp. 130–32, 136–44, 145–51, 153. Cole’s work is a transcription and edition of most of the important documents from the North Pacific expedition. Also see Brooke, *John M. Brooke, Naval Scientist*, pp. 126–30, and Goetzmann, *New Lands, New Men*, pp. 353–56.

74. Hine, *Edward Kern*, pp. 119–24; Cole, *Yankee Surveyors*; Brooke, *John M. Brooke, Naval Scientist*; and Goetzmann, *New Lands, New Men*.

75. Goetzmann, *New Lands, New Men*, p. 353; Brooke, *John M. Brooke, Naval Scientist*, p. 122; Kazar, ‘The United States Navy and Scientific Exploration,’ pp. 216–17, 231; Towle, ‘Science, Commerce, and the Navy,’ pp. 107–9; and ‘Log of the *Vincennes*,’ Lieutenant Rodgers, July 19, 1855, ms., roll 10, frame 77, microcopy 88, *Records, No. Pac. Exp.*, N.A.

76. Kazar, ‘The United States Navy and Scientific Exploration,’ pp. 226–28.

and the champion of special creationism, with the proof of genus similarity and the obvious evolution of the species. Agassiz questioned how the two closely related species could have been found so far apart on the globe. Gray used Agassiz's own theory of an Ice Age against him. Eons ago, the land bridge was wider, and the Ice Age glaciers had pushed the plants or seeds down in different directions from a common source. Each time the glacier advanced and receded the same process took place.⁷⁷ Gray had not only vanquished the champion of special creation, he had also provided the best evidence so far for Darwin's theory of evolution. Thus, the explorers of the early Republic contributed much more than mere collections for sophisticated European closet scientists. Americans like Gray, Maury, and Dana could be sophisticated too; and United States exploring expeditions on both land and sea had more than contributed their share of the mapping of the earth's surface (counting the oceans, approximately 80 percent).

All of these American scientific exploring expeditions joined with those of Britain, France, and even Spain to produce what one scholar has termed the 'Greater Enlightenment' phase of the Second Great Age of Discovery.⁷⁸ That heightened scientific spirit, together with its consequence, Romanticism, was generated by pictures and tales of incredible expeditions to strange lands with jungles and lost cities, long surreal Arctic nights, and whole continents with strangely different ecological systems or biota. So different, in fact, were these biota, that Lewis Carroll felt the urge to spoof 'impractical' expeditions in his poem 'The Walrus and the Carpenter,' where, along with 'cabbages and kings,' he suggested inquiring whether 'pigs have wings.'⁷⁹ In the 'Greater Enlighten-

77. A. Hunter Dupree, *Asa Gray* (New York: Atheneum Press, 1968), pp. 251-61.

78. Stephen Pyne, 'A Third Great Age of Discovery,' in Sagan and Pyne, *The . . . Rationales For Solar System Exploration*, pp. 17, 40-41. I accept this refinement of scientific thought in the Second Great Age of Discovery because it is in following the tenets of Lockean empiricism that naturalists and artists became aware of the qualitative aspects of natural history specimens and their exotic nature, which then led straight into Romanticism.

79. Lewis Carroll, 'The Walrus and the Carpenter,' in *Alice's Adventures in Wonderland and Through the Looking Glass* (London: Oxford University Press Reprint, 1971), p. 164.

ment,' reality surpassed imagination as the collections of exotic specimens piled up in museums like the Smithsonian and thousands of travel books appeared. These books were gorgeously illustrated, not only with scenes of adventure in distant lands but also with views of exotic peoples and specimens of natural history that created a whole *new* imagination and a whole *new* aesthetic sensibility. These were the primary 'stuff' of artistic Romanticism—far more so than the works of the Schlegel brothers and the English Lake Poets.⁸⁰

Darwin, trekking in the jungles and over mountains in South America, standing amidst the strange biota of the Galapagos, made sense of it all.⁸¹ For Americans, he helped transform the 'common sense' static philosophy of Jefferson and Humboldt into the dynamics of the pragmatism under which we currently all live—until the Third Great Age of Exploration provides us with something better. Meanwhile, on a less exalted level, what became obviously all the more relevant as a result of the North Pacific Exploring Expedition was the importance of Alaska and the Aleutian Islands, which that veteran of the meetings of the American Geographical and Statistical Society of New York, William Seward, managed to purchase for the United States in 1867. For a time the North Pacific became, pragmatically speaking, an 'American Lake.'

The question now remains, in the Third Great Age of Discovery that began about the time of the Great War, will imperial rivalries still exist? What new discoveries in science, comparable in scope to the earlier age, will emerge? And above all, what social and political rearrangements comparable to those generated by the Second Great Age will Modernism's self-reflexive and prosthetic Third Great Age of Discovery produce?

80. See footnote 78, above. Also see Goetzmann, *New Lands, New Men*, pp. 2-3.

81. See Charles Darwin, *Journal of Researches into the Geology and Natural History of the Various Countries Visited during the Voyage of H.M.S. Beagle Round the World*, Everyman's Library Edition (London and New York: J. M. Dent & Sons, Ltd., and E. P. Dutton & Co., 1930), pp. 357-86, esp. pp. 379-81.

A NOTE ON
THE CONCEPTUALIZATION OF THE
AGES OF DISCOVERY

My own interest in delineating *several* 'Ages of Discovery' goes back to 1960, when I published 'The West in the American Age of Discovery' in *Arizona and the West* (1960). I subsequently enlarged on this theme (1) in my 1966 book *Exploration and Empire*, (2) in a paper delivered at a meeting, in 1976, of the American Association for the Advancement of Science, 'Paradigm Lost,' which subsequently appeared in Nathan Reingold, ed., *The Sciences in the American Context* (Washington, D.C.: The Smithsonian Institution Press, 1979), and also (3) in a lecture that I delivered at the opening of *The Magnificent Voyagers* exhibition at the Smithsonian Institution in 1985 entitled "'The Whole World is an America, a New World," or The Ages of Discovery.' This material I further developed in my book *New Lands, New Men: America and the Second Great Age of Discovery*, an account of an era that ended with the rise of Modernism in the early twentieth century. While developing the concept of 'ages' of discovery, in the course of writing a still as yet unpublished—because unfinished—intellectual history of America, I became convinced that ages of discovery and exploration were linked very closely to changing syndromes of thought in nearly all other cultural endeavors, especially science. Indeed, I had long (1957–68) taught a course in American intellectual history that spanned from the age of Newton to the age of Einstein, as well as courses in the history of science. In the course of teaching both graduate and undergraduate courses and writing on this subject since 1957, I had also developed unique definitions of 'culture' (a social screen that filters *out* unusable information from a constant bombardment of data or sense impressions and ideas), 'civilization' (a culture that can admit or absorb a very great multitude of information and yet still stay intact as a social entity). A civilization, because it is cosmopolitan and open, rarely suffers from what Alvin Toffler has called 'future shock,' though 'information overload' is an ever-present danger. Perhaps the United States

has so suffered, in recent times, from the effects of a self-centered, morally relativistic syndrome of Modernism that made the era called 'the sixties' [*sic*] inevitable.

I include the above account to clarify my intellectual relationship with my former graduate student Prof. Stephen Pyne, whose dissertation on geologist Grove Karl Gilbert I directed, and who, by mutual agreement, became the chronicler of the Third Great Age of Discovery. He began to develop this concept at the same American Association for the Advancement of Science meeting in 1976 that I attended, in a paper entitled 'From the Grand Canyon to the Marianas Trench,' which was also published in Reingold's *The Sciences in the American Context*.

Pyne touched on some aspects of the Second Great Age of Discovery in his master's thesis, which I supervised, on Clarence Dutton and the Grand Canyon, later published as *Dutton's Point, An Intellectual History of the Grand Canyon*, monograph 5 (Grand Canyon National Park: Grand Canyon Natural History Association, 1983). We disagree as to the nature of the Second Great Age of Discovery. I attribute it to the late seventeenth and early eighteenth centuries' scientific revolutions, and I see it as being composed of exploring expeditions by both land and sea. Pyne concludes that it was characterized by the exploration of the interiors of the continents, after the world oceans had been thoroughly explored in what he calls the 'Greater Enlightenment.' I have no quarrel with his term the 'Greater Enlightenment,' but I believe that in practical terms his geographic, rather than intellectual, division of the Ages of Discovery contradicts the intellectual shift implied by 'Greater Enlightenment,' and, in addition, leaves out the hundreds of oceanic expeditions of the late eighteenth and early nineteenth centuries, such as the Great United States Exploring Expedition of 1838-42, which proved Antarctica was a continent, and Darwin's voyage on the *Beagle*, which added a critical historical dimension to Euro-American thought. It also leaves out the first scientific mapping of the ocean floor and Prof. James Dwight Dana's clues as to shifting undersea plates that created the

volcanic island chains in the Pacific. Moreover, as early as my 1966 book, *Exploration and Empire* (see footnote 8), I had envisioned exploration as being a process quite different from discovery. I saw exploration in relation to cultural and intellectual shifts of interest, that caused the oceans and continents—indeed, the earth (and space)—to be the objects of constant exploration and reexploration, that sought different phenomena or answers to new questions. Discovery was merely the fortunate outcome of the *process* of exploration. Unlike Pyne, I do not separate the Ages of Discovery geographically (i.e., Age of Ocean Expeditions, Age of Land Expeditions) but rather, intellectually; and I do not think that any part of the earth remains fully ‘discovered,’ even now; and that, in fact, it is always subject to inquiries engendered by different people on different missions in different eras.

I include this perhaps overlong note to answer and clarify a chronology with respect to the conception and nature of ages of discovery discussed in footnote 1 of Professor Pyne’s recent article ‘The Third Great Age of Discovery,’ in Sagan and Pyne’s, *The . . . Rationales for Solar System Exploration* (see footnote 3). I think this outline of the chronological and conceptual differences inherent in the development of both of our works is important to make clear where each of us, as historians, is coming from, and where we are going. Thanks to his brilliant work in *The Ice* (Iowa City: University of Iowa Press, 1986) and in his article ‘The Third Great Age of Discovery,’ I consider Professor Pyne the foremost authority on the exciting Third Great Age of Exploration in which we now live.

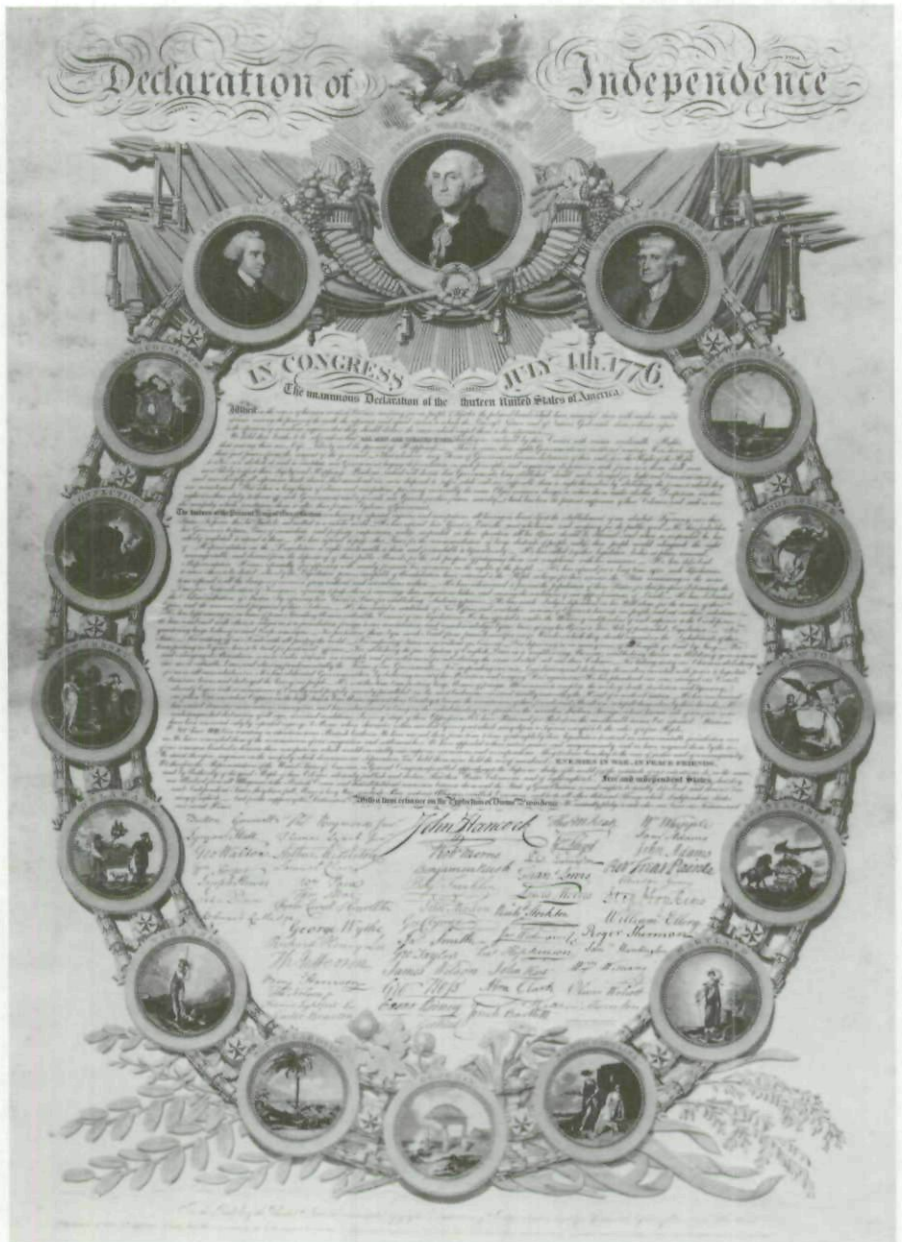


Fig. 1. The Declaration of Independence in a decorative border, 'designed' and published by John Binns (entry no. 5). Courtesy Massachusetts Historical Society.

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