Names on the Ocean Bottom, or Some Observations on the Invisible Landscape

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AMONG THE NEARLY WIDE-OPEN SPACES where the place-namer has been able to exercise his art increasingly in recent decades are, first, the universe, which, having bowed to Miss Fuller (in spite of Carlyle) and the march of science, the place-namer has accepted as his oyster; second, more specifically, the moon, both fore and aft, now the subject of frequent maps in the daily newspapers; third, the subcontinent of Antarctica, upon whose white surface, figuratively, hundreds of new names have appeared as a result of the extensive explorations following World War II; and fourth, the ocean bottom, where scientists are daily adding new names.

Although the oceans cover 71 per cent of the surface of the earth (about 140,000,000 square miles), the number of names labeling features of the land forming their bottom is extremely small. Accurate maps exist for only about one per cent of this area. Indeed, place names in the abyssal deeps, which occupy, at a guess, 90 per cent of the ocean area, were, until very recently, almost nonexistent.

It is ironic to note, says one authority, that names for the constellations and signs of the zodiac, stretching through the depths of space, date from perhaps 3,000 B.C., while names still do not exist for countless sub-oceanic features comparatively so near us on our own planet. Moreover, much more is known about the surface of the moon, many of whose features have long been named, than is known about many parts of the nearby ocean depths.

Submarine place names on general and popular maps, depicting oceans and continents as apart from navigational charts, were almost unheard of a decade or so ago, and are not common now. Among map publications in the English language, the only area

looked into in this investigation, most of the well-known world atlases still ignore the labeling of underwater features. The great *London Times Atlas of the World,* in five elephant folios, includes no such names. The *Encyclopaedia Britannica* atlas volume, in the edition of 1961, at least, shows no underwater place names. Strangely, in elaborate charts and tables accompanying the plates, the *Britannica* lists the oceans and seas of the world, the principal islands, the largest lakes, the longest rivers, and the highest mountains, but it says nothing at all about the greatest depths of the oceans, nothing about what they are called or where they are located, information certainly as interesting to the general reader as the names, locations, and heights of the highest land peaks (whose greatest heights the greatest ocean depths far exceed). A table naming the greatest depths can, however, be found accompanying the article "Ocean and Oceanography." In the recently published new edition of the separate *Britannica World Atlas* (1966) the two-page map of the world does, to be sure, grudgingly label a dozen large underwater features.

Rand McNally's *International World Atlas* (1961), with full-page maps of the Atlantic and Pacific, labels only some island dots, mentioning not a single underwater feature, not one of the great depths, not one of the great underwater mountain chains or peaks. (I might add that the two polar maps in this atlas are also nearly destitute of names, although hundreds are available to the map-maker from scientific sources.)

The *Life Pictorial Atlas of the World* (1961), however, does indicate a few of the greatest land features of the ocean depths, especially in the Atlantic.

One well-known popular atlas, by contrast to these commercial ventures, one which is constantly re-edited and updated by the incorporation of the latest scientific data, has shown a steady rise in the number of underwater labels on its plates during the last decade or so. It is the *National Geographic Atlas of the World,* which has appeared as a long series of single plates and as complete editions dated 1963 and 1966. It is the only atlas which also includes explanatory notes right on its plates, as, for example, on the map of the Atlantic:

> *Mid-Atlantic Cordillera.* This submarine ridge is the world's longest mountain range, stretching 10,000 miles. Covered by water averaging a mile in

depth, it separates the Atlantic Ocean into eastern and western basins roughly three miles deep. Only a few of its highest peaks emerge to form islands, largest of which are the Azores.

This ridge was mentioned by the *New York Times* on Dec. 10, 1966, in connection with the discovery of a magnetic pattern frozen in the ocean floor. Again, on the *Geographic's* map of the Pacific Ocean, beside a marked spot just east of the southern tip of Mindanao, are the words: "World's deepest, Cook Depth, 6297 fathoms (37,782 feet)." This is the way intelligent mapmaking should be conducted. This depth, by the way, is named after *H. M. S. Cook*, a survey ship, which may itself possibly be named after the great explorer. (The Oxford Press's *Atlas of Britain and Northern Ireland* (London, 1963), also labels numerous features of shallow offshore Britain, but none of the abyssal deeps.)

In the field of gazetteers, the *Columbia Lippincott Gazetteer of the World* (1962 edition) includes names for only a handful of the greatest trenches, the Puerto Rico (with its Brownson Deep and Milwaukee Depth), the Marianas (with its Nero Deep), the Japanese (with its Tuscarora and Ramapo Deeps), and possibly a few more. Apparently no seamounts or guyots are listed. *Webster's Geographical Dictionary* (1965) lists the chief banks, deeps and trenches, though it is mistaken about the Mindanao Deep (35,400 feet) being the deepest yet found at the time of its publication (see the statement on Cook Depth above). Again I find no seamounts or guyots listed, but they may have been omitted because they were too low in the scheme of importance of items to be included in the volume.

To choose at random among popular books on the sea, G. E. R. Deacon's showy *Seas, Maps, and Men: An Atlas-History of Man's Exploration of the Oceans* (Garden City, 1962) contains several very poor relief maps of the ocean bottom which bear a few almost unreadable labels on large features.

Now a word on the history of underwater exploration, for the history throws light on the naming process. Measuring the depths of the sea apparently dates from remote antiquity, as Deacon says,[1] for plumb lines are shown in Egyptian wall paintings. This was a necessity from earliest times if sailors were to protect life, goods, and trade from shipwreck on rocks and sands. These measurements

[1] p. 190.

and accompanying place-naming occurred in shallow regions because here were the greatest dangers and because only here would plumb lines reach. For the depths such sounding lines would not suffice. Because the sea bottom in shallow areas was first plumbed, therefore, and because these shallow areas were along the shores of the Mediterranean and the Atlantic coasts of Europe, names are thickest and oldest here.

I think of Antonio's bad luck on the Goodwin Sands, in the English Channel just south of the mouth of the Thames, as reported by Salarino in *The Merchant of Venice*, 3.1.1–5:

> *Salanio:* Now, what news on the Rialto?
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> *Salarino:* Why, yet it lives there uncheck'd that Antonio hath a ship of rich lading wrack'd on the narrow seas; the Goodwins, I think they call the place; a very dangerous flat, and fatal, where the carcases of many a tall ship lie buried, as they say.

(The Goodwins are still sometimes in the news, and probably always will be. A story and a photograph in *Time* several years ago told of a ship foundering on the Goodwins.)

The first study of the Mediterranean, the birthplace of Western civilization and of the earth sciences, a sea to which Herodotus referred in the fifth century B.C. and which Ptolemy mapped inaccurately (employing latitude and longitude, however), was made by Bartholomew Crescentius in his *Della Nautica Mediterranea* (Rome, 1602).[2] It is a curious and paradoxical fact that in the next century terrestrial mapmakers picked up the idea of contour lines from a map drawn and published in 1725 by Luigi Marsigli in his *Histoire Physique de la Mer*. Here he drew numerous lines from the coasts of Provence and Languedoc into the deep Mediterranean, joining points of equal depth, and so establishing the relief of the sea bed in profile. He clearly showed the shallow shelf, already named *La Plaine* by fishermen, and also a second one, sounding up to 250 meters before the drop into the abyss. Others used and refined the idea in mapping the coasts of Holland and the English Channel. The science of measuring depths thus developed ahead of that of measuring altitudes. Measuring altitudes had to await the development of the barometer, especially as improved by Laplace.[3] Many

[2] J. M. Houston, *The Western Mediterranean World: An Introduction to its Regional Landscapes* (London, 1964), p. 38.

[3] *International Yearbook of Cartography* (1962), pp. 152–53.

French and Italian studies followed, especially in the nineteenth century. Since 1910 an international commission, operating from the Oceanographic Institute at Monaco, has concentrated on the Mediterranean, yet the sea remains still largely unknown.[4]

Elsewhere, the first sounding beyond the Continental Shelf was made by Captain Constantine John Phipps (Lord Mulgrave) in the basin between Iceland and Norway as he voyaged toward the North Pole in 1773 in *H. M. S. Racehorse*. His sounding, 683 fathoms, is still on Admiralty charts. A half century went by before much further progress into the deeps was made.[5]

Matthew F. Maury, the American naval officer (1806–1873), was the first person to examine ships' logs and to organize their data systematically. One of the earliest and greatest expeditions was that of *H. M. S. Challenger*, directed by Sir Wyville Thompson, in 1872–76.[6]

It was only in 1920, with the development of echo sounding, that the configuration of the ocean bottom, long thought to be a flat, monotonous floor, became known, and the details of ocean bottom topography began to accumulate only during and after World War II with the use of positioning methods determined by electronics. Then came the revelation of great mountain chains, wide plains, large areas of rolling hills, deep rift valleys, and isolated mountains, many of them with flat tops, all features which called for names.[7]

In this connection Harris B. Stewart Jr. says that present deep-sea maps are at about the stage of maps of North America at the time of Lewis and Clark. He adds that when underwater features become fully charted (as they are not at present, even in major shipping lanes), ships will navigate by them with confidence. He gives a persuasive example of the importance of underwater charting. The *Explorer*, a ship of the U.S. Coast and Geodetic Survey, while on the major sea lane between Panama and Key West, passed directly over an uncharted mountain less than ninety feet under the surface. It turned back to chart and sample this great feature, which was then named *Explorer Bank*. The author speculates on what might have happened in the future if a large cargo-carrying submarine had run into it.[8]

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[4] Houston, *op. cit.*, p. 37. [5] Deacon, *op. cit.*, pp. 190–91.

[6] *Collier's Encyclopaedia*, s.v. "Oceanography".

[7] *World Book. Encyclopaedia*, s.v. "Oceanography".

[8] *The Global Sea* (New York, 1963), pp. 14–15.

Increasingly, photographs from airplanes have proved useful. I myself, as an avid tourist, have flown over every ocean and many seas, and have constantly marveled at differing colors of water, indicating depths along continental coasts, at the mouths of great rivers (like that of the Nile recently, for example) and in the vicinity of the myriad islands of the sea (Tahiti, the Fiji group, and the small islands near Timor and Borneo not long ago, for another example). Now pictures from satellites in space are revealing many new facts about the sea floor, giving ideas of depth according to the depth of the color, locating unmapped shoals, and recording sudden changes of underwater topography such as channels created by hurricanes.[9]

Meanwhile the demand for undersea topographical information has expanded rapidly since World War II, and enormous data collecting and processing are going on. Oil and gas exploration forms one of the greatest demands. Said a *New York Times* headline on November 16, 1966, p. 65: "Use of Space Skill in Undersea Hunt for Oil Suggested." From the article itself we read:

> The aerospace and petroleum industries should combine their technological strengths for the joint exploration of offshore continental shelves... Within 35 years the world's population will have doubled... The oceans represent the last great resource for feeding it and providing the chemicals and minerals and water to meet all the future needs of man....

There will be bases 1000 feet deep "where 30 and 40 workers will live for extended periods." Indeed, shallow undersea areas have already become recreation spots, and John Pennecamp Coral Reef State Park, off the Florida Keys, which may be visited only by skin divers, has become America's first undersea park.

The terminology of strictly undersea topography includes at least the following 24 terms (some of them have their equivalents on dry land; some do not):

bank	guyot	rise
basin	hill	sands
canal	plain	seamount
channel	plateau	shoal
deep	province	sill
depth	reef	tablemount
escarpment	ridge	trench
fracture zone	rift	trough

[9] Paul B. Lowman, Jr. "The Earth from Orbit," *National Geographic* 130 (Nov., 1966), p. 656.

A word on two of these terms is called for.

> *guyot (Webster's Third New International):* Named after Arnold H. Guyot, died 1884, American geographer and geologist, born in Switzerland. Definition: A flat-topped submarine mountain or seamount, commonly found in the Pacific Ocean where the flat summits are at depths below the surface of the water as great as 5000 feet.
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> *seamount (Webster's Third New International):* A submarine mountain rising above the deep sea floor commonly for 3000 to 10,000 feet and having the summit 1000 to 6000 feet below sea level.

Both of these terms sprang into prominence following World War II. Professor Harry Hammond Hess, of Princeton, in 1946, "showed that hundreds of flat-topped sea mounts are scattered over the Pacific," and gave them the name *guyot. Hess Guyot,* in the mid-Pacific, is named after Professor Hess who discovered it while commanding the *U.S.S. Cape Johnson,* "in honor of his maintenance of scientific interest under difficult wartime conditions and of his paper (Hess, 1946) which first called attention to guyots." *Cape Johnson Guyot,* near by, was named after the *U.S.S. Cape Johnson,* the ship on which Dr. Hess was navigator and commanding officer. This ship took the original line of soundings resulting in the discovery of Hess and Cape Johnson guyots.[10]

Here are samples of some of the older underwater names around Britain which I picked up from a British government hydrographic chart posted on the seafront at Margate, Kent, in the summer of 1966. The seafront, looking northward, faces the estuary of the Thames where it joins the Channel. Place names in these waters are scattered thickly, perhaps every quarter of a mile on an average.

> *Sands* named Gunfleet, Bachelor's Spit, Foulness, Maplin.
> *Shallows* named The Cant, Shingles Patch, Pudding Pan, Kentish Flats.
> *Channels* named Shipway, Sledway, Goldmer Gat, Wallet, East Swin.
> *Deeps* named Black, Knock, Ooze, Middle.

In spite of their name, these deeps were very shallow, under about 75 fathoms, compared to abyssal deeps. Elsewhere around Britain, on other maps, are *banks* named Buttock, Bligh, Bill Bailey's, Lemon, Broken, Indefatigable, Rosemary, Swarte (Dutch spelling), North West Ling, Little Halibut, Great and Little Fisher, Buchan,

[10] Edwin L. Hamilton, *Sunken Islands of the Mid-Pacific Mountains* (New York, 1956), pp. 14, 18.

Dogger, and Wee Bankie (east of the Firth of Forth). Still others are The Warp, Le Colbart, Sandettie, North Hinder (Scottish for *hindrance*?), Galloper, Gabbard, The Would, the Long Forties, and The Smalls.[11]

When we turn to modern labels and the great features of the abyssal deeps, we find that they are usually named after nearby land features. *Examples in the North Atlantic* are, the Greenland-Iceland Rise, the Labrador Basin, the Great Bahama Bank, and, in the Caribbean arm of the Atlantic, the Cayman Trench, the Yucatan Basin, the Colombian Basin, the Venezuelan Basin, the Tobago Trough, the Barbados Trough, and the Puerto Rican Trench.

In the South Atlantic one finds the Pernambuco Abyssal Plain, the Argentine Basin, the Angola Abyssal Plain, the Falkland Trough, the South Sandwich Trench, and the Atlantic-Indian Rise. Seamounts and other isolated features, however, appear usually to be named after persons or ships. Among the Altantic seamounts are Faraday, Anton Dohrn, American Scout, Plato, Cruiser (called a tablemount, actually; south of the Azores). A group of seamounts roughly west of the Straits of Gibraltar are named Gettysburg, Josephine, Ampere, Seine, and Dacia.

In the Pacific is the Gulf of Alaska Seamount Province. The Gulf of Alaska, by the way, is one of the few areas of the globe where systematic soundings are carried on: it is being explored under an annual program of the U.S. Coast and Geodetic Survey. On December 27, 1966, for example, the *New York Times* headlined a news item, "Mountains on Ocean Floor Around Aleutians Revealed," and opened its story, dated from Washington, by saying

> The existence of dozens of previously uncharted undersea mountains, ridges and basins was disclosed today with the publication of six new maps of the ocean floor surrounding the Aleutian Islands. The maps cover 400,000 square miles of sea bed.... The newly discovered mountains rise as high as 6,510 feet from the ocean floor.

Published by the Environmental Science Services Administration in the Department of Commerce, the maps "should prove valuable in the study of earthquakes and of great aid to oceanographers and commercial fisheries," the dispatch concluded.

[11] Oxford Press, *The Atlas of Britain and Northern Ireland* (London, 1963), passim.

By contrast, the least known of the global seas is the far South Pacific, south of about 30 degrees south latitude, between New Zealand and South America.[12] This writer has been down there, east and south of New Zealand, and also south of Australia, in both the southern Tasman Sea and in the Great Australian Bight.

Sample names of large features in the Pacific include the Aleutian Basin, the Mendocino Escarpment (off Cape Mendocino, California), the Murray Fracture Zone (off southern California), the Tehuantepec Ridge (off southern Mexico), and the Guatemala Basin. Seamount groups in the North Pacific include Giacomini, Palton, Parker, Gilbert, Surveyor, Miller, Pathfinder, and Bear. In the South China Sea, an arm of the Pacific, west of North Borneo, occur banks named Prince of Wales, Prince Consort, Vanguard, Rifleman, Grainger, and Alexandra. Just off Saigon Pearl Bishop Bank must be well known today to American skippers.

In the Arctic Ocean are found the Eurasian Basin (at the Pole), the Canadian Ridge, the Chukchi Rise (north of Alaska), the Greenland Basin, the Lomonosov Ridge (very long and lying right across the Pole, with the Eurasian Basin, above, alongside), and the Murmansk Rise, among many others.

In the Indian Ocean it will suffice to name the Reunion-Seychelles Ridge (southeast of the Seychelles), the Somali Basin (east of the Somali Republic), the Mauritius Ridge (north of Mauritius), and the Crozet Basin (near the Crozet Islands, far to the south).

An Ocean Survey Program was begun by the ship *Pioneer* in February, 1961. It produced some accurate maps of undersea topography, but this was a mere start on a gigantic job. In the same year Unesco's Inter-governmental Oceanographic Commission was formed, with 44 countries sending representatives to its first meeting in Paris. It led to a good co-operative program among seven countries which explored the floor of the tropical Atlantic in 1963. A similar program was undertaken in the Indian Ocean.[13]

Once the world's continental shelves are conquered, predicts Stewart (p. 10), some ten million square miles, roughly equal to the area of Asia (p. 17), will be open for exploitation of its enormously rich animal, vegetable, and mineral wealth. It is the richest of all frontiers by far. The money now being spent on its investigation is

[12] Stewart, *op. cit.*, p. 21.

[13] *Ibid.*, pp. 91–93, 122.

large, yet only a pinpoint compared with that being put into the space program. But progress continues as men not only multiply soundings but learn to live and explore underwater for longer and longer periods. In this area the Frenchman Jacques-Ives Costeau is the leader. Indicative of the growing interest in the watery underworld is the fact that the U.S. government is now choosing a site and building a new Federal institute of oceanography. All of this activity means that new names are sure to be set down in quantity on the invisible landscape in coming years.

Perhaps, moreover, the time is ripe for some organization to initiate the publication of a popular, exclusively underwater atlas and gazetteer of the world, one which would be periodically updated. Thus, the public would be kept aware of our growing knowledge of the invisible landscape.

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NOTICE

The Tenth International Congress of Onomastic Sciences will take place in Vienna, Austria, from September 8–13, 1969. President: Prof. Dr. E. Kranzmayer, Vienna; Secretary General: Dr. H. Hornung, Vienna. Topic of the Congress will be "The Mountains in Onomastic Sciences." A first preliminary program will be distributed during the summer of 1968. For information, please apply to the Secretariat, Tenth International Congress of Onomastic Sciences, Stadiongasse 6–8, A 1010 Vienna/Austria.