By William H. MacLeish

The Blue God
known as the Gulf Stream, but much about it remains a mystery.

For centuries mariners have hitched rides on the Great Ocean Current.
“Look for a tide rip in about 90 minutes,” the captain of the chemical carrier Exxon Wilmington told his deck officer. “It’ll be setting southeast to northwest.”

The captain, Larry Wonson, was looking for markers that would set him up for a free ride on the most spectacular current system in the world. The tide rip was one of them. Another lay ahead: the west wall, which is the inshore edge of the current, nearest Florida. Once he’d found that, he would set a parallel course about a dozen miles out to sea, and we would probably be close to where the current flows fastest.

With summer coming on, the west wall is likely to be pretty close to shore. Maybe.

The Wilmington was running through the Straits of Florida, the narrow sea separating the Florida peninsula from Cuba and the broad shallows that surround the Bahama Islands. She shuttles lubricating oils and plasticizers from Exxon’s refinery in Louisiana to New Jersey. When I boarded at Baton Rouge, we ran down the Mississippi to the Gulf of Mexico. I watched the river roiling its load of stolen silts and thought of the names it has carried. Indians had called it the Father of Waters, others simply Old Man River. The metaphor for me came from T. S. Eliot, who lived by the Mississippi as a boy. “I do not know much about gods,” Eliot wrote in The Dry Salvages, “but I think that the river / Is a strong brown god—sullen, untamed and intractable.”

Why are there palm trees on the Scilly Isles?

I was looking for a god of another color. A blue god. I was working on a book about the Gulf Stream, the mysterious current that has also been called a river in the ocean, about its effect on the North Atlantic and the climate and civilizations of the lands bordering it. For almost five centuries the Stream has served sailors crossing the Atlantic, determining trade routes and landfalls. Yet even as early mariners used it, they did not understand it. We do not even fully understand it today. The long held and seemingly logical notion that the warming Stream, running against the shore, helps palm trees grow in Ireland, the Scilly Isles and Brittany has proved not quite true. My reporting would mean several years of voyaging, not all of it on the Gulf Stream itself. I would also sail on, dive in and fly over sister currents that form a great swirl in the ocean, called a gyre.

The Wilmington was a good ship to set out in. Every two weeks she enters the Stream. Her skipper is on speaking terms with the blue god. His crew calls him the Gulf Stream guru. Wonson grew up in Rockport, Massachusetts, minored in oceanography at the Maine Maritime Academy and has been on the Exxon East-coast run for 15 years. When the company began a research program to see how its ships could best use the Stream’s currents to cut fuel consumption and save time on the voyage north, Wonson worked with marine scientists assigned to his vessel.

Now to help him search for the west wall, the Wilmington’s captain has Coast Guard reports on current location and velocity. But he still relies more on any hunter’s truest friend, instinct built from experience. Ragged lines of drifting weeds tell him something of what is going on at the surface and below. The current often runs dark blue, and so he keeps an eye out for indigo. He looks for lines of squalls that sometimes build over the west wall where different water masses meet. And he runs regular checks on the temperature of seawater in the engine intake. Especially near the surface, the Gulf Stream system railroads enormous amounts of warm water northward; if the temperature at the intake drops, you’ve probably missed your best connection.

Wonson started hitchhiking back when we were still in the Gulf of Mexico, taking advantage of an exten-
sion of the Gulf Stream system that scientists call the Loop Current. The Loop pokes up between Cuba and Mexico through the Yucatán Channel, shedding eddies that swirl off into the Gulf. Most skippers rounding the thumb of Florida pull out of the current at a point from which they can steam a geographically direct course. By contrast, Exxon captains follow the Loop for 10 or 15 miles beyond that point. Then they head up for the Dry Tortugas, west of the Florida Keys, to get an optimal push from this tributary of the blue god. The Wilmington did that and saved half an hour, maybe a little more. Then she skirted the Keys and closed on Miami, making 20.5 knots as against the 16.5 she can do in slack water. Larry Wonson grinned as he read the speed indicator and said, "I sense the presence of external assistance."

When you're an observer aboard a working ship, it's best to stay on the bridge, if the captain will allow it, out of the way in some corner where you can watch and be forgotten. Wonson let me take over a high chair and small desk way over to starboard, and there I sat, 86 feet above the sea and almost 500 aft of the bow. A perfect place for reading and jotting down notes, and sending the mind out to settle on the sea.

I was disappointed by what I saw. During a decade of work editing a magazine of oceanography, I had developed some idea of the Gulf Stream's power. By now, the Wilmington was well into the Florida Current, which runs from the Straits up the coast to Cape Hatteras. It is there, according to many oceanographers, that the current becomes the true Gulf Stream, flowing out eastward toward the Grand Banks of Newfoundland. The Florida Current, in fact, transports water at a rate of about 30 million cubic meters per second. (A cubic meter of seawater would fill a giant claw-foot bathtub to overflowing.) The current constantly changes speed and direction. At its fastest it does five knots or a bit more. On land, a jogger can go much faster. But try swimming against a five-knot current. Faced with less than a knot of flow, divers wearing swim fins cannot move against it for long unless there is bottom nearby to crawl along.

Such a giant of motion should show itself, I thought, muscling up as a big river does, a multiplication of Mississippi's. But no. To my untutored eye at least, we could have been running through just about any part of the subtropical Atlantic. Wonson found his west wall and pointed it out to me. It turned out to be just a slick on the surface a couple of miles off, puny for the boundary of a god's domain. "If we were to cross the edge head-on," he said, "you'd see your wake in the distance moving north with the main current and your near wake moving south in the countercurrent." The edge, in fact, is often so sharp that you can cross it in a ship's length or two.

More flow than all the rivers in the world

Up near the Grand Banks, the Stream is somewhat cooler and runs slower, but the volume of water it transports increases to at least 150 million cubic meters per second, something like 100 times the flow of water in all the rivers in all the countries of the world. A great-grandfather of waters, indeed, yet a flow often masked by fogs created by its passage under the cold air coming off the Canadian Maritime Provinces.

Storms can make the Stream dramatically visible. A northeaster blowing down against the current comb it into nasty steep waves that make sailors miserable. The Wilmington ran into such a storm on a recent trip. Nothing of consequence got bent, but the crew took a beating, and the ship lost a lot of time. On this passage, though, the sea simply dozed. Swells on their way to the sands of Florida slipped across the bow in close order, following on in a rhythm slow as sleep.

"He was not eaten by sharks," Homer asserted, "and was rescued by a passing ship not in the picture."
such a duck pond, it was difficult to believe that there was a giant below, carrying me along as the demon beneath the keel carried the Ancient Mariner.

It was even more difficult during the first days of European exploration. Ships then were blocky and slow. They could run before the wind or reach across it, but could beat toward it only obliquely and only with great difficulty. Against a wind and current, they were all but helpless. If the blue god caught them, escape could be difficult. There was little they could do but wait for a breeze from the right quarter. Christopher Columbus made the first reported crossing of the North Atlantic, running before the trade winds along the southern arc of the Gulf Stream's gyre (see map on pp. 50-51). No one knows how many more ships and men preceded him on that same southern route—Phoenicians, Celts, Jews—never to return, some to be borne away on the Gulf Stream.

_Luckily, Columbus missed the Stream_

By great good fortune, Columbus missed the Gulf Stream. According to Samuel Eliot Morison, the celebrated historian of Europe's American discoveries, had the Admiral of the Ocean Sea not decided to alter course as he neared the Bahamas to follow flocks of migrating birds, he and his mutinous crew might have sailed into the grip of the great current. Then, Morison speculated, "The fleet would have touched (and perhaps more than touched—gone ashore) on the coast of Florida somewhere between Jupiter Inlet and Cape Canaveral." If they did not go aground in a swell or following sea—if, in short, they survived—they might well have been "swept along the coast of Georgia and the Carolinas, returning to Spain (if they managed to return) by the westerlies north of Hatteras and Bermuda."

Going adrift on undrinkable water is a hard fate for landsmen to think about. Winslow Homer learned that when his ubiquitous painting *The Gulf Stream* went on exhibit in the early years of this century. It shows a black man lolling on the deck of a derelict sloop, the sea around him studded with sharks, and the public was quick to react. "The criticisms of *The Gulf Stream* by old women and others are noted," the painter wrote to a dealer who had told him about the flap. "You may inform these people that the Negro did not starve to death. He was not eaten by the sharks. The waterspout did not hit him. And he was rescued by a passing ship which is not shown in the picture."

Columbus was a notable navigator. He not only discovered the way to America, he developed a sense of the currents encountered along that way. When becalmed in open ocean, he took to lowering a sounding line to learn—from the way the line departed from the...
During his 1492 voyage, here fancifully portrayed about a century later, Columbus successfully followed the northeast trade winds to the New World, turning south just before he encountered the Gulf Stream.

vertical—something of what was moving below the surface. He marked the presence of several flows associated with the Gulf Stream system. But the admiral never met the blue god and so never discovered the best way home from America.

The man who did unwillingly discover it, feeling its power just off what is now the city of St. Augustine, was Juan Ponce de León, one of the most rapacious of Spain’s conquistadores. Already the subjugator of Puerto Rico, in 1513 Ponce de León sailed in toward the Florida coast to look for treasure—and a certain spring said to rejuvenate a man’s amatory powers. He found neither. But in the course of closing with the land—which he named Pascua Florida, because it was Easter—he found the Florida Current, which whisked one of his vessels out of sight before it could sail free of the flow and get back to the anchorage.

It was not Ponce de León but his pilot, one Antonio de Alaminos, who first put the Stream to use for the greater glory of Spain. Alaminos was a preeminent reader of the sea, and he remembered what he read. His skill was such that in 1519, when Cortés took Mexico, he asked Alaminos to carry home news of the treasures turned up by conquest, to dazzle the Spanish court. Alaminos’ instructions were to make the fastest possible crossing, and he did so, letting the Loop Current help him cross from Mexico to western Florida. When he passed the Tortugas, he took an enormous gamble. He remembered the vessel from Ponce de León’s fleet being carried north by the sea that clear day at Easter. “He thought,” wrote a historian of the time, “that those mighty currents ought to empty somewhere into an open space.” He bore away downstream into the open space of the North Atlantic. As he

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went north, the prevailing wind pattern shifted, blowing first from the east and then from the west. When the first long breath of the westerlies hit him, Alaminos turned toward home, his sails bellying full.

That return voyage established what came to be known as the Highway of the Indies and literally changed the course of world history. Treasure galleons began to follow Alaminos' highway from the Caribbean and Gulf of Mexico, while Spanish ships outward bound to the New World generally followed the Columbian track along what came to be called the southern route.

During his nautical gamble, Alaminos probably composed a rutter—that is, a set of sailing instructions that early pilots guarded as if they were gold. In a sense they were, for if you had good rutters, chances were you could get wealth. "If from Havana thou wouldst set they course for Spaine," reads an early Spanish rutter, "thou must goe Northeast and so shall have sight of the Martyrs [the Florida Keys, so named because some of their rocks looked to the Spanish like men suffering] ... and the coast lieth east and west. The marks be these; it sheweth like heads of trees, and in some places [there are] certaine rocks with white sandy beaches." In the shallow waters, the use of the lead was all-important for ascertaining depth, as well as the type of bottom. Black sand stuck to the tallow packed into the end of the lead meant one location, "shellie ground and periwinkles" another.

As the Spanish conquest radiated south and north from the Caribbean, the great current became part of the route used for exploration and settlement. After the Spanish came the British, French and Dutch, raiding and settling. Spanish forts went up as far north as the Chesapeake. Undaunted, the British took and held Virginia, which the Spanish considered part of their Florida.

Columbus' fellow Genoese, John Cabot, established a northern route to the New World in 1497, just five years after the admiral established the southern route. Yet more than a century separates the Spanish settlement of Santo Domingo and the first French fur-trading post at Quebec. The Northern lands were more forbidding, and the first great treasure found there was not gold but the noble cod swimming in mobs over the Grand Banks off Newfoundland.

Long before navigators understood them, linked swirls and eddies of the Gulf Stream System around the Atlantic basin, when combined with the northeast trade winds and the westerlies, determined the course followed by early mariners, and the shape of maritime progress. Watery vortex, known in oceanography as a gyre, still puzzles scientists and helps shipping.
In pioneering the northern route, Cabot and his successors sailed to the Grand Banks and followed the Labrador Current down the coast. Generally they ran north of the Gulf Stream, but on occasion they entered it. One indication that they did comes from Cabot's chroniclers, who reported that the beer in his hold suddenly turned warm.

Advances in maritime skills and ship design permitted captains to take more liberties with the winds. Vessels began voyaging almost directly across the ocean. Some bucked the Stream and its cousins a good part of the way. The Pilgrims did that, evidently. Not much is known of their passage, but it took them 66 days. They were aiming for the Virginia lands, but as they tried to cross the Stream, one theory has it, they got shunted up to Cape Cod. That sort of thing did happen. The British adventurer Bartholomew Gilbert, coming up the Stream, stayed in the current too long, overshot the Chesapeake and finally got off at New York.

In time, the British decided that using the southern route to go much farther north than Virginia didn't make sense. They divided their holdings, the southern to be serviced by the Columbus route, the northern by more direct runs across the Atlantic. The Dutch in what is now New York stuck by the southern route, so the end result was a geographic anomaly: colonies a couple of hundred miles apart depended on sea lanes that varied in length by 3,000 miles and in latitude by as much as 30 degrees.

I had planned to walk up the Wilmington’s long foredeck to the bow. I love standing over the water, looking down as the blade of a ship’s hull slices and plows. Often dolphins surf there, planing off the bow wave, heads slightly down to catch the angle of sheared water. But something—the cargo, the miles of pipeline running fore and aft—put me off, and I stayed astern, shifting in my mind from human interactions with the Stream to the billions upon billions of plants and animals that have migrated in it.

Not that the Stream is a populous place. Waters lying over the continental shelves and slopes of North America are far richer in marine life. In fact, the near-surface layers of the Stream support not much more life than do those of the arid Sargasso Sea, which borders it offshore. Species abound in the current, but populations are apt to be small—and often a long way from home; I have seen butterfly fish swimming in a Rhode Island cove, carried thousands of miles from their native bottoms, thanks to the Stream. It is the business of currents to entrain, to catch up and carry along. The Florida Current and the Gulf Stream are champions at providing such submarine transportation, moving not only water, nutrients and pollutants, but also life forms that either are incapable of resisting the pull of the flow or, likely, ride it out of some innate preference.

I have dived with marine biologists along the eastern edge of the Florida Current, drifting in the company of beautiful transparencies—barrel-shaped salps, winged snails, Venus’ girdles—all moving downstream. Eventually, most of them will die out as the water that carries them cools or as contortions in the current pull them into hostile environments. But while they live, they add
Benjamin Franklin was one of the first men to make a study of the Gulf Stream system, and to try charting it in detail. His 1769 map was lately rediscovered by Woods Hole oceanographer Philip Richardson, and has just been acquired by the Library of Congress.

The animal lives in fresh water and spawns in salt, yet few photographs have ever been made of adult eels deep in the North Atlantic. All of them were taken by cameras aboard the Alvin, a small research submersible. At this point all marine biologists can do is theorize about how the young eels, the transparent, leaf-shaped leptocephali, get back to the rivers of their home shores. The strong belief is that the leptos drift with the gyre following courses of varying length. European stocks take about three years for their journey, American stocks take only one.

The Wilmington neared Hatteras, the legendary cape of storms. "If the Tortugas let you pass," mariners said, "beware the shoals of Hatteras." Diamond Shoals, the graveyard of the Atlantic, lay far off the port bow. Many of the vessels buried in those sands were driven in on the shoals while on their way north, down the Stream. Many more, particularly after the development of Colonial maritime trade, met their fate while sailing the other way, coasting south along favorable countercurrents inshore of the blue god. As they closed on Hatteras, their opportunities for maneuver dwindled perilously; they ran in the narrows between the Scylla of the shoals and the Charybdis of the Stream.

All along Florida and up past the Carolinas, the current lies against the continent, running over a vast
The Stream and its mysteries

plateau. The surface of the plateau is scoured by flows so strong that they bore along some wreckage of the space shuttle Challenger, making a difficult recovery operation more difficult. But at Hatteras, the current, now officially the Gulf Stream, literally falls into the North Atlantic. In ways scientists don’t yet understand, it separates itself from the coast and enters the ocean interior. It spreads out, too, covering more than 50 miles of ocean surface. It slows, picks up more water and starts a kind of oceanic snake dance. It writhes into meanders that grow into what on land would be called oxbow lakes but here form rings or eddies that curl inshore or seaward of the main flow. Some rings descend right to the ocean floor, 4,000 meters down, but the current itself is apt to bottom out at around 2,000 meters. Overall, the Stream’s reactions to the gravitational and rotational forces of the Earth become more complex.

Early sailors knew nothing of this and precious little about any other current moving out of sight of headlands and other terrestrial reference points. They had no adequate marine chronometers to time the sun’s nooning and thus establish any reliable idea of longitude. During the initial exploration (and exploitation) of the New World, cartographers often masked oceanic ignorance behind drawings of sea monsters and mythological phenomena like the Maelstrom, the man-eating whirlpool off Norway. Well into the 18th century, when marine chronometers were available, charts paid less attention to currents than to shoals and reefs and other stationary obstacles to navigation.

Mariners learned as they sailed. No one knows how the Gulf Stream got its name. The Gulf of Mexico might have been involved, though it is equally possible that the gulf in question was the Gulf of Florida, an early name for the Florida Straits. I have come across references to the blue god as the Sailor’s Current, and I’m sorry the name didn’t stick. They certainly deserve the tribute.

Scientific study of the Stream suffered from the same misinformation and superstition as did maritime cartography. Oh, there were theories aplenty. One held that ocean waters poured into the Earth through holes in the North Pole and reappeared, fresh and sweet, fountaining into headwaters of the rivers. Some said that the currents followed the stars as they circled the planet, but others reckoned the sun evaporated so much water at the Equator that waters rushed into the steep valley thus created. Slowly, however, as the natural philosopher began to listen more to the mariner, oceanography stirred into life.

One stirring seems, at first glance, a particularly odd concatenation of events. Shortly before the American Revolution, complaints came to an agent in London about delays in their mail service from the mother country to the New World. The agent in turn put the matter before a visiting cousin, a Nantucket whaleman. Oh yes, said the whaleman, he and his colleagues often chased whales along the edge of the Gulf Stream. They had often seen British mail ships slogging along, plugging straight into the current. He had hailed them on occasion, he said, and told them of their plight. But they were “too wise to be counselled by simple American fishermen.”

The London agent? A Mr. Franklin, of Philadelphia. He asked his cousin to outline the position of the great current and provide instructions on how best to deal with it on the mail routes to the Colonies. Timothy Eel, photographed by submersible Alvin, may have used Stream system to help it return to home river.
Folger did so, and the result was the Franklin-Folger map (p. 53). There were three editions, the first printed in 1769 or 1770. It was remarkably accurate for its time, but the British evidently remained too wise to be counseled. During the American War of Independence, Franklin gave the map to the French. Possibly it helped in speeding French aid to the struggling rebels.

Benjamin Franklin was a man of catholic curiosity. The subjects of his observations ranged from electricity to smallpox, whirlwinds and waterspouts to Scottish tunes, the effect of oil on water to problems of population. He understood the influence of winds on oceanic currents. But lacking the dynamical sophistication of modern oceanography, he attributed the strength and length of the Gulf Stream to its "considerable Descent, and moving from Parts where the Water is higher, to Parts where it is lower." It was a good try. There is descent of sorts along the Florida Current—half a foot or so over the length of the Florida peninsula—but that, we would later learn, is only one of several forces shaping the Stream.

During several of his transatlantic crossings, Franklin took a sea thermometer with him, painstakingly recording water temperatures. He even devised a container that would collect water at depth, but the pressure stove in his stoppers. His faith in the thermometer was such that he overestimated its powers to track a single current. At one point he thought he had followed the Gulf Stream right across the Atlantic to the Bay of Biscay, but there are other sources of warm water in the ocean.

The Stream mingled with the blood of the family Franklin. Ben had taken his son William, and William's son, William Temple, to sea to help him with his research. Ben's grandson, Jonathan Williams, was so admiring of the sea thermometer that he claimed it could locate not only currents but "banks, coasts, islands of ice and rocks under water." Franklin's great-grandson, Alexander Dallas Bache, was the more reasoned scientist. Bache headed the U.S. Coast Survey in the mid-19th century, a position from which he directed some of the first intensive research on the causes and serpentine course of the Gulf Stream. It was while engaged in that work that Bache's brother George, captain of the brig Washington, lost his life to a hurricane off the dread shoals of Cape Hatteras.

Bache's great rival in Washington was a U.S. Navy lieutenant and gifted popularizer of things oceanic named Matthew Fontaine Maury (SMITHSONIAN, March 1984). Maury developed a valuable program for collecting and collating shipboard observations of winds and currents. He also developed a description of the blue god which to this day sticks in the public mind. "There is a river in the ocean," Maury wrote. "In the severest droughts it never fails, and in the mightiest floods it never overflows. Its banks and its bottoms are of cold water, while its current is of warm. The Gulf of Mexico is its fountain, and its mouth is in the Arctic Seas. It is the Gulf Stream."

That is a powerful metaphor. It is hard not to think of the great current in other than riverine terms. It is, after all, the Stream. Its writhings and sheddings are

Swarms of small, semitransparent salps like this one are carried north from warm climates to cold.

Bluefin tuna is one of many submarine hitchhikers, sometimes riding for miles to new feeding grounds.
In the days of sail, the sweep of the currents along the Carolinas' coast used to carry ships aground. called meanders and eddies. Yet the Gulf Stream, of course, is not literally a river, as we shall see (next month, in the second part of this report). It is more like a ribbon flow of current that separates the warm water of the Sargasso Sea from the cooler East-coast waters of North America.

The federal government continued to push investigations of the Stream. Beginning in 1885, John Pillsbury, a naval officer serving with the descendant of Bache's outfit, then called the U.S. Coast and Geodetic Survey, actually went out and anchored in the Stream. It was a tour de force rather than a practical technique, requiring miles of special cable, special winches and a kind of shock absorber to do the job. But when he was done, Pillsbury's instruments, including an effective current meter of his own design, produced data on the Stream's ceaselessly changing velocities and flows that were used for years afterward. Pillsbury too could not resist the Maurian metaphor. "In a vessel floating on the Gulf Stream," he wrote, "one sees nothing of the current and knows nothing but what experience tells him; but to be anchored in its depths far out of the sight of land, and to see the mighty torrent rushing past at a speed of miles per hour, day after day and day after day, one begins to think that all the wonders of the earth combined can not equal this one river in the ocean."

On the last morning of my trip aboard the Exxon Wilmington, we sighted our first land since Florida, the highlands of New Jersey. Above them and all along the western horizon, a brown stream flowed, a Mississippi of the air, a river of smog. Larry Wonson told me we had left the Stream about eight hours before. Sometimes, if you're lucky, a meander of the current will give you a ride close inshore; in winter, that can mean not only a boost in speed but a warm, looping flow that keeps ships from icing up.

No such boost this time. Elapsed time for the trip wouldn't be even close to the 3 days 17 hours logged on a New York run the previous year. "The engines went 1,595 miles," Larry Wonson told me, and thanks to the push of the Stream "the ship went 70 miles more than that." The current had saved us only 4½ hours. Still, in fuel and related costs, a cut in 4½ hours in steaming time worked out to a savings of $5,000. That, multiplied by the run of two ships—the Wilmington and her sister ship, the Exxon Charleston—every two weeks or so, added up to real money.

We were well within the inbound traffic pattern now, ambling in a line of wide-hipped container ships, tankers and bulk carriers. Ambrose Light showed ahead, at the foot of New York Harbor. As we prepared to take on our pilot for the run in, I thought of another harbor, far smaller, a day's steaming farther up the coast, the snug little port of Woods Hole under the shoulder of Cape Cod.

After the daring Lieutenant Pillsbury, American involvement in Gulf Stream research—indeed, in oceanography generally—sagged a bit. Or perhaps the energy building in European centers of marine science made it look that way. The Scandinavians in particular took the lead, developing theories to explain how winds affect current formation and how water moves beneath the surface. Yet early in the 20th century, concerned U.S. officials found oceanographers to be as rare as hen's teeth. There was one center on the West Coast, the Scripps Institution of Oceanography in Southern California, and not much to speak of on the coast abutting the Gulf Stream. To rectify the situation, in 1930 the Rockefeller Foundation and other agencies underwrote the formation of the Woods Hole Oceanographic Institution in Massachusetts.

**Wonderful days for oceanography**

The "Oceanographic" started out with one building and one ship. She was the largest steel-hulled ketch of her day, and for the first 15 years of her long life, she was the only craft in the United States built exclusively for blue-water research. Her name was the **Atalantis**, but people who knew her called her the "A-boat." Her skipper, a young man with the appropriate name of Columbus Iselin, spent a good deal of time on the currents and eddies of the Gulf Stream system.

Iselin, who refined the concept of that system—Florida Current here, Gulf Stream there—showed a seaman's humility in addressing his subject. "The
problem of oceanic circulation," he wrote, "is such that we cannot hope for a satisfactory solution for a long time to come." But his eye and his hunches produced conclusions that have survived revision by successive investigations to which all science is heir. Iselin began to refine and qualify, for instance, the popular concept of the Stream as simply a hot current in a chilly sea. The warm part of the current stays mainly on the surface, to a depth of only a couple of hundred meters. "The fact is," Iselin reported, "even the southeast side of the current (except at the surface) is not quite as warm as the water at corresponding depths in the Sargasso."

Those were wonderful days for oceanography. The science was too young to insist on advanced degrees for her practitioners. Painters and college drop-outs, would-be ministers and yachtsmen with a taste for research went to work on the A-boat. They got seasick, played pranks (one radio transmission back to Woods Hole reported "Sea state: 6. Sobriety: 0") and came home with a sustained record of Gulf Stream behavior. That data helped nourish an expansion—a revolution, even—in the study of the dynamical processes that govern ocean currents.

The Wilmington lazied into an anchorage near Brooklyn and dropped her hook. She rode too low in the water to negotiate the channels leading to her delivery point back of Staten Island. A barge would take on some of her cargo. While we waited, Wonson talked about the return trip. He wouldn’t mind accepting the knot-and-a-half assistance provided by the countercurrents near Hatteras, he said. But Diamond Shoals retains its reputation, and Exxon won’t allow its skippers within miles of the place. So, to avoid the Atlantic’s graveyard, the Wilmington would cut eastward across the Stream and run down outside it.

Once on the side of the Stream farthest from land, she might be able to catch a ride on one of what are known as cold-core rings, those curious eddies of the Stream that catch up cool coastal water. Cold-core rings rotate counterclockwise, and usually move west or southwest. (Warm-core rings, patches of Sargasso Sea captured by meanders, wander coastal waters in generally the same directions, but rotating clockwise.) The trouble is, you may run into the wrong part of the ring and get a brake rather than a boost. The Wilmington had that bad luck once when she was dodging around a hurricane. "The ship was clicking along at 16.5," Wonson said, "then, bingo! She’s making 13."

As I rode to shore in a water taxi, I took one last look at the ship. The skipper stood out on the bridge wing, talking with one of the mates. Far up the harbor, the stelae of lower Manhattan rose in clear light, and I thought of the Wilmington, outbound, hunting flows that would take her back, skirting the domain of the blue god, to the home of the brown.

I, too, would soon be outward bound, asking questions. Where, really, does the Gulf Stream go? What makes it so powerful? Will it continue to affect our lives? The responses would provide a portrait of modern oceanography, now a full-grown science employing a full range of intriguing, space-age instruments. They would create a deeper respect for the ways in which the blue god still guards its mysteries and its marvels.

Kicking up a froth in the dark-blue Stream, Wonson’s tanker rides the famous current toward Hatteras.

Next month: Science and the Stream