

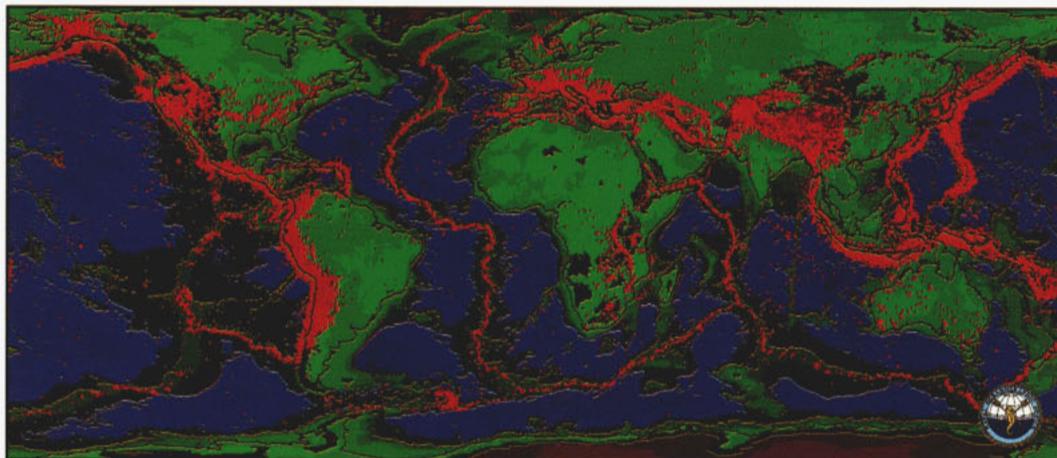
ALL HANDS

MAGAZINE OF THE U.S. NAVY



OCEANS

APRIL 1995



Earthquake epicenters



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On the Covers

Front cover: View of the Western Pacific taken from Apollo 13, in 1970. Photo courtesy of NASA.

Opposite page: "Destroyer Man," oil painting by Walter Brightwell.

Back cover: EM3 Jose L. Tapia aboard USS Gary (FFG 51). Photo by JO1 Ron Schafer.

Because there is an ocean, there is a Navy.

The ocean is the single, fundamental difference separating navies from armies and air forces.

Because of this, it is important to understand the maritime environment, so it can be described and predicted for development, deployment and employment of naval systems.



Charthouse

Drug Education For Youth program seeks sponsors

The Navy is looking for interested active and reserve commands to sponsor the Drug Education For Youth (DEFY) program this summer. In 1994, 28 military sites across the nation helped more than 1,500 youths using the prepackaged innovative drug demand reduction program.

DEFY reinforces self-esteem, goal-setting, decision-making and substance abuse resistance skills of nine to 12-year-old children. This is a fully-funded pilot program of the Navy and DOD. DEFY combines a five to eight-day, skill-building summer camp aboard a military base with a year-long mentor program.



"There is no question that DEFY is great for the kids, but it is also a great leadership and self-esteem builder for our Sailors and Marines," said LCDR Wallace Lloyd, DEFY program manager for the Department of the Navy Drug Demand Reduction Task Force.

The excitement which DEFY has created among Navy and Marine Corps communities is evident by its rapid growth from two to 28 sites in one year. Lloyd hopes for 60 programs this year as the program continues to evolve.

For information packets on the DEFY program, contact LCDR Wallace Lloyd at the Drug Demand Reduction Task Force at DSN 226-1157/58/59 or (703) 696-1157/58/59.

Navy Department Releases New Pregnancy Policy

Secretary of the Navy John Dalton issued new pregnancy guidelines for Sailors and Marines Feb. 7. "Our intent is to provide an environment where service men and service women can make conscious and informed decisions about when and under what circumstances to have children," said Dalton.

"The Navy's leadership recognizes that pregnancy is a natural event and not a medical emergency," said Dalton. "We're providing this policy to build positively on existing programs in the Navy and Marine Corps to ensure equality of opportunity while maintaining operational readiness."

The new guidelines acknowledge that both pregnancy and parenthood are compatible with a naval career. The new policy directs Department of the Navy commands to ensure that a pregnant service member's health, career and welfare needs be accommodated to the greatest extent possible.

The policy is the product of an extensive review of the policies for all four military services. The new guidelines place special emphasis on educating service members about the large support network available to them. The sea services' leaders will now be required to increase training for Sailors and Marines about the many medical, legal, financial and spiritual resources available to them. The goal is to in-

form service members in making family planning decisions that are supportive of both their naval service and their parental responsibilities.

"Our approach is not to direct behavior but rather to educate fully so that our service members can make thoughtful and informed decisions," said Dalton. "It is our best hope for a fair and equitable approach to pregnancy, parenthood, family responsibilities and military service."

In addition to educational programs, service women assigned to imminently deploying units will now be given priority access to OB/GYN care.

At the 20th week of pregnancy, a service woman without dependents may now be granted basic allowance for quarters if she requests to move off base prior to giving birth.

Secretary Dalton also directed the Navy and Marine Corps to compile data on the effects of non-deployability on operational readiness. They will also assess health care risks associated with pregnancy and other types of medical conditions that may exist for service women and service men assigned to operational/deployable commands and support commands with significant occupational health considerations (for example, ship and airplane construction/repair facilities).

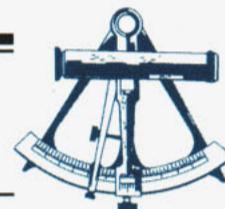
More information is available in SECNAVINST 1000.

Expedited citizenship available for Gulf War vets

Aliens and non-citizen nationals who served on active duty during the

Persian Gulf conflict can apply for expedited naturalization.

President Bill Clinton signed an Executive Order Nov. 22, 1994, that authorizes citizenship for eligible Sailors. Members of the armed forces must have served honorably between Aug. 2, 1990, and April 11, 1991.



Physical presence in the Persian Gulf during that period is not required.

Personnel must have been inducted, enlisted, or reenlisted in the U.S., the Canal Zone, American Samoa, or Swains Island, or have been lawfully admitted to the U.S. for permanent residence.

Personnel applying for expedited naturalization must submit three Immigration and Naturalization Service (INS) forms: INS Form N-400 (application for naturalization), INS Form N-426 (certificate of military service) and INS Form G-325B (biographic form). The forms can be obtained and filed at any INS office.

More information and assistance are available from Naval Legal Service Offices, Navy JAG at (703) 697-9161 or DSN 227-9161, PERS-662 at (703) 697-6621 or DSN 227-6621 and NAVADMIN 006/95.

Fleet support lateral transfer criteria set

Officers may request transition to the new Special Duty Officer (Fleet Support) Community beginning with the April 1995 Lateral Transfer and Redesignation Board. The community is a gender-neutral restricted line community that supports shore commands and staffs, in positions from division officer to major command and beyond.

Officers will be considered on the merits of their past performance and professional qualifications achieved. Officers in the surface, submarine, special warfare, aviation, and special operations communities must be warfare qualified prior to applying.

The board will evaluate officers on their prior experience in areas of specialization such as activity management; space and electronic warfare; manpower, personnel and

training; and logistics and sealift.

Unrestricted line officers must be commanders and below. Staff corps officers applying for transfer must be lieutenant commander and below. More information is available in NAVADMIN 007/95.

Sexual harassment continues to drop



Results from the 1993 Navy Equal Opportunity and Sexual Harassment (NEOSH) Survey show that the Navy is heading in the right direction in eliminating all forms of discrimination and sexual harassment from its ranks.

Sailors who participated in the survey, conducted Navywide every other year since 1989, said they believed sexual harassment has decreased and their commands are taking equal opportunity complaints seriously.

The percentage of women who said they were sexually harassed in the last year was the lowest since the 1991 survey, dropping 25 percent for female enlisted members. The number of women officers who said they were harassed dropped 40 percent from the 1989 survey.

The survey results indicated that

most personnel agree or strongly agree that they have an equal chance to serve, learn and progress no matter what race or ethnic group they belong to. All groups surveyed had generally positive perceptions of the Navy's equal opportunity climate.

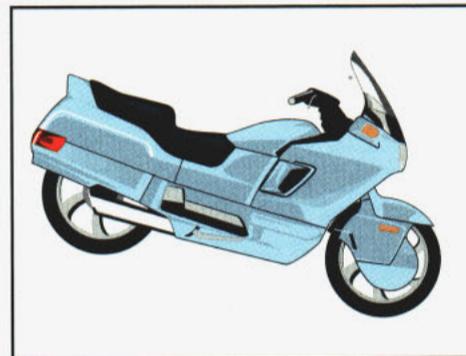
More details about the survey are available in NAVADMIN 005/95.

Safety Center advises against foreign port two-wheelers

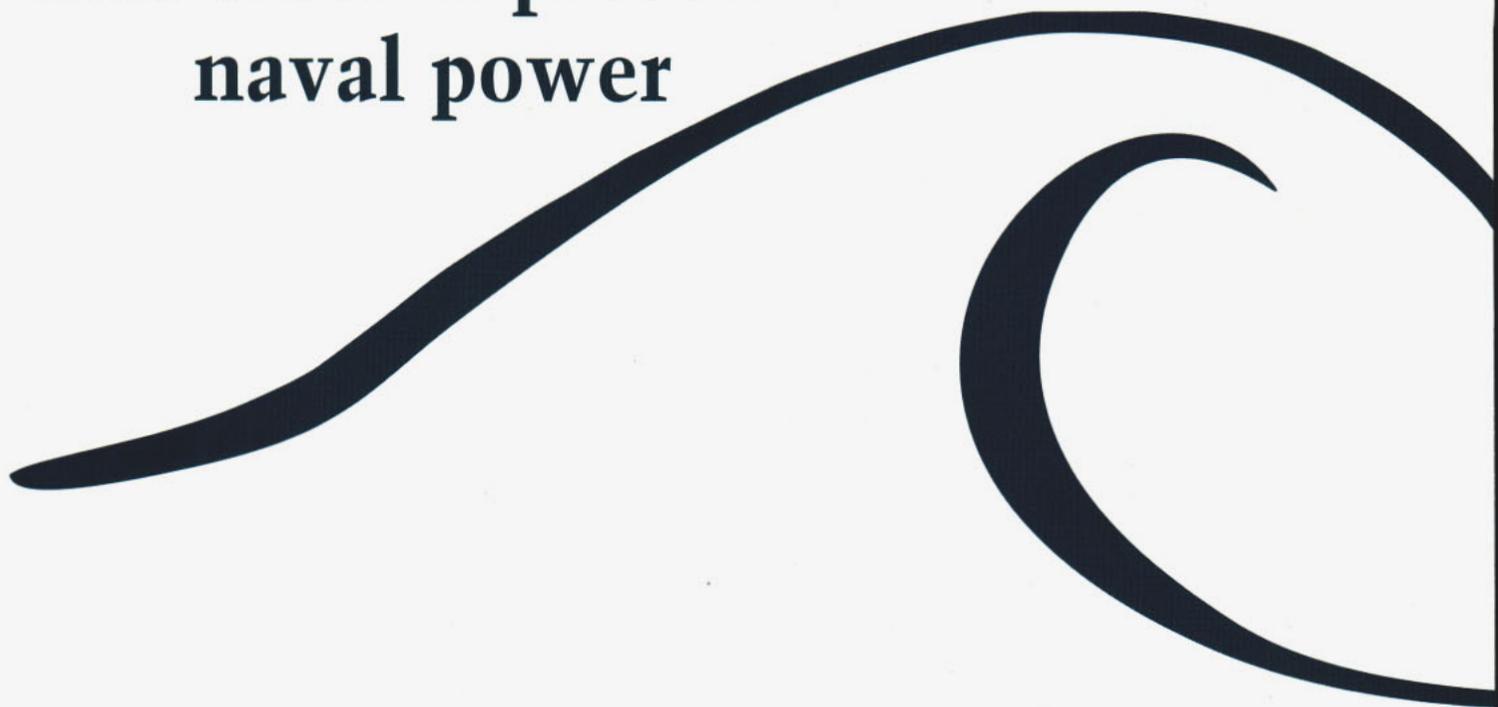
As a result of several serious mishaps involving deployed Sailors on rented motorcycles, scooters or mopeds, the Naval Safety Center recommends that commanders prohibit rental of two-wheeled vehicles in foreign ports.

Host nation traffic laws, signs, driving on the left in some countries and speed laws are often misunderstood. Most rental companies do not furnish the personal protective equipment (helmet, eye protection, reflective vest, etc.) required by Navy and Marine Corps instructions and orders. Requirements for motorcycle training may not be waived.

Rather than risk individual mishaps, off-duty groups should do their sightseeing by bus tours or car rentals while in foreign ports, the Safety Center recommended. †



The wave represents naval power



It ♦ is ♦ an ♦ ocean ♦ wave .



The ♦ wave ♦ is ♦ propelled ♦ by ♦ weather .



The ♦ wave ♦ breaks ♦ when ♦ it ♦ comes ♦ ashore .

To sail safely at sea, the Navy has always had to understand, describe and predict the ocean environment. This knowledge allows the Navy to operate successfully in the planet's most dynamic environment: the ocean.

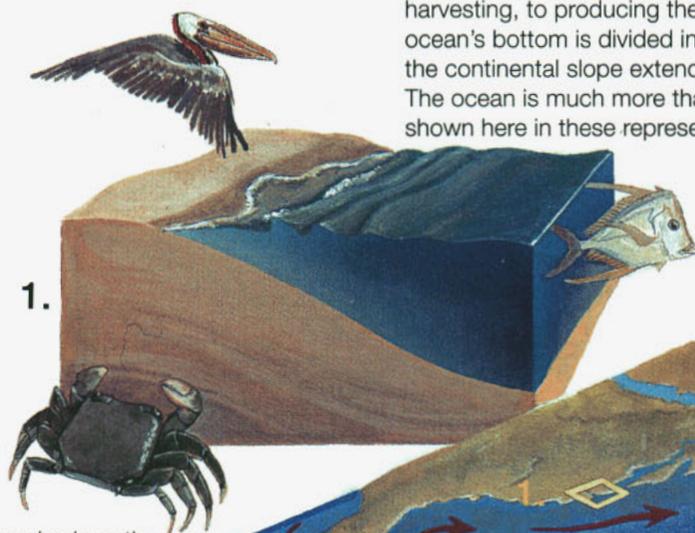


In this issue of *All Hands*, you will be introduced to some of the knowledge of the oceans accumulated during the years. You will become more familiar with the environment in which you operate and realize the Navy's world-class science efforts are continuing to expand the knowledge of the use of the oceans in naval operations.

The Navy's knowledge of the oceans – from space to the bottom of the sea, and from the open ocean to the complex littoral – equates to a very real kind of power: power to ensure we prevail as we move “Forward ... From the Sea.”

The

The oceans cover more than 70 percent of the Earth's surface and affect every aspect of our lives — from the traditional fish and shellfish harvesting, to producing the world's major weather patterns. The ocean's bottom is divided into the continental shelf along the coasts, the continental slope extending downward, and the deep ocean floor. The ocean is much more than the blue water upon which we sail — as shown here in these representative looks into the ocean.



1. The littoral zone extends along the continents from the beach seaward to a depth of about 200 meters. It is an oceanographically complex region that challenges Navy operations with factors such as tides; seas and surf; reefs and sandbars; sediment variations and submerged features; sea life; and highly variable weather. Nearly 200,000 varieties of organisms live here and account for 90 percent of the world's fish and shellfish catch.



2. The Gulf Stream is a massive warm ocean current flowing northeast along the eastern seaboard and across the Atlantic Ocean. Spawning the dangerous nor'easters that mariners dread, warm and cold water eddies form along its wall and complicate anti-submarine warfare training and operations.



3. The abyssal plains of the deep ocean are extremely flat and extend for hundreds of miles. The extreme cold, intense pressure and total darkness require adaptations to see and be seen and forced evolution of bizarre creatures, such as the *Idiacanthus panamensis* shown here with body studded with light-producing photophores.

Oceans

6. The interaction of the cold Labrador Current and the warm Gulf Stream around Newfoundland's Grand Banks brings abundant nutrients up from the bottom, producing one of the richest fishing grounds in the world. The boundary between the two currents is so sharp that the bow of a ship can be in one current and the stern in the other. Constant, dense fog is so thick here that you likely could not see from bow to stern.



6.



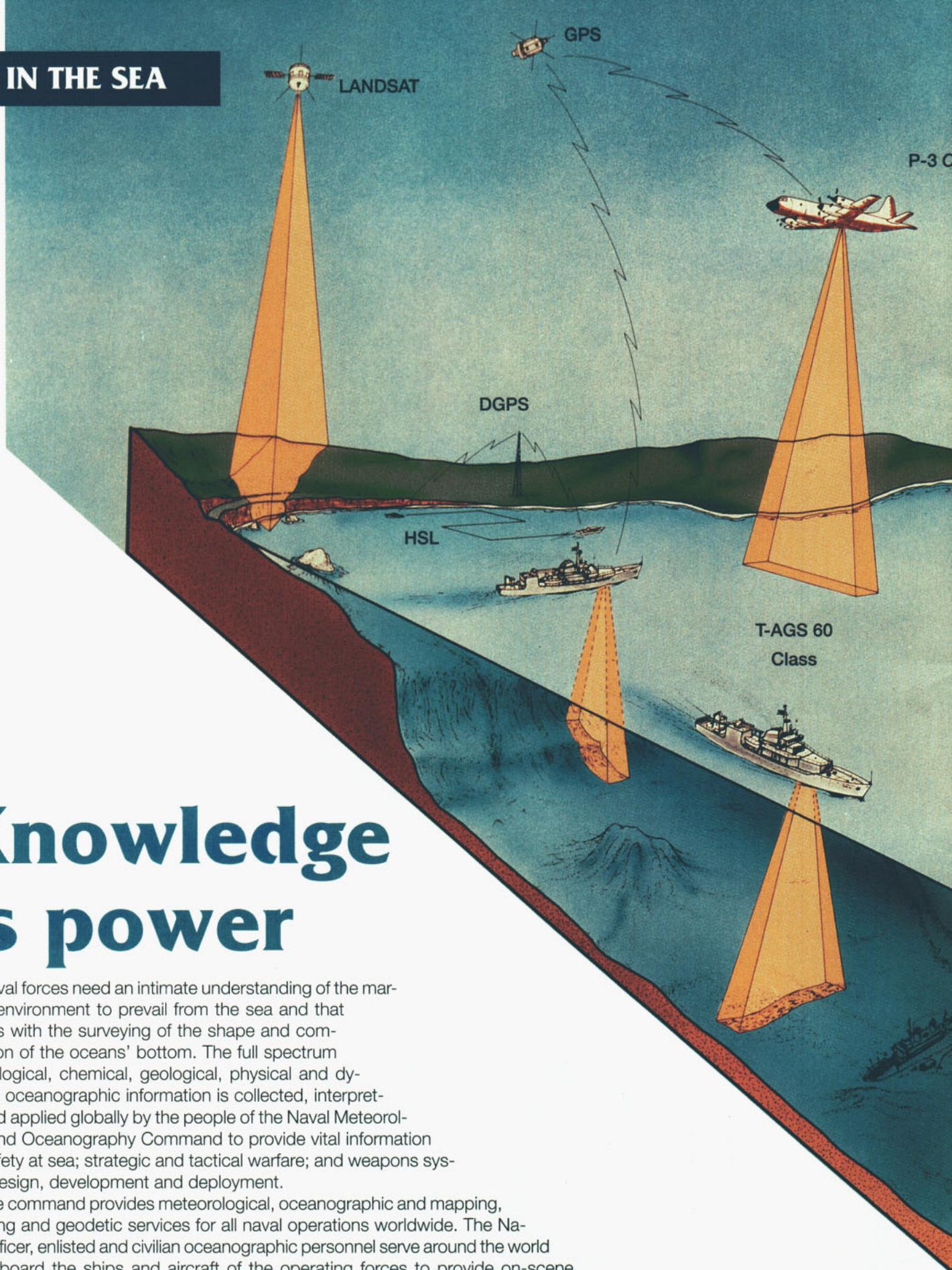
5.

5. In the polar regions sea ice forms from freezing seawater and icebergs break off from land glaciers and drift out to sea. If both polar caps and the Greenland Ice Cap were to melt, oceans would cover 90 percent of the Earth. The first under ice transit to the North Pole was made by USS *Nautilus* (SSN 571) in 1957. Navy oceanographers map the ice to ensure safe passage for ships and submarines.



4.

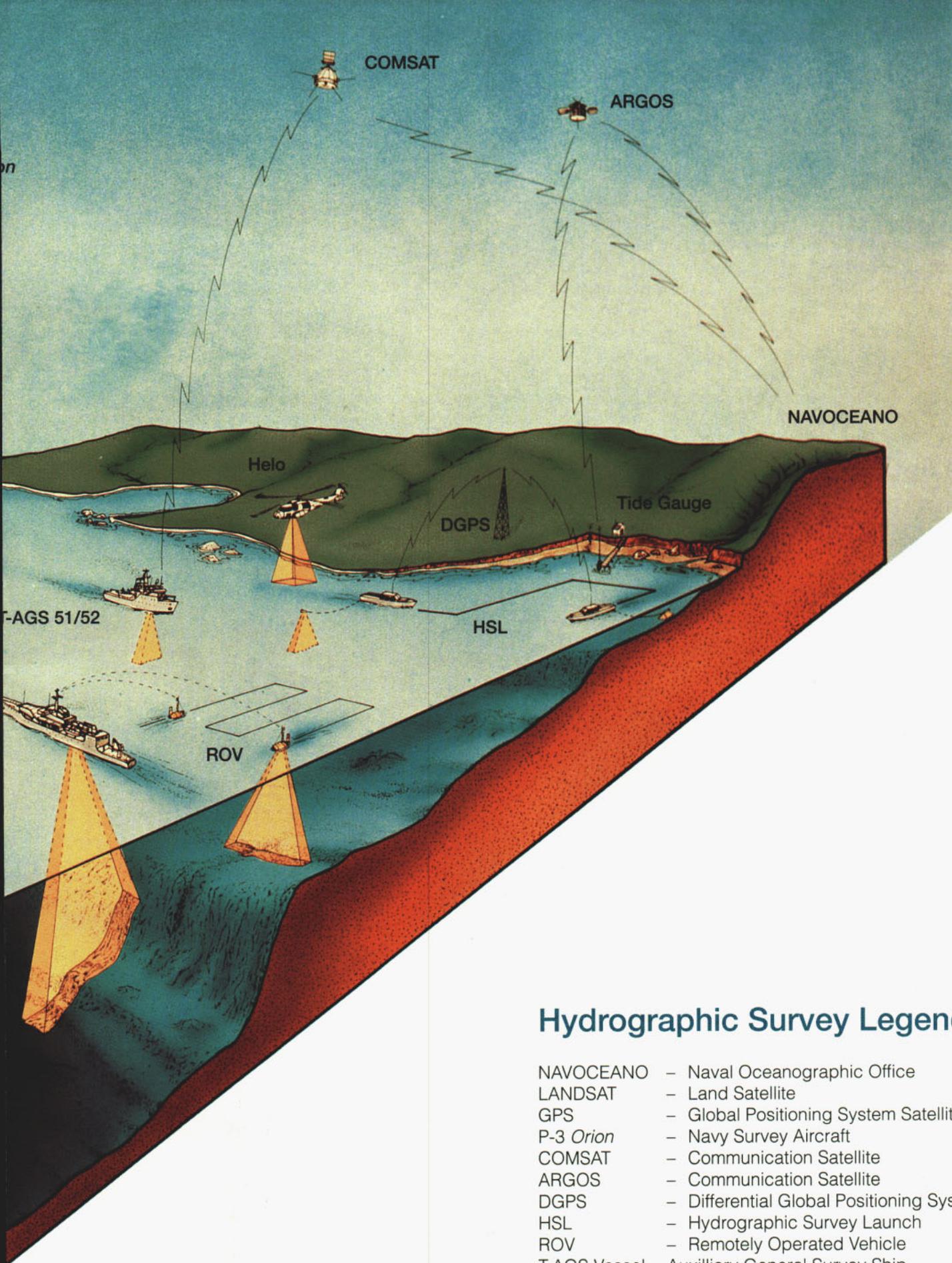
4. As crustal plates shift on the ocean bottom, earthquakes result and volcanoes erupt. The Mid-Atlantic Ridge extending from the Arctic to the Antarctic is the longest mountain chain on Earth. Smokers and vents appear where hot magma is forced from the Earth's interior and allows animals, such as tube worms, to thrive and grow to nearly 10 feet in length.



Knowledge is power

Naval forces need an intimate understanding of the maritime environment to prevail from the sea and that begins with the surveying of the shape and composition of the oceans' bottom. The full spectrum of biological, chemical, geological, physical and dynamic oceanographic information is collected, interpreted and applied globally by the people of the Naval Meteorology and Oceanography Command to provide vital information for safety at sea; strategic and tactical warfare; and weapons system design, development and deployment.

The command provides meteorological, oceanographic and mapping, charting and geodetic services for all naval operations worldwide. The Navy's officer, enlisted and civilian oceanographic personnel serve around the world and aboard the ships and aircraft of the operating forces to provide on-scene services. †



Hydrographic Survey Legend

- NAVOCEANO – Naval Oceanographic Office
- LANDSAT – Land Satellite
- GPS – Global Positioning System Satellite
- P-3 *Orion* – Navy Survey Aircraft
- COMSAT – Communication Satellite
- ARGOS – Communication Satellite
- DGPS – Differential Global Positioning System
- HSL – Hydrographic Survey Launch
- ROV – Remotely Operated Vehicle
- T-AGS Vessel – Auxilliary General Survey Ship
- Helo – Near-shore Harbor Survey Helicopter

Glowing in the dark

Fireflies sparking on a summer's evening. Jellyfish glowing in night waters. These are examples of bioluminescence – light emitted by living organisms. Unlike incandescent light, the light produced by luminous animals and plants results from a biochemical reaction to oxygen.

Among the thousands of species of bioluminescent marine creatures, the majority are planktonic organisms. Frequently found in immense groups, these creatures glow in the wake of swimming fish or passing ships. The Navy studies bioluminescence because when ships pass through concentrations of bioluminescent creatures, the ship's turbulence may disturb the creatures, causing them to emit light and reveal the location of the ship. Some luminous species of saltwater bacteria cause decaying fish to glow in the dark. Certain animals such as the “flashlight” fish culture colonies of these bacteria on their bodies and use them as their own light source.

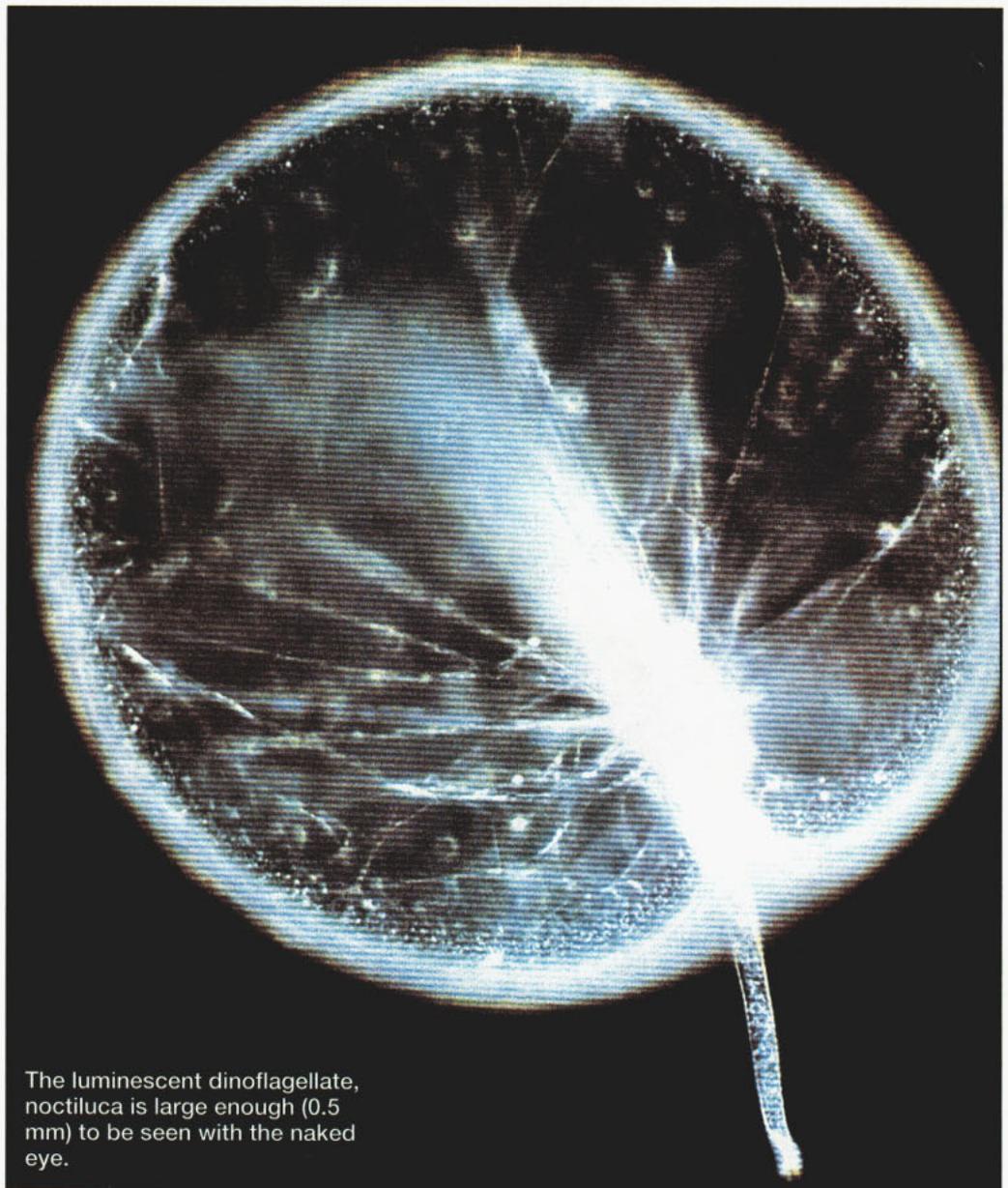
At levels where the sun does not penetrate, luminous animals give the effect of a starlit night. Scientists estimate 96 percent of all creatures found at these depths possess some form of self-light generation. Some deep-sea creatures develop photophores, light-producing organs which may be arranged in symmetrical rows along the fish's body or in a single unit overhanging the mouth. Studies reveal that photophores are connected to the nervous system and are biochemically activated.

Why does bioluminescence occur? Scientists still aren't certain, but there are several possible reasons. “Blinking” patterns observed in many species indicate that the light serves a communication or courtship purpose. The light may reveal food or lure prey. Creatures with poorly developed or nonexistent eyes may use the light to blind or startle predators.

In the past, bioluminescence caused superstition, awe, and even fear. Today, it remains one of nature's most fascinating phenomena. Bioluminescence can be used as a tool to locate ships and schools of fish and detect illegal fishing or chemical hazards. †



Bioluminescence was once confused with phosphorescence in the belief that it was caused by the element phosphorus.



The luminescent dinoflagellate, noctiluca is large enough (0.5 mm) to be seen with the naked eye.

Sounds from the sea

The undersea world presents an image of peaceful, quiet serenity. This appearance is quite deceptive. Besides being dynamic and challenging frontiers for exploration, the oceans are extremely noisy places.

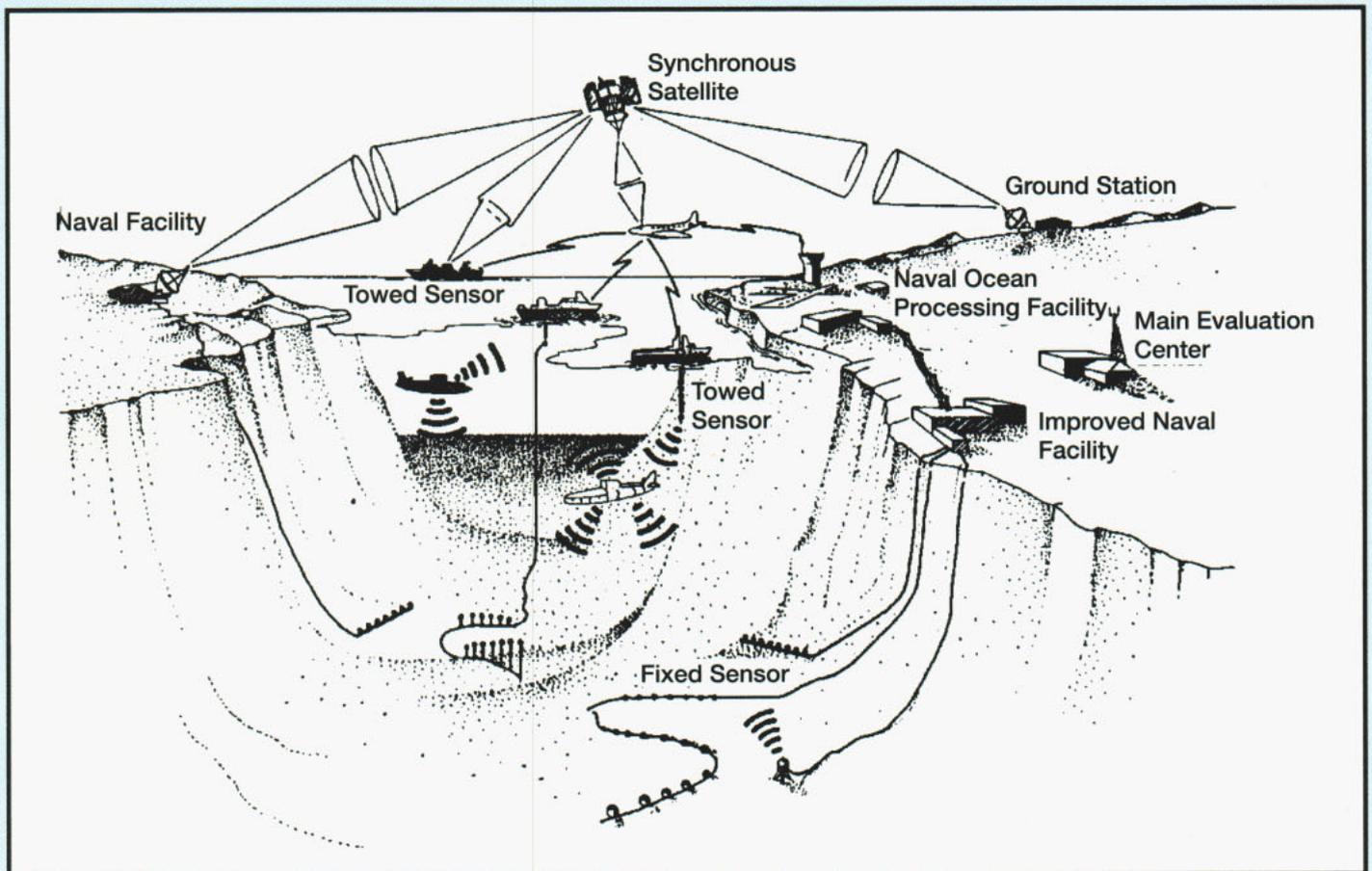
Land animals, such as dogs and cats, bark and meow to communicate. Fish and other marine animals also communicate with their own unique sounds. In combination, these form a confusing medley which, when picked up on sonar, can sound remarkably similar to the noises made by boat engines and propellers.

A thorough understanding of these animal noises is necessary to distinguish them from the sounds the Navy is actually attempting to hear – submarines.

These sounds apparently serve as communication, defense and courtship means between the many different species of marine creatures.

Studies of the squeals made by dolphins and porpoises reveal that these highly intelligent sea mammals have a very sophisticated “language” and that they can even mimic the human voice. Whales communicate with sounds similar to the trumpeting of elephants.

Drumfish and groupers produce drum-like thumps, probably as a defense mechanism against predators. Croakers are so called because of the hollow noises they emit. The mating call of the toadfish resembles a boat whistle. Other noisy sea animals include sea lions, seals, crabs, snapping shrimp and lobsters. ‡



The U.S. Navy's ocean surveillance system consists of both fixed and towed acoustic sensors that provide submarine detection and cueing to tactical anti-submarine warfare forces.

Why is the ocean blue?



The calm blue Gulf Stream. The exotic turquoise Caribbean Sea. The Pacific Ocean reflecting a brilliant coral sunset. Although sea water is usually thought to be deep blue, the world's waterways actually form a rainbow of colors.

The sea appears to be blue for the same reason that the sky looks blue. Sunlight, composed of electro-magnetic radiation ranging in color from red to blue, is scattered by particles suspended in the water. The shorter blue wavelengths scatter more effectively and are absorbed less quickly than the longer red and orange wavelengths.

Sea water appears blue for about 100 feet under the surface although a small percentage of undetectable blue light remains in the water up to the 600-foot level. At about 400 feet, color becomes indistinguishable and shadows disappear. After 600 feet, light absorption is so complete that the ocean appears black.

Because the sea is a mirror of the sky, clouds or a sunset can further alter the water's color. An overcast day

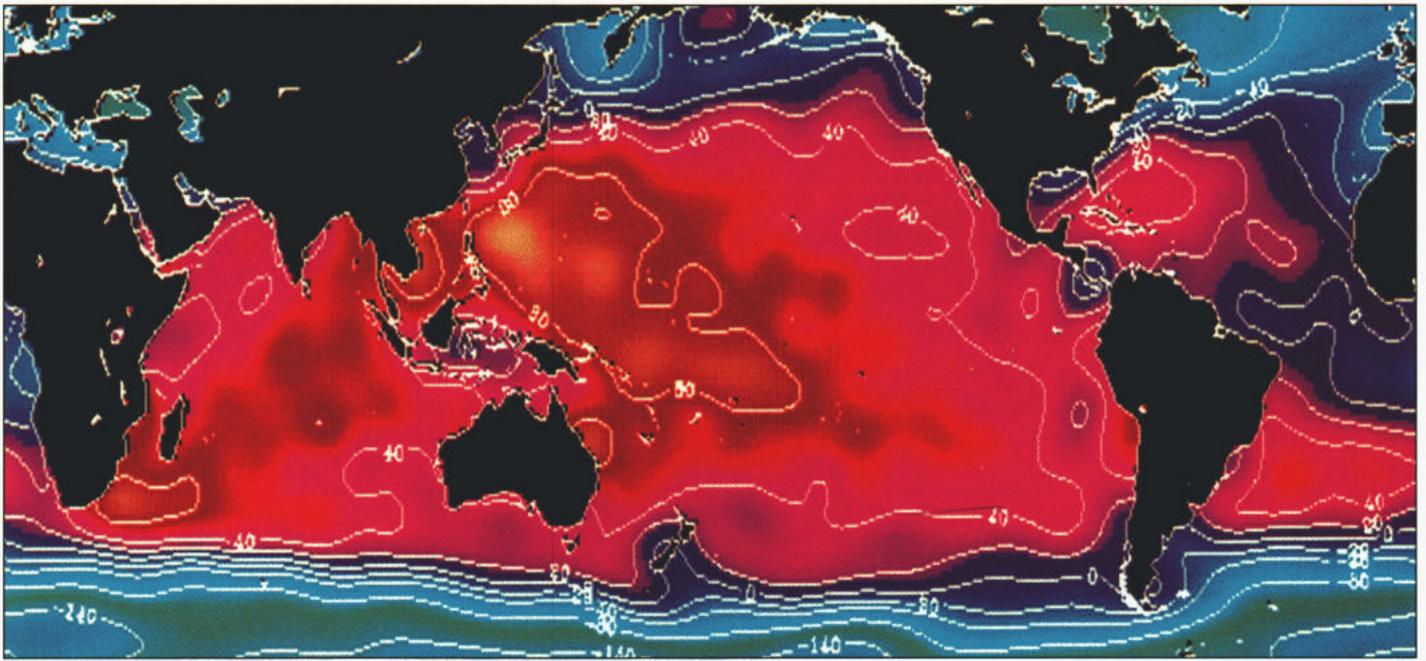
can change a bright blue lake to a steely gray.

Light absorption explains blue water, but why is the Red Sea red and the Yellow Sea yellow? These colors are caused by microscopic organisms, silt and mud suspended in the water. Near some coastlines, microscopic floating plants exude yellow pigments which turn the normally blue water to green. Some algae release brownish-red pigments, hence the Red Sea. The Yellow Sea owes its hue to mud carried in by its contributing rivers. The color deepens during floods.

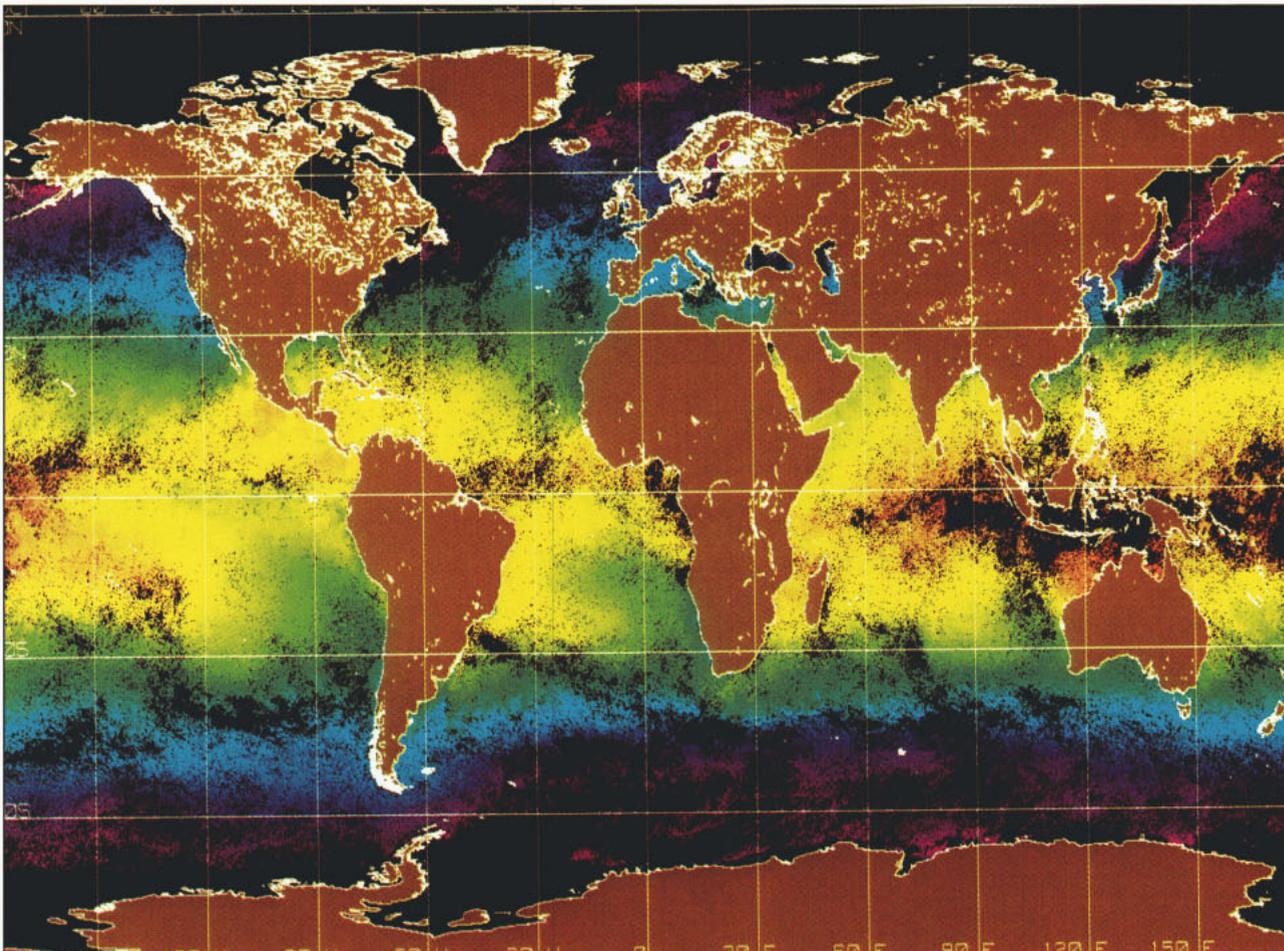
Unlike most major bodies of water, the Black Sea is landlocked with only one narrow, shallow outlet connecting it to the Mediterranean Sea. There is little oxygen in the water except near the surface, and the result is a heavy concentration of hydrogen sulphide near the bottom which colors the water black. Despite the many scientific reasons for the shifting colors of the oceans, the sea and its hues remain a subject of mystery and legend. As seawater changes from serene blue, to vivid aqua, to turbulent black, the sea often seems as moody as the humans who sail its surface. †

Oceans and Major Seas

Name	Area sq. mi	Average depth (feet)	Greatest known depth (feet)	Location of greatest known depth
<i>Pacific Ocean</i>	64,000,000	13,215	36,198	<i>Mariana Trench</i>
<i>Atlantic Ocean</i>	31,815,000	12,880	30,246	<i>Puerto Rico Trench</i>
<i>Indian Ocean</i>	25,300,000	13,002	24,460	<i>Sunda Trench</i>
<i>Arctic Ocean</i>	5,440,200	3,953	18,456	<i>77° 45' N; 175° W</i>
<i>Mediterranean Sea</i>	1,145,100	4,688	15,197	<i>Off Cape Matapan, Greece</i>
<i>Caribbean Sea</i>	1,049,500	8,685	22,788	<i>Off Cayman Islands</i>
<i>South China Sea</i>	895,400	5,419	16,456	<i>West of Luzon</i>
<i>Bering Sea</i>	884,900	5,075	15,659	<i>Off Buldir Island</i>
<i>Gulf of Mexico</i>	615,000	4,874	12,425	<i>Sigsbee Deep</i>
<i>Sea of Okhotsk</i>	613,800	2,749	12,001	<i>146° 10' E; 46° 50' N</i>
<i>East China Sea</i>	482,300	617	9,126	<i>25° 16' N; 125° E</i>
<i>Hudson Bay</i>	475,800	420	600	<i>Near entrance</i>
<i>Sea of Japan</i>	389,100	4,429	12,276	<i>Central Basin</i>
<i>Andaman Sea</i>	308,100	2,854	12,392	<i>Off Car Nicobar Island</i>
<i>North Sea</i>	222,100	308	2,165	<i>Skagerrak</i>
<i>Red Sea</i>	169,100	1,611	7,254	<i>Off Port Sudan</i>
<i>Baltic Sea</i>	163,000	180	1,380	<i>Off Gotland</i>



Global chart of dynamic ocean heights. Red corresponds to the areas of ocean higher than the global mean (i.e., warmer) and blue areas are lower relative to the mean (i.e., colder).



This image depicts the sea surface temperatures of the world's oceans. Red and yellow indicate warmer temperatures and purple indicates the coldest water.

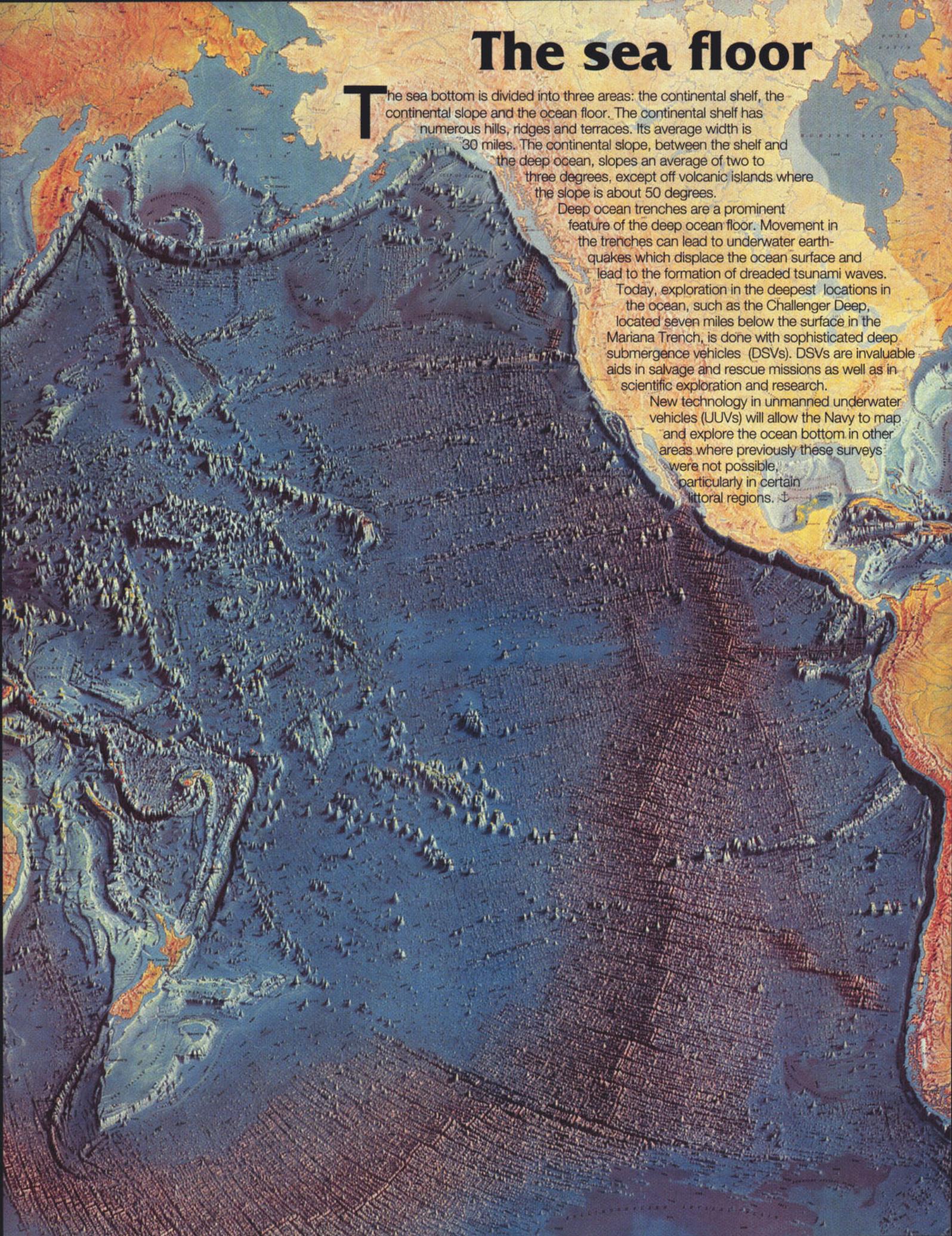
The sea floor

The sea bottom is divided into three areas: the continental shelf, the continental slope and the ocean floor. The continental shelf has numerous hills, ridges and terraces. Its average width is 30 miles. The continental slope, between the shelf and the deep ocean, slopes an average of two to three degrees, except off volcanic islands where the slope is about 50 degrees.

Deep ocean trenches are a prominent feature of the deep ocean floor. Movement in the trenches can lead to underwater earthquakes which displace the ocean surface and lead to the formation of dreaded tsunami waves.

Today, exploration in the deepest locations in the ocean, such as the Challenger Deep, located seven miles below the surface in the Mariana Trench, is done with sophisticated deep submergence vehicles (DSVs). DSVs are invaluable aids in salvage and rescue missions as well as in scientific exploration and research.

New technology in unmanned underwater vehicles (UUVs) will allow the Navy to map and explore the ocean bottom in other areas where previously these surveys were not possible, particularly in certain littoral regions. ↓



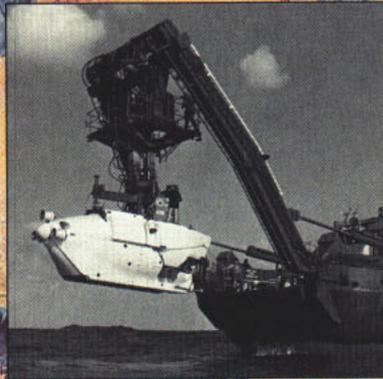
Undersea volcanoes

Millions of years ago, thousands of volcanic islands such as the Hawaiian Island chain were born in oceans throughout the world. Undersea volcanoes are still found in all the oceans with approximately 10,000 active ones on the floor of the Pacific Ocean.

Volcanoes alternate active periods which can last for millions of years with long dormant phases. During active periods, the lava cone builds up and eventually explodes onto the ocean floor as molten lava. The lava solidifies and turns into volcanic rock.

These volcanoes are enormous. Hawaii, the largest mountain on earth, has a relief of 32,024 feet above its base – more than 3,000 feet higher than Mt. Everest.

The low-frequency noises of volcanoes are another challenge for Navy underwater acoustics. The extremely warm temperature also heats the water and results in significant changes in the food chain, such as tube worms which can increase in size by a factor of 10 from those living in other areas of the oceans. ↓



The deep submergence vehicle *Alvin* is lowered from the research vessel *Atlantis II*, after preparations for a 12,500-foot descent to the wreck of the *Titanic*.



Giant Floe: 3,000' - 5 miles



Medium Floe: 600' - 3,000'

Go with the floe

At first glance, sea ice may seem to be a simple subject to understand – the poles are cold and ice-covered, and the ice caps are permanent features. Unfortunately, it is not that simple. The ice-covered area doubles every winter before shrinking during the warm months to its minimum size in September, and the ice edge can move up to 200 km in a single week from the actions of ocean currents and storms.

For nearly 40 years our Navy has deployed submarines under the Arctic ice, so we must understand the ice conditions where it is thin enough for them to surface for operations and in an emergency. Surface ships operating near the ice edge need forecasts of the ice edge movement because most are not ice-strengthened and must

avoid the ice completely.

Patrol aircraft have flown throughout the Arctic for many years and must know the ice characteristics for sonobuoy deployment. And the personnel who are stationed in Thule, Greenland, and McMurdo Station, Antarctica, rely on resupply ships that need to know the ice conditions.

Also, there are many interests outside of the Navy who are studying the ice or using ice information for many reasons including the effects of possible global warming and climate change; where schools of commercial fish can be caught; shipping along the Alaskan North Slope; and transport of pollution in the Arctic from freshwater river runoff. †

Ice in the Sea

Ice in the sea consists, for the most part, of either sea ice formed by the freezing of top layers of the ocean, or ice bergs originating from glaciers or continental ice sheets.

Sea ice accounts for probably 95 percent of the area of ice encountered, but bergs are important because of the manner in which they drift from their point of origin, constituting a navigation hazard.



A certain amount of ice encountered at sea originates in rivers or estuaries as fresh water ice; however its importance is local as it is already in a state of deterioration by the time it reaches the open sea. The first sign that the sea surface is freezing is an oily opaque appearance of the water. This appearance is caused by the formation of spicules, minute ice needles, and thin plates of ice known as frazil crystals, which develop into thick soupy slush.



Except in wind-sheltered areas, the slush, as it thickens, breaks up into separate masses, frequently in a characteristic pancake form. The raised edges and rounded shapes result from collisions of the cakes. With continuation of low

temperatures the cakes freeze into a continuous sheet. Ice may grow to a thickness of four or five inches in the first 48 hours, after which growth becomes progressively slower. Sea ice seldom becomes more than five to seven feet thick the first winter.



As stresses are relieved, long cracks develop which permit movement of segments within the pack. With the shifting of the ice, crowding may cause the ice to pile up into pressure ridges and hummocks. Rafting (overriding of one piece onto another) is the most common effect of pressure. In spring or summer as snow or the surface of the ice melts, the ice becomes covered with water. Continued thawing of the ice develops honeycomb passages and holes into which the surface water drains. †





Small Floe: 30' - 600'



Block: 6' - 30'



Brush: 6'



Ice Cubes: 1"

Icebergs



Ice of land origin in the sea, though often spectacular, is of minor importance in arctic operations except in localized areas. Icebergs are large masses of ice detached from the fronts of glaciers, from glacier ice tongues, or from the shelf ice of the Antarctic. Smaller masses, termed growlers and bergy bits, originate, like bergs, from glaciers, or are formed from the disintegration of icebergs and other masses of land-formed ice.



When the fog is dense but the sun is shining the first appearance of a berg is in the form of a luminous white object. If the sun is not shining it is a dark, somber mass with a narrow streak of black at the water line.



It is often erroneously assumed that a berg with one-eighth above water and seven-eighths submerged should be floating with a draft seven times its height above water; but these ratios hold good only for mass, and not for shape.

Ice off the southeast coast of Greenland. Composite satellite imagery shows visible pack ice (upper center) along coast. The multi-color bands indicate ice measured by passive microwave radiation, which allows satellites to chart ice even through cloud cover. The vertical bars indicate thickness of ice.

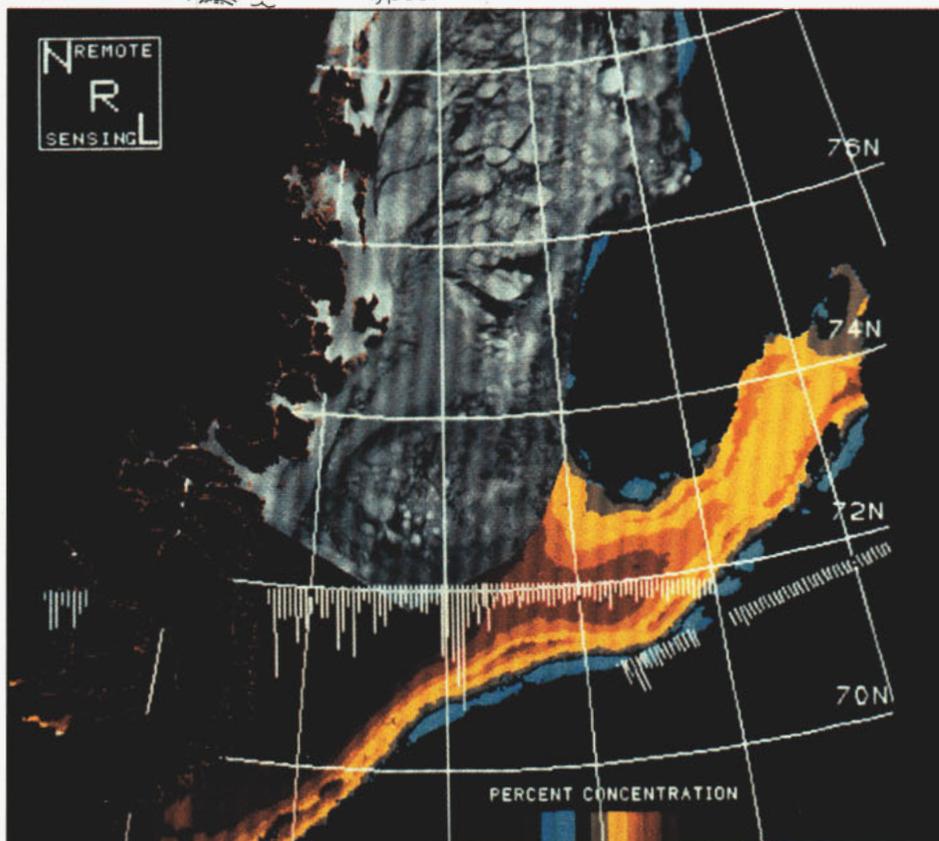
Icebergs are products of the land, and not of the sea. Arctic bergs originate mainly in the glaciers of Greenland, which has 90 percent of the land ice of the north polar region.



At times an iceberg will appear dark in contrast with the sky or with other bergs in the direct sunlight, and this phenomenon has often led mariners to report islands where none exist.



Measurements on Arctic bergs show that the draft is seldom more than five times the exposed height for the blockiest bergs, and may be as low as one or two times the height for the pinnacle and irregular types.



Time and tides ...

Although the effect of the moon's gravity upon us is only one ten-millionth the Earth's own gravitational pull, its power is enough to drag the Earth's oceans from their normal boundaries. Luckily, tidal forces can only affect large bodies – such as the oceans – and this explains why soup tends not to spill over the sides of the bowl when the moon is full.

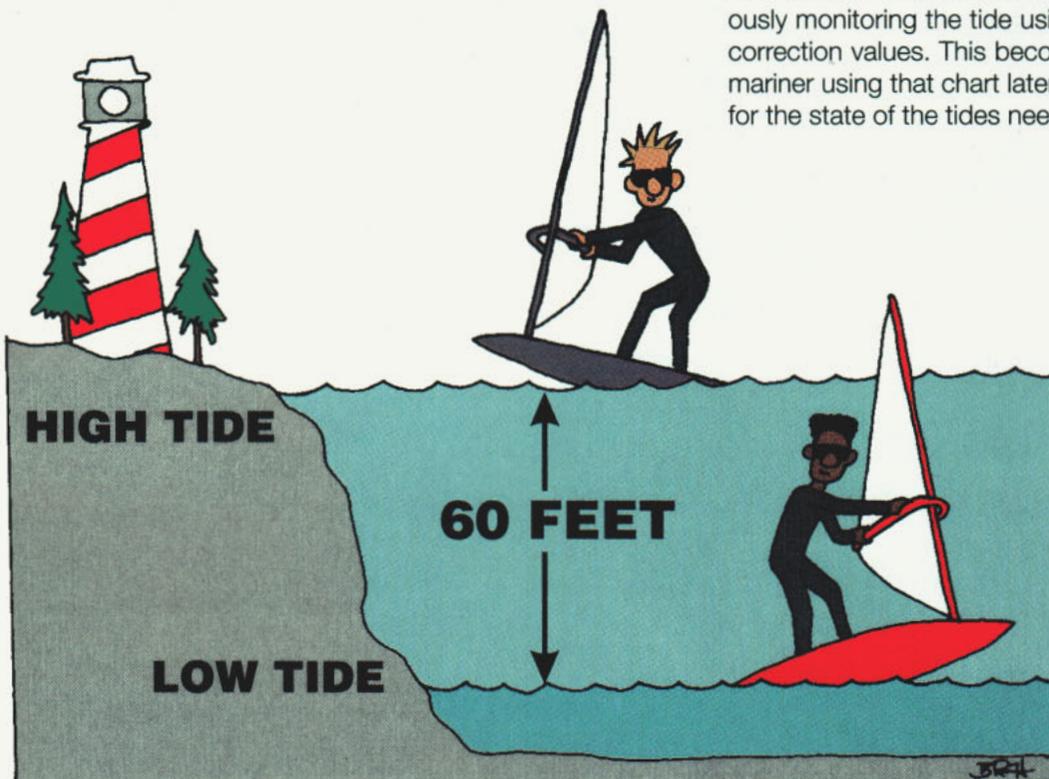
Tidal swelling occurs twice a day on both sides of the Earth, once when the moon is directly overhead, and once when the moon is on the other side of the Earth. Tides typically have ranges in the one to two meter range, but there are some areas which show no tides at all, and others which have ranges up to 10 meters.

In times of war, considerations such as the phases of the moon and tidal forces can have critical influence. Knowing they had only a two-day window of opportunity, World War II's D-Day Allied forces hit the beaches of Normandy on June 6, 1944, knowing the low tides and the moon's brightness would reveal the full extent of Hitler's "wall of death." Thus began the end of the war.

Conversely, disaster struck the Marines at Tarawa in 1943, when unanticipated low water over the barrier reef grounded an entire wave of landing craft hundreds of yards short of the beach. With the Navy's increased focus on the littoral, knowledge of the tides becomes ever more critical.

The actual speed and height of tides is not only affected by the moon, but by land masses, water depth, winds and barometric pressure. When the barometer drops by one inch of mercury, the seas rise by 13 inches. The effects are even more amplified when the moon is at perigee, or closest distance to Earth. Not only will this coincidence bring the highest tides of the year, it can also cause coastal flooding. Although the moon's distance from us varies only from 9 to 14 percent closer at time of perigee, it can cause tidal influences that are 30 to 48 percent greater during times of perigee.

Because tides continually change the depth of the water, any depth measurement taken during Navy hydrographic surveys will depend upon the time that measurement was taken. Since a chart can only reflect one depth value, soundings obtained during a survey need to be corrected for the state of the tide. This is done by continuously monitoring the tide using tide gauges, and adding correction values. This becomes the charted depth. Any mariner using that chart later will adjust the charted depth for the state of the tides needed. †



The Bay of Fundy, between Nova Scotia and the Canadian mainland, exhibits tidal ranges up to 60 feet.



Navy oceanographers: surveyors of the seas

Story by JO1 Ron Schafer, photo by Patricia Lanza

When the Naval Undersea Warfare Center in Newport, R.I., chose Onslow Bay as the site for their proposed shallow water undersea warfare training range, they realized they would need to know every inch of the area. They needed a team of experts to obtain the necessary information and data about the site. Enter the Naval Oceanographic Office.

NAVOCEANO, headquartered at the Stennis Space Center, Miss., is the largest single element of the Naval Meteorology and Oceanography Command. The office conducts oceanographic surveys in the world's oceans using ships, aircraft and other platforms to collect hydrographic, magnetic, geodetic, biologic, chemical, navigation and acoustic data.

The survey of the Onslow Bay site, located off the coast of Morehead City, N.C., was a general oceanographic and bathymetric survey to fully characterize the area and determine if there was anything to prevent the installation of hydrophones and underwater cables that would constitute the proposed range. The range would be used primarily for underwater weapons systems training but would include some evaluation and test components.

"Our job," explained Jim Glydewell, a senior NAVOCEANO representative and head of the Onslow Bay survey team, "is to collect, process and establish a data base [of] oceanographic data. We give the data to the customer in a nice processed form, but we also put it in our data base so that anyone who needs the data

can get it."

The survey area measured 35 by 50 nautical miles, approximately 200 percent larger than the proposed range. Water depths ranged from 20 to 200 fathoms. Among the data taken, according to Glydewell, were measurements of conductivity, temperature and depth, side-scan sonar and sub-bottom profiling, bottom samples and gravity measure-

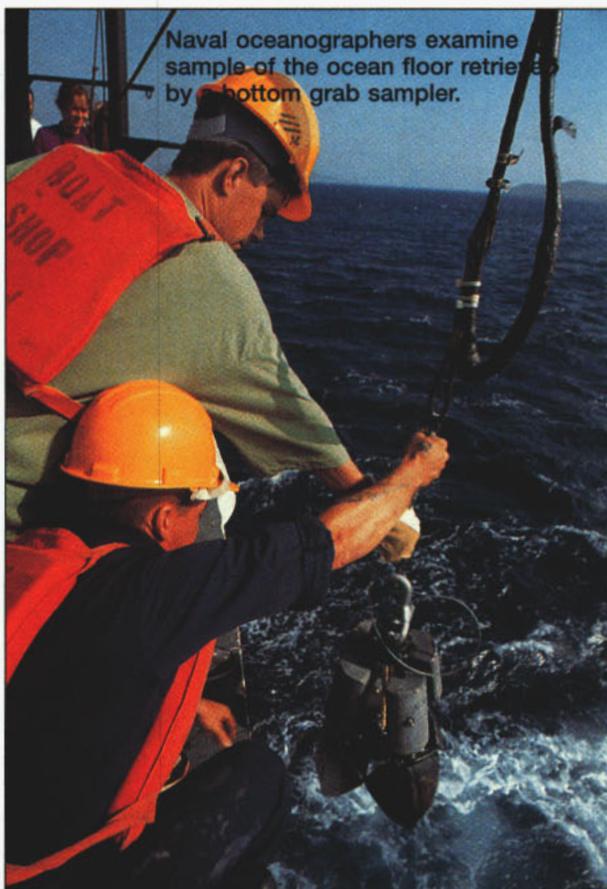
ments. More than 480 nautical miles of continuous data were collected along with 164 bottom samples. Bottom composition affects acoustics, anchorages and landings and must be considered in any survey taken.

Operating on board USNS *Kane*, one of eight Navy oceanographic survey ships, the 11-member crew from NAVOCEANO included physical scientists, geologists, physicists and oceanographers. "It's fairly typical," Glydewell said of the team's makeup. "For this particular survey, I wanted to be sure we had the proper mix of talent, so I chose people very carefully."

NAVOCEANO also provides service to international customers. Agreements with other nations, including Morocco, South Korea and Indonesia, enable NAVOCEANO to supply them with a minimal amount of equipment and personnel to help them begin coastal

surveys of their own. The data obtained in those surveys is then added to the NAVOCEANO data base and is made available governmentwide. †

Schafer is a Norfolk-based photojournalist for All Hands.



Naval oceanographers examine sample of the ocean floor retrieved by a bottom grab sampler.

Freedom of Navigation, Freedom

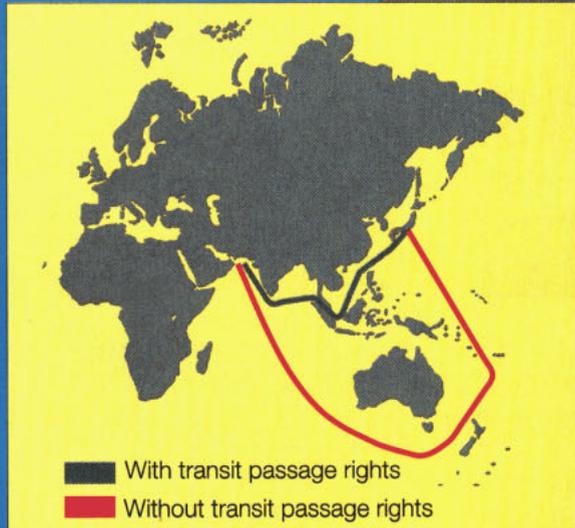
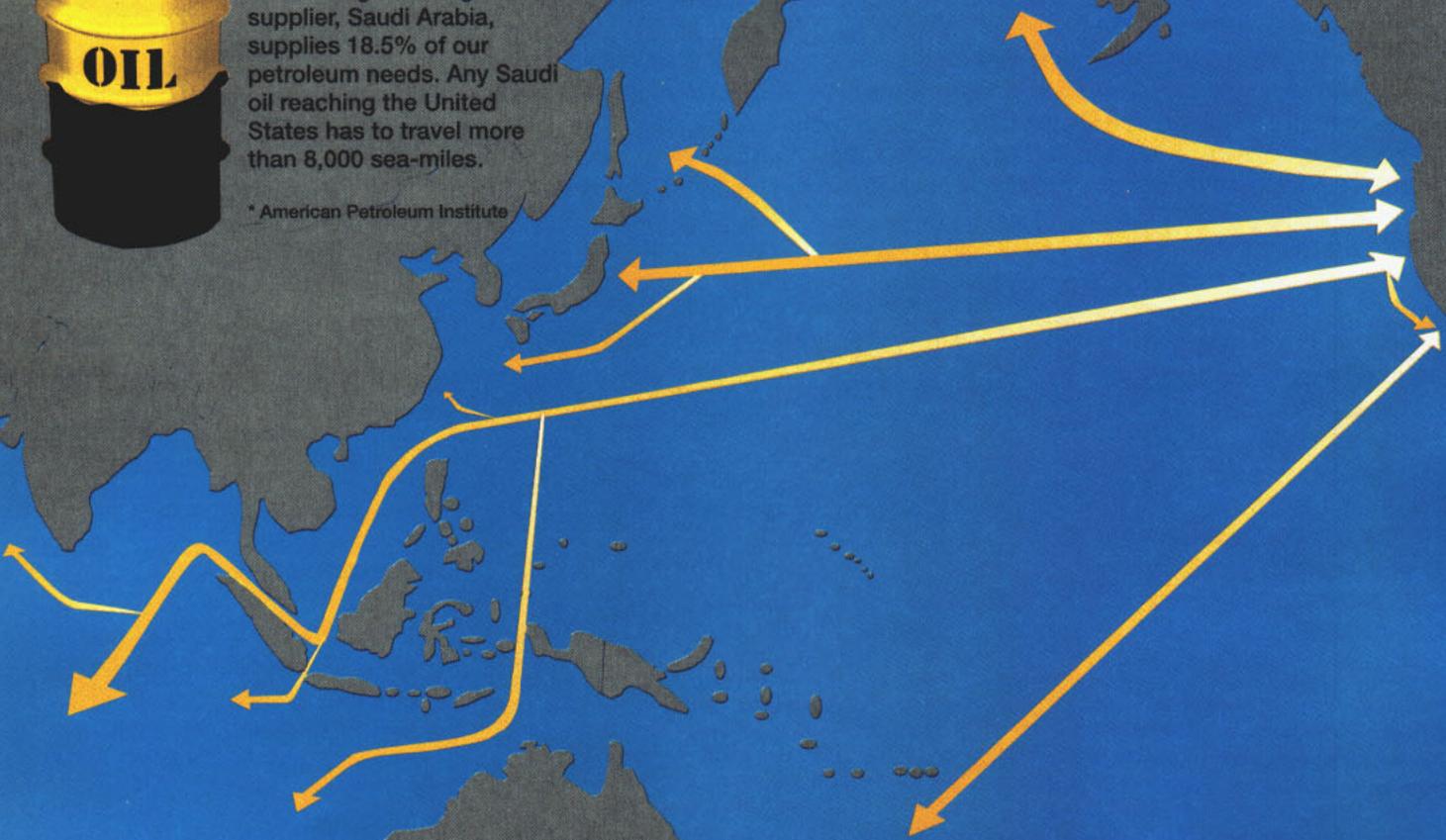
In 1994, for the first time, more than half of the oil used in the U.S. was imported.*

The largest foreign supplier, Saudi Arabia, supplies 18.5% of our petroleum needs. Any Saudi oil reaching the United States has to travel more than 8,000 sea-miles.

* American Petroleum Institute



Seaborne commerce exceeds 3.5 billion tons annually and accounts for 80 percent of trade among nations.



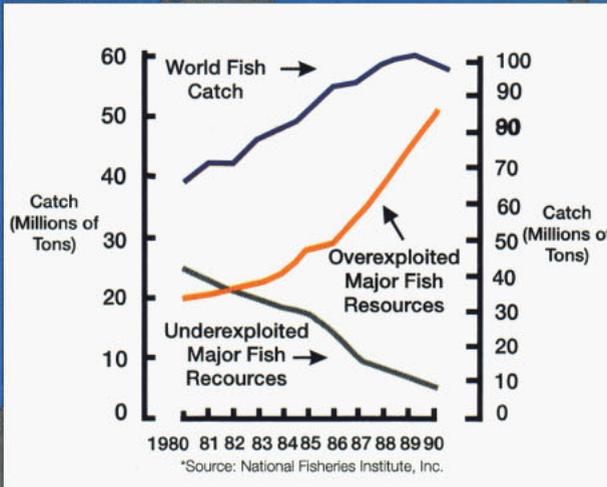
Freedom of Navigation

The United States relies upon the freedom to transit international waters and straits for its economic and military security. The 1982 U.N. Law of the Sea Treaty stabilized the breadth of territorial seas at 12 nautical miles; set forth navigational regimes of innocent passage in territorial seas; established transit passage in straits used for international navigation; and reaffirmed the traditional freedoms of navigation and overflight in exclusive economic zones and the high seas beyond.

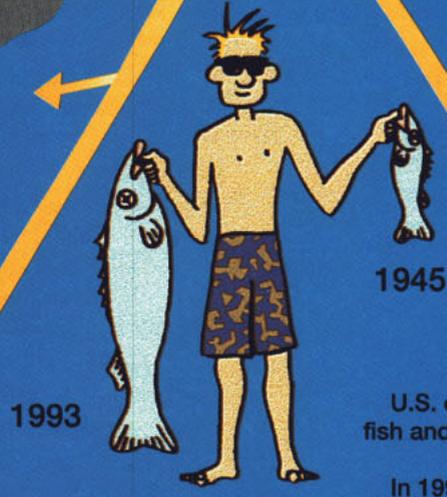
Transit Passage: Battle Group Cost and Time Savings

If prevented from transiting through the Indonesian Archipelago and the Strait of Malacca, a battle group sailing from Yokosuka, Japan, to Bahrain would have to reroute around Australia. Assuming a steady 15-knot pace, the six-ship battle group (all consuming conventional fuel) would require an additional 15 days and approximately 94,050 gallons of fuel to transit an additional 5,800 nm. Additional fuel cost would be approximately \$2.9 million.

to trade, Freedom to Fish



The U.S. and world economy would soon fail, if the United States could not import and export goods across the oceans. Virtually every aspect of our daily lives are touched by goods and services that are ultimately connected to free trade over the oceans. The U.S. Navy ensures our national security by keeping the sea lanes open for.



U.S. commercial fishermen caught 4.4 billion pounds of fish and shellfish in 1945 and 10.5 billion pounds in 1993.

In 1993, U.S. consumers spent more than \$38 billion on Seafood products.

Predicting weather



Mariners have always realized the tactical importance of weather and, from the beginning of time, have tried to forecast it.

The invincible Spanish Armada owed its defeat in the 16th century to the violent storms it encountered off the coast of Britain en route to its invasion of that country. The weather's effect on military battles elevated meteorology to a science during the mid-19th century.

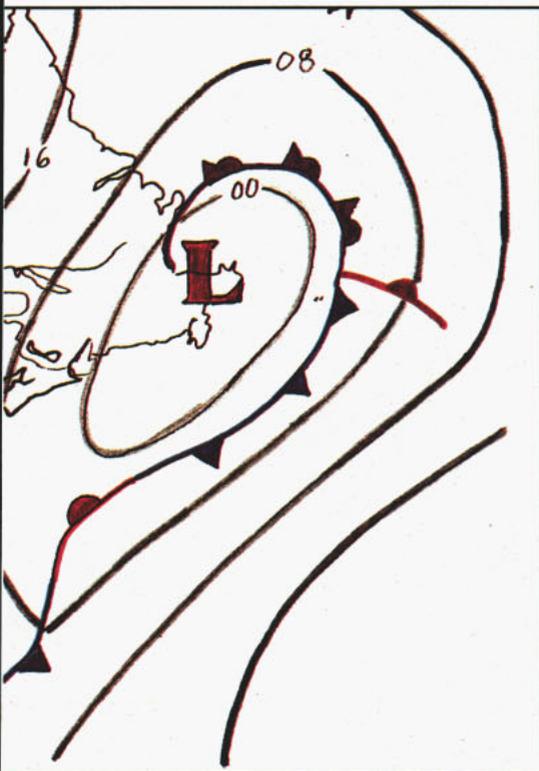
The French were responsible for the first weather map. During the Crimean War Emperor Napoleon III commissioned his Royal Astronomer to study weather forecasting after the Black Sea fleet was downed by a winter storm. The astronomer gathered all available weather reports preceding the storm, traced the path of the disturbance across southern Europe, and put his discovery in the form of a series of weather maps. With the invention of the telegraph, systematic collection of weather reports began.

U.S. naval officer Matthew Fontaine Maury is considered the father of military weather forecasting. During the mid-1800s he studied ships' logs to determine wind and weather trends. Using these findings, he made up charts and sailing directions that cut the sailing time from New York to San Francisco by almost 50 days.

During World War I, CDR Francis W. Reichelderfer, a



for military ops



U.S. Navy pilot and meteorologist, applied the still-evolutionary concepts of fronts and frontal activity to naval weather forecasting. Military forecasters soon added the latest mass and front movements to their daily maps.

During World War II, the Japanese used the weather to great advantage during their surprise attack on Pearl Harbor – a storm moving across the Pacific provided the cloud cover that helped prevent detection of the Japanese fleet. The Normandy Invasion, Operation *Overlord*, owed its success to a specific set of weather requirements. D-Day had to fall during the period one day before or two days after a new or full moon, followed by at least three days of light and clear skies. Had the invasion not taken place on June 6, 1944, it would have had to be postponed at least two weeks.

Today, the environment is acknowledged as a determining factor in all military operations from cruise missile strikes to amphibious landings to special warfare operations. Knowledge of the weather, which controls the seas, is to the advantage of military decision makers. Navy aerographer's mates, aided by technological advances, still provide that face-to-face customer service that aided successful operations of the past. †



Weather and the Sun

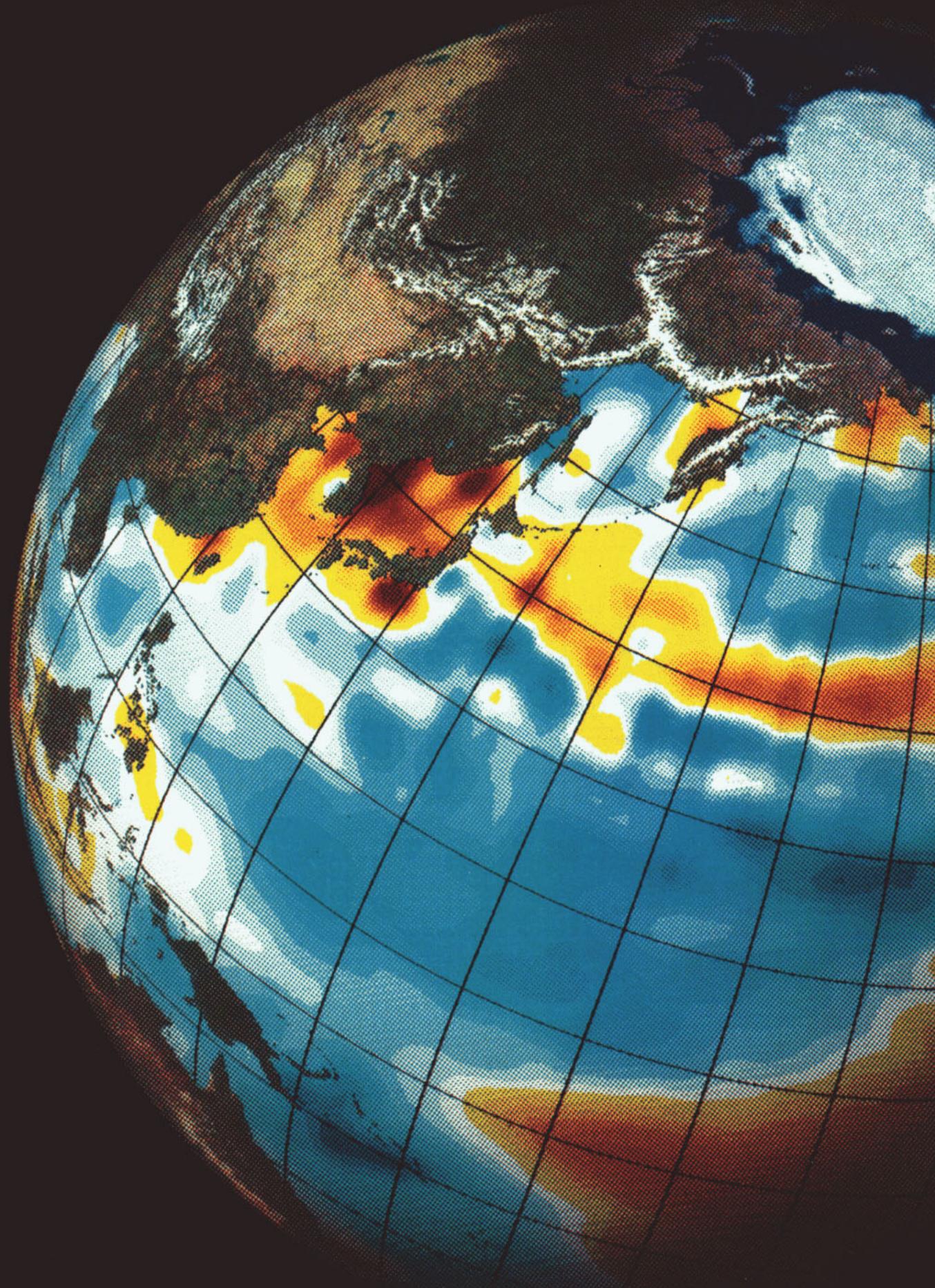
Where does the weather come from? Why is it warm and sunny one day, cool and rainy the next? The answer is the sun. As the power source for our entire solar system, the sun has a dramatic effect on the weather even when we can't see it. Fluctuations in the weather result from differential heating of the earth's surface and the atmosphere's efforts to distribute the heat evenly around the globe.

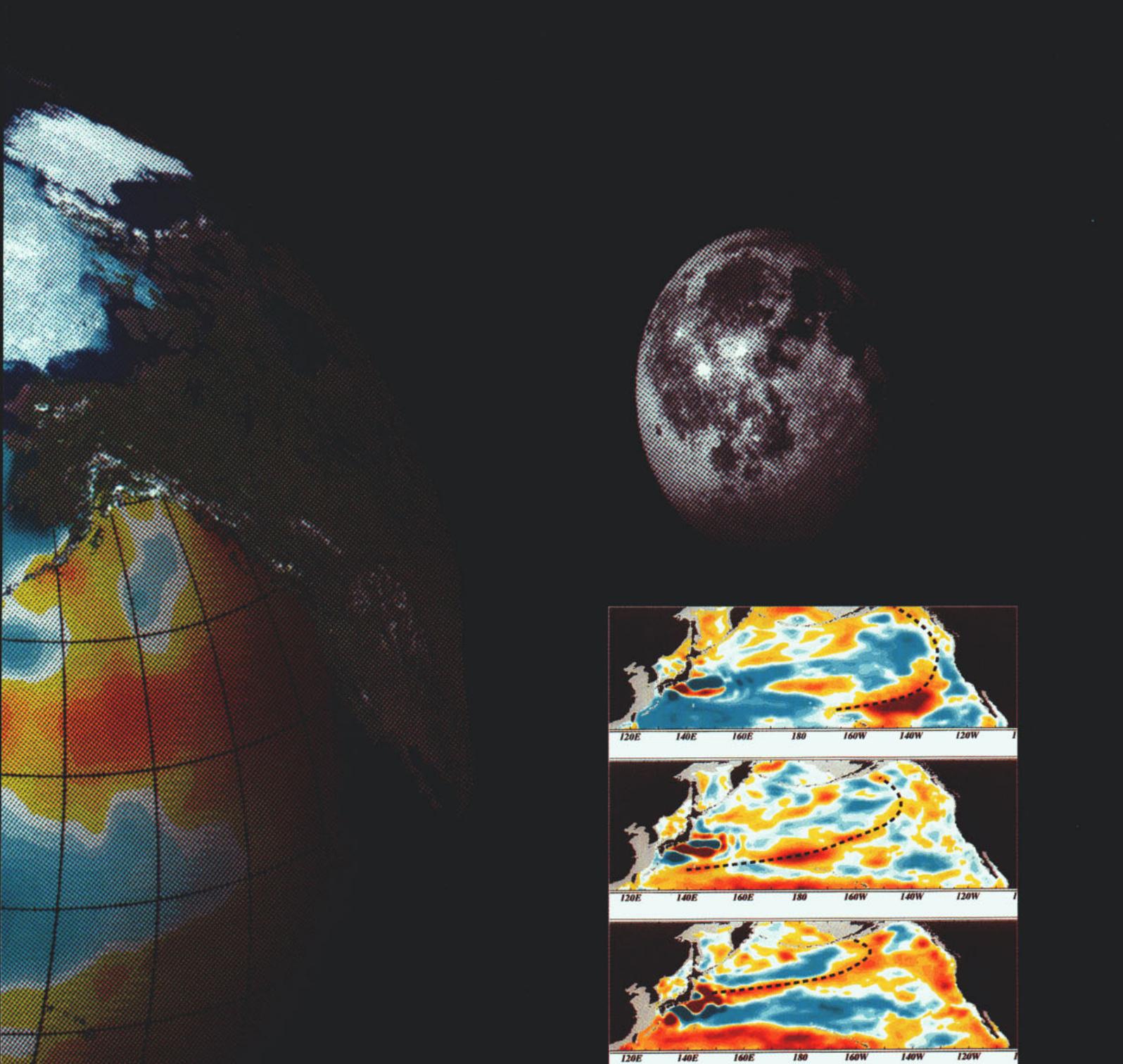
Although it feels like the sun heats from above, warming actually occurs from below. Concentrated radiation from the sun passes through the atmosphere in the form of short, ultraviolet rays. The earth absorbs this energy and turns it into heat and reradiates some of it back into the atmosphere, which seals it protectively around the earth like a blanket.

Because this incoming radiation is concentrated along the equator, the atmosphere must also redistribute this heat to rebalance the unequal heating. It does so through air masses and fronts. Air masses transport heat, and fronts separate the different air masses.

Most heat redistribution takes place along the polar front, the line separating the northern cold air masses from the southern warm air masses. As the low pressure systems move along this front they drive cold air to the south, and push warm air to the north, thus maintaining a heat balance. †







What is El Nino?

The easterly tradewinds along the equatorial regions of Earth maintain a system of westward flowing ocean currents. When the tradewinds suddenly decrease in strength, or even reverse in severe cases, the pool of warm water in the Western Pacific Ocean moves east toward the Americas. This phenomenon is known as El Nino. El Nino means "the child" because it arrives off the coast of Peru about Christmas time.

The 1982-83 El Nino, known as the El Nino of the century by weather watchers, produced dramatic oceanic anomalies such as increases in the sea-surface height and temperature along the coasts of North and South America, with important consequences for fish populations and local rainfall. The effect of this El Nino was felt throughout the globe through changes in local weather patterns. The 1994-95 heavy winter rainfall on the West Coast was also caused by El Nino. †



Clouds

Everyone has heard the expressions “Cloud 9,” and “castle in the clouds.” Although clouds look like delectable whipped cream and spun sugar confections, they are actually masses of condensed water vapor.

Clouds form when moist air rises through the atmosphere. As the earth’s surface warms, water evaporates until the air is saturated. As the air rises through the atmosphere, pressure decreases, and air expands and cools rapidly. Water droplets condense and become visible as clouds.

Dense clouds form during storms. Water droplets inside the air grow heavy and eventually descend as rain. In time, this moisture evaporates and reforms in the atmosphere as clouds. This process is called the hydrologic cycle.

Clouds may develop in other ways. When air passes over a cooling surface, such as the dewy ground at night, the wind may stir some of the coolness upward, creating fog. Artificial clouds form when damp air masses of different temperatures mix. Examples include the steam made by your breath in cold weather and the exhaust trails produced by high-flying aircraft.

What about snow clouds? Condensing vapor rarely produces ice crystals directly. Water droplets at below

freezing temperatures are said to be super-cooled. Occasionally a very small number of these will freeze. However, ice crystals absorb more water vapor so that they quickly grow, shed splinters, and multiply. Eventually, the water droplets completely evaporate and the cloud is composed entirely of snow and ice crystals.

There are many different types of clouds. The most common is the cumulus, a billowy cloud heaped high on a flat base. Cirrus clouds are wispy and streaked. Stratus clouds are layered, dark, and hang low in the sky. A nimbus is the black sheet which covers the sky during rain storms. There are many variations on these basic types including the fleecy cirrocumulus, whose delicate rows resemble the markings on a mackerel; the cumulonimbus, an extremely large, anvil-shaped cumulus cloud; and the stratocumulus, dark gray clouds associated with winter.

Cloud shapes are affected by several factors, notably the wind. As the high-piled cumulus hits the bottom of the stratosphere, a ceiling effect occurs; the top of the cloud flattens against this invisible surface and spreads into an oval. Winds can further stretch and pull the clouds into fanciful shapes. †

Typhoons and hurricanes

Hurricanes, typhoons, baguios, willy-willies — tropical cyclones are called by many names the world over, but they all present an equal threat to shoreline communities and ships at sea. Officially known as hurricanes in the North Atlantic, Caribbean, Northeast Pacific, and Gulf of Mexico and typhoons west of the international date line, these storms pack winds in excess of 74 mph as they rotate around a relatively calm center called an "eye."

Covering an expanse of 100 to 800 miles, an average tropical cyclone in one day releases energy equivalent to 400 21-megaton hydrogen bombs. Winds near the center can gust to more than 200 mph and tides can rise to 25 feet above normal — enough to level shoreline communities and destroy, or at the very least, cripple ships caught in their fury.

Most cyclones are born in the world's tropical and subtropical waters as tropical disturbances. Fed by warm, moist tropical air, they evolve into tropical depressions (winds of 38 mph), tropical storms (73 mph) and finally tropical cyclones (74 mph). Typhoons surpass the number of hurricanes in the Atlantic and Caribbean by a ratio of 3



USS Hornet (CV 12) crew members inspect the damage to their ship after a typhoon in 1945. Typhoons pack winds in excess of 74 mph.

to 1. Tropical cyclones have never been recorded in the South Atlantic because the water is too cold. †

Tropical Storms and Hurricanes, 1886-1992

The official season in the Northern Hemisphere extends from June 1 to November 30 and peaks from August to October; however, storms frequently occur during the off-season as well, especially in the Pacific. February is the least likely month for tropical storm formation.

	Jan.-Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Number of tropical storms	3	11	30	33	66	115	42	21	3	377
Number of hurricanes	1	3	23	36	150	193	96	22	3	527

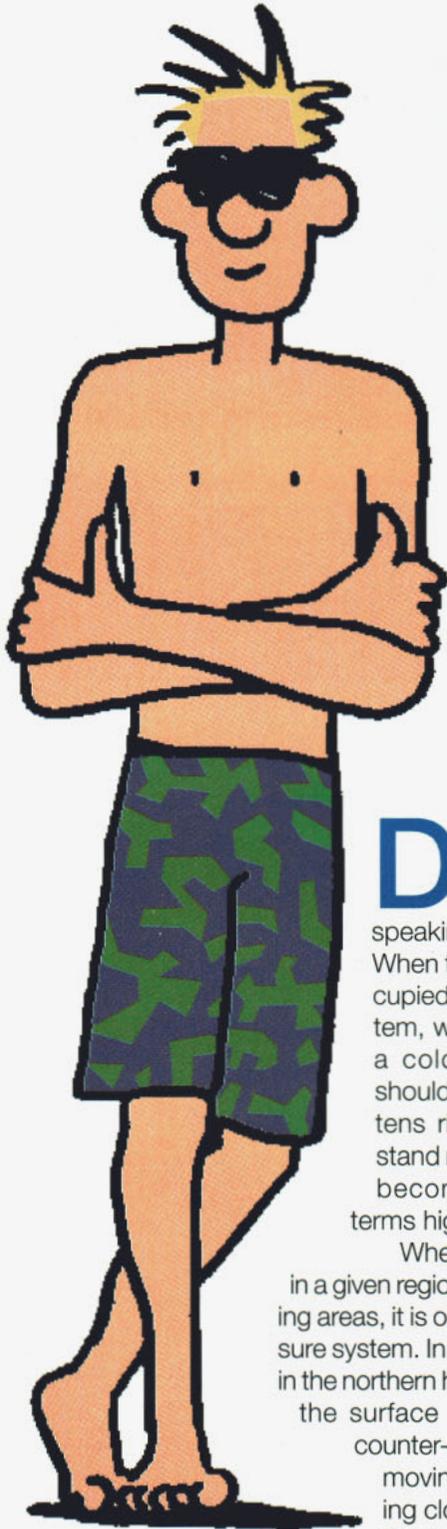
Hurricane Advisories and Warnings

Thanks to modern detection and tracking devices, specifically satellites, the Navy-Air Force Joint Typhoon Warning Center in Guam and NOAA's National Hurricane Center in Miami can usually provide up to 72 hours of advance warning. "Advisories" are issued if hurricanes approach land. A "watch" is issued whenever a hurricane becomes a threat to coastal areas. A hurricane warning is issued when winds greater than 74 miles an hour are expected in a specific coastal area within 24 hours. Precautionary actions should begin immediately.

During a hurricane

Navy forecast centers at Norfolk, Guam and Pearl Harbor broadcast predicted hurricane positions and movements to ships at sea with recommended routes to avoid dangerous winds and seas. Ships in port will usually sortie to a safe hurricane anchorage or head seaward if the hurricane is predicted to strike near their port. This requires an even longer range prediction for large ports such as Norfolk in order for all ships to reach safety.

Source: Federal Emergency Management Agency and NOAA



Highs, lows and fronts

Do weather forecasters on the evening news seem to be speaking a foreign language? When they say the area is occupied by a low pressure system, will it rain or stay dry? If a cold front approaches, should you get out your mittens right away? To understand meteorology, one must become familiar with the terms highs, lows and fronts.

When the surface pressure in a given region is less than surrounding areas, it is occupied by a low-pressure system. In a low-pressure system in the northern hemisphere, winds near the surface circulate inward in a counter-clockwise direction. Air moving inward rises producing clouds and precipitation. Stormy weather is a byprod-

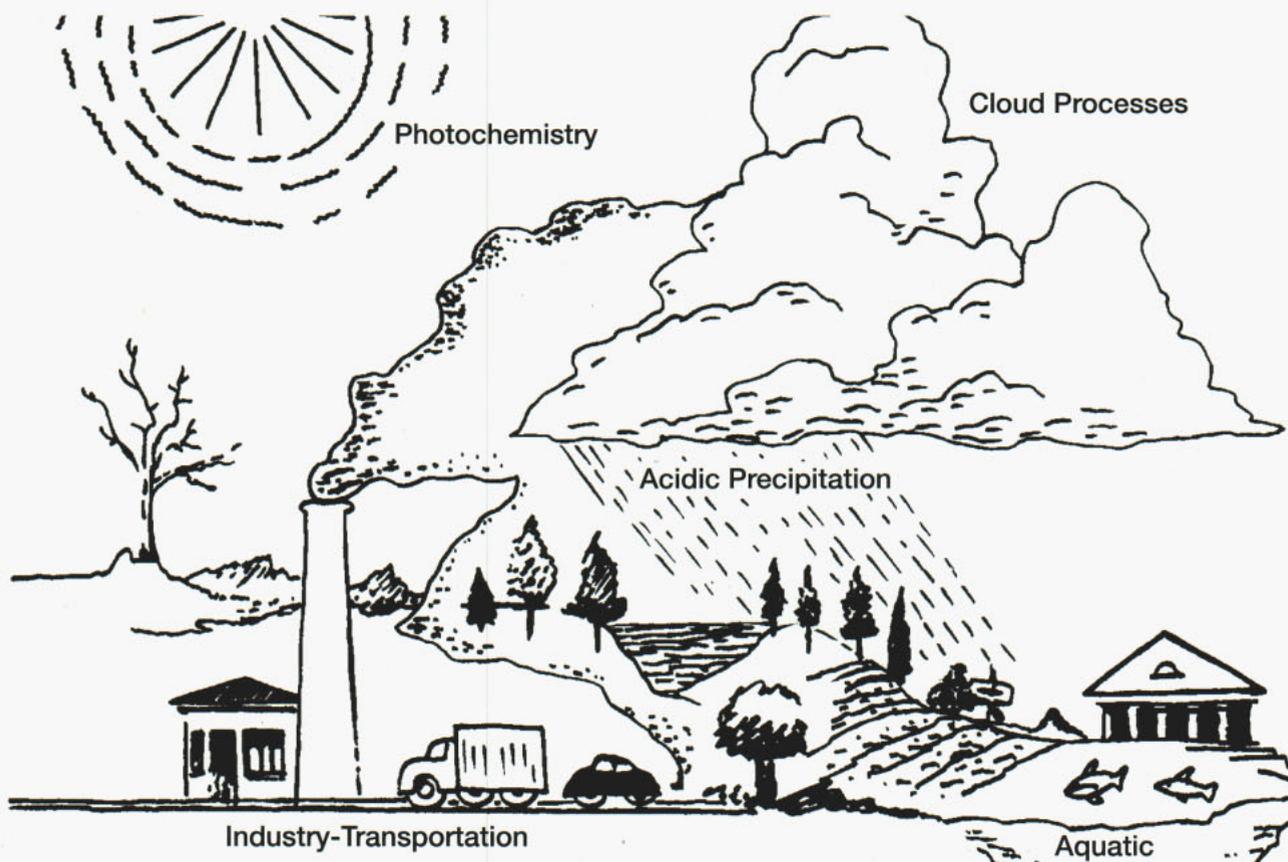
uct of a strong low-pressure system.

In a high-pressure system, winds near the surface spiral outward in a clockwise direction. The weather is generally fair, but there may be some showers or thunderstorms nearby, especially in hot, humid weather.

A drop in atmospheric pressure signals the approach of a low-pressure system or the departure of a high-pressure system. When pressure rises, the opposite is true. The rate of this rise or fall depends on the speed of the movement and intensity of the systems.

A low-pressure trough often goes hand in hand with a cold front – a mass of advancing cold air pushes up against the retreating mass of warm, moist air. When this occurs, the wind shifts. Pressure falls as the trough approaches. The cold front often brings with it a line of showers followed by a temperature drop.

A warm front occurs when a mass of warm air advances against a retreating wall of cold air. Pressure falls rapidly as the front nears. The weather is cloudy with steady precipitation. If the front passes directly over, temperatures may rise until the next cold front comes through. †



Acid rain

The atmosphere is like an enormous chemist's beaker – a vessel where gases mix, mingle and react. Often they turn into poisonous substances capable of returning to earth as rain or snow. Acid rain has been blamed for the death of several lakes and rivers in North America and may be partially responsible for worldwide forest depletion as well.

Each day, thousands of tons of sulfur and nitrogen oxides are pumped into the air by fossil fuel-burning plants and automobile exhaust systems. Sunlight converts these gases into sulfuric and nitric acids which then are absorbed by the water particles in clouds. Mixed with rain and snow, they fall back to earth, usually hundreds of miles from the original source of the pollution.

The term acid rain is somewhat misleading. In addition to the 'wet' substances of rain, snow and fog, dry particles of sulfur and nitrogen oxides also fall and are absorbed by plants and soil. These particles, known as acid deposition, turn acidic when mixed with surface moisture.

A substance's pH factor, a figure on a scale of 1 to 14, determines a substance's acidity. A pH value of 7 is neutral. A figure less than 7 indicates higher acidity, more

than 7 means greater alkalinity. Rainfall with a pH lower than 5.6 is considered abnormally acidic.

Acid rain releases chemicals from the soil into rivers and lakes, restricting the growth of aquatic plant roots. These chemicals also clog the gills of aquatic animals, attack their bodies and causes life-threatening deformities in their young.

As plants, insects, fish, amphibians and reptiles disappear, the structure of the lake's ecosystem weakens and collapses. When the lake is completely unable to support life, mammals and birds which rely on the lake as a food source become endangered. Sadly, dead lakes and streams often appear clear and beautiful.

Some scientists think that acid rain affects forest growth by weakening trees so that they are less likely to survive droughts, insect attacks, diseases or storm damage.

Natural habitats are not the only ones endangered. Man-made office buildings, houses and automobiles also erode due to repeated soakings of acid rain.

Several government agencies are investigating acid rain. Through the use of new technologies, we are beginning to clean up sulfur emissions made by factories. †

Waves

Where do they come from and how do they affect naval ops?

Waves originate from two sources: wind-driven, called seas and swells, and geological disturbances, known as tsunamis.

A wave's size and shape reveal its origins. A breeze of only two knots can cause small ripples to grow on calm water. Whitecaps are seen when the winds reach about 15 knots. Choppy waves that are still being pushed by the local winds are called seas. As waves leave the area in which they were generated, they are called swells and can travel thousands of miles over the open ocean.

No two waves are identical, but they share common traits. Every wave, from a tiny ripple to the largest tsunami, has a measurable wave height, the vertical distance from its crest (high point) to its trough (low point). Wind speed, duration and fetch (the distance over which the wind blows over open water) determine how high a wave grows. The maximum height a wave may grow from a steady wind over 24 hours is usually less than one half the wind speed in miles per hour. When a wave bottom begins to drag on the bottom, the top continues forward until the wave "breaks" on the shore.

When waves reach the beach they can form three types of breakers, depending on the beach slope. Spilling breakers, a favorite with surfers, are turbulent water with

foam cascading down the front. They form on gently sloping or flat shores and roll great distances before breaking. Breakers that form from a steeply sloping bottom are plunging breakers. As the crest folds over, it creates a large air pocket, followed by a smooth wave front. Experienced surfers can sometimes crouch under the falling crest and "ride the tube." Surging breakers peak up, but rather than plunge or spill, surge smoothly up the beach face.

Tsunamis, erroneously called tidal waves, are the most destructive form of waves. These result from underwater earthquakes or volcanic eruptions that disrupt the water's surface.

The tides have nothing to do with their formation. Tsunamis can travel at 400 mph and be only three feet high in the open ocean.

However, a tsunami's wavelength — the distance from the crest of one wave to the crest of the next wave — can be 60 miles. As the water quickly piles up on the beach, it can reach a height of more than 100 feet.

Wave forecasts are made daily with Navy computer models. Surf predictions for amphibious landings and sea and swell forecasts for tactical ocean ship routing services are examples of integrating wave predictions into naval operations. †

Polynesians navigated most of the Pacific Ocean by sense of touch

Throw a stone into a large lake, and the pattern of ripples set up will be disturbed by any rocks that break the surface. Given a chart of the ripples, it would be possible for someone with a knowledge of mathematics to calculate the rocks' positions.

Enlarge the pond to the size of an ocean, substitute waves for ripples and islands for rocks, and it is still possible to apply the same principles to pinpoint the location of an island 100 miles away.

Some 2,500 or 3,000 years ago the ability to read the messages of the waves in this way helped a race of master navigators to reach and colonize almost every habitable island in the vastness of the Pacific.

The Polynesians had no maps to guide them, no compasses, no sextants, no telescopes, not even a written language through which to hand down the lessons of experience. Yet over a period of 1,000 years they populated more than 12 million square miles

of the Pacific.

They were able to do so because of their knowledge of the stars and their sensitivity to the sea. They noticed that when waves hit an island, some were reflected back in the direction from which they came, while others were deflected at angles around the island to continue in altered form on the other side. Investigating the phenomenon further, they acquired sufficient knowledge of the behavior of the waves to be able to reckon the location of an island possibly 50 to 100 miles away.

It was an intricate science and an intimate one, for it was not possible to read the waves from a height. The Polynesian sailor had to be so close to the waves that he could feel their motions.

He would go to the bow of his canoe, crouch down in the hull, and literally feel the different sets of waves below. Within minutes he would be able to determine the position of the nearest island, intervening reefs and other islands. †
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Diving and pressure

For centuries, the prospect of sunken treasure and an unexplored frontier have lured daring adventurers to the deep ocean world. There, the pressure exerted by the water column (seven tons per square inch at the deepest part of the ocean) could easily crush anyone not in a specially configured deep submergence vessel.

Below 300 feet, the pressure exerted on divers is nine times that at surface, and the increase of nitrogen bubbles in solution in the bloodstream may cause nitrogen narcosis, a condition of increasing mental disorientation. Divers suffering from nitrogen narcosis act drunk and become dangerous to their diving companions and themselves.

The bends occurs when nitrogen bubbles collect in body joints, bone marrow, muscles and nerve centers and expand during rapid ascent. If the pressure is not immediately increased, redissolving the gas, it may result in brain damage, crippling or death. Following a long dive, divers must undergo a gradual decompression process so that the nitrogen in the blood may be released slowly through the lungs. The deeper the dive, the longer the decompression time.

Pressure is a major diving hazard, but precautions, such as proper diving instructions, safe equipment and the awareness of pressure-related health symptoms can help ensure a safe exploration of the ocean world. †



The Gulf Stream

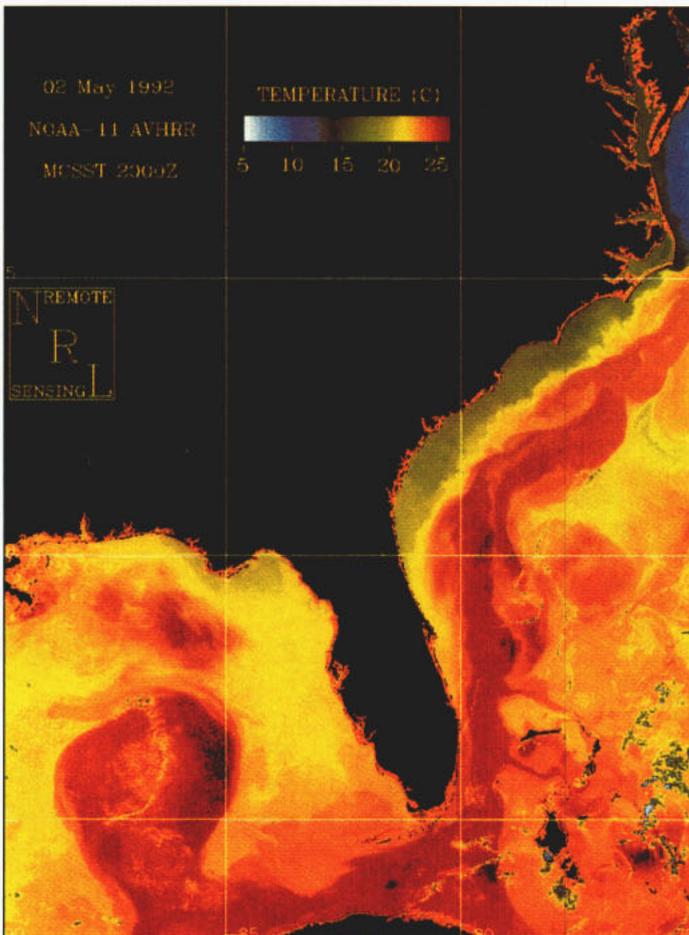
The Gulf Stream is a warm ocean current in the North Atlantic flowing from the Gulf of Mexico, northeast along the U.S. Coast to Nantucket Island, and then across the Atlantic to the British Isles.

The Gulf of Mexico, once thought to be the source of the Gulf Stream, actually contributes very little to its flow. The Gulf Stream really results when two strong currents, the North and South Equatorial Currents, mingle in the passage between the Windward Islands and the Caribbean Sea.

The true Gulf Stream flows between the Straits of Florida, and the Grand Banks. However, it is part of a much larger Gulf Stream system, which covers the entire northward and eastward flow from the Straits of Florida, including the branches crossing the North Atlantic from the region south of the Newfoundland Banks.

Water flows through the Straits of Florida at a rate of approximately 26 million cubic meters per second, about 1,000 times greater than the flow of the Mississippi River. It increases to 75 to 90 million cubic meters per second by the time it reaches Chesapeake Bay due to the addition of Sargasso Sea water and a contribution from the Continental Slope. As the water turns eastward, beyond the Grand Banks, the flow decreases to less than 40 million cubic meters per second. The boundary between the Gulf Stream and surrounding water is extremely sharp, often resulting in a temperature difference of 10 C, and abrupt changes in water color and sea state. Crossing the Gulf Stream can be difficult during underway replenishment and makes the ASW problem more complex. †

Infrared view of the Gulf Stream as seen from space by NOAA's polar orbiter *Tiros*.



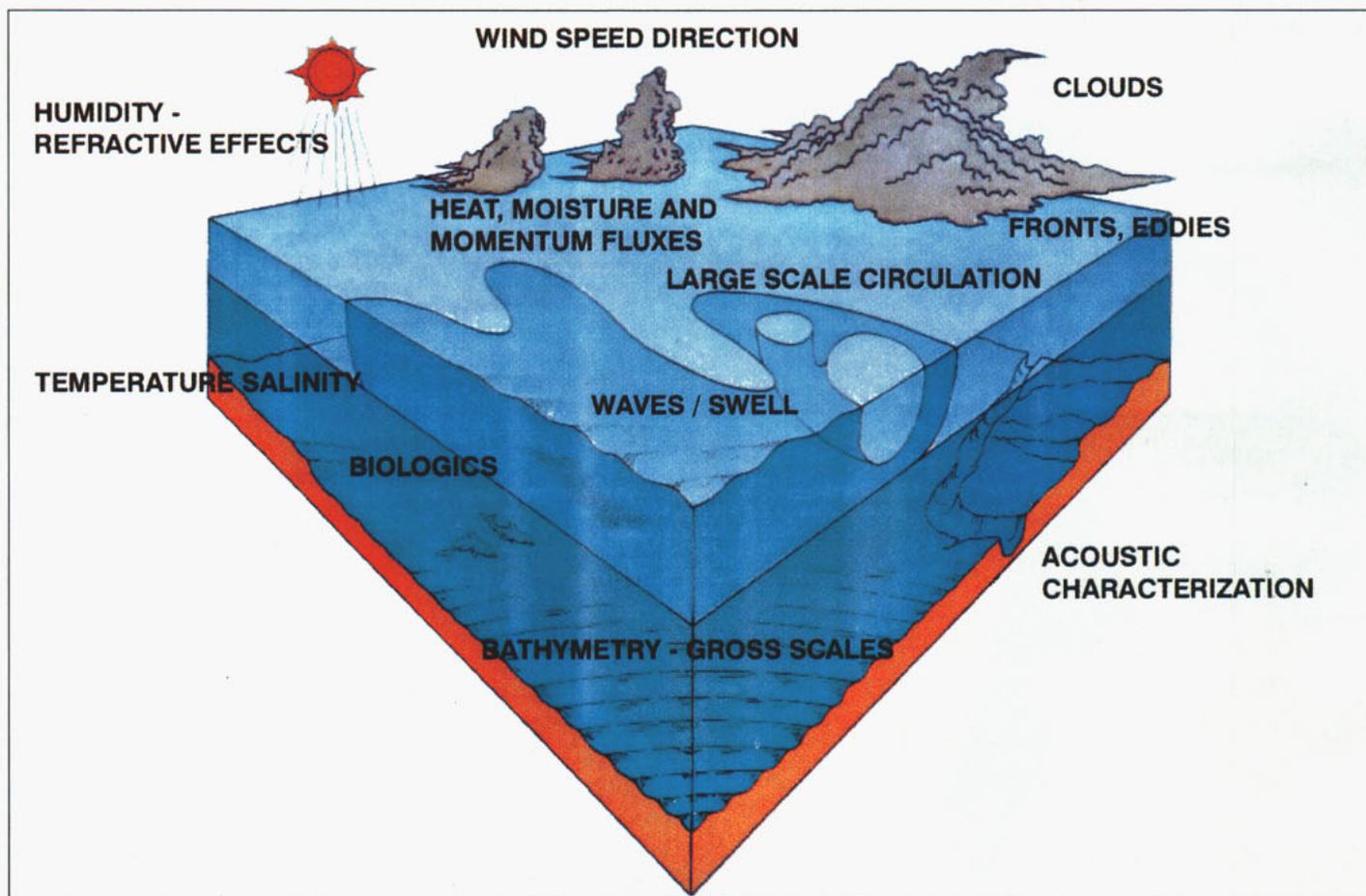
The big picture

The knowledge gained through applied scientific study and oceanographic data collection is of vital concern to the warfighter. Getting this information to the operating forces is the responsibility of the Naval Meteorology and Oceanography Command. Safety is always a top concern, whether routing ships across the ocean to save fuel and time and to avoid hazardous seas and weather, or

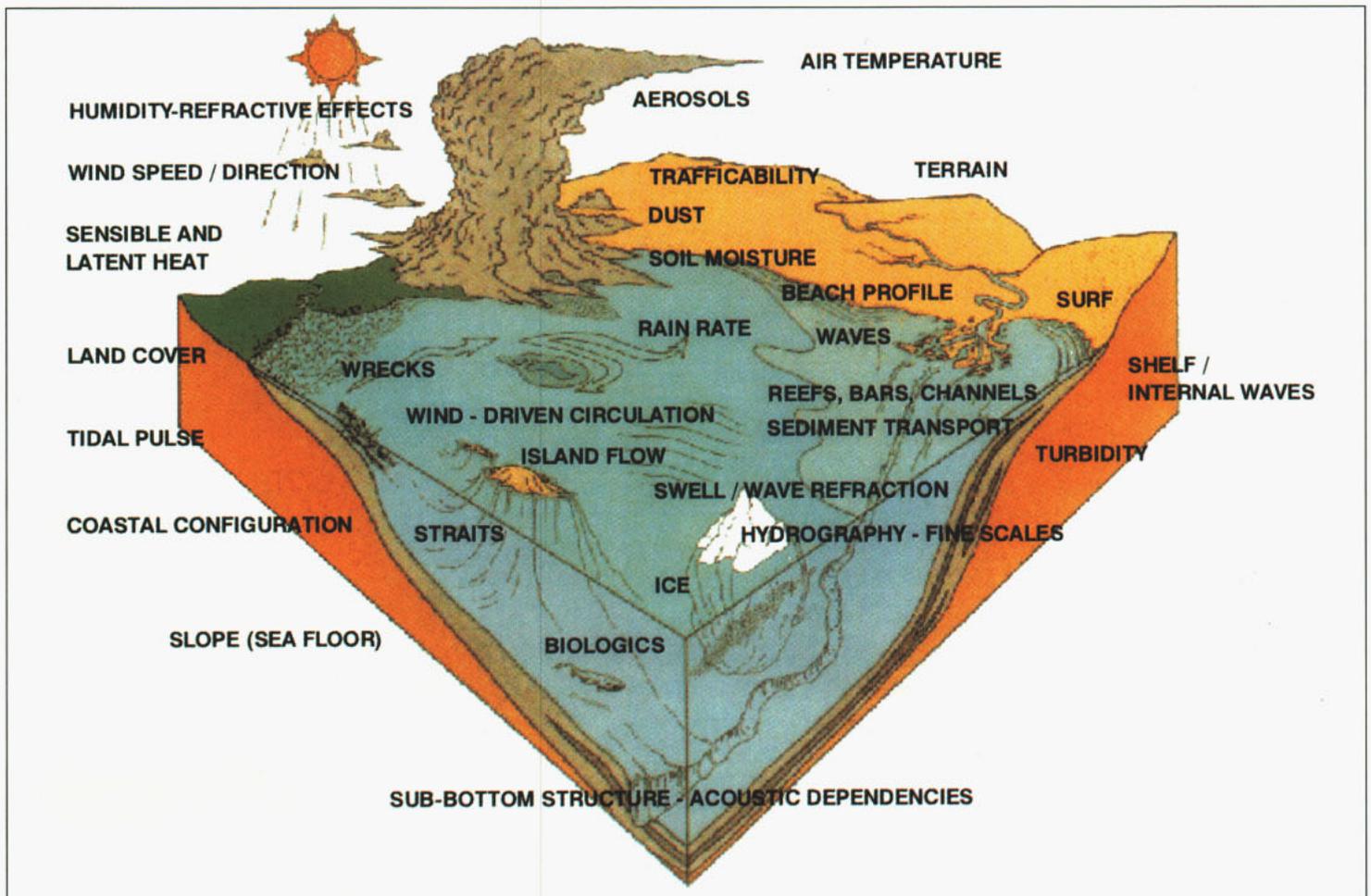
providing warnings of approaching typhoons or hurricanes. Every aircraft flight or ship maneuver requires consideration of what the ocean and atmosphere are going to do.

Each day, the Navy's super computer center at the Fleet Numerical Meteorology and Oceanography Center in Monterey, Calif., receives up to 2 million observations from around the world. Based on these observations, computer-

Blue water



Littoral water



based predictions are then made of the ocean's temperature, circulation, waves, ice, and the changes in the atmosphere. These predictions are available to naval oceanographers on ships and at airfields around the world who then provide forecasts for their Navy customers.

Since the end of the Cold War, naval oceanography has shifted its focus from deep-water anti-submarine warfare (ASW) — where large areas of the ocean moved and changed slowly — to the highly complex shallow water and near-shore environment, called the littoral. The challenges of the naval oceanography community are to predict the effects that changes in the littoral environment have upon

the Navy's ships, aircraft, weapons, sensors and operations. The Naval Oceanographic Office uses survey data collected from ships, aircraft and satellites to provide highly specialized products for the littoral environment.

The littoral zone became of great concern during the Gulf War as Iraqi mines, oil spills and smoke from burning oil wells drifted down the coastline of the Persian Gulf. Predicting the motion of these hazards required highly detailed knowledge of the water, beach, currents, winds, rain rate and a host of other types of data. †

ENVIRONMENT

➤ Naval Research Lab scientists take ocean floor measurements with a trident spear probe.

▼ A scientist sets up a model of a sediment experiment which will place dyed grain-sized particles on the ocean floor to track sediment.

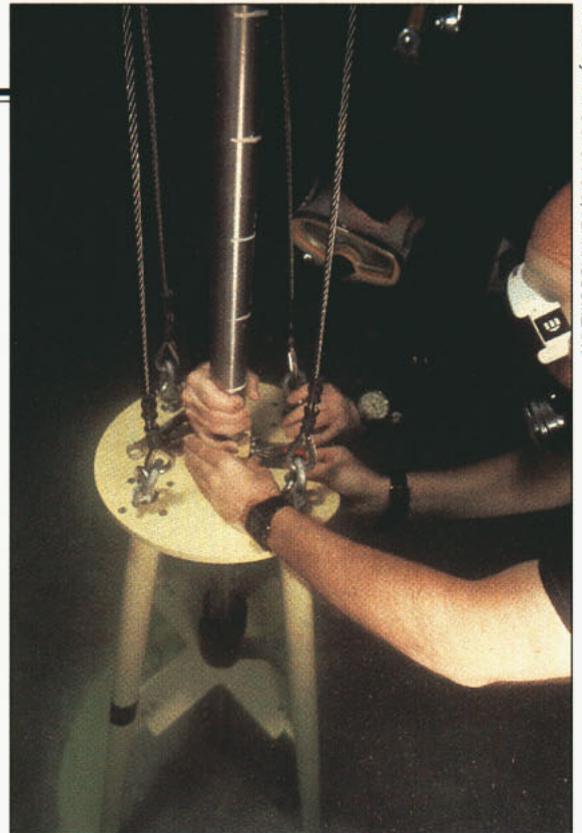
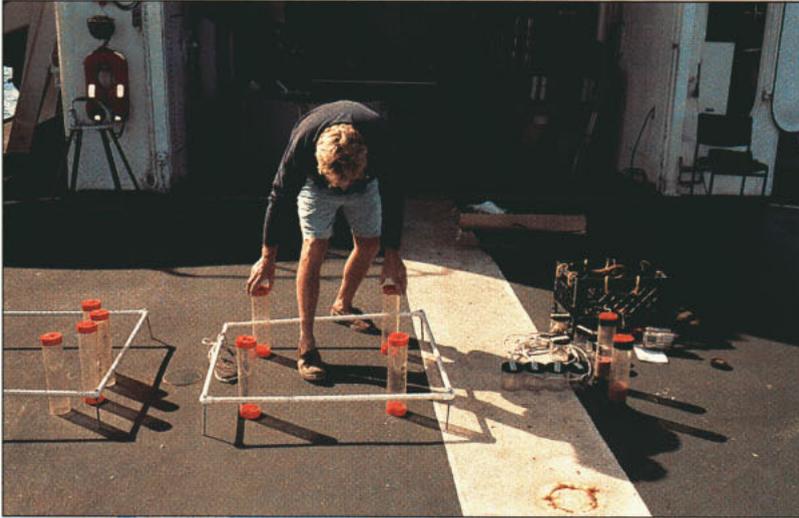


Photo by PH1 Glen J. Hurd, FTIMAGCOM/LANT





The Key West Campaign

Helping the Navy's vision

Story and photos by JO1 Ron Schafer

Haiti. Somalia. The Persian Gulf. As the Navy increasingly operates in shallow water environments around the world, maintaining a ready and capable mine countermeasures (MCM) program has never been more vital. To that end, scientists from the Naval Research Laboratory (NRL) are halfway through a five-year program to study the coastal environment's influence on MCM operations.

In February, scientists from NRL were joined in Key West, Fla., by an international group of scientists for the

third exercise of the Coastal Benthic Boundary Layer Special Research Program. "The Key West Campaign" included three ships — one from Germany and two from the United States — and more than 100 scientists and technicians representing six nations.

According to Dr. Michael D. Richardson, the project's lead scientist, the objective of the exercise was to gather data from the abundant carbonate sediments found at the site. The data are used to improve the ability of the Navy's MCM systems to detect, classify and neutralize mines located on or in the ocean floor.

Carbonate sediments consist of small particles of algae, broken animal shells, skeletons and coral that result from nature's process of breaking down coral reefs. Environmental processes such as waves, currents or marine life control the distribution of properties that make up the structure of each type of sediment. Using data from the Key West exercise, scientists can create prediction models to determine the sediment type in similar shallow water environments, particularly those in potential areas of conflict for the Navy.

"Essentially," said Richardson, "we're looking at environmental processes such as tides, waves, currents or animals that would be there, primarily the chemical processes that go on in the sediment."

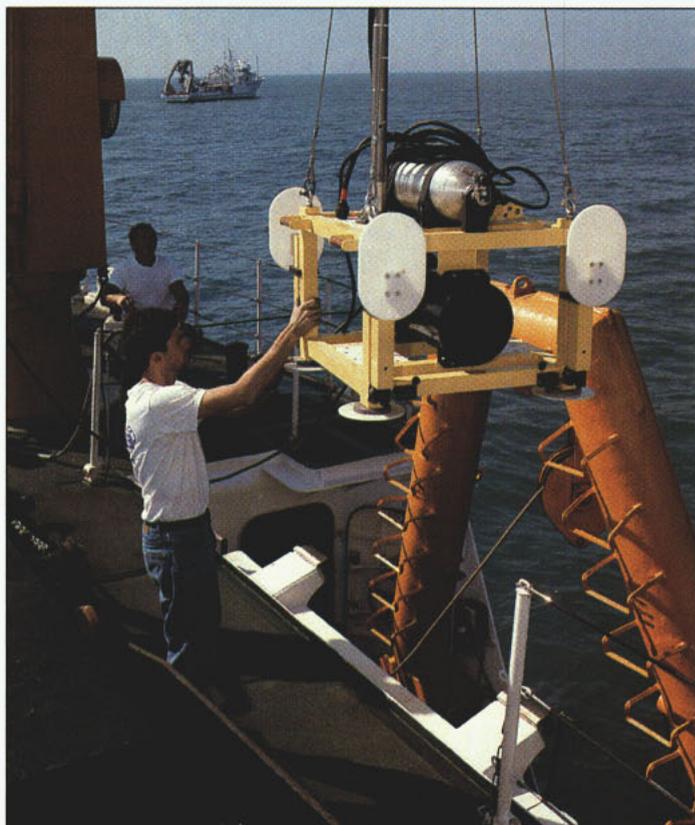
"By understanding how the environmental processes control sediment structure, we can predict what the sediment structure may be in areas that we haven't operated in or we don't have information on."

Predicting a specific sediment type can provide tactical aids that will help to make informed decisions whether to hunt or sweep for mines.

"They can better predict whether mines will bury or not and they can better know how to make settings on the sonar system which is integral to the MCM 1 *Avenger* class," said Richardson.

Having moved from a blue-water battlefield to coastal regions, information gathered during this research program will have a profound impact in leading the Navy's mine countermeasures program into the 21st century. †

Schafer is a Norfolk-based staff writer for All Hands.



◀ ▲ Scientists from the Naval Research Lab prepare and launch a duomorph, a probe which measures the rigidity of sediment.

A special treat for Mother Earth

Story by JOC Martin Fucio and SN M. Taylor Clark,
photos by JOC Fucio

Something's cooking aboard USS *Theodore Roosevelt* (CVN 71) and it's not in the galley! On *Roosevelt's* last deployment, the crew developed a cookbook of environmental recipes titled *The Environmental Compliance Program Cookbook* to help other ships comply with local, state, federal and international environmental rules.

"We called it a cookbook because the Navy puts out enough reports and manuals," said CDR Stu Paul, editor of the cookbook and a former aircraft maintenance officer aboard USS *Theodore Roosevelt*. Paul and LTJG Mike Gallop, who literally wrote the book on trash and hazmat handling while serving aboard *Roosevelt*, wanted a user-friendly approach to sharing lessons learned. As *Roosevelt* and Air Wing 8 tried ideas that worked, Gallop and Paul wrote a step-by-step explanation of how to replicate the 28 ideas aboard other ships or shore activities. The results read like a cookbook — with the instructions resembling recipes.

Theodore Roosevelt sailors developed many of the ideas themselves, but others were adapted from other places in the Navy — for example the Consolidated Hazardous Material Control Management Program (CHRIMP) uses

NAWC Point Mugu's Hazardous Inventory Control System (HICS). CHRIMP establishes one central location as a hazardous materials minimization (HAZMIN) center for the issue and return of hazardous materials such as greases, brake fluids, anticorrosives and about 250 other commonly used items.

If a Sailor needs a quart of paint, he or she goes to the HAZMIN center, fills out a short form and receives a numbered paint can. An easy-to-use HICS computer program tracks the can, which must be returned within 48 hours. When the can is returned, it's stored for reissue if it still has paint in it, or is properly disposed of if empty. This eliminates the half-empty cans of paint stored on shelves here and there throughout the ship which might have created a fire hazard. CHRIMP is also user-friendly. "We tried to make it simple," said Gallop. "When a system is easy to use, people are more likely to use it.

Another great idea *Theodore Roosevelt* Sailors used to save the earth (and taxpayers' dollars) was purchasing reusable rags. Shipboard housekeeping consumes a huge numbers of rags, which are normally used once and then discarded. By processing used rags in a specially developed rag-oil separator to remove most of the oil and



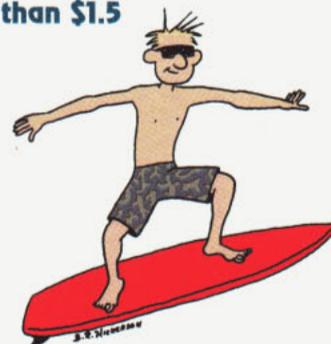
grease, washing them in a commercial washer and reusing them, *Theodore Roosevelt* reduced the number of rags used during a six-month deployment from 2,800 bales to 1,600 bales for a purchase savings of \$58,735. They realized further savings of \$78 per barrel for disposal of the rags as hazardous waste. And, of course, the rags didn't find their way to a landfill.

Altering PMS oil change intervals for aviation support equipment, laser particle counters in lieu of patch testing for hydraulic fluids and many other good ideas are highlights among the recipes in the book. The cookbook has helped spawn an official "Pollution Prevention Opportunities Handbook" being printed and distributed to all commands this spring. Look for it as a great place to think up some ideas you can use aboard your ship or station.

LTJG Mike McDowell, Gallop's successor as environmental compliance officer, and the rest of *Roosevelt's* crew continue searching for simple solutions. An important lesson is — write down your good ideas, so others can find out about them.



The Navy will invest more than \$1.5 billion on environmental programs in FY96.



◀ AS2 Phillip Hardy uses the aerosol can puncturing device, which collects residual waste for proper disposal. After puncturing, aerosol cans are flattened for easier disposal.

Get it here, get it now

To obtain a copy of USS *Theodore Roosevelt's* cookbook, write:

Commanding Officer
AIMD/1M-1/EC Cookbook
USS *Theodore Roosevelt* (CVN 71)
FPO AE 09599-2871

You can also get a copy of the cookbook (text only) on the NAVSAFECEN BBS, (DSN) 564 7927 or (804) 444-7927.

USS *Theodore Roosevelt* has sent more than 300 copies of the cookbook to commands throughout the Navy, continuing the work begun by the ship's namesake.

"President Theodore Roosevelt was one of this great nation's first environmentalists," said CAPT Stanley Bryant, USS *Theodore Roosevelt's* former commanding officer in the intro to the cookbook. "We hope we are following in his footsteps." †

● AE1 David McCarty, removes rags from the commercially available washer and dryer aboard USS *Theodore Roosevelt* (CVN 71).

Fucio and Clark are assigned to the public affairs office, USS Theodore Roosevelt (CVN 71).



Zapped!

GW Sailors put the squeeze on shipboard trash

Story by JO1 Lee Bosco,
photos by PH2 Troy Hoagland

It's been a seagoing habit for thousands of years. Ancient mariners did it. The Vikings did it, even the Spanish Armada did it. But the U.S. Navy is doing something about dumping trash and garbage at sea.

For centuries, thousands of pounds of garbage were dumped into the planet's oceans with little thought given to the damaging consequences. A newfound wisdom, coupled with some common sense, has prompted the world, and the Navy, to take a closer look at the age-old practice of tossing trash over the fantail.

USS *George Washington* (CVN 73) took a major step toward an environment-friendly solution when it was selected as the operational test site for the Compressed Melt Unit (CMU) plastic waste processor.

After 21 months of intensive devel-

opment, NAVSEA approved the production of the plastics processors, which compress shipboard-generated plastic waste into 20-inch disks.

George Washington is complying with the Marine Plastic Pollution Research and Control Act enacted by Congress in 1987. The act prohibits the overboard discharge of shipboard plastic waste.

Navy surface ships are required to complying with this act by Dec. 31, 1998. Through a massive effort, the Navy will have plastics waste processors installed aboard all surface ships by that date.

Doug Vaughters, an engineer, and technician Mike Murnane, two members of a five-man team from the Carderock



▲ Airman Tian Chen (left) and Airman Brian Detrich (second from right) get a first hand look at the future of shipboard plastic disposal. Civilian technicians Doug Vaughters and Mike Murnane hold a plastic disk produced by a Compressed Melt Unit plastic processor installed on board USS *George Washington*.

Division, Naval Surface Warfare Center (CDNSWC), Annapolis, Md., embarked *George Washington*, preparing the ship for the arrival of the first CMU plastic processor in the fleet.

The CMU plastic processor is revolutionary in its design because of its simplicity. The CMU heats the plastics to the melting point while compressing them into a smaller volume. Any water contained in the plastics is cooked off. The temperature of the melted plastics is high enough that most odor-causing bacteria are eliminated. When cooled under pressure, the plastics wastes form

a dense disk, slightly smaller than a man-hole cover.

"The volume reduction ratio is 30-to-1," said Vaughters. "That means five to six large garbage bags make one disk. Without these plastics processors, most ships would have to stow those garbage bags and that takes a lot of space ... not to mention the sanitary conditions of the area where they are stowed ... and the smell," added Murnane.

"The CMU is going to make Sailors' jobs easier, living conditions better and keep damaging plastics out of the environment," he said. "We're looking at ways to recycle the plastic disks, so in the long run the Navy may even make money selling the disks."

GW also has pulpers that grind a combination of all paper and food products and sea water to make a fine slurry (garbage mixture). The result is a 98 percent liquid solution which is returned to the sea at a rate of 180 gallons per minute. The slurry disbursts and degrades much quicker than the paper and food would have had they gone over the side in their original form.

Plastic, paper and food aren't the only solid wastes *George Washington* generates. At sea, the ship is home to almost 6,000 crew members who seem able to generate more trash than party-goers on New Year's Eve in Times Square. Sailors go through metal cans and bottles at such a rapid pace that the Navy, early on, realized it needed a separate system to cope with the denser waste.

The glass/metal shredder is an acceptable solution to storing this solid waste. The shredder breaks up cans and bottles so, when put in a container, they take up much less space.

George Washington's future plans call for collecting, washing and shredding all aluminum cans. The aluminum will be held on station until the ship returns to port. Then the waste will be turned over to a recycling plant. This could be a very profitable venture, in addition to being environmentally sound.

With additions like these, the words,

"Dump all trash clear of the stern" will someday be reserved for sea stories and chanties about those who sailed before. †

Bosco and Hoagland are both assigned to USS George Washington (CVN 73) public affairs office.

► **USS George Washington's BM2 Thomas Whitesell shows the result of the ship's glass and metal waste shredder. The shredder reduces waste volume by a 2:1 ratio, allowing more material to be held on station in limited shipboard space.**

▼ **BT1 Michael Taylor of Jacksonville, Fla., navigates the aisles at Naval Station Norfolk's HAZMIN Center. Taylor will retrieve hazardous materials with a specially designed order picker.**



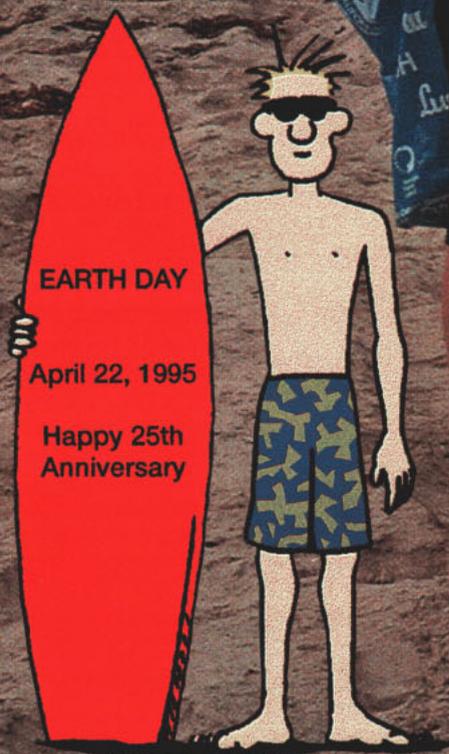
ENVIRONMENT

Story and photos by JO1 Ray Mooney

When some 6,000 people hit the San Diego beaches recently, it wasn't to bag rays, but to bag trash. As part of the California Coastal Commission's effort to clean up litter on the coastline, the call went out for volunteers to scour local beaches. In response, 26 commands from Naval Station, San Diego, responded with 300 volunteers.

"We not only work here, we live here too," said Sonar Technician (Surface) 1st Class (SW) Frederic Agunat, stationed aboard USS *Rentz* (FFG 46). "We're members of the community and we should do our fair share."

Sailors and their family members picked up bottles, cans, shoes, trash, pieces of timber and even hypodermic syringes



Cleaning



along three stretches of coastline in San Diego, including Border Field State Park, a strip of beach south of San Diego that runs right up to the Mexican border.

San Diego's beaches were cleaned a week after central and northern California beaches were picked up, completing the effort to make the beaches a cleaner and safer place for everyone. "I surf, so I have a vested interest in coming out and helping clean things up a little bit," said Gas Turbine System Technician (Mechanical) 2nd Class Christopher Gibson, stationed aboard USS *Curtis Wilbur* (DDG 54). "Sometimes when I surf I run into things floating in the water, like plastic bags and just about anything else. There's a lot of pollution, and it just ticks me off." ↓

Mooney is a San Diego-based photojournalist for All Hands.



PN1 Angel Quezada, his wife PN1 Kelly Stine and their son Zachary teamed up with 300 volunteers from Naval Station, San Diego, to storm the San Diego beaches during a huge litter pickup.



PN2 Lee Kenemore, STGG Jose Santos, EMC Oscar Dimaragi and SK2 Edgardo Garcia of SIMA San Diego pick up trash along the beach. All kinds of trash were picked up by volunteers during the cleanup effort.

up on the coast

Whale flies south after being rescued

Navy transports whale that was found dying on a New Jersey beach

Story by JO1(SW) Jim Conner, photos by National Aquarium, Baltimore

The Navy's C-2 COD (carrier onboard delivery) aircraft are best known by Sailors aboard aircraft carriers for carrying people, parts and mail. However, a C-2 from Fleet Logistics Squadron 40 (VRC 40), Norfolk, last year had the opportunity to transport a female pygmy sperm whale, cargo not usually associated with any naval aircraft.

The whale was given the nickname "Inky" by staff at the National Aquarium in Baltimore. The nickname came about because of the ink-like dye this species of whale releases as a defense mechanism. Inky was rescued from the New Jersey coast on Thanksgiving Day, 1993. She was first brought to the Marine Mammal Stranding Center in Brigantine, N.J., then transferred the next day by a Coast Guard helicopter to the National Aquarium.

At the aquarium, medical staffers determined Inky was suffering from stomach disease. After a basic examination and six endoscopic procedures during a 19-day period, aquarium medical staff removed a large piece of mylar balloon, as well as pieces of clear plastic and parts of plastic garbage bags from Inky's stomach. "It's almost like she ate a small trash bag containing these items," aquarium veterinarian, Dr. Brent Whitaker said.

After five months of around-the-clock

care from aquarium veterinarians, marine mammal specialists and numerous volunteers, the whale was rehabilitated and readied for release off the coast of Florida into its natural habitat. Upon final examination before leaving the aquarium, Inky weighed 323 pounds, some 116 pounds heavier than when she was found.

The Navy's assistance was requested to transport the whale from Baltimore to Florida. The air crew involved in transporting the whale on the C-2 were pilot LT Drew Basden of Virginia Beach, Va., co-pilot LT Tami Fennell of Boulder, Colo., in-flight plane captain Aviation Structural Mechanic 1st Class Alan Slifer of Frederick, Md., and Loadmaster ASMAA Jody Giordano of Harding, Penn.

Inky was transported in a dry sling that required attendants to keep her skin moist and cool continuously and her temperature stable by rubbing her with ointments, spraying her with water and covering her with ice packs.

Upon arriving in Florida, Inky was transported to Marineland in St. Augustine where she got used to the sunshine and warm waters before being released off the coast of Florida. †

Conner is a photojournalist for All Hands.



► A plastic bag, a mylar balloon and other pieces of plastic trash were removed from Inky's stomach. If they had not been removed, the whale would have died.

▼ Inky, the female pygmy sperm whale rescued after she became stranded on the New Jersey coast, plays in the hospital pool with David Schofield, Marine Animal Stranding Coordinator at the National Aquarium in Baltimore.



Bearings

Senior chief gets a kick out of life

Some people, like Senior Chief Navy Counselor Wilfred L. Cotto, believe focus and concentration are key elements to a successful life. However, Cotto is also using an ancient art form to help him achieve his lifetime goals.

"Karate requires me to focus and concentrate continuously, and I've been able to apply those qualities to other aspects of my life," said Cotto, a 17-year Navy veteran.

Cotto first became interested in karate at the age of 16 while growing up in Bronx, N.Y. A friend who practiced karate invited him to visit the school to observe a demonstration.

"I was very interested," said the 35-year-old Cotto. "Once I saw the

demonstration, I became even more curious and wound up joining the class."

During his spare time, Cotto also competed and even placed in several full contact karate tournaments. In 1983, he was the No. 1 ranked middle-weight in New York City.

Because Cotto enjoyed being a recruiter, he changed his job specialty from working with aircraft to working with people as a Navy counselor.

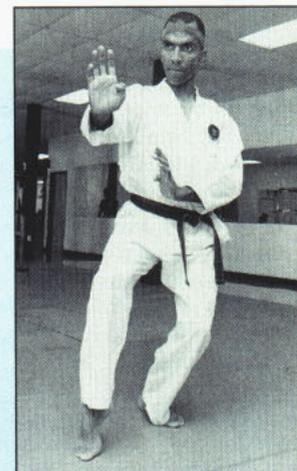
As a black belt, Cotto has found that his role in karate has become more of a teacher. To become a better instructor, he studies the history of the martial arts, particularly the *goju-ryu* style. *Goju-ryu*, which means "the style of soft and hard," is a Japanese-

NCCS(SW) Wilfred L. Cotto demonstrates a karate stance.

Okinawan form of karate.

"I think my involvement with karate has complemented my advancement in the Navy because everything that I've done in karate has been documented in my performance evaluations," said Cotto. "I think it is a positive extra curricular activity and enables me to demonstrate my leadership ability." †

Story and photo by JOCS Doug Gorham, Navy Public Affairs Center, San Diego



Guam lends a helping hand in Kenya

Thanks to the Sailors and Marines assigned to USS *Guam* (LPH 9), some special children in Mombasa, Kenya, will find it hard not to be "tired" when they play.

Sailors and Marines aboard *Guam* helped improve community relations when they visited the Salvation Army Children's Home in Mombasa. More than 50 volunteers installed tire swings on the playground's trees and built an additional swing set for the children. The volunteers also painted the orphanage's kitchen and several other rooms.

The orphanage is home to 61 children, ranging from three to 14 years old. "We meet the needs of every child," said Salvation Army Captain Bilha Rewa, superintendent of the home.

The orphanage relies totally on funds provided by sponsors. The ship's chaplain, LCDR Bradley R.

Sickler, said that the Sailors and Marines brought many items for the orphanage. "We had books, first aid supplies, medical cleaning agents and dental kits."

In addition to the material support, Sailors and Marines played with the children and took plenty of photographs. Loud cheers erupted from the children whenever a photo was taken.

"Children are the purest part of being human," said Lance Cpl. Richard Gutierrez, an infantryman on board *Guam* and volunteer at the orphanage.

The presence of Navy and Marine Corps personnel definitely had a positive effect on the children. "When they heard Sailors and Marines from the ship were coming, they were very happy," said Rewa. "Having the Sailors and Marines here doing so much for them, it really makes them feel loved." †



▲ Children at the Salvation Army Mombasa Children's Home wait to swing on a tire put up by crew of the USS *Guam* (LPH 9).

▼ Constructing a swing set are Lt. Timothy R. Quiner (left), LCPL Richard Gutierrez and FN Shawn L. Jackson.



Story and photo by JOSA Eric M. Wagner, assigned to USS *Guam* (LPH 9) public affairs office.



DS1(SW/AW) Stefan E. Valian is realizing his childhood dream of being a train operator. "This is my childhood dream come true!"



Going locomotive

Do you remember what your reply was as a child when adults would ask, "What do you want to be when you grow up?" Data systems Technician 1st Class (SW/AW) Stefan E. Valian remembers. "I've always wanted to be a train engineer," he said. Working toward his childhood dream, Valian volunteers as an operator at the Western Railway Museum at the Rio Vista Junction in Rio Vista, Calif. "I go as often as my wife lets me," he joked.

Valian is training on the diesel locomotive and hopes to be a qualified engineer soon. He believes his interest in trains began on family road trips when his father would point out all the passing trains to keep him quiet.

He remembered hearing of the museum a few years ago when he was attending Data System Technician "A" school at Combat Systems Technical Schools Command (CSTSC), Mare Island, Calif. When he returned to CSTSC in April 1991, he decided to ride Rio Vista and check it out. Thoroughly impressed, he asked if someone with practical

experience with trains could become a volunteer and was pleased at the response. "Anyone can go there and get training on different aspects of the museum. Everyone there is a volunteer, from the engineers to the grounds keepers," Valian said. He has qualified on 12 different pieces of railway equipment during the past three years. "This is my childhood dream come true!"

The Los Angeles native not only operates the museum's trains, he is also responsible for greeting visitors

and sharing the historical value of each museum piece with them. Valian is also a qualified conductor and brakeman on the Western Railway Museum's passenger train.

Now that Valian is living his childhood dream, what's next? "I still have nine and a half years before I retire from the Navy. Then I'd like to work for the Short Line Railroad, but if that doesn't work out I'll continue volunteering at museums. My long-term goal is qualifying as an engineer on a steam locomotive." His love of trains is not confined to his volunteer work. He, of course, is working on a complete miniature train model at home.



Story and photo by ET2 Tonja Murphy, assigned to Combat Systems Technical Schools Command public affairs office.

Brothers make commissioning, reenlistment a family affair

Receiving a commission as a limited duty officer is an occasion when most Sailors want their family to join them. But at his recent commissioning ceremony, ENS John J. Coyne took things a bit further.

Coyne, a former Chief Storekeeper (SS/SW/AW), was commissioned an ensign in the Navy Supply Corps during a ceremony at the Naval Air Station Oceana, Va. Immediately after taking his oath of office, he called Cryptologic Technician (Administrative) 1st Class James E. Coyne, his older brother, forward and administered the reenlistment oath as CTA1 Coyne signed on for another four-year hitch.

"It was very special," said CTA1 Coyne following his reenlistment.



Newly commissioned ENS John J. Coyne reenlists his older brother, CTA1 James E. Coyne, who signed up for another four years.

"John's made me proud since the day he joined the Navy."

Also attending were retired Master Chief Aviation Maintenance Administrationman Robert E. Coyne and Operations Specialist 2nd Class

Christopher S. Coyne, ENS Coyne's father and brother, respectively.

Emotions ran high during the ceremony. "I was holding back the tears," said OS2 Coyne. "It was that emotional."

ENS Coyne, not surprisingly, attributed some of his success to family influence. "With my father being a retired master chief," he began, "and my brothers in the Navy, I saw that it is a rewarding career. They've fully supported me in all that I wanted to do." †

Schafer is a Norfolk-based staff writer for All Hands.

Bearings

Batman beware! The Joker's on board

"I want the truth," yelled Engineman 3rd Class Kenneth Hamilton as Jack Nicholson climbed the ladder to the flight deck. Without missing a beat, Nicholson responded, "You can't handle the truth!" After repeating his ever-famous line from his box office hit, "A Few Good Men," he turned to the crowd of 60 Sailors and said, "Oh, by the way, disregard my comment about your white uniforms, I really love you guys!"

Nicholson wasn't joking either. While USS *San Jacinto* (CG 56) was anchored in Villifranche, France, Nicholson pulled his 25-foot speed boat alongside *San Jacinto's* ladder to come aboard. Not recognizing the famous actor, the petty officer of the watch turned him away. Yeoman 3rd Class David Scott and LTJG Chris Sweeney, who did recognize him,

hailed Nicholson back. The word quickly passed the movie star was on board, and very soon the crew mobbed around him asking for pictures and autographs.

As Nicholson was given a tour of the ship, it was easy to see he wasn't very interested in the billion-dollar war vessel. He wanted to see the crew. As LT Brent Kyler and LT Roy Kitchner toured him through the ship, a blue caterpillar followed with Sailors excitedly snapping pictures. Nicholson leisurely toured the



ship and stopped frequently to sign everything from ball caps to scraps of paper with a personal note and autograph.

Finally it was time for Jack to depart. With at least 200 Sailors to send him off, he descended a ladder and climbed into his speed boat. The crew cheered loudly as Nicholson waved and drove off. †

Deyo Sailors to the rescue

For most crew members, the day included a bus ride and tour of the Louvre museum, Eiffel Tower, Arc de Triomphe and many other sights in Paris. For Operations Specialist 1st Class Brian Dailey of Augusta, Maine; Hospital Corpsman 2nd Class Benjamin Roberson of Jamaica, N.Y.; Yeoman 2nd Class Jose Soto of Aguadilla, P.R.; and Personnelman 2nd Class Gary Simmons of Monroe, Mich., the day would offer much more.

While waiting for the bus to return them to Le Havre, France, where their ship, USS *Deyo* (DD 989), was making a port call, they heard the commotion of a car accident nearby. "We heard squealing brakes and crunching metal and went to take a look," said Roberson. A small Renault was overturned with a woman trapped inside. "I could



USS *Deyo* (DD 989) Sailors, on liberty in Paris, help a woman who was trapped in her car.

see the woman was alive, but it was obvious she was going into shock. I knew we had to do something quick," Roberson said.

While Dailey tried calming the woman from the passenger's side of the overturned car, the other Sailors pried open the mangled door. Once the door was open, the rescuers

eased the woman from the car. "The woman had several cuts on her face and her hand was bleeding. It looked like it had been crushed," said Soto. "I found a first aid kit in the back of her car and did what I could for her hand."

After bandaging the woman's hand, the Sailors took her to a nearby hotel and called paramedics. "She spoke very little English and none of us speak any French. But we all spoke to her in a calm voice and it seemed to relax her," Simmons said.

The paramedics arrived a short time later and provided medical assistance before taking the woman to a nearby hospital. The four Sailors departed to catch their bus, never knowing the name of the woman they had helped. †

Story by CTO3 Paul Waz and ENS Douglas Sasse, photo by PN2 Gary Simmons.



Back together again

Most family reunions are special moments. You get a chance to share time with relatives you have not seen in many years, or only see every now and then. You might even meet relatives for the first time.

Many of us take for granted how precious this shared time with family members is, but not Senior Chief Cryptologic Technician (Collection) Charles "Ed" Garrison of Naval Technical Training Center, Corry Station, Pensacola, Fla., who was reunited with his sister and three brothers in Wichita, Kansas.

For the first time in 32 years, Garrison met with brothers Gary Garrison, also a senior chief cryptologic technician, from Cambridge, England; Scott (Garrison) Schulle from Arlington, Texas; Randy (Garrison) Becker from Wichita, Kansas; and sister, Luella (Garrison) Mendoza from

Lincoln, Neb.

The last time they were together was not under such pleasant circumstances. Their father was in prison and they were abandoned by their mother. "For three days we were without adult supervision or food," said Ed. "My sister and I had to knock on doors and ask our neighbors for food." He was 6 and his sister was 8 years old.

The children were placed in a child detention center. From that point Garrison said the family split up like the four winds. "My youngest brother, Scott, who I last remember seeing when he was 17 months old and in diapers, was adopted," he said. "Randy went to several foster homes before he was adopted. Luella went to



an orphanage run by the Daughters of Charity. Gary grew up in foster homes. I went to a couple of foster homes before being sent to Father Flanagan's Boys Town in Nebraska when I was 10."

Coincidentally, both Luella and Scott wrote to the adoption agency at about the same time asking for information on each other.

Luella always worked to keep the family together. "She has been the mother hen gathering up her chicks," said Ed. "She was the one who kept the thin strands of our family held together. I'm just glad our reunion went so well." †

Story by JO3 Travis Conley, Naval Technical Training Center, Pensacola, Fla.

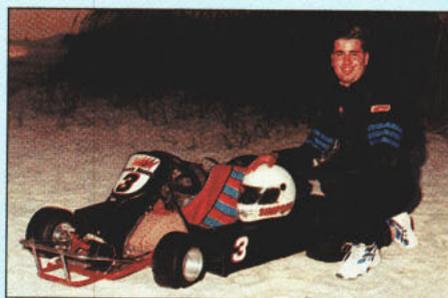
Blue Angel flies past checkered flag

Terry Coddington is accustomed to speed and noise. After all, he's a support crew member of the Navy's flight demonstration squadron *Blue Angels*.

This Sailor doesn't seek his off-duty thrills in the air, however. He races behind the wheel of a go-kart at speeds of up to 90 mph.

"Cruising along when you are only one inch off the ground feels more like 200 mph," said Coddington. "You have to take racing seriously at those speeds."

The 23-year-old native of Gettysburg, Pa., recently won the World Karting Association's Deep South Regional Championship Series in the stock 100cc Two-Cycle category. The series consists of 10 races held



Terry Coddington, a member of the Navy's Blue Angels, seeks his off-duty thrills not in the air but by go-karting.

throughout the southeastern United States.

It was early 1993 when Coddington caught the racing bug. After reporting to the *Blue Angels* in Pensacola, Fla., the 5-foot-11-inch, 175-pound driver

targeted his sights on winning a local track championship.

"I wanted to start with a local race, but people kept telling me I was good enough to compete on a regional, even national level. My early racing efforts turned into something bigger than I could have ever hoped for," Coddington said proudly.

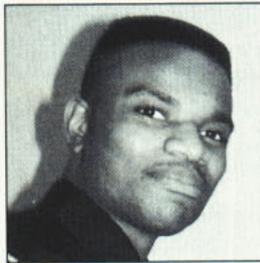
Coddington captured 25 pole positions, 29 feature wins in 34 starts and capped the season by winning the 1994 Southern Dirt Championship. "I had the chance to work with the 1994 Country Time Winston Cup team. It was a tremendous experience and I learned a lot." †

Story by JO1 Robb Pailthorpe, photo by PH1 Casey Akins, both assigned to the Blue Angels public affairs office.

Shipmates



Mike Matthews, Director of Hospitality at Puget Sound Naval Shipyard, Wash., is the Navy's first recipient of the Certified Hotel Administrator award from the American Hotel and Motel Association. This award is the hotel industry's highest standard of hospitality excellence for professional hotel executives and leaders. Matthews manages the Bachelor Quarters at the shipyard.



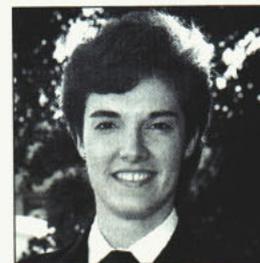
HM2 Benjamin Smalls was named Sailor of the Quarter, for 1st Quarter 1995, at Hospital Corpsman "A" School, Great Lakes, Ill. The Atlanta native also won his fifth Weight Lifting/Bench Press Title within 12 months at NTC Great Lakes. Smalls' goal is to compete in the 1996 Olympic Games in Atlanta.



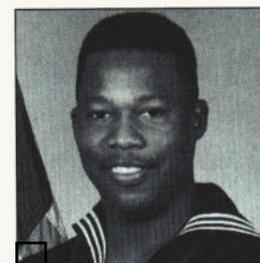
LCDR Kathryn Hire, a naval reservist stationed at Patrol Squadron (VP) 62, NAS Jacksonville, Fla., is one of 19 new astronaut candidates selected by NASA for the Space Shuttle program. Hire, a Mobile, Ala., native, was chosen from among 2,962 applicants, and was one of seven Navy selectees.



SM1(SW) Kevin D. Futrell recently qualified as USS *Robert G. Bradley's* (FFG 49) first enlisted officer of the deck under way. The Kentucky native developed his skills while standing under-instruction duty during both Operation *Support Democracy* off Haiti and USS *Dwight D. Eisenhower's* Battle Group's pre-deployment exercises.



LT Lisa M. Truesdale assumed command of the Navy's Ceremonial Guard in January 1995, becoming the first woman to lead any of the five services' premier ceremonial unit. The Ceremonial Guard performs all official duties and represents the Navy in parades and ceremonies held in Washington, D.C. Truesdale, from Endwell, N.Y., joined the Ceremonial Guard in June 1993.



OS1(AW) Charles K. Briggs of Naval Command, Control and Ocean Surveillance Center RDT&E Division, San Diego, was selected the command's Sailor of the Year 1994. Hailing from Philadelphia, Briggs was cited for his expert supervision and completion of 3,156 performance acceptance test procedures on the Block 1 Advanced Combat Direction System.

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Oceanography as a career

The Navy's Oceanography team consists primarily of Aerographer's Mates (AGs), Special Duty Oceanographer Officers (1800s), METOC Limited Duty Officers (6460s) and civil service personnel in several professional series. Other ratings and officer warfare communities are also involved with oceanography applications to fleet operations.

Most of the officers and enlisted are serving aboard ships in the OA weather divisions, afloat staffs or mobile environmental teams, stationed at naval air activities worldwide or working in several production and regional forecast centers to support forces and provide data and products. The civilian team is spread throughout these centers offering long-term continuity and providing specialized services. They also serve aboard oceanographic ships to conduct data collection surveys.

To provide services for safety at sea, strategic and tactical warfare and weapon system design, development and deployment requires personnel with highly technical education and experience backgrounds. The fields of expertise include all aspects of oceanography - physics, geology, chemistry, biology, meteorology, geography, geodesy and many related fields of applied oceanography.

There are billets at sea for all AGs and 1800/6460 officers through commander to provide real-time weather and oceanography forecasts to support staff, group or independent operations in all warfare areas. Unified CINC staff billets are available to those who have the right experience to apply Navy skills to joint requirements. Shore billets, in addition to forecast centers, include all major staffs, systems commands and research laboratories.

Most of the officers (1800s) enter the

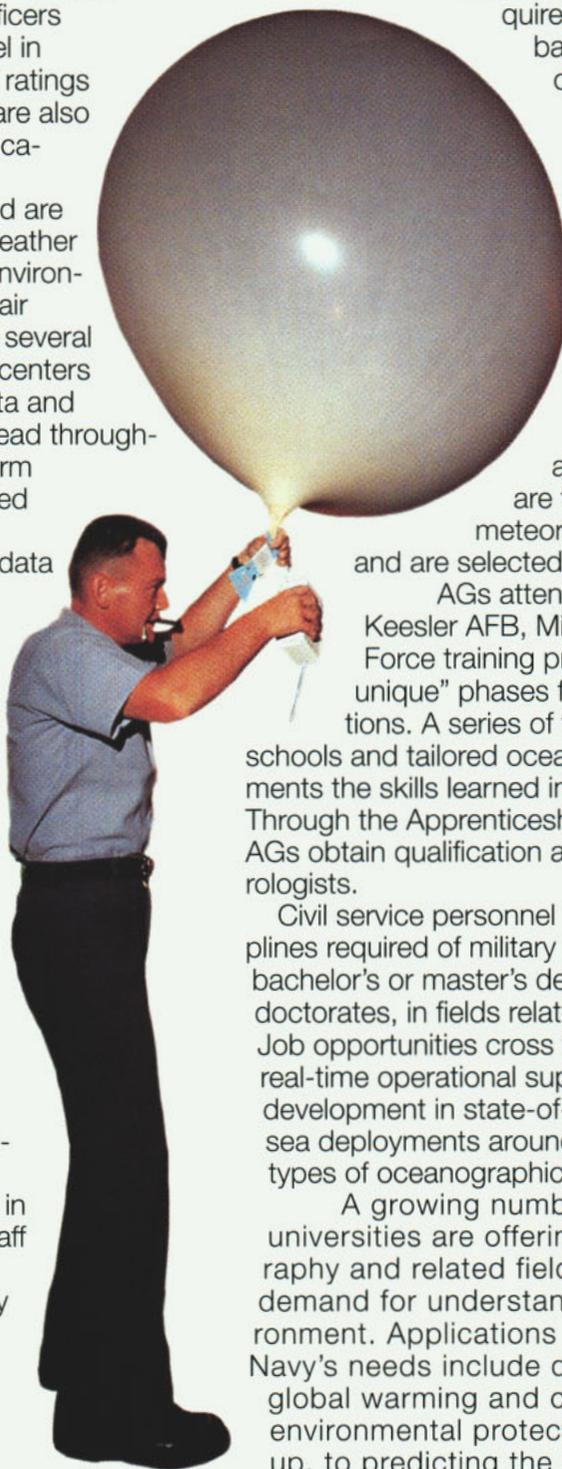
community through lateral transfer with a warfare specialty; a few are directly accessed through

USNA, NROTC and OCS. Requirements include having a bachelor's degree in oceanography, meteorology, mathematics, physics or a related science field of study. Nearly all 1800s will attend the Naval Postgraduate School as a lieutenant to earn a master's degree in meteorology and oceanography; a few will be accepted for further education to earn a doctorate. LDOs (6460s) are the technical experts in meteorology and oceanography and are selected from within the AG rating.

AGs attend "A" and "C" schools at Keesler AFB, Miss., in a joint Navy-Air Force training program which has "Navy-unique" phases for specific Navy applications. A series of fleet or supplemental schools and tailored oceanography courses augments the skills learned in the rating pipeline. Through the Apprenticeship Program, many senior AGs obtain qualification as certified civilian meteorologists.

Civil service personnel focus on all of the disciplines required of military personnel. Most have bachelor's or master's degrees, and a few have doctorates, in fields related to their specializations. Job opportunities cross the entire spectrum from real-time operational support, to research and development in state-of-the-art systems, to at-sea deployments around the world collecting all types of oceanographic data.

A growing number of colleges and universities are offering courses in oceanography and related fields to meet increased demand for understanding the ocean environment. Applications in addition to the Navy's needs include diverse areas from global warming and climate change, to environmental protection and ocean clean-up, to predicting the effects of the oceans and atmosphere on the future of our society. †





NAME: EM3 Jose L. Tapia

SHIP: USS Gary (FFG 51)

HOMETOWN: New York City

JOB DESCRIPTION: "I work on anything that is electrical on the ship. I stand the CCS (console control station) watch, that's the second highest [senior] watch in Engineering."

PLACES VISITED WHILE IN THE NAVY: Thailand, Pakistan, Australia and the Persian Gulf.

HOBBIES: Drawing

BEST PART OF THE JOB: "I like all the training and opportunities for school the Navy offers."

