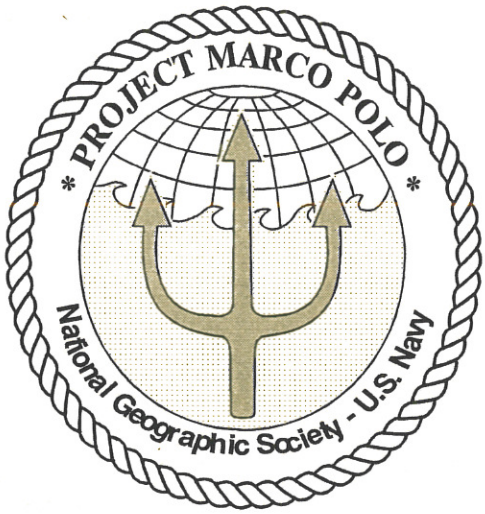

PROJECT MARCO POLO

To Promote the Study of Geography Among American Students

A Joint Program of the Oceanographer of the Navy and the National Geographic Society

Aboard the Navy Coastal Survey Ship

USNS CHAUVENET

14 July - 1 August 1992

EGYPT
The Mediterranean
GREECE

ITINERARY FOR PROJECT MARCO POLO III

July 14 to August 1, 1992

* *
* -- USA -- EGYPT -- SUEZ CANAL -- NAVY SHIP -- GREECE -- USA --*
* *

JULY 14 — **all day:** Depart U.S. to Frankfurt, Germany (arriving early in the morning of July 15).

JULY 15 — **evening:** Fly from Frankfurt, Germany to Cairo, Egypt. Transfer to Siag Pyramids Hotel. Orientation meeting.

JULY 16 — **morning:** Visit Egyptian museum in Cairo.
afternoon: Fly to Luxor and embark on the M/S Nile Sphinx. Visit Temples of Karnak and Luxor.
evening: Sound and Light show. Overnight in Luxor.

JULY 17 — **morning:** Cross to West bank of the Nile, visit the Necropolis of Thebes, Valley of the Kings and Queens
afternoon: Sail to Esna.
evening: Lecture and overnight in Esna.

JULY 18 — **morning:** Visit Temple of Khnum the ram-headed God
afternoon: Sail to Edfu. Visit the Temple of Horus.
evening: Sail to Kom Ombo. Lecture and overnight there.

JULY 19 — **morning:** Visit Ptolemaic Temple of Kom Ombo. Sail to Aswan.
afternoon: Visit Mausoleum of Agha Khan and Botanical Gardens.
evening: Lecture and overnight in Aswan.

JULY 20 — **morning:** Disembark from M/S Nile Sphinx. Visit Aswan High Dam. Transfer to airport.
afternoon: Fly to Cairo. Visit Old Cairo and the Khan Elkhalili Bazaar. Visit the Pyramids and Sphinx.
evening: Lecture and overnight at Siag Pyramids Hotel.

JULY 21 — **morning:** Visit Navy Medical Research Unit in downtown Cairo.
afternoon: free in Cairo
evening: Transfer to Port Suez by bus. Board USNS Chauvenet. Orientation meeting and overnight on ship.

JULY 22	**morning and afternoon:** Transit through the Suez Canal. **evening:** Lecture. Overnight on-board.
JULY 23	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 24	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 25	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 26	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 27	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 28	**all day:** Conduct shipboard activities. Lectures and presentations after dinner. Overnight on-board.
JULY 29	**morning:** Dock in the port of Piraeus, Greece. **afternoon and evening:** free in Piraeus (sign in/out with the Chauvenet). Overnight on board ship.
JULY 30	**morning:** Orientation bus tour of Athens, including Acropolis and National Archeological Museum. Return to Piraeus. **afternoon and evening:** On your own. Individuals and groups must sign in/out with the ship, and advise on plans and return times. Overnight on-board ship.
JULY 31	**morning and afternoon:** On your own. Individuals and groups must sign in and out with the ship, and advise on plans and return times. **evening:** Bus to Athens airport for those departing on early morning flight back to Frankfurt and the U.S. Those remaining in Greece beyond the end of the Marco Polo program will overnight on-board.
AUG 1	Disembark from the USNS Chauvenet. All those remaining in Greece are responsible for their own transportation, accoMmodations and itinerary at this point.

Nightly Lecture&Discussion Series

PRESENTOR(S)	LECTURE/PRESENTATION TOPIC
North Carolina	A Geographic Comparison Between the Nile River Valley and the Colorado River Valley
Minnesota	Cairo -- Islam's Greatest City! A Historical/ Geographic Overview
California	The Geography of Egypt
Alaska	Hieroglyphics and/or Rudimentary Arabic
Alaska	The Great Religions of the Middle East/Moslem Islamic Traditions in Egypt
North Carolina	Desert Geography; Physical and Human Characteristics
Michigan	The History and Impact of the Aswan Dam and the Suez Canal
California	Plate Tectonics/The Red Sea
J. Herman (Navy)	Post-War Cairo to Capetown Navy Exploring Expedition
P. Simms (Navy)	Biologics in the Mediterranean Sea
J.Herman (Navy)	Disease in Egypt and Africa - Changing the Face of a Continent
(Navy)	Meteorology - Observations/Forecasts at Sea
(Navy)	Mapping and Charting; How It's Done
(Navy)	Oceanography in the Mediterranean - an Overview
(Navy)	A History of World Ocean and Sea Mapping
Minnesota	Urbanization in the Bronze Age Mediterranean Culture
Michigan	The Geography of Greece

AGAIN, FEEL FREE TO RE-WORD LECTURE TITLES AS YOU SEE FIT. REMEMBER THAT THESE LECTURES/PRESENTATIONS ARE INFORMAL, AND WILL PROBABLY BE LIMITED TO 30-40 MINUTES AT A TIME. THERE WELL MAY BE NIGHTS WITH DOUBLE LECTURES, AND NIGHTS WITH NONE -- STAY FLEXIBLE!

Some Things to Think About...

The following were some thoughts from friends who have travelled widely in Egypt. Perhaps we can talk about these in discussions after our nightly lectures:

- The obstacle to comprehension of the Egyptian culture is talking instead of looking and listening; being loud and confident in the normal peer-group situation. It completely repels the quiet, observant Arab.

- Women in Egypt and the Muslim world.... are they doomed, or a force for the future?

- Does a different technology mean a different world view? Are there alternatives for the world to industrialization?

- What can Americans learn from Egyptian cultural values?

- What sciences have the Egyptians' developed (astronomy, waterpower, mathematics, time)?

- Was Egypt always a desert?

- Social pressures: to work or to learn. What are the choices and employment prospects open to children of *each* sex? What is the role of the elderly in this society?

- What are Egypt's biggest problems? If you were President of Egypt, what would you ask of the West, and what would you avoid?

- Why is birth control so difficult in developing nations, when population explosion and ecology are dire threats?

- What can we learn from being a tiny minority visiting Egypt that will help us understand racial differences in our own country?

- What is the impact of our Western consumerism and tourism on modern developing nations like Egypt?

- Are Americans a cultural predominant influence around the world — or is that a myth? What *is* the American culture? What are the fundamental beliefs that characterize the American culture? Is it freedom of speech/press/religion? free education? equal treatment under the law? free enterprise? minority rights/ equality?

- Muslim fundamentalism... what can we expect.... what are the demands/needs/rights of these people?

- Pollution. Is it a special threat in the Mediterranean?

- There was a mad scramble for Africa in the 19th century. The entire continent was divided up by the European powers. Then came decolonization. What was the impact of this? What problems has it caused today?

- Egypt and the Suez Canal was a strategic pivot for British India and the Empire, and now for Western interest in the Arabian Gulf. What are the implications for modern international politics?

- Cleere, 6/15/92

Sources: personal, interviews

Getting Started...

Unfortunately, much of the history presented in our schools generally ignores two thirds of the world, confining itself to limited areas in the Mediterranean, to western Europe, and to the Americas, of course. Of China and Japan, India, the Moslem and Islamic worlds, and much of Africa, almost nothing is taught. Yet, contributions to *our* civilization from *these* civilizations are enormous! These ancient civilizations are now powers with which we must deal today, and it is wise for us to understand them. Egypt is no exception.

• Talk, talk, talk with anyone you can find who has traveled to Egypt and the Near East. Ask them their impressions, customs and social rules-of-thumb they may remember, books they might recommend, foods they particularly liked (or disliked!), the kinds of people they met, etc., etc. If they took pictures, ask to see them. Find out as much as you can. Beware of those who speak negatively about their experiences or bad-mouth the country, its people, culture, or way of life. Remember what Mark Twain said: "Travel is fatal to prejudice, bigotry, and narrow-mindedness." At least it should be. Come to us with an open mind!

• Start with Fodor's Egypt — the latest issue of this annually printed guide book that you can find. It contains an unbelieveable amount of useful and necessary information as well as a concise history of Egypt from ancient to modern and contemporary times. I am enclosing photocopied pages of the history section to get you started. Other than Fodor's, look for other travel/guide books on Egypt. Purchase what you feel you might want to keep; borrow the others from your libraries.

• To learn more about the real story of the discovery of the only unplundered pharaonic tomb found in the Valley of the Kings in modern times, find Thomas Hoving's Tutankhamen: The Untold Story. This wonderfully readable book was written by the former curator of the Metropolitan Museum of Art in New York who managed the magnificent traveling exhibit of Tut's tomb treasures to this country in 1978. The true facts in this extraordinary discovery in 1922 are not at all what you might have imagined or previously read! The book is out of print, but your library will be able to get it on interlibrary loan. It is an absolute must for your visit to Luxor's Valley of the Kings.

• Ask your librarian to recommend books for you to study both Egypt and Greece. Keep in mind that you will get a whole lot more out of your trip if you know something of both the ancient and modern history of the country, its politics, customs, social histories, its ancient gods and modern religions, its economics, etc. Knowing even just a smattering about these subjects will help you understand what you will see and experience. The following National Geographic Magazines contain stories on Egypt and Greece: April 1991; February and December 1982; March 1980; March 1977; June 1975; October 1963. Read, read, read!!

• On a lighter note, search out historical novels Although the particulars of the story may be fiction, some of these are written to rather exacting historical accuracy. Some that were recommended to me (but I haven't checked them out myself yet) are Alan Drury's Return to Thebes and God Against the Gods; The Egyptian by Mika Waltari; Child of the Morning by Pauline Gedge; The Sphinx by Robin Cook. Also, Lloyd Alexander has written an adventure series which includes one on Egypt. Lighthearted mysteries are those in the Amelia Peabody Mystery Series by Elizabeth Peters: The Mummy Case, Lion in the Valley, The Deeds of the Disturber, Curse of the Pharoah.

• Go to your local video rental stores, and check out anything you can find on Egypt and Greece. I've found some great stuff in the travel sections, the educational sections, even the classics sections. For a younger audience, David Macaulay's *Pyramid* is a good start (his children's book on the same subject is good, too). Some of the old movies must be taken with a grain of salt, but they're great to get you in the mood. Check out *Zorba the Greek, Cleopatra*, etc.! If you get cable television, watch for specials on the Learning Channel and the Discovery Channel. There's a series airing now on civilizations that covers the ancient Mediterranean. I also caught part of a show recently called *Testament* that seemed interesting — matching archaeological evidence (or lack of) to biblical stories.

- Cleere, 6/15/92
Sources: personal, interviews

IDEAS FOR BACKGROUND READING

Here is a short list of books and magazine articles you may be interested in reading before our trip. The book titles were collected informally through a variety of sources, and are intended as "light" reading (fiction, historical novels, adventure...).

* Historical/adventure novels:

  God Against the Gods and Return to Thebes, both by ALAN DRURY
  The Egyptian, by MIKA WALTARI
  Child of the Morning PAULINE GEDGE
  The Sphinx, by ROBIN COOK

* Everyday life, power, and politics in ancient Egypt

  Ancient Evenings, by NORMAN MAILER

* Lighthearted mysteries set in turn-of-the-century Egypt

  The Amelia Peabody Mysteries, by ELIZABETH PETERS
  (four titles)
  - The Mummy Case
  - Lion in the Valley
  - The Deeds of the Disturber
  - Curse of the Pharaohs

* National Geographic Magazine articles of interest:

  April 1991: RAMSES THE GREAT and THE SPHINX REVEALED

  December 1982: THE MEDITERRANEAN and LOST OUTPOST OF ANCIENT EGYPT

  February 1982: EGYPT'S DESERT OF PROMISE

  March 1980: GREECE: GETTING THE MOST OUT OF LIFE

  March 1977: EGYPT: HER DAZZLING PAST AND HER HOPEFUL FUTURE

  June 1975: NEW LIFE FOR SUEZ

  October 1963: THREATENED TREASURES OF THE NILE (about the Aswan Dam) and TUTANKHAMUN'S GOLDEN TROVE

NGS/1992

Packing & Traveling

Traveling in a large group will require you to pack lightly and smartly. You will be required to be responsible for and to carry your own bags, and be able to move quickly in a group at a moments notice. Based on what we've learned from our previous Project Marco Polo expeditions, this is what you should remember:

• Egypt is a Moslem and Islamic country; they dress modestly and traditionally and consider large uncovered portions of the body equivalent to walking around naked. As representatives of the National Geographic Society and the Navy, we must respect their beliefs and customs. WE WILL BE ABSOLUTELY ADAMANT ABOUT THIS! Egyptian men have a habit of staring, and to invite this may make you uncomfortable (both men and women!). No muscle shirts, short-shorts, cut-off jeans, backless or short dresses, or tight clothing of any kind. THIS WILL BE ESPECIALLY IMPORTANT ONCE WE LEAVE THE LARGE CITY AND GET TO THE SMALLER TOWNS WE WILL VISIT, WHERE TOURISTS ARE NOT AS COMMON. T-shirts are acceptable, with no slogans or advertisements printed on them (this is especially important for the official photographs we will be taking). Females should keep the upper parts of their arms covered. Conservatism is the key word!

• Pack lightly! There are laundry facilities aboard the navy ship. Try to pack all your things in one easily managed suitcase or bag, and one carry-on, both of which will fit under your seat or in an overhead compartment on the plane. Checked baggage always runs the risk of getting lost and stranding you in Egypt with no clothes. You can always pack an extra bag or box for the trip home and check that into the plane's baggage. Airlines can generally find a lost bag and get it to your home, but they won't be able to locate you in Egypt on the road or aboard a navy ship.

• Pack 100% cotton, light-colored, loose-fitting pants, shirts, and skirts, a good pair of walking shoes, cotton socks, a modest bathing suit, a jacket or windbreaker for cool evenings. Any non-natural fabric is going to be very uncomfortable in Egypt's summer weather. T-shirts will not give enough protection from sun to arms and neck: pack long-sleeved shirts. Females may be more comfortable in mid-calf, loose-flowing cotton skirts. A small collapsible umbrella for shade in the desert is advised.

• Pack one nice outfit (dress — or skirt and blouse — for women, slacks, lightweight jacket and a tie for men) for possible formal and official gatherings.

• Pack a hat with some sort of visor, and a good pair of sunglasses. The sun is unrelenting in Egypt. You absolutely must keep your head/neck/ears shaded. Baseball caps will not always be enough protection; bring along (or purchase once you arrive) a lightweight, straw hat with an all-around brim. If you have very short hair, pack a neckerchief to protect the back of your neck. Pack a water bottle, lemon-drops for a dry mouth, wet-wipes, small packets of tissues, and sunscreen.

• Pack a sturdy pair of sneakers or shoes! No high heels allowed. Open-toed shoes and sandals are not allowed on the decks of the Navy ship. Short sleeved shirts and bermuda shorts are OK on the Navy ship.

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• If you use electric hairdryers, shavers, etc., pack an adaptor that will handle 220 AC, 50 cycles. Egyptian wall plugs are the two-prong European type. Each student/teacher "team" may want to share these so we are not all carrying the same items. Also, don't bring a plug-in alarm clock — these will run at 50 cyles and your clock will lose time. Use battery-powered alarm clocks.

• Pack and use a fanny pack that is large and sturdy enough to carry your money, passport, extra film, sun-screen, sunglasses, packets of tissues, and a small notebook to take notes for your journal. Alternatively, you may want to carry a small, sturdy knapsack for those larger items. NEVER remove you fanny or money belt and put it down! You will be handing out plenty of *baksheesh* (see Customs & Traditions notes) during your stay in Egypt, so a separate coin purse for a pocket may also come in handy.

• Pack your medical history, your eyeglass lens prescription, and a listing of any medications you are on. Make a copy and give it to your state Coordinator. Make two photocopies of the identification page in your passport. Leave one copy at home, and carry the other in a separate place from your passport. Carry receipts for valuables such as cameras (you can have a local camera shop fill out a low value for your "second-hand" camera). Carry a list of emergency phone numbers.

• Although our official photographer will be with us, I doubt any of you plan on not taking pictures yourselves. Pack your camera, your film (film is expensive in Egypt — buy it here), and a supply of plastic bags to keep them safe from desert sand. Pack batteries if your camera uses them. If you have one, pack foil bags for your film to protect it from foreign x-ray machines. Photographer Patricia Lanza welcomes your calls if you have specific questions about your camera and film. Call her in California at 310/450-4415.

• If you have a small pair of binoculars and a small flashlight (for inside tombs and temples), pack them. (Don't go out and buy these items, as many of us already have them. We can share.)

• Pack facesoap, and a collapsible drinking cup for travel on the road. Toilet facilities will not be up to U.S. standards — bring tissue paper! Also, feminine hygiene needs are not readily available — ladies should bring their own.

• Pack small give-away items as favors (these came in very handy in both Indonesia and Japan). Pens, pencils, buttons, balloons, pennant-pins, etc., anything from your schools, promotional pieces from your townships and cities such as keyrings, magnets, etc. — anything that will pack easily, a few at a time, in your fanny pack/knapsack. I'm told pens are especially good.

• Buy what guidebooks you want with you before you go. The selection in Egypt is not always good.

• DO NOT TAKE/WEAR: jewelry (except plain wedding band and small earrings), walk-man or transistor radios, offensive books or magazines, alcoholic beverages, large amounts of cash (take Traveler's Checks and a credit card (altho these will not be accepted everywhere)). Egypt is a poor country, and although violent crime is nearly unknown, petty thievery and pickpocketing is common in tourist areas.

* All your camera equipment is going to have to be declared ahead of time, however, if you plan on carrying a video recorder, please call us.

-Cleere, 6/15/92
Sources: Fodor's; State Dept; interviews

Customs, Taboos & Traditions — the Egyptian Way of Life

While in Egypt, we will be representatives of the National Geographic Society and the U.S. Navy, and as such we must respect the Egyptians, their customs, beliefs and traditions. We must quickly get accustomed to the different way of life in this extraordinary country. Keep in mind, too, that Egypt wants to become a modern nation as quickly as possible, but changing a country whose patterns are 7,000 years old is a difficult task at best. Do not expect to find it like home. Enjoy and experience the differences!

• Egypt is a Moslem and Islamic country. They are not shy about saying their prayers in front of others, and you will see this often as you travel through the country. Orthodox Moslems pray toward Mecca five times a day. Fundamental Islamic women cover their entire bodies, and men will wear skullcaps and short beards. Egyptians are governed by the philosophy of "Inshallah" — *if God wills* — a fundamental concept of reliance on God. Because they identify with community groups, the personal needs and desires often become secondary to those of the group. (Remember, America is one of the few countries in the world that emphasizes the individual rather than the group.) This philosophy is deeply rooted in the minds, hearts, and behavior of the people. They accept and revere all of the major prophets from Adam to Jesus, with Mohammed being the "last and greatest." They are very tolerant of other peoples and religious minorities.

• The Egyptians are modest in their dress. Many men will be seen wearing the traditional "gallabeya," a loose-fitting, long-sleeved gown that is comfortable in Egypt's hot climate. Low necklines, short skirts and shorts, sleeveless blouses, tight anything, are considered offensive and will invite unwanted attention and touching. Do not wear anything that is questionable. Egyptian men have a habit of staring — not considered impolite in their culture— and discretion is necessary, not to mention *respectful.*

• Unless you want your camera confiscated, DO NOT take photographs of police, soldiers, military installations, the Aswan Dam, etc. When in doubt, ask first.

• Spatial distance between members of the same sex is much closer than in our country, and you may often see good friends of the same sex holding hands. This is not considered unusual. The distances kept between men and women are greater than in our country. Unless invited to do so, do not use first names *or* last names alone without the title (Mr., Miss, Doctor, etc).

• Egyptians dine very late. If invited to dinner, a small gift is proper. The Koran prohibits pork and alcohol, but these may be served to foreigners. When giving or receiving anything from the table, when eating finger foods, or when offering or receiving a gift, always use both hands or the right hand— *never* the left hand— which is considered improper and unclean. It is also considered poor manners not leave a bit of food on the plate, which is a sign of abundance and a compliment to the host. Although dietary precautions will be necessary (see Health notes), we will be expecting you to try the Egyptian way of life, including tasting their foods. Because this should be a learning experience, we are hoping you do not go out of your way to seek out American fast-foods in the city.

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• When in a social situation, be careful about bestowing elaborate praise on something someone is wearing, or has in their possession. This may be interpreted as your saying you want it, and an Egyptian might feel he is compelled to give it to you. He will be doing only what is right in his society, but you may feel embarassed afterwards. In Egypt, generosity is a way of life, and hospitality is an obligation. Don't put yourself in awkward situations.

• Egyptians love to talk and to discuss issues on almost any topic. Do not be the loud, ugly American!! Be sensitive to their point of view. Most Egyptians like Americans, and are eager to tell you so and discuss American politics, customs, history, etc. Be sure you know something of Egypt's contemporary history and politics, too.

• Greetings are expressive and elaborate. Egypt is like most of the rest of the Mediterranean: they touch, push, shove, kiss, and hug a great deal. Don't be put off by this. In rural areas, blondes and blue-eyed persons will be stared at and touched. In some cultures, this is considered good luck.

• Excercise patience. And more patience. Life moves more slowly in Egypt than it does here, and this can be frustrating for Americans who cannot understand such a total unconcern for time. They cannot be hurried, so don't even try. "Bukra fil mishmish" — *tomorrow when the apricots bloom* — is the Egyptian way of expressing a tomorrow which stretches into infinity. Time has no limit here. Egyptians are blessed with a healthy sense of humor, and you will need one, too.

• *Baksheesh*, a way of life in Egypt, is an act of "sharing the wealth." Ask for and accumulate and save all small notes and coins given as change. All services, whether large or small, are normally rewarded, and the traveler would be wise to carry a large quantity of small change at all times. At most restaurants, hotels, and tourist sites, hordes of men and children will hover around you to give you service. If a service has been performed, 50 piasters (about 15¢) will go a long way. Be sure you know and understand the currency of Egypt before you get there (at this writing, one Egyptian dollar (L.E. 1) is worth $ .31. There are 100 piasters in the Egyptian dollar).

• Most officials speak English, and if you keep smiling and are polite, you will find most officials pleasant and helpful. If you wish to take close-up photographs of individuals, it is always polite to ask first. As many Egyptian are very poor, some may ask for a small amount of *baksheesh* in exchange. It will be up to you if you want to pay (25 *piasters* will go a long way).

• Bargaining and haggling is a way if life in Egypt. Be prepared to barter for what you wish to buy. The asking price can be 10 times more than what the seller is actually willing to accept. Fix in your mind ahead of time what you are willing to pay, and <u>be firm</u>.

• Egypt has one of the lowest crime rates in the world, and violence (other than family vendettas) is nearly unknown. However, Egypt is bitterly aware that it is a very poor country (you will have to get used to this quickly) and petty thievery is not unknown. Be circumspect with your belongings, and do not take up offers to "help you carry" your suitcase, or to "take your picture" with your own camera. Although most of these will be sincere, one in a thousand may not. (Although he never found anything missing, a friend of mine who spent a month in Egypt padlocked his suitcase to his hotel bedstead each day as he left to go touring. Prior to adopting this practice, he would notice that his things had been rummaged through during the day - probably by curious hotel help.)

-Cleere, 6/15/92

Sources: Fodor's, State Dept, Brigham Young Univ Culture-Gram, interviews

Health Precautions & Recommended Immunizations

Egypt is a member of the World Health Organization and adheres strictly ito its immunization requirements. Anyone who arrives in Egypt without proper records or innoculations will be quarantined. At this writing, the only mandatory innoculations required are for Yellow Fever and Cholera for those travelers coming from an infected area. The Center for Disease Control (CDC) has a tape recorded message (404-332-4559) that gives recommendations for travelers to Africa, and lists recent outbreaks of disease on that continent. It is extremely detailed and lengthy (there is a separate number that your doctor can call for further information), and if you do call, plan on being on the phone for at least 30 minutes listening to the tape. Visit your doctor or local health department for an up-to-date medical and dental exam to make sure you are in top physical shape. Erring on the side of caution, the Department of Defense recommends that you have your immunizations up-to-date for:

- Hepatitus A*
- Typhoid Fever
- Meningococcal Meningitus
- Tetanus
- Diphtheria
- Polio
- Measles, Mumps, Rubella (MMR)*

• Cholera, Malaria, and Yellow Fever are not considered high-risk for the amount of time we will be in Egypt and the locations we will visit, however, you may wish to talk to your own physician about having and taking these immunizations and prophylaxis.

• To guard against mosquitos, long sleeves at night are recommended, along with a repellent containing DEET such as Cutters and Ultrathon.

• Dust and pollution can irritate the bronchial tubes. Persons prone to respiratory problems, dust allergies, and hay fever may experience difficulty. Talk with your doctor about any medication you may want to carry with you.

• The high concentration of dust and airborne particles may lead to eye irritation for those who wear contact lenses. Bring regular eyeglasses in addition to an extra pair of contacts, and all supplies for contact lenses.

• If you are prone to sea sickness, pack anti-motion sickness pills or ask your doctor for a skin patch. You should be in top physical shape for this expedition. You will be walking and hiking quite a bit in a very dry, hot climate. If you are on any specific medications, please let your State Coordinator know about them ahead of time.

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It is highly likely that some of us will come down at some point with the local version of King Tut's Revenge, better known in Egypt as "Gippie Tummy." While this is not life-threatening, it can make you pretty miserable, so precautions need to be taken:

• Drink only bottled or boiled water and carbonated beverages. Avoid all uncooked meats and vegetables, and eat only raw fruits *that you can peel yourself.* Stay away from ice, shellfish and dairy products.

• Pack some Imodium for diarrhea. This is available over the counter.

• Ask your family physician about antimicrobial medication (Septra or Cipro), but remember that you cannot take this if you are allergic to sulfa drugs.

• Pepto-Bismol contains bismuth, and if taken regularly, constantly coats your stomach and is excellent for traveler's diarrhea. Two tablets 4 times a day is highly recommended.

Note: I was given a health and immunization brief for travel to Egypt by Dr. Bruno Petruccelli in the Pentagon. Your own physician is invited to call him with specific questions on 202-576-3587.

* The MMR immunization and the Gamma Globulin for Hepatitus A should not be administered at the same time.

-Cleere, 4/13/92

NEWS! from the OCEANOGRAPHER OF THE NAVY

Department of the Navy Office of the Chief of Naval Operations
34th St. and Mass., Ave., NW Washington DC 20392

USNS CHAUVENET

USNS CHAUVENET is a coastal hydrographic survey ship operated for the Oceanographer of the Navy by the Naval Oceanographic Office with a crew of merchant mariners. The Chauvenet is 393 feet long, 54 feet wide, 130 feet high and weighs 4,000 tons and can go up to 15 knots maximum.

The mission of Chauvenet is to support the Naval Oceanographic Office task of preparing updated and new charts of various area around the world, including ports, approaches to ports, and various coastal areas. These charts show the hazards (sunken ships, sand bars, coral reefs, shallow waters, etc) to navigation, as well as the channels in port areas so that ships can safely enter harbors and various coastal areas.

Since 1968, when the Chauvenet was built for the Navy, the ship has conducted these kinds of surveys in many different parts of the world, including Africa, the Far East, Central America, the Caribbean, and the Near East.

In order to accomplish its mission, Chauvenet carries four survey launch boats (called HSL's, or launches) which survey the waters close in to the shoreline (where Chauvenet would be at risk) and bring this data back to the "mother ship."

The Ship's crew is a combination of civilian mariners, uniformed navy personnel, and 6 to 8 civilian scientists, who process the bathymetric data the ship collects. The civilian mariners are responsible for the day to day operation, maintenance, painting and other tasks needed to keep the ship clean and in good condition. The uniformed Navy crew is responsible for the technical operations conducted on the ship. While you are onboard you will meet both the navy uniformed crew, as well as the civilian operating crew. The Master of the ship, addressed as "Captain," is Jerry Lucks. The Commanding Officer of the Navy crew onboard is Lieutenant Commander (LCDR) Kathy Garcia.

The USNS Chauvenet is named for William Chauvenet an astronomer and mathematician. He entered Yale University at age 16 in 1840. During his career he was appointed professor of mathematics in the Navy, then was placed in charge of the Naval Asylum in Philadelphia. He later served as professor of mathematics and chancellor of Washington University. He was then elected to the American Philosophical Society and the American Academy of Arts and Sciences. In 1968, the coastal hydrographic survey ship, USNS Chauvenet (T-AGS 29), the namesake of Professor Chauvenet, was launched. It was built by Upper Clyde Shipbuilders in Glasgow, Scotland. It has recently completed a hydrographic survey off the coast of Saudi Arabia and is coming home to the United States to be deactivated. The Marco Polo project represents one of its last operations.

Lieutenant Commander Katharine Garcia
Commanding Officer
Oceanographic Unit Four, USNS CHAUVENET

Lieutenant Commander Katharine Garcia was one of the first women to graduate from the United Stated Naval Academy in Annapolis, Maryland in 1976. She earned a BS degree in Oceanography. Her first tour of duty was at the Naval Eastern Oceanography Center in Norfolk, Virginia as both the Systems Officer, and the Environmental Services Duty Officer.

LCDR Garcia then reported to Naval Support Force Antarctica, where she deployed to the Antarctic every six months for the next three years. From 1986 to 1989, she attended the Naval Postgraduate School in Monterey, California, graduating with a Master's Degree in Meteorology and Oceanography. In 1989, LCDR Garcia reported as the Ice Officer to the Naval Polar Oceanography Center in Suitland, Maryland, where she stayed for the next 3 years.

In 1989, LCDR Garcia was named the Commanding Officer of Oceanographic Unit Four, aboard the USNS Chauvenet, then operating off the Saudi Arabian peninsula. LCDR Garcia is married to David Garcia, and resides in Alexandria, Virginia.

~

Captain Jerry D. Lucks
Master of the Ship
USNS CHAUVENET

Captain Jerry Lucks was born in Brooklyn, New York. He attended City University of New York, graduating with a degree in Philosophy. He went on to attend the Great Lakes Maritime Academy where he received a pilot license for the Great Lakes.

Prompted by a yearning to broaden his environs, Captain Lucks emigrated to the oceans, where on an early assignment he was employed as an able-bodied (ordinary) seaman aboard the Naval Oceanographic Office's USNS Wilkes — an general oceanographic survey ship — operating in the Indian Ocean. Numerous assignments followed aboard various other survey vessels. These experiences afforded opportunities for advancement to ship Master.

Captain Lucks' first assignment as Master was aboard the USNS Lynch. He assumed command of the USNS Chauvenet on 1 July 1991, and intends to sail Chauvenet to her deactivation in Gulfport, MS in October 1992. Captain Lucks owns homes in Brooklyn, NY, and in the Majorcas.

PROPOSED SCHEDULE OF ACTIVITIES DURING MARCO POLO III

21 Jul .... Arrive onboard CHAUVENET
22 Jul .... Depart Suez
Depart approximately 1300 local
Morning will be used for orientation
Transit Suez Canal
23 Jul .... Begin program

TENTATIVE SCHEDULE

23 Jul

Group	0830 - 1130	1300 - 1600
1	Geology	HYDRO
2	Biology	Geology
3	MENTOR (include weather obs)	Biology
4	HYDRO	MENTOR (include weather obs)

Group	0830 - 1130	1300 - 1600
1	HYDRO	MENTOR (include weather obs)
2	Geology	HYDRO
3	Biology	Geology
4	MENTOR (include weather obs)	Biology

24 Jul

Group	0830 - 1130	1300 - 1600
1	HYDRO	MENTOR (include weather obs)
2	Geology	HYDRO
3	Biology	Geology
4	MENTOR (include weather obs)	Biology

25 Jul

Group	0830 - 1130	1300 - 1600
1	MENTOR (include weather obs)	Biology
2	HYDRO	MENTOR (include weather obs)
3	Geology	HYDRO
4	Biology	Geology

26 Jul	....	Proceed to Pireaus On the way conduct Biological Tows, XBTs, and underway weather obs Begin processing data Begin presentation packages
27 Jul	....	Transit -- conduct Biological Tows, XBTs, and underway weather obs Continue presentation package
28 Jul	....	Transit -- Summarize data Complete presentation package
29 Jul	....	Pireaus

TENTATIVE EVENING PROGRAMS

- Reading Charts
- Circulation of the Eastern Mediterranean Sea
- The Nile River
- Bioluminescence
- Astronomy

o GEOLOGY. Participants will collect bottom samples along several locations off the Nile. They will examine each sample for coarseness, color, odor, presence of sand or shell. They will record their findings, participate in a discussion of the Nile, its value in Egyptian Society, past and future. After recording their observations, the students will wash down the area and read the equipment for the next group.

o BIOLOGY. Participants will sample areas of the water column. They will rig the sampling nets, tow and recover, make a physical description of the samples and preliminary identification. After recording their findings, will wash the nets and ready the area for the next group.

o HYDRO. Weather permitting, the students will go onboard the Sound Boats for a morning or afternoon of data collection. The students, with uniformed sailors along, will steer the boat, collect data, and other activities associated with hydrographic survey.

o MENTOR. This program is designed to pair a uniformed sailor with a student, accompanying the sailor during a period so they may understand more fully about life on ship. They may visit the bridge, learn about the sailor's speciality, visit the engine room and other areas on the ship. During this period, the students will participate in launching weather balloons and recording the resulting data.

FROM SEA TO SHINING SEA -

A Brief History of Naval Oceanography

The study of the dark, cold world beneath the sea, the atmosphere above it, and the interface of the sea surface with the atmosphere — all this is the realm of naval oceanography. The vast ocean that makes up three-quarters of the Earth's surface is a world of relentless energy, grandeur and mystery. This water world has been a source of food, the birthplace of weather systems that sweep across the continents, a pathway for commerce, and a turbulent field of battle. Naval oceanographers have studied it for 150 years.

Even before the United States Congress authorized a Navy in 1798 to defend our coasts and ocean commerce, our need for knowledge of the sea environment was demanding. The primary concern of any seafarer was —and is— navigation and safe passage in foreign, as well as domestic waters. Yet, for years hundreds of our ships foundered or were lost in waters that were unfamiliar to the seafarer. These disasters are well documented throughout our history.

In 1807, Congress had authorized the taking of a survey of the coasts of the United States "... in which shall be designated the islands and shoals and places of anchorage..." With that, the Coast Survey was established. In 1830, the Board of Navy Commissioners recommended that a "Depot be established" so that the navy's navigational equipment could be collected and rated, and this was done. But still, there was no mention of oceanography or hydrography. Even in the heyday of clipper ships and whalers, even though the vast majority of our naval and merchant ships cruised the world's great seas and oceans and sailed into foreign harbors and ports, the systematic exchange and collection of oceanographic data waited till nearly mid-century.

On August 31, 1842, construction of the navy's Depot of Charts and Instruments was authorized with the passing of Bill No. 303 of the 27th Congress. The Report to Congress that accompanied this bill specified that:

> *"... it is particularly desirable that information on this subject [hydrography] be collected from all quarters, as well for the navy as for the commercial marine generally; and there is, no doubt, a great mass of such information locked up in the memories of our whalers and Indiamen. Indeed, it may be safely said, there is scarcely a voyage made to the Indian ocean or China seas, in which some new shoal or reef is not discovered. How useful the knowledge would be to other navigators! yet, from the fact that they know not where to send it, perhaps it never passes beyond the immediate crew. The depot of charts and instruments is the proper receptacle of such information..."*

With the passing of this Bill, and with navy Lt. Matthew Fontaine Maury at the helm of the new Depot as its first Superintendent, the first formal scientific investigations of the deep ocean environment began. When Maury took over in 1842, he "became convinced that his chief duty should be the preparation of ocean charts... Charts on naval vessels were found to be over 100 years old and quite useless." It was time to assert our independence from the British Admiralty, and make some real contributions to hydrography.

In late 1842 it was ordered that all navy captains send navigational, hydrographic and meteorological data to the Depot, and it soon poured in — some of it over 120 years old. Maury began receiving information on the track routes of vessels, the prevailing direction and force of winds, temperature of air and water, duration and direction of storms, limits of the Gulf Stream force and set of currents, position of icebergs, position of seaweeds, errors in existing charts, and the points along our own coast that required additional lighthouses. By September 1843, Maury asked permission to publish his first chart of the Atlantic Ocean.

Under Maury's direction, all of the hundreds of ships' logs that were stored in the the navy's warehouses were hauled out and studied. Soon the presses were rolling, producing his famous *"Winds and Currents Charts."* By comparing the logs of ships on a given route, Maury

could pinpoint locations where extremes and differences occurred, and was able to suggest certain areas of the oceans that should be avoided at different times of the year.

Maury devised an "abstract log" which was supplied to all Navy ships. Navy captains were required to complete these logs for each voyage, while merchant and foreign vessels did so on a voluntary basis. In exchange for sending him completed logs, Maury would send his charts. Maury's Wind and Currents charts made an immediate impact on ocean commerce. Using them, clipper captains were able to shave 47 days off the passage from New York to San Francisco, resulting in a savings of millions of dollars annually.

The practical benefits resulting from Maury's efforts drew the direct support of Congress, who authorized the Secretary of the Navy in 1849 to assign three ships "for testing new routes, and perfecting the discoveries made by Maury in the course of his investigations of winds and currents of the oceans." With the invention of telegraphy, deep ocean surveys in the North Atlantic commenced, and these three ships were put to use. During this survey the first specimen was brought up from the ocean floor. Within a few years, the first depth chart of the Atlantic Ocean was published, and in 1858 the first successful transatlantic cable was laid down. Naval Oceanography had come of age.

Lead line soundings remained as the best technology we had till the turn of the century. The tragic sinking of the *Titanic* in 1912 provided the impetus for the development of echo sounding instrumentation. *Sonar* was soon put to use for submarine detection. After the War, Dr. Harvey Hayes of the U.S. Naval Experimental Stationin Annapolis invented the *sonic depth finder* and within a few short years our information database exploded. Suddenly our impression of a flat and featureless sea floor changed dramatically. The bottom of the ocean turned out to be as diversified as the land surface. Huge mountainous areas, volcanic cones, canyons as big and bigger than the Grand Canyon, and abyssal plains — all were found. Now, any ship with a depth finder affixed to its hull could crisscross the ocean taking soundings, and a contour profile of the undersea terrain could be produced. The first bathymetric chart from sonic soundings appeared in 1923 and they appeared regularly as new information was collected and processed.

During World War II the Navy vigorously pursued oceanographic research to meet defense needs. To maintain the scientific momentum after WWII, the Office of Naval Research was established. Through them, many private and academic oceanographic institutions began receiving funding support, as well as ships and other specialized platforms, for conducting ocean science programs. While these ships originally included former minesweepers and salvage tugs, these have been replaced with ships specially designed and built for oceanographic research.

The Navy's pursuit of oceanography eventually lead it into the ocean depths, The bathysphere TRIESTE was used for a series of deep ocean dives. On 23 January 1960, off Guam, the TRIESTE descended to the very bottom of the Challenger Deep---35,800 feet. The contest was over; man had gone safely to the deepest ocean depth, and marine life was observed there.

Soon after the TRIESTE experience, the Navy built the ALVIN, still operated by Woods Hole Oceanographic Institution. It is primarily used by the civil oceanographic community, and has made many deep sea discoveries, including the ill-fated TITANIC and undersea "vents." Besides the ALVIN, the Navy directly operates an impressive variety of undersea vehicles, both manned and unmanned, including SEA CLIFF and TURTLE and the nuclear-powered research submarine NR-1. In addition, the Navy's "Man-in-the-Sea" projects have been a major component of the Navy's oceanography program. The SEALAB project involved three successive underwater habitats, testing man's ability to live for extended periods underwater.

During the 1960's two further revolutions took place. At the Naval Oceanographic Office scientists transformed the single beam echo system into a multi-beam echo system, generically called *swath beam*. This new technology allowed for an array of beams to sound the bottom in a swath 80% as wide as the water is deep, every 300 to 500 feet. The next step was to view and measure Earth's oceans from space. When NASA launched *Seasat* in 1978, the satellite's radar

altimeter began transmitting precise measurements to approximately 1 1/2 feet (half a meter) of 95% of the ocean surface.

Geophysicist William Haxby of the Lamont-Doherty Geophysical Observatory took the data and translated it to give us a global map of the ocean floor. Seamounts, rifts and ridges appeared. Hitherto unknown fracture zones were discovered. After *Seasat* failed, *Geosat* was launched in 1985, put a new radar altimeter in space, able to measure the sea surface to within about 8 inches (20 cm). When processing the incoming data, the Naval Oceanographic Office discovered 452 previously uncharted seamounts. Building on the success of *Geosat*, the Navy is now developing a continuing series of radar altimeter satellites which will be referred to as *Geosat Follow-On*.

Every U.S. ship and aircraft that goes out to sea now uses products and support provided by naval oceanography. Naval oceanography today consists of 12 ships, 3 aircraft, and includes about 3,000 people (most are civilians) at 65 locations around the world. As in the days of Maury, weather observations are collected from worldwide civil and military sources. This information is provided to the U.S. fleet anywhere they might be in the world in near-real-time, and has spawned a number of tailor-made services that would have made Maury proud. For example, the navy's *Optimum Track Ship Routing* program recommends the safest, most efficient and economical passage for ships on the high seas — not unlike Maury's Ship Track charts did in their day. Use of the service, especially on long ocean crossings, has not only been vital to the safety of ships, but has also — again like Maury's charts — saved millions of dollars in fuel costs alone. Today, the navy offers a similar service to military aircraft. Weather is seldom neutral; it favors those who know how to use it.

In addition, today's naval oceanographers investigate the nature and behavior of the oceans, conduct surveys to collect data on thee composition and roughness of the ocean floor, as well as temperature, salinity, pressure and other characteristics that influence the transmission of sound in the sea. This information is collected by navy ships, submarines, aircraft and buoys, as well as "ships of opportunity." The data is then combined with historical records, and a prediction can be made of the path that sound will take as it moves through the water. This is essential. It enables us to locate and track submarines of potential adversaries, as well as to conceal our own.

Because U.S. ships operate in areas covered with ice, specially configured aircraft fly missions to profile ice ridges and water openings and measure ice thickness there, monitor ocean conditions below the ice, and record the movement of the icepack itself. Naval oceanographers use satellites to determine sea height, sea surface temperature, ocean currents, upwelling, water masses and frontal boundaries which can help hide enemy submarines. This information, so essential in locating and tracking submarines, is provided in near-real-time to our fleet commanders worldwide.

To help promote safe shipping in the polar regions the Navy and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) cooperatively operate the Joint Ice Center in Suitland, Maryland. The Joint Ice Center provides weekly sea ice analysis charts, seasonal outlooks, and individualized sea ice forecasts and support for ships operating in or near the polar pack ice.

The task of surveying the more than three-quarters of the Earth's surface that is water, is an undertaking of enormous proportions — well beyond the resources of any one nation. In some cases, we are engaged in cooperative agreements with both established and emerging maritime nations that transcend political boundaries and, in many cases, hostilities. Naval oceanographers, in specially outfitted oceanographic survey ships, measure water depths, and the variation in the Earth's magnetic field, determine gravity anomalies and define the shape and texture of the ocean floor. Using multi-beam swath sonar systems, for the first time, a picture of the Earth's ocean floor is being slowly painted.

The Oceanographer of the Navy, on the staff of the Chief of Naval Operations, assists the Assistant Secretary of the Navy for Research, Engineering, and Systems (RE &S) with the related plans, programs and policy matters of oceanography. He also serves as the Naval

Deputy to the Administrator, National Oceanic and Atmospheric Administration (NOAA) and advises on Navy/NOAA cooperative programs and national security matters.

The Oceanographer of the Navy oversees both the Naval Oceanography Command (which has charge of 70 oceanographic facilities around the world as well as 12 oceanographic survey ships and three survey aircraft), and the U.S. Naval Observatory, which has stations both in the U.S. and New Zealand.

On the international front, the Oceanographer provides policy guidance on data exchange, export control, foreign disclosure and cooperative programs, advises on maritime law developments and its impact on naval oceanography, provides the liaison with academia and private industry, supports the Assistant Secretary of the Navy (RE&S) in his role as Navy coordinator for the U.S. Antarctic program, and coordinates the Defense Department's requirements for Coast Guard icebreaker services in polar regions. The Oceanographer's continuing objective is increased cooperation with other agencies and nations. By sharing oceanographic observations and analyses that are integral to his mission, he makes a major contribution to the scientific objectives and priorities as set forth by the interagency Committee on Earth Sciences, to aid in the assessment of the extent and rate of change of the global climate as it is manifested in the oceans and the polar regions.

Under the Hydrographic Cooperation program (HYCOOP) the Navy is cooperating with various nations in coastal hydrographic surveying. International oceanographic cooperation agreements are also used to collect or exchange data for ice forecasting, mine countermeasures, and antisubmarine warfare. Work is also proceeding on improvements to oceanographic data bases and models to support NATO naval operations.

Naval oceanographic technology has evolved to where we can send people and instruments to the deepest part of the world ocean. To do this safely requires detailed information of the ocean bottom and the geological forces that shape the ocean basins. Deep diving navy submarines and submersibles need to know how to find their way and their position in an underwater world of perpetual darkness, and the need to have precise charts for bottom reference is vitally important. Similarly, the pursuit of science continues to push us deeper into the oceans.

Today, naval oceanography is an interlocking complex of scientific disciplines. It has progressed into a global science with tools that enable us to go deep into space or to the depths of the sea to observe and work. The end result is to expand our knowledge of our planet, to protect our national interests, and to bring our ships home safely and soundly.

Mapping & Charting the World's Coastal Waters ~
A Brief Overview

Egypt, Somalia, Djibouti, Indonesia, Haiti.... These names conjure up images of the exotic, the rare and colorful, the extraordinary sights, sounds and smells of foreign ports. For thousands of years, a variety of civilizations have set their sails and rudders towards foreign places and ports — and thousands of ships have foundered and been lost in unfamiliar waters. This is nothing new, in fact, these disasters are well documented throughout history. Two thousand years ago, in Acts 27, Verses 39-41, Paul's shipwreck on the island of Malta was recounted:

> "*... Now when it was day, they did not recognize the land, but they noticed a bay with a beach, on which they planned if possible to bring the ship ashore... then hoisting the foresail to the wind they made for the beach. But striking a shoal they ran the vessel aground; the bow struck and remained immovable, and the stern was broken up by the surf...* "

For if a ship's captain did not know the waters he was in — if he had no *rutters* or charts or logs — he sailed at tremendous risk to his ship and crew.

For nearly 150 years, ever since Congress decided that for the safety of American sailing ships we would survey all the waters of the world, small, non-combatant navy ships have sailed to foreign ports to take on the arduous task of mapping the underwater landscape for developing countries who do not yet have the technology to do it themselves. Nearly 75% of the world is still surveyed to an unacceptable standard. Some coastal charts still in use predate Charles Darwin and Captain Cook! Today the United States Navy has only two small hydrographic survey ships just coming on line — the *McDonnell* and the *Littlehales* — built recently to replace the aging *Chauvenet* and the *Harkness* — to survey the world's coastal waters.

The world's coastal waterways are taken for granted. Despite amazing leaps in our knowledge of other worlds in the Solar System, we still know amazingly little about the landscape of the world beneath our own waters. Only 5% of the ocean floor has been mapped with a precision equal to that mapped on the Moon. Yet, what we 've mapped of the Earth's underwater realm is as bizarre and dramtic as that we've recently seen on the surface of the outer planets. New technology, including satellite imagery, has revealed a mysterious world of underwater volcanic cones, great featureless abyssal plains, canyons as big and bigger than the Grand Canyon, and mountains that dwarf mighty Everest. We are driven by necessity to know the ocean landscape: for safety in navigation, for its commercial resources, and for pure science. And, we've been at it for at least 3,500 years, when Egypt's Queen Hatshepsut had her artists depict, in the temple of Deir al-Bahri, the taking of a "sounding" on a voyage to the land of Punt. Hydrography was probably ancient even then.

The task of surveying the more than three-quarters of the Earth's surface that is water, is an undertaking of enormous proportions — well beyond the resources of any one nation. Therefore, we are engaged in cooperative agreements with both established and emerging maritime nations that transcend political boundaries and, in many cases, hostilities. The end result is to expand our knowledge of our planet, and to bring our ships home to our shores safely and soundly. It is a story of adventure, science, human relations, and most of all, geography.

On board the ship, the work of collecting the survey data goes on 24-hours a day. While the mother ship criss-crosses the waters out to depths of 600 feet, small "launches" are winched down from the ship and fan out towards the shore to survey the shallow waters. Echo sounders (fathometers) are located at the bottom of both the ship and the launch boats. Time (from an onboard atomic clock), position (from Global Positioning Satellites, or GPS), and depth (from the ship's fathometers), is gathered simultaneously and fed to the Survey Control Room located for "steadiness" in the center of the ship. The survey tracks are printed out on huge sheets, and the crew pours over these to determine how well the survey "line" was tracked. Deviations are not uncommon — it's tough to "steer a straight line"— and blatant problems are designated "holidays", there to go back to and do again at first opportunity.

Ultimately, the data collected become the charts for which the United States has become so respected, and indeed, liable. These charts are so precise that, should a ship navigating these waters run aground and it is determined that the chart was wrong and the mariner not at fault, it is the chartmaker that is held responsible.

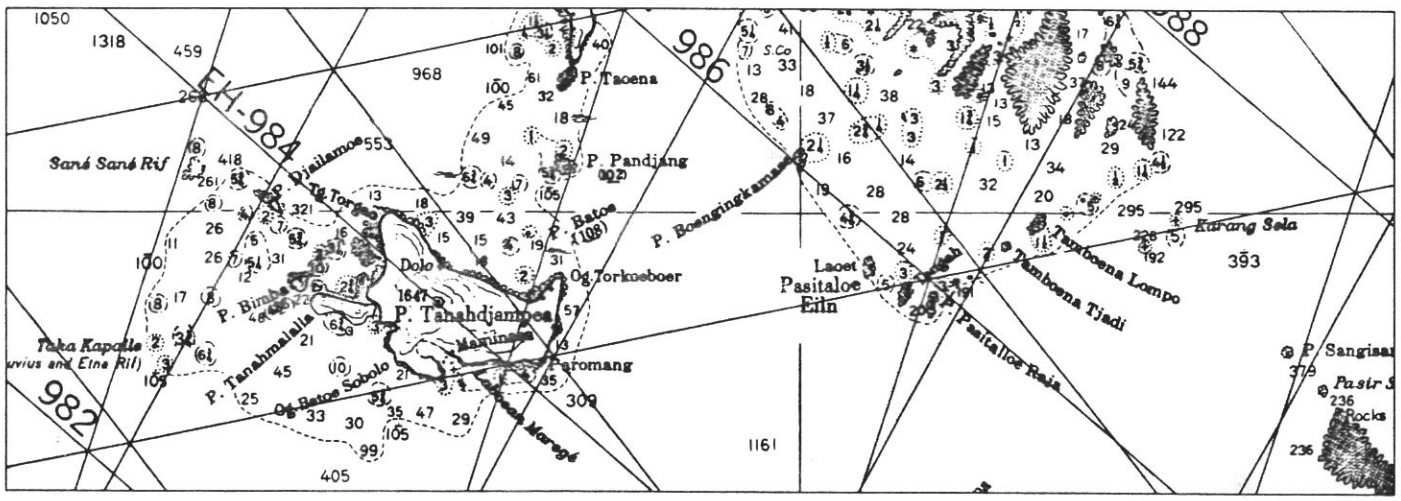
Hydrographic surveying is considered "arduous sea duty" within the navy. Life for these civilian and military men and women becomes their small world aboard the ship, or at the campsite. The only communication with home occurs when a ham radio operator makes a good connection, mail is delivered but once a month (even less often to the navigation sites), and a good time after hours means fishing for the local catch over the side or watching the manta rays perform flips 10 feet into the air.

Here, then, is a true example of "The White Fleet", a group of dedicated navy oceanographers, physical scientists, and technicians, who visit amazingly primitive and non-well travelled areas of the world. As dramatic as all the technological developments are in mapping the surface of the Earth through remote sensors, there is a small force that, by necessity, still does it the old fashioned way.

The USNS Chauvenet's last U.S. port call was in 1989. Prior to that date the ship had been in foreign waters for over 10 years surveying off the coasts of Panama, Indonesia, the Philippines, Diego Garcia, Somalia, and Kenya. The data collected over this 10-year period was used to update existing nautical charts, and to create over 100 new ones. The ship has recently completed a survey off the coast of Saudi Arabia, and is returning home to be deactivated.

Charting unknown waters

Story by Gail S. Cleere



Surveys conducted by USNS *Harkness* will update navigation charts based on data nearly a century old.

When mariners sailed into unfamiliar waters without appropriate nautical charts, they were always in danger of running aground.

For thousands of years, sailors used rope or lead-lines to determine water depth under the keel. But this process, which was used up until World War I, was laborious and fraught with error.

For American sailors, the Coast Survey was organized in 1807 to map the domestic coastline. But mariners were on their own in foreign seas.

It took the sinking of the Titanic to speed development of echo-sounding instrumentation. Sonar produced an echo return by bouncing sound waves off solid objects – like icebergs.

Modern hydrography got under way within a few short years when the sonic depth finder was developed. This device allowed ships to take soundings while in motion, producing a contour profile of undersea terrain by "connecting the dots."

Today, our own coastlines continue to be surveyed by the National Ocean Service, but nearly 75 percent of foreign coastlines are not surveyed to an acceptable standard. It is said that some foreign coastal charts still in use pre-date Captain Cook.

The Defense Mapping Agency works with the Oceanographer of the Navy to meet coastal survey requests submitted by fleet commanders from around the world. The Naval Oceanographic Office carries out the actual survey operations.

Two hydrographic survey ships, operated by the Military Sealift Command and staffed with merchant mariners conduct the work. They are USNS *Chauvenet* (T-AGS 29) and USNS *Harkness* (T-AGS 32). Two additional ships are under construction.

Each ship uses four hydrographic survey launches for surveying in shallow water and support boats for use in land-based operations. Each survey launch is outfitted with automated hydrographic survey equipment that permits it to operate independently.

A typical survey begins months before the survey ship arrives. Clearances are obtained from the host country, survey specifications are outlined, land-based transmitter sites are established and geodetic markers are placed.

One or more detachments of navigation technicians move into the sites, prepared to live alone for as long as six months. The ship continuously gathers data, criss-crossing the deeper waters while her launches survey shallow waters.

With echo sounders constantly pinging the bottom, simultaneous recordings are made of time, position and depth. These figures are simultaneously fed into the ship's computers. Survey track lines are printed out in large sheets.

Collected data undergoes further processing at the Naval Oceanographic Office and is forwarded to the Defense Mapping Agency where new charts are produced and distributed. □

HYDROGRAPHY AND THE U.S. NAVY

What is hydrography?

Hydrography is that science which measures and defines the bottoms of oceans, lakes, rivers, harbors and other water forms on earth. Since its major focus provides information for safe navigation, it also includes definition of adjacent land areas. In a modern sense, hydrographic surveys define coast lines, locate and measure submerged features (such as shoals, reefs, rocks, wrecks,etc.) and collect other valuable information on tides, currents, gravity, earth's magnetic field as well as the water itself.

Why hydrography?

The principal objective of a hydrographic survey is to provide information to make nautical charts, with particular emphasis on defining features that may affect navigation. A chart differs from a map in that it is designed to provide a working surface which a mariner uses to determine position and safely conduct his vessel through the water.

To illustrate this, consider what you do when you want to walk from one place another. If you know the neighborhood, you look for familiar landmarks (streetnames and numbers, buildings, etc.) to make course corrections (left and right turns) and arrive at your destination. If you don't know the neighborhood, you use a map to identify prominent landmarks, determine your position and make appropriate course corrections. In a nautical sense, this is called piloting. The mariner uses special equipment to identify landmarks, mark his position a chart and determine course changes to get him to a destination.

Imagine now that in walking through an unknown neighborhood you can see buildings and road signs but a low dense fog at your knees prevents you from seeing the ground. Tough, isn't it? This is the biggest problem for the mariner...he can't see the bottom either and runs a terrible risk of running aground or hitting submerged objects. You can see that the navigational problem consists of two parts: locating a vessel's position with respect to features (both land and oceanic) and determining the depth of the water (which we will call **soundings**).

The nautical chart helps the mariner solve this problem in several ways:

- It provides a surface for him to determine and plot his position.

- It displays water depths (or soundings), and it shows the mariner where it is safe to steer and where it is dangerous.

- In some waters where adequate landmarks are not available to determine position, the mariner may be able to compare soundings taken from his own vessel with charted depths, and in this way he can determine his position.

- By displaying other information such as tides, currents, aids and hazards to navigation, bottom composition, etc. The chart gives the mariner other valuable tools to help him navigate through a neighborhood he cannot see.

It is absolutely essential that hydrographic surveys accurately collect the information which will eventually be printed on those charts.

How is a hydrographic survey done?

Survey planning. The Defense Mapping Agency (DMA) in Washington, D.C. makes nautical charts for mariners. When they need to produce a chart but do not have enough hydrography for a useful product, they ask the Naval Oceanographic Office (called NAVOCEANO) to conduct a hydrographic survey. Because there are different methods of collecting data, NAVOCEANO conducts a thorough assessment of the effort needed to do the job and potential problems which might be encountered. For instance, NAVOCEANO might ask a foreign country to conduct the survey or they might do it themselves. Some survey work is done better by small boats (hydrographic survey launches - also called "launches" or "HSL's"), while other surveys require larger ships.

In some areas of the world, their information is needed to assess the effort to do a survey that might already exist or be easy to establish. In other areas, this might be a long and difficult task. If a survey is needed of an area off the coast of a foreign country, we have to get permission from the country to work there. This permission (called diplomatic clearance) can often take months to get.

What constitutes a hydrographic survey?

Planning for a hydro survey may often begin several years before a ship is actually available to do the survey. The first thing that the hydrographers do is review all existing information available in the area. This will help determine what type of work and how much work is needed. This review includes:

- aerial photography
- maps and existing charts from previous surveys
- geodetic information to determine how much land survey is needed to establish horizontal and vertical control
- existing tide information to determine the numbers and locations of tide gauge sites required

- information on currents
- sound velocity data (this is needed to calibrate and adjust echo sounder data)
- weather information (in some areas of the world, surveys are planned on a seasonal basis to take advantage of prevailing good weather and avoid prevailing poor weather)
- navigation information

Using all this data, NAVOCEANO hydrographers will develop plans to establish "control" (where to install the shore-based radio sites and tide gauges) and determine what additional hydrographic information is necessary to collect during the survey. The hydrographers will then write a Hydrographic Project Instruction (the **HPI**) which will be the bible for that particular survey. The HPI provides precise specifications and instructions to conduct the survey. It provides a sheet layout scheme which is the guide which the hydrographer will use to plan daily survey operations for ships and launches.

There are many important factors that make up a good "hydro" survey. Let's concentrate on the **basics: ship position, soundings (i.e., water depth)** and **submerged hazards.**

Position: It doesn't help the mariner if a survey determines that the depth of water (sounding) at a given point is 10 feet or that a particular hazard protrudes from the bottom to a depth of 20 feet, if we don't know exactly *where* that sounding is. You should note that there are many different techniques and equipment to determine a vessel's position. Some are more accurate than others.

Charts also contain inherent errors resulting from the charting process. (We won't get into those here...many highly technical papers have been written on the subject. Just remember that methods to determine ship positions and charts are never 100% accurate.) To limit the effects of these inaccuracies, we make nautical charts as accurate as we can but keep in mind: Hydro surveys use techniques and equipment generally more accurate than those used by other ships.

Before a hydro survey team collects **any** information, they first establish "**survey control**". Survey control is the method hydrographers use to determine exactly where survey vessels are with respect to the land at all times. It has two parts, **horizontal control** and **vertical control**. **Horizontal control** is used to determine ship position (i.e., where on the surface of the earth the ship is at a particular time). There are many methods and systems available to establish horizontal control, ranging from visual techniques using sextants to satellites. The most common method generally resembles something like this:

Before conducting a hydro survey, a **geodetic survey** team is sent to the area where the ship will be operating off the coast. Using instruments similar to those you may have seen used by construction and land surveyors (but far more accurate and complex)

or satellite equipment, they determine very precise geographic coordinates (latitude and longitude) for several key **land** positions. These positions mark the spot where the hydro survey team constructs antennas used to transmit very precise radio signals. During the actual hydro survey, survey vessels use special receivers which monitor signals from two or more of the transmitting sites to determine their position. The transmitting sites ashore and receiving ships are known as the **hydrographic control net.**

You can see that this is a complex effort. First, we establish **geodetic** control for the antennas and, using radio transmissions from those positions, establish **horizontal survey** control for the vessels which collect depth information. While hydrographers still use this method, modern satellite technology, called the Global Positioning System (or GPS) will make this easier in the future. Ships around the world will be able to use the GPS satellite system to determine their position. Survey vessels equipped with satellite receivers will eliminate the need for the radio survey net and geodetic survey teams to establish horizontal control in most areas of the world.

Soundings and **"vertical control":**

If you think that determining position is difficult...you're right! However, measuring the depth of the water is even harder. With the positional problem, at least you can *see* the spot you want to measure. You can't see the sea bottom. It is this aspect of a hydro survey which makes the professional hydrographer blend the skills of an **artist** with those of the **scientist.**

Before we describe how this is done, let's clear up the difference between soundings and the **charted water depth.** When a ship (whether it's a survey ship or any other ship) determines the depth of water with its echo sounder, that's a **sounding.** The value which appears as the printed depth on a nautical chart, however, is related to all soundings taken at that location.

For a start, you've probably heard of **the tides.** Because tides continually change the depth of water, any measurement will depend on the time it was taken. To make matters more difficult, there are many factors (some of which we don't understand very well) which affect tides. Since a chart can only reflect one depth value, soundings obtained during a hydro survey need to be corrected for the state of the tide. This is done by continuously monitoring the tide during a survey using **tide** gauges and adding a correction value to soundings based on these measurements. This becomes the charted depth. When a mariner uses the chart later, he determines the depth of water by adjusting the charted depth for the state of the tide he needs.

Just as we needed horizontal control to determine accurate positions, we also need **vertical control to ensure accurate** water depths. Vertical control is established by relating our soundings

to a reference point *on land*. Using instruments known as **levels** (again, very similar to construction and land survey instruments), survey teams measure key positions in the survey area which are used to install tide measuring equipment known as **tide staffs** and **tide gauges**. Data taken from these instruments are used to **determine the chart datum and reduce** survey soundings to that datum.

Once "survey control" (that is, the geodetic control, hydrographic positioning net and tide gauges) has been established, soundings are collected using a variety of instruments ranging from a **leadline** (which is basically a weighted string dropped into the water) to sophisticated **multi-beam echosounders** which measure water depth in a wide swath on both sides of the vessel. The most common sounding method uses **sonar (or echosounder)**. The survey vessel transmits a very high pitched sound (called a **ping**) into the water and then listens for the sound to be reflected by the sea bottom and returned to the ship. If you have ever yelled into a canyon and listened for your echo, it's the same principle. By measuring the length of time between the ping and the echo, the sonar is able to determine water depth.

Submerged hazards. While sonars (echosounders) can accurately determine water depth, they cannot generally detect submerged obstacles (large rocks, sunken ships, etc.). Because these features are just as important as shoals (shallow areas) to mariners, hydrographic surveys will also sweep an area to locate potential hazards and accurately determine their position. The traditional method is called a **wire-drag** survey. A very simple approach is to tow a wire cable between two vessels which steer parallel courses. When the wire catches a submerged obstacle, the vessels may use a number of different techniques to determine the size, shape and position of the obstacle. Modern surveys now use an instrument called a **side-scan sonar** instead of wire-drags. Towed behind a single vessel, the side-scan sonar takes an electronic "picture" of sea bottom. It is much more efficient than wire-drags and allows hydrographers to accurately and rapidly survey areas for submerged hazards.

An important factor in hydro surveys is **coverage.** While existing capabilities cannot detect 100% of all submerged features, the hydrographer must ensure that the amount of soundings collected adequately depict the bottom and identify significant features.

Line Spacing. The HPI specifies specific **line spacing**. This is the **line spacing** between successive "tracks" across the water that the survey vessel will steer to collect soundings. The ship will survey an area by criss-crossing it in a series of survey "tracks." The best spacing is developed to ensure sufficient coverage without wasting valuable time by collecting too much data in a given area. It is affected by the depth of water, nature of the bottom and type of echo sounder. For instance, in an area with a gentle-sloping, sandy bottom, the line-spacing may be fairly large. In an area which is very rocky with many shoals, the line-

spacing will be small to ensure hazards to navigation are not missed during the survey.

Once the planning is complete and the survey ship is available, the actual survey can begin. If GPS is not available, and radio systems are used for hydrographic control, the survey team will establish the shore-sites. These are manned 24 hours a day, seven days a week until the survey is complete (which may take many months). In large areas, these sites may need to be moved every now and then as the survey progresses. Often, survey operations are interrupted to resupply the shore sites with food, water and fuel for diesel generators used to power the radio transmitters, lights and other equipment. The shore party ensures that all equipment works properly. They also perform other functions such as maintaining tide gauges.

After the shore sites have been established and tide gauges installed, the survey ship and launches will start to collect soundings. Each day, the ship and boats will be given a survey sheet. They will steer their vessel along prescribed tracks at the pre-determined line-spacing, regularly plotting their position and meticulously recording every detail of the survey in journals called **logs**. These logs contain the results of daily equipment checks and calibrations, routine data checks, times, weather and sea conditions, speed, and more. At the end of each day, hydrographers analyze, correct and adjust all this data eventually producing a completed plot of soundings called a **smooth sheet**. The data is analyzed each day to determine if survey specifications need to be modified or adjusted to fit the nature of the survey area. For instance, if the data reveals unsuspected shoals or other hazardous features, the hydrographer may decide to investigate certain areas other with smaller line-spacings. Plotting the data will also reveal **holidays** (where data was accidently missed or bad data was collected) which must be resurveyed.

During the course of a survey, the hydrographers will collect other valuable information in the area such currents, bottom composition (mud, sand, rock, etc.), information on local aids for navigation (buoys, lights, etc.) and much more.

What does a normal survey day resemble?

Actually, a routine survey day starts the night before. The hydrographers analyze and plot the soundings taken during the day and determine if the data gathered, and the area covered was good quality. Sometimes unforeseen factors such as bad weather or equipment malfunctions will render all or parts of sounding data unusable and these may not be detected until analyzed later. As mentioned earlier, this analysis may also reveal *holidays* or areas requiring additional investigation with smaller line-spacing. Based on the data review and the overall survey specifications, the hydrographers will plan the next day's work for the mother ship and survey launches. They prepare launch and ship plotting sheets,

logs and specific instructions. For instance, to make plotting on a large sheet manageable, work done on different days is plotted using a different color for each day. The daily instructions let survey crews know what area they will survey, what line-spacing they will use and what color to plot their data.

Depending on the survey specifications, some areas may have ship-only work, launch-only work or both ship and launch work. When the survey requires both, the ship will general survey throughout the night and the launch boats will go out early in the morning. Again, depending on the area, the launches and the ship may work miles apart from each other.

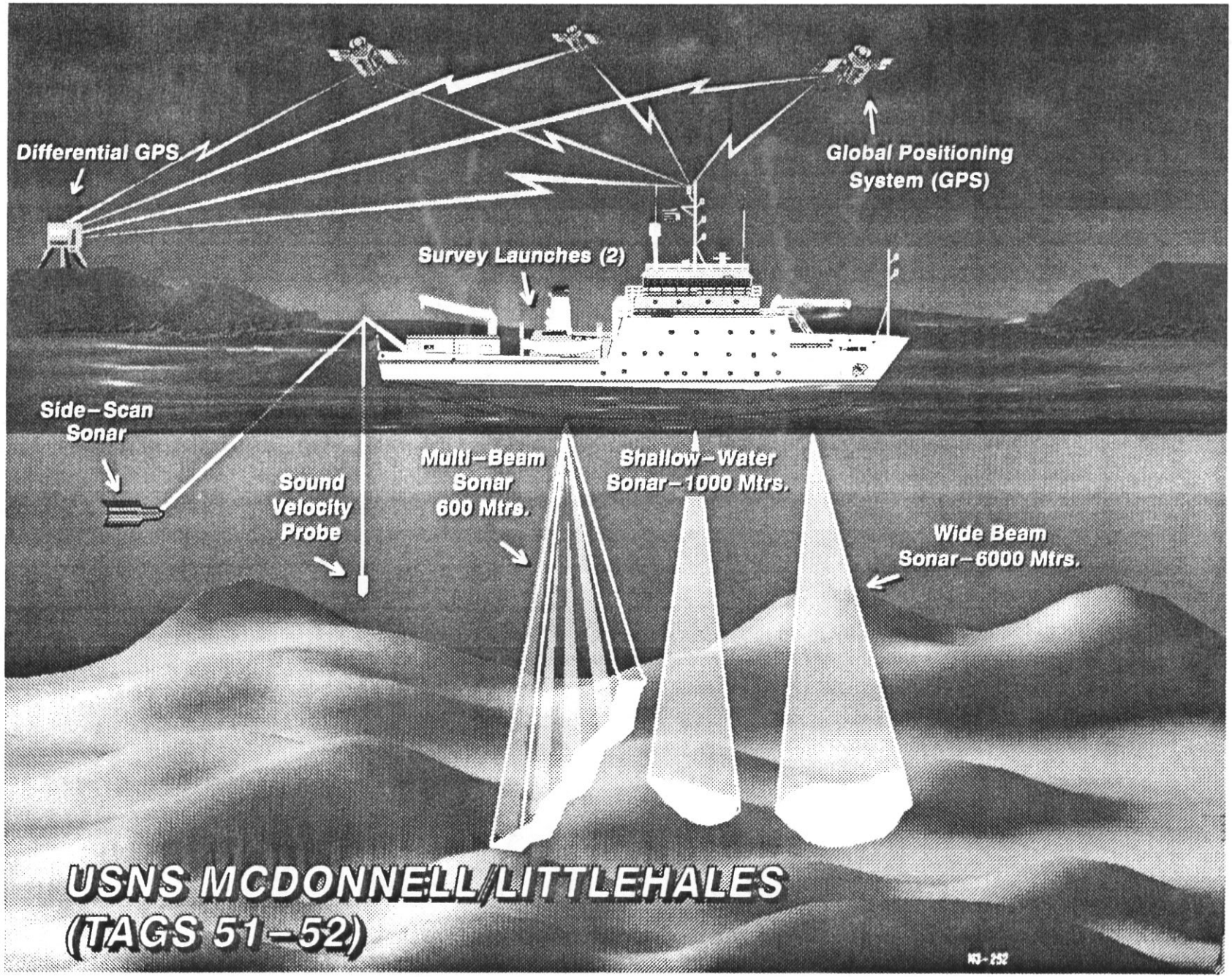
Onboard the mother ship and the launches, survey crews collect soundings - plotting their position and recording regular navigation and data checks. Traditionally, these are hand-plotted; however, while you are on the ship in a room called "Survey Control" you will see a modern system called the Hydrographic-Oceanographic Data Acquisition System (HODAS). HODAS is a computer which helps hydrographers record, analyze and plot soundings automatically.

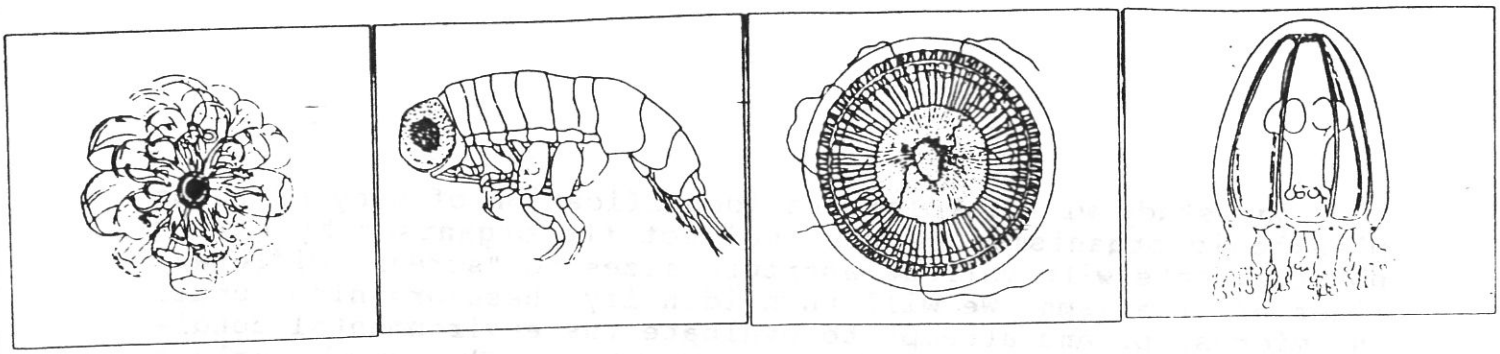
The launches generally collect soundings until early evening when the ship recovers them. Following dinner, the hydrographers again plot and analyze the data and plan the next day's work.

This daily routine is sometimes broken up by establishing current stations, taking bottom samples, re-supplying or moving radio-sites to new positions on land, establishing new tide gauges, etc. Additionally, when there is no launch work or when bad weather prohibits small boat operations, the crews maintain and repair the launches.

What happens when the work is finished?

When a "smooth" survey sheet is completed, it is sent back to NAVOCEANO along with tapes, logs, records, etc. After undergoing very close scrutiny and final corrections by experienced quality control hydrographers at NAVOCEANO, this smooth sheet will be provided to the Defense Mapping Agency (DMA). DMA will gather the data, process it, and then print the nautical charts of the area surveyed. The charts of the area surveyed on this particular survey operation will then be made available to ships and mariners around the world. Chances are that the area of the world just surveyed will not be surveyed again for many years.


Differential GPS
Global Positioning System (GPS)
Survey Launches (2)
Side–Scan Sonar
Sound Velocity Probe
Multi–Beam Sonar 600 Mtrs.
Shallow–Water Sonar–1000 Mtrs.
Wide Beam Sonar–6000 Mtrs.
USNS MCDONNELL/LITTLEHALES
(TAGS 51–52)
M3-252



Biology Aboard the USNS CHAUVENET — Patricia Simm (NAVOCEANO)

Dear fellow Marco Polo participants,

I wanted to give you some ideas about the biological research we'll be conducting as part of the Marco Polo study this summer. I should warn you that the work of biological oceanographers is possibly the most complex of all the marine sciences!

Ours is the work of unraveling the mysteries of life cycles intricately tied to the motions of the life-sustaining fluid ocean itself. For instance, how does plant production depend on the physical factors such as vertical mixing induced by waves and turbulence? How does this mixing affect the supply of nutrients needed for plant growth? How is this growth tied to the population of animals which feed on the plants?

The biological oceanographer also seeks to understand the schemes of adaptation. How do different organisms live and persist in the ocean habitat? You may discover that the shallow waters of coastal oceans behave quite differently from those of the open ocean. There are more nutrients, there is much more "seasonality" as measured in everything from sunlight to freshwater runoff to "pulses" of animal migration, and there are human beings to introduce all sorts of complexities. One of our main goals will be to determine how population distributions and dynamics change as we go from a coastal environment (which is influenced by discharge from the Nile River) to an open ocean environment (higher salinity, lower input of nutrients).

How is ocean life organized? In what ways does the marine biosphere differ from our terrestrial sphere? In terms of volume of living space, the marine sphere is 80 times larger than the terrestrial sphere. Marine life forms, shapes, behavior, and life cycles are very different from their terrestrial counterparts. The body sizes of marine species are often substantially smaller than those of species found on land partly because water is very dense (a thousand times denser than the fluid air in which we exist) and also because of the turbulent nature of the fluid. While you may never have seen the planktonic organisms pictured here, they are actually much more common in the oceans than crabs, shrimp, or fish.

Our study will involve the identification of many of these planktonic organisms. We will collect the organisms by towing plankton nets with various aperture sizes to "screen" different sizes of organisms. We will then identify these organisms under the microscope and attempt to evaluate the environmental conditions which influence their distribution. This will include measurements of temperature, salinity, dissolved oxygen and Secchi depth. You should be considering the complexities of collecting an adequate representation of oceanic populations. Many of these organisms change their position in the water column by migrating vertically during the course of a day. Their distribution may be "patchy" and related to physical factors. Biological sampling is additionally complicated by the inability to sample the same mass of water at different intervals of time--we simply do not know where the water column sampled yesterday is today. We must take multiple and repeated samples just to estimate a real-ocean biological situation.

Bioluminescence is the emission of light (usually blue-green) by living organisms. Perhaps the most interesting fact regarding bioluminescence is the great number of totally unrelated and diverse organisms which have developed this ability. Many of the organisms which you see here are luminescent, as are bacteria, copepods, jellyfish, squids, and many fishes. By sampling at night, we hope to observe this phenomenon and identify the organisms which produce it.

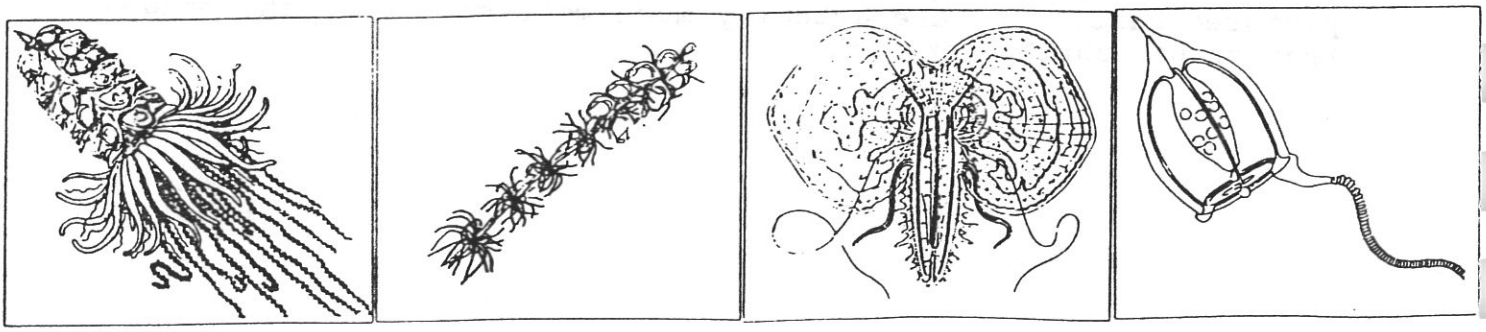
The famous oceanographic cruise of the HMS CHALLENGER (1873-1876) carried a team of scientists over the world's oceans to gather all manner of physical, chemical, biological, geological, and meteorological data. Out of this came some 50 volumes of analyses and descriptions. Today, with advanced technology, the same amount of data may be accumulated in a matter of days. We will compile our data as did the CHALLENGER scientists, with a pencil and log book. We will then plot the data on charts, and learn new ways to summarize and present the data.

As you can probably see, there are many questions to be asked and pondered. I'm looking forward to working with all of you. If you have any questions or ideas about the project in the mean time, please feel free to contact me at (601) 688-4111.

Sincerely,

Patty

Patricia Simm

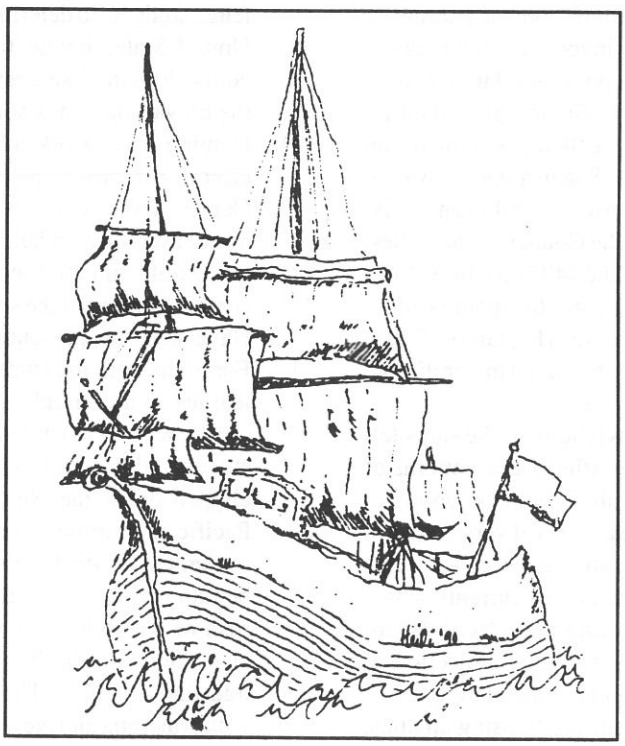


Using Winds and Ocean Currents in Teaching Human Movement

by John Brierley

WESTCHESTER HIGH SCHOOL, LOS ANGELES, CALIFORNIA.

Global patterns of winds and ocean currents have been vital to human patterns of settlement and trade until the twentieth century, when various technologies and human choices allowed for movement against both the winds and the currents. Yet, students tend to be isolated from and largely ignorant of water and wind patterns and their direct influence on weather, climate, and Place (the physical and human characteristics of a place that make it special or unique). We should teach our students about winds and ocean currents so they will better understand the risks and achievements of historic figures in context with the physical elements and the technologies of their time.



Patterns of wind can be presented as part of a continuum of the global heat exchange. Tropical air rises convectionally, cools, descends and forms the familiar wind patterns of the subtropics and tropical regions. Polar masses of air move toward the tropics and create zones of instability when meeting the tropical air masses. Resulting from all of this moving air is a series of prevailing wind systems that were well known to many people in the last century. Terms such as *monsoon, westerlies, trade winds, doldrums, roaring forties,* and *horse latitudes* were much more commonly understood by our ancestors than they are by the general public now.

Ocean current patterns are much more complex and less well understood. Huge streams of water (currents) are set in motion under the ocean's surface, carrying warm water into the high latitudes (the Gulf Stream and Kuroshio Current are examples) or colder water into the lower latitudes (the Benguela Current and California Current are examples).

Maritime civilizations developed in many coastal regions of the world and took their water crafts into unknown seas where they learned of wind and current patterns. They made use of their knowledge of these patterns for promoting trade and settlement. The explosive diffusion of Europeans, beginning in the 15th Century, in their wind-powered vessels is well-known. Equally well-known are the ecological effects of the diffusion of both people and plants by ship, both in the past and present. Less well-known are the incredible journeys in the Pacific Ocean by the Polynesian, Micronesian, and Melanesian peoples to settle island chains. And too, Thor Heyerdahl and others argue that long oceanic journeys were undertaken from Africa and South America to settle lands to the west.

The following three lessons will provide students enrolled in a World History and Geography or a United States History and Geography course with an opportunity to better appreciate the importance of the earth's winds and ocean currents. The learning outcomes for the lessons are:

1. To become more aware of the patterns of winds and ocean currents of the world and be able to identify locations and regions of winds and currents.
2. To understand the effects of the prevailing winds and ocean currents upon human trade and settlement.
3. To analyze the interaction between humans and their wind and ocean current environments.

Day one: Trade and the Usual, Boring Weather

A. We will look at how the Europeans, by 1440, used the winds and ocean currents as they sought to find ways to avoid intermediate stops in the Islamic lands. First we will read a poem by John Masefield (Untermeyer 1936).

CARGOES

Quinquireme of Ninevah from distant Ophir
Rowing home to haven in sunny Palestine,
With a cargo of ivory,

And apes and peacocks,
Sandalwood, cedarwood, and sweet white wine.

Stately Spanish galleon coming from the Isthmus,
Dipping through the Tropics by the palm-green shores,
With a cargo of diamonds,
Emeralds, amethysts,
Topazes, and cinnamon, and gold moidores.

Dirty British coaster with a salt-caked smoke-stack
Butting through the Channel in the made March days,
With a cargo of Tyne coal,
Road-rail, pig-lead,
Firewood, iron-ware, and cheap tin trays.

B. Discuss each of the following points in the poem.
   1. Why would galleys with five banks of oars (Quinquireme) be carrying goods from Ninevah to Ophir to Palestine? (Discussion may involve economic geography principles of supply and demand.) Students should locate places mentioned in the poem using an historical atlas.
   2. Why would a galleon be coming from the Isthmus of Panama? (Discussion may involve the later idea of the Isthmus of Panama as a point of relative ease of transhipment from the Pacific to the Atlantic.) Where would that Spanish galleon be bound and why? (Probably bound for a Spanish port by way of one of the passages in the eastern Caribbean.) Discuss Mercantile theory and the Council of the Indies.
   3. Why were people from the date 1492 on willing to go to such great distances (Panama to Spain is more than 3,000 nautical miles one way) for cargoes? (For adventure, to see new things, to spread their religion, for profit are possible answers.)

      Point out that as the navigators of the ships left Europe, they fell under the influence of patterns of winds and ocean currents that could be good for trade, or adversely, could make travel very difficult.

C. Students should be given an atlas showing ocean currents and asked to locate the Atlantic Ocean currents which join Spain to Panama (Canaries Current and North Atlantic Equatorial Current). Use an overhead projection of the same map to guide the students in the activity.

D. Ask the students to locate a Spanish city using an atlas. What is the approximate latitude and longitude of Spain? Locate a city in Panama. What is the approximate latitude and longitude of Panama? Locate both Spain and Panama on a world map showing ocean currents. Which current moves southwest away from Spain? (Canaries Current). What island does that current strike? (Canary Islands). Which current proceeds west across the Atlantic Ocean? (North Atlantic Equatorial Current). Using currents to return to Spain, ask students what two currents they would use? (Gulf Stream and North Atlantic Drift.) Suggested maps to use for this atlas exercise are: *Goode's World Atlas, 18th ed.*, pages 14-15; *Scott, Foresman World Atlas*, page 24; and *National Geographic Atlas of the World*, page 226.

E. Have students speculate on how sailing with these currents might have helped trade. (Ideas may include the concept of the ocean acting as a conveyor belt and carrying the ship forward.) Discuss why getting back the same way might be difficult. (Going against the ocean currents requires much more energy.)

F. Once students have grasped the idea of the masses of water assisting or hindering ocean movement, proceed to a discussion of the winds. Ask students to "navigate" to Panama from Spain on the northeast trade winds and return on the westerlies. (Make sure they identify the doldrums and understand what that region of "fickle" winds represents to sailing vessels.)

G. Have students work in pairs to explain in writing why it was difficult to go from Europe southward along the coast of Africa to the Indian Ocean in the middle of the 15th Century (Answers may include the fact that the belt of the doldrums had to be crossed; the Benguela Current flows from south to north along the west coast of Africa and ships would have had to sail against the current; the southeast trade winds worked against ships, also.) Challenge students to determine why a sailing ship leaving the United States bound for South Africa would prefer a course looking like a reversed "S." (The ship would use the prevailing winds and ocean currents for propulsion.)

H. Continuing to work in pairs, students can discuss the effects a monsoon pattern had on sailors in the Indian Ocean. (Answers may include the fact that the winter northeast monsoon helps travel from India to East Africa but would hinder travel in the other direction. The summer pattern of the southwest monsoon is the reverse). Have students present their findings to the class.

I. For homework the students should apply what they have learned to a particular trading pattern being studied by their class. For United States History and Geography students, this could include the China Trade, the era of clipper ships; the New England whaling ships in the Pacific as recorded in *Moby Dick* (Melville 1851); the settlement of the Caribbean by the Spanish and others beginning in 1492; or the California hide trade and gold rush of the 1840s. In a World History and Geography class, units on the British and Dutch East Indies spice trade are a natural. The 19th century English wool trade with Australia and New Zealand, the China trade, and the slave trade from Africa to the New World from 1585 to 1830 all lend themselves to a study of winds and ocean currents.

Day Two: Trade and Mother Nature Make Some Places More Exciting Than Others

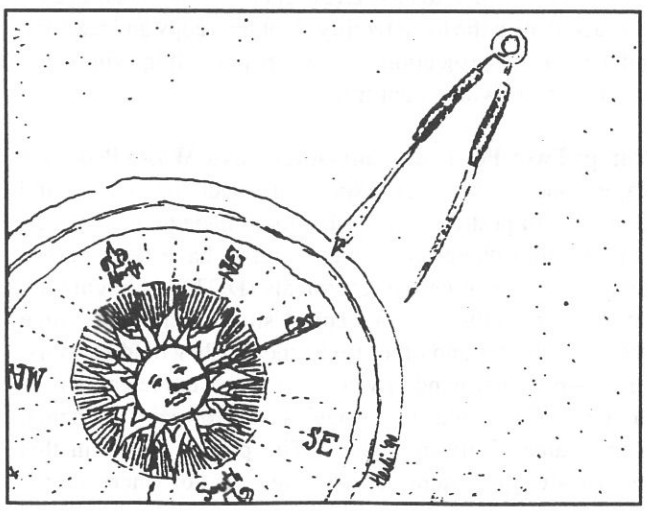
A. Begin with a review of the idea of trade. There is a great range of motivations for trade. Among them are economic, social, cultural, and adventure considerations. Cities are usually the places where long-distance trade in luxury goods occurs. Lead a discussion of the homework findings from day one. Answers might include American manufactured goods for cattle hides and sea otter

pelts in the California trade; also, cloves, pepper, and cinnamon from the East Indies in return for European metal goods in the spice trade. Continue with a review of winds and ocean currents.

B. Explain that not all the winds are the same at all times and in all places. Ask students to explain what a **calm** day is and recall a day of high wind velocity that occurred in the school community. Mention that wind speeds can reach levels that are quite high—gale force winds reach speeds of 39-45 mph (34-47 knots), storm winds reach velocities of 55-73 mph (48-63 knots), and hurricane force winds exceed 74 mph (64 knots). Discuss the effects of such winds in terms of events that students might have observed when objects were moving at such speeds. Ask what happens to trees when winds increase their speed. (Leaves flutter, tree sways, the loss of limbs, trees blow over.) What happens to man-made structures as winds increase in velocity? (Windows rattle and even break, roofs blow off buildings.) Have the students seen a vertical rain? A slanting rain? A horizontal rain? Have they put a hand outside the window of a car moving at the above speeds and felt the force of the wind on their hand? What happens to insect life hitting the windshield at speeds equaling storm velocity? If you teach in an area where the wind chill index is usually reported by the media, you might introduce that topic as well.

C. One place that sailors learned early on to have great respect for was Cape Horn, the southernmost point of South America [56°S; 67°W]. The Cape is well into the region of high winds associated with *the roaring forties*. Point out that in the southern latitudes, south of the great capes, there are no continental masses to break up or slow the winds as they blow "round the world." Point out that before the opening of the Panama Canal, shipborne trade and other movement had to "round the Horn" to enter the Pacific from the Atlantic. From Magellan in 1519, to Drake in 1578, to Cook in 1769, to Darwin's voyage of the *Beagle* (1831-36), all experienced the Horn.

D. Have students read the following account of Cape Horn from *Along the Clipper Way* (Chichester 1966): Italicized words will be discussed after the reading is completed.



The prevailing winds in the Forties and Fifties, between 40°S and 60°S, are westerly and pretty fresh on the average. For instance, off the Horn there are *gales of Force 3* or more on one day in four in the spring and one day in eight in the summer. Winds have a lazy nature in that they refuse to climb over a mountain range if they can sweep past the end of it. South America has one of the greatest mountain ranges of the world, the Andes, which blocks the westerlies along a front of 1,200 miles from 35°S right down to Cape Horn. All this powerful wind is crowding through Drake's Strait between Cape Horn and the South Shetland Islands, 500 miles to the south. The normal westerlies pouring through this gap are interfered with by the turbulent, vicious little c*yclones* rolling off the Andes. The same process occurs in reverse with the easterly winds which, though more rare than the westerlies, blow when a *depression* is passing north of the Horn.

As for the waves, the prevailing westerlies set up a current flowing eastwards round the world at a mean rate of 10 to 20 miles per day. This current flows in all directions at times due to the passing storms, but the result of all the different currents is this 10 to 20 miles per day flowing eastwards. As the easterly may check this current or even reverse it for a while, the prevailing stream flowing eastwards may sometimes amount to as much as 50 miles a day. As with the winds, this great ocean river is forced to pass between South America and the South Shetland Islands. This in itself tends to make the stream *turbulent*.

But there is another factor which greatly increases the turbulence. The bottom of the ocean takes the form of shelves between the Horn and the Shetland Islands and this induces the huge seas to break. It is like a sea breaking at *Bournemouth* in a gale, except that the waves, instead of being 4 feet high are likely to be 60 feet high.

There is yet another factor to make things worse. Anyone who has sailed out past the *Needles from the Solent* when the outgoing tide is opposing a *Force 6* wind knows what a hateful, short, steep sea can result. A yacht will seem to be alternately standing on its stem and its stern with a lot of water coming inboard. The same thing happens at the horn on a gigantic scale if there is an easterly gale blowing against the current flowing past the Horn.

What size are these notorious waves? No one yet has measured them accurately in the Southern Ocean, but the oceanographers have been measuring waves in the North Atlantic for some years. The British Institute of Oceanography has invented a wave-measuring instrument which they use at the weather ships stationed in the Atlantic. Recently one instrument with a 60-foot scale recorded a wave of which the trace went off the scale. This wave was estimated at 69 feet in height, higher than our five

story house in London. An American steamship in the South Pacific is said to have encountered a wave 112 feet high. Brian Grundy who used to sail with me in *Gypsy Moth II* told me that when he was in the Southern Ocean in a big whaling steamer, he reckoned that one wave was 120 feet high. L. Draper of the Institute of Oceanography says that, according to *Statistics of a Stationary Random Process* if a sea of average height 30 feet is running, then one wave out of every 300,000 can be expected to be four times that height, i.e., 120 feet (Chichester 1966).

E. Having read the quotation from Chichester, ask students for questions about the reading. Students often ask about *Force 3 gales* (wind speed 34-40 knots with an average of 39 knots); *cyclone* (a low pressure system of steep gradient); *depression* (a low pressure system); *turbulent* (instability and bumpiness); *Bournemouth* (United Kingdom port on English Channel [50°44'N; 1°55'W]); *Solent and the Needles* (at entrance to Portsmouth and Southampton harbors in the United Kingdom—noted for treacherous winds, tides and currents); *Force 6* (wind speed 22-27 knots with an average of 24 knots).

F. After questions from the reading have been discussed, ask students to close their eyes and visualize the conditions described from the perspective of a boat or ship. What does the wind feel like? What do the seas look like? Then have each student write as though they were a crewmember of a ship of 80 tons, roughly one hundred feet in length. Such a boat or ship would be approximately the size of Drake's *Golden Hind* or Magellan's *Victoria*.

G. Several variations may be used with this lesson focusing upon local conditions where extremes occur. You might wish to describe the renaming of the Cape of Storms to become the Cape of Good Hope. Ask students to use the atlas to identify places where the names describe the place as a dangerous or extreme place (Cape Wrath in Scotland). Identify places where extremes of wind and temperature similar to those of Cape Horn may be found (North Cape, Cape of Good Hope). You might alter the technology in the writing sample and have the students imagine themselves on a larger vessel (an **Iowa** Class Battleship, 887 feet long), on a submarine, on a small boat (21 feet), or on a windsurfer with a wetsuit and booties. The idea is to allow the students to imagine the conditions with themselves in the picture as a way to further understand the effects of winds and ocean currents on lives.

H. After the writing sample is collected show a short video or film clip demonstrating the type of conditions seen at the Cape. I recommend *Around Cape Horn* filmed by Captain Irving Johnson in 1929 aboard a sailing ship. You will affirm for the students that winds, currents, and places combine to create distinctive relationships. The video is available from Mystic Seaport Museum, Mystic, Connecticut 06355.

Day Three: Winds and Ocean Currents and Their Global Effects

A. Review the current and wind patterns taught on previous days of this unit. Remind students that ocean currents and winds are potential carriers of oceanic or atmospheric borne materials over great distances. Ask what would happen to a fishing net float accidentally released into the currents off the coast of Japan? (It might end up on the coast of California—as many have.) You could discuss the direction taken by smoke resulting from the burning of fields near the school. Discuss the odors associated with a nearby industrial operation. Where do you smell the odor from the local sewage treatment facility? Focus on winds and ocean currents as natural patterns of transportation. Remind students that the patterns of wind and water are found worldwide.

B. Form groups of approximately four students and assign each group one of the following prompts. The groups are to follow the directions in their prompt and then make a report of their findings to the class.

Prompt One: Nuclear Issues

A major concern since 1945 has been the release and circulation of nuclear materials into the atmosphere and oceans. Significant agreements have been reached to prevent the proliferation of nuclear materials and to limit their entry into the environment (such as atmospheric test ban treaties). Using an atlas, determine where nuclear materials would be transported by wind if they were released at Cadiz, Spain; Jacksonville, Florida; Norfolk, Virginia; Groton, Connecticut; Greenock, Scotland; or another location near a nuclear materials facility. (Note: the places given for this exercise are all locations near bases for American ballistic missile submarines.)

Plot the spread of the materials on a map of the North Atlantic Ocean. When plotting is complete, identify the Windward and Leeward Islands (Windwards at 12°45'N; 61°40'W). Why should people on these islands be concerned about the potential release of radioactive material in places far from their homes, such as Cadiz, Spain?

As an optional follow-up activity, research the Chernobyl accident in the USSR. If the school is near a nuclear power facility it should have an evacuation plan for use in case of an accident at the local facility. Obtain a copy and read and understand the projections based on prevailing winds and ocean currents where appropriate.

Prompt Two: Pesticides and Other Toxic Waste Products

Major concern has been expressed about the release and circulation of pesticides and other man-made toxic materials into the atmosphere and oceans. Laws have been passed banning the use of certain chemicals (DDT) and regulating use of others in the environment. Using an atlas, determine where pesticides and other toxic chemicals would be transported—by either wind or water—if they were released near Monterey, California; Los Angeles, California; Yokohama, Japan; Taipei, Taiwan. (Note: The places given in this exercise are sites where pesticides are used or where a toxic

waste leak could occur in the event of an industrial accident.)

Plot the spread of the toxic materials on a map of the North Pacific Ocean. When plotting is complete, locate and label the Mariana Islands (17°20'N; 145°00'E). Why should people on these islands be concerned about the potential release of toxic waste products in places far from their homes such as Los Angeles, California?

Prompt Three: The Closing of the Panama Canal to Shipping

Since the opening of the Panama Canal, people have discussed the possible closure of that route, resulting from political change in Panama, sabotage of the lock system, or a natural catastrophe. If the Panama Canal were closed, ships would have to travel between the Atlantic and Pacific Oceans by way of Cape Horn. Using an atlas, determine the distance from Los Angeles to New York City by way of the Panama Canal. Then determine the distance by way of Cape Horn. How much further is it by way of the Horn? If a tanker broke apart in passage around the Horn and released its cargo into the prevailing ocean currents, what directions and places would be affected?

Plot the spread of the materials on a polar projection of the Southern Hemisphere. When plotting is complete, locate and label the Kerguelen Islands (49°50'S; 69°30'E). Why might wildlife on the Kerguelen Islands be affected by the closure of the Panama Canal?

Following the presentation of reports by each group, review with students that global patterns of winds and ocean currents have played a vital role in world wide patterns of settlement and trade. These patterns will continue to influence human affairs in the future.

Evaluation

Give a short quiz that asks the students to fill in a response to questions such as:

1. An identifiable stream of water moving through the ocean over long distances, similar in type to the Gulf Stream is often called a _____. (current)
2. Prevailing winds are usually identified by the direction they blow *from* or *to*? (from.)
3. The Canary Islands are located on the sailing trade route from
   A. Europe to America,
   B. America to China,
   C. China to Australia,
   D. India to the Middle East. (A)

Have the students write an essay of five paragraphs or more that responds to the question: Why are winds and ocean currents important to human affairs? The answer must identify patterns of winds and ocean currents. (I require the naming and correct description of at least one.) It must identify the effect of a pattern on trading routes in the past. It must identify the potential effect of movement of pollutant material by the currents and winds. It must state a description of winds and ocean currents in extreme locations and their effect upon humans. It must conclude with an evaluation of the importance of knowing winds and ocean currents.

Conclusion

These exercises and comments are intended to have a Middle School or High School class study and begin to comprehend the extraordinary significance of ocean currents and winds in the shaping of historical geography. Even though contemporary modes of transportation seem to be freer of the force of these natural currents, the patterns of geographic trade, interaction, and warfare have been shaped in considerable part by these fundamental geographic elements. Such lessons help students see the importance of geography and its influence.

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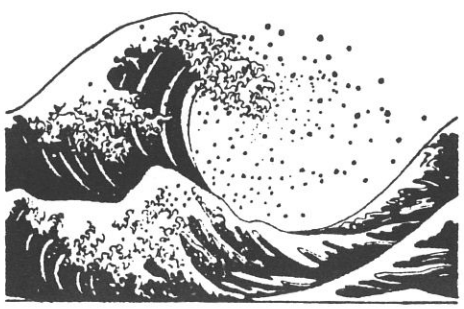


background notes

Egypt

United States Department of State
Bureau of Public Affairs

December 1990

Arab Republic of Egypt

PROFILE

Geography

Area: 1,001,450 sq. km. (386,650 sq. mi.); slightly smaller than Texas, Oklahoma, and Arkansas combined. **Cities:** *Capital*—Cairo (pop. over 12 million). *Other cities*—Alexandria (4 million), Aswan, Asyut, Port Said, Suez, Ismailia. **Terrain:** Desert except Nile Valley and Delta. **Climate:** Dry, hot summer, moderate winters.

People

Nationality: *Noun and adjective*—Egyptian(s). **Population** (1989): 54.8 million. **Annual growth rate:** 2.6%. **Ethnic groups:** Egyptian, Bedouin Arab, Nubian. **Religions:** Sunni Muslim 90%, Coptic Christian. **Languages:** Arabic (official), English, French. **Education:** *Years compulsory*—ages 6-12. *Literacy*—45%. **Health:** *Infant mortality rate*—(1989) 93/1,000. *Life expectancy*—59.3 yrs. **Work force:** *Agriculture*—44%. *Government, Public Service and Armed Forces*—36%. *Privately owned service and manufacturing enterprises*—20%.

Government

Type: Republic. Independence: 1922. Constitution: 1971.

Branches: *Executive*—president, prime minister, cabinet. *Legislative*—People's Assembly (444 elected and 10 presidentially appointed members) and Shura (Consultative) Council (140 elected members, 70 presidentially appointed). *Judicial*—Court of Cassation, State Council.

Administrative subdivisions: 26 governorates.

Political parties: National Democratic Party (ruling), New Wafd Party, Socialist Labor Party, Socialist Liberal Party, National Progressive Unionist Grouping, Umma Party. **Suffrage:** Universal over 18.

Central government budget (FY 1989-90): $30.3 billion.

Flag: Three horizontal stripes—red, white, and black from top to bottom—with a golden hawk in the center stripe.

Economy

GDP (FY 1987-88): $34.5 billion. **Annual growth rate:** 2%. Per capita GNP (1987): $680.

Natural resources: Petroleum and natural gas, iron ore, phosphates, manganese, limestone, gypsum, talc, asbestos, lead, zinc.

Agriculture: *Products*—cotton, rice, onions, beans, citrus fruits, wheat, corn, barley, sugar.

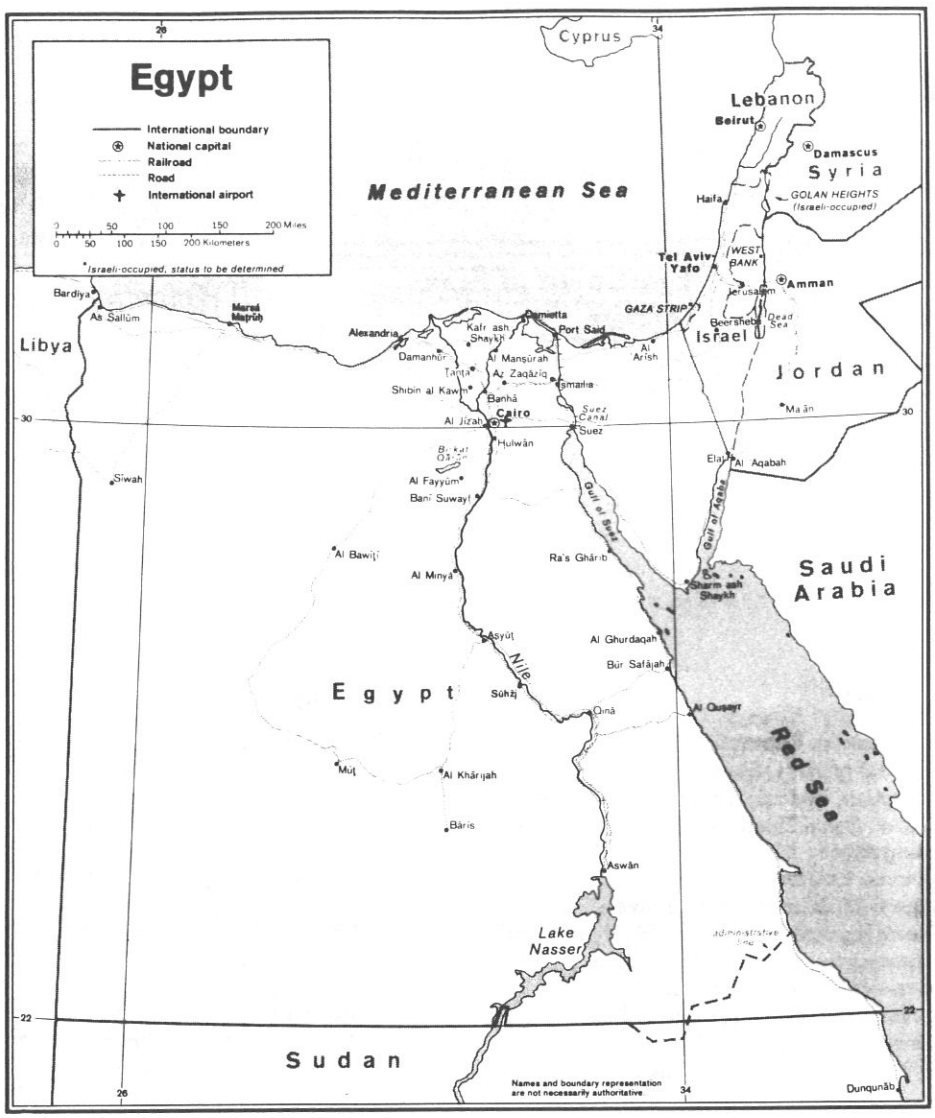
Industry: *Types*—food processing, textiles, chemicals, petrochemicals, construction, light manufacturing, iron and steel products, aluminum, cement, military equipment.

Trade (FY 1988-89): *Exports*—$2.5 billion: petroleum, cotton, manufactured goods. *Major markets*—United States, Japan, Italy, Germany, France, UK. *Imports*—$10.1 billion: foodstuffs, machinery and transport equipment, paper and wood products. *Major suppliers*—US, Germany, France, Japan, Netherlands, UK, Italy.

Free market exchange rate: 2.59 Egyptian pounds=US$1 (fluctuates).

Membership in International Organizations

UN and some of its specialized and related agencies, including the International Monetary Fund (IMF), World Bank, General Agreement on Tariffs and Trade (GATT); Arab League; Nonaligned Movement; Organization of African Unity (OAU); Organization of the Islamic Conference (OIC).



PEOPLE

Egypt is the most populous country in the Arab world and the second most populous on the African Continent. Of the country's 54 million people, 99% live in Cairo and Alexandria, elsewhere on the banks of the Nile River, in the Nile Delta, which fans out north of Cairo, and along the Suez Canal. These regions are among the world's most densely populated, containing an average of over 1,450 persons per square kilometer (3,600 per sq. mi.). Small communities spread throughout the desert regions of Egypt are clustered around oases and historic trade and transportation routes. The government has tried, with mixed success, to encourage migration to newly irrigated land reclaimed from the desert. However, the proportion of the population living in rural areas has continued to decrease as people move to the cities in search of employment and a higher standard of living.

The Egyptians are fairly homogenous: Mediterranean and Arab influences appear in the north, as well as some mixing in the south with the Nubians of northern Sudan. Ethnic minorities include a small number of Bedouin Arab nomads dispersed in the eastern and western deserts and in the Sinai, as well as some 50,000-100,000 Nubians clustered along the Nile in Upper Egypt. Before construction of the Aswan High Dam began, Nubian villages stretched irregularly along the Nile; they have since been relocated along the banks of Lake Nasser.

The literacy rate is about 45% of the adult population. Education is free through university and compulsory from ages 6 to 12. About 87% of all children enter primary school; half of these drop out after their sixth year. There are 16,000 primary and secondary schools with some 10 million students and 12 major universities with about 500,000 students, as well as 67 teacher colleges. Major universities include those of Cairo (100,000 students) and Alexandria and the 1,000-year-old Al-Azhar University, one of the world's major centers of Islamic learning. Arabic is the official language.

Egypt's vast and rich literature constitutes an important cultural element in the life of the country and in the Arab world as a whole. Its novelists and poets were among the first to experiment with new styles of Arabic literature, and the forms they developed have been widely imitated. Egyptian novelist Naguib Mahfouz was the first Arab to win the Nobel Prize for Literature. Egyptian books and films are available throughout the Middle East.

HISTORY

Egypt has endured as a unified state for more than 5,000 years, and archeological evidence indicates that a developed Egyptian society has existed much longer. Modern leaders urge Egyptians to take pride in their "pharaonic heritage" and in their descent from mankind's earliest civilized society. The Arabic word for Egypt is *Misr*, which originally connoted civilization or metropolis.

Archeological findings show that primitive man lived along the Nile long before the dynastic history of the pharaohs began. By BC 6000, organized agriculture had appeared.

In about BC 3100, Egypt was united under a ruler known as Mena, or Menes, who inaugurated the 30 pharaonic dynasties into which Egypt's ancient history is divided—the Old and Middle Kingdoms and the New Empire. For the first time, the use and management of vital resources of the Nile River came under one authority.

The pyramids at Giza (near Cairo) were built in the 4th dynasty, showing the power of the pharaonic religion and state. The Great Pyramid, the tomb of Pharoah Khufu (also known as Cheops), is the only surviving example of what

the ancients called the Seven Wonders of the World. Ancient Egypt reached the peak of its power, wealth, and territorial extent in the period called the New Empire (BC 1567-1085). Authority again was centralized, and a number of military campaigns brought Palestine, Syria, and northern Iraq under Egyptian control. The language of ancient Egypt was related to the Berber and Semitic languages, with a lesser Galla and Somali influence.

Persian, Greek, Roman, and Arab Conquerors

In BC 525, the Persian warrior Cambyses, son of Cyrus the Great, led an invasion force that dethroned the last pharaoh of the 26th dynasty. The country remained a Persian province until the conquest of Alexander the Great in BC 332. This legendary figure founded and gave his name to Alexandria, the port city that became one of the great centers of the Mediterranean world. Located there was another "wonder"—the lighthouse at Pharos—and the largest libraries of the ancient world. With a population of 300,000, the city was a center of Hellenistic and Jewish culture. After Alexander's death in BC 323, the Macedonian commander, Ptolemy, established personal control over Egypt, assuming the title of pharaoh in BC 304. The Ptolemaic line ended in BC 30 with the suicide of Queen Cleopatra. The Emperor Augustus then established direct Roman control over Egypt, initiating almost seven centuries of Roman and Byzantine rule. According to tradition, St. Mark brought Christianity to Egypt in AD 37. The church in Alexandria was founded about AD 40, and the new religion spread quickly, reaching Upper Egypt by the second century.

Following a brief Persian reconquest, Egypt was invaded and conquered by Arab forces in 642. A process of Arabization and Islamization ensued. Although a Coptic Christian minority remained—and remains today, constituting about 10% of the population—the Arabic language inexorably supplanted the indigenous Coptic tongue. For the next 1,300 years, a succession of Turkish, Arabic, Mameluke, and Ottoman caliphs, beys, and sultans ruled the country.

European Influence

Napoleon Bonaparte arrived in Egypt in 1798. The 3-year sojourn in Egypt (1798-1801) of Napoleon's army and a retinue of French scientists opened it to direct Western influence. Napoleon's adventure awakened Great Britain to the importance of Egypt as a vital link with India and the Far East and launched a century-and-a-half of Anglo-French rivalry over the region.

An Anglo-Ottoman invasion force drove out the French in 1801, and following a period of chaos, the Albanian Muhammad Ali obtained control of the country. Ali ruled until 1849, and his successors retained at least nominal control of Egypt until 1952. He imported European culture and technology, introduced state organization of Egypt's economic life, improved education, and fostered training in engineering and medicine. His authoritarian rule also was marked by a series of foreign military adventures. Ali's successors granted to the French promoter, Ferdinand de Lesseps, a concession for construction of the Suez Canal—begun in 1859 and opened 10 years later. Their regimes were characterized by financial mismanagement and personal extravagance that led to bankruptcy. These developments led to rapid expansion of British and French financial oversight that, in turn, provoked popular resentment, unrest, and, finally, revolt in 1879.

In 1882, British expeditionary forces crushed the revolt, marking the beginning of British occupation and the virtual inclusion of Egypt within the British Empire. Between 1883 and 1914, the British Agency was the real source of authority. It established special courts to enforce foreign laws for foreigners residing in the country. Such privileges for foreigners generated increasing Egyptian resentment. To secure its interests during World War I, Britain declared a formal protectorate over Egypt on December 18, 1914. This lasted until February 28, 1922, when, in deference to growing nationalist feelings, Britain unilaterally declared Egyptian independence. British influence, however, continued to dominate Egypt's political life, and fostered fiscal, administrative, and governmental reforms.

In the postindependence period, three political forces competed with one another: the Wafd, a broadly based, nationalist political organization strongly opposed to British influence; King Fuad, whom the British had installed on the throne during the war; and the British themselves, who were determined to maintain control over the Suez Canal. Although both the Wafd and the king wanted to achieve independence from the British, they competed for control of Egypt. Other political forces emerging in this period included the Communist Party (1925) and the Muslim Brotherhood (1928), which eventually became a potent political and religious force.

During World War II, British troops used Egypt as a base for Allied operations throughout the region. British troops were withdrawn to the Suez Canal area in 1947, but nationalist, anti-British feelings continued to grow after the war. Violence broke out in early 1952 between Egyptians and British in the canal area, and anti-Western rioting in Cairo followed.

On July 22-23, 1952, a group of disaffected army officers led by Lt. Col. Gamal Abdel Nasser overthrew King Farouk, whom the military blamed for Egypt's poor performance in the 1948 war with Israel. Following a brief experiment with civilian rule, they abrogated the 1923 constitution and declared Egypt a republic on June 18, 1953. Nasser evolved into a charismatic leader with a broad following in the Arab world as a whole.

Nasser and his "Free Officer" movement enjoyed almost instant legitimacy for ending 2,500 years of foreign rule. They were motivated by numerous grievances and goals but wanted especially to break the economic and political power of the landowning elite, to remove all vestiges of British control, and to improve the lot of the people, especially the *fellahin* (peasants).

A secular nationalist, Nasser developed a foreign policy characterized by advocacy of pan-Arab socialism, leadership of the "nonaligned" or "Third World," and close ties with the Soviet Union. He sharply opposed the Western-sponsored Baghdad Pact (1955). When the United States held up military sales in reaction to Egyptian neutrality vis-a-vis Moscow, Nasser concluded an arms deal with Czechoslovakia in September 1955. When the United States and the World Bank withdrew their offer to help finance the Aswan High Dam in mid-1956, he nationalized the privately owned Suez Canal Company. The crisis that followed, exacerbated by growing tensions with Israel over guerrilla attacks from Gaza and Israeli reprisals, resulted in the invasion of Egypt that October by France, the United Kingdom, and Israel. While Egypt was defeated, the invasion forces were quickly withdrawn under heavy US pressure. The Suez war (or, as the Egyptians call it, the tripartite aggression) instantly transformed Nasser into an Egyptian and Arab hero. Nasser soon after came to terms with Moscow for the financing of the Aswan High Dam—a step that enormously increased Soviet involvement in Egypt and set Nasser's government on a policy of close ties with the Soviet Union. In 1958, pursuant to his policy of pan-Arabism, Nasser succeeded in uniting Egypt and Syria into the United Arab Republic. Although this union had failed by 1961, it was not officially dissolved until 1984.

Nasser's domestic policies were arbitrary; frequently oppressive; yet generally popular. The regime jailed opponents often without trial. Nasser's foreign policies, among other things, helped provoke the Israeli air and armor strikes of June 1967 that virtually destroyed the armed forces of Egypt, Jordan, and Syria and led to Israel's occupation of the Sinai Peninsula, the Gaza Strip, the West Bank, and the Golan Heights. Despite this setback, Nasser was revered in Egypt and elsewhere in the Arab world until his death in 1970.

After Nasser's death, one of the original Free Officers, Vice President Anwar el-Sadat, was elected president after Nasser's death. In 1971, Sadat concluded a treaty of friendship with the Soviet Union but, a year later, ordered Soviet advisers to leave Egypt. In 1973, he launched the October war with Israel, in which the Egyptian Armed Forces performed effectively. With his country's credibility restored, Sadat felt able, in 1974 and 1975, with US participation, to negotiate two Sinai disengagement agreements with Israel by which Egypt regained the Suez Canal and parts of the Sinai. In 1977, Sadat journeyed to Jerusalem to meet with Prime Minister Begin and to address the Israeli Knesset. This breakthrough foreshadowed the Camp David accords of September 1978 and the Egyptian-Israeli Peace Treaty of 1979, both negotiated with intensive US participation. Throughout this period, US-Egyptian relations steadily improved, but Sadat's willingness to break ranks by making peace with Israel earned him the enmity of most Arab states.

Camp David and the Peace Process

In a momentous change from the Nasser era, President Sadat shifted Egypt from a policy of conflict with Israel to one favoring peaceful accommodation through direct negotiation. Following the Sinai disengagement agreements of 1974 and 1975, a fresh opening for progress was created by Sadat's dramatic visit to Jerusalem in November 1977. This led to President Jimmy Carter's invitation to Sadat and Israeli Prime Minister Begin to join him in trilateral negotiations at Camp David. The outcome was the historic Camp David accords, signed by Sadat and Begin and witnessed by Carter on September 17, 1978. These agreements comprise frameworks for a comprehensive settlement of the Middle East conflict and for a peace treaty between Egypt and Israel.

Negotiations on bilateral peace began in October 1978 and were concluded with the signing of the Egypt-Israel Peace Treaty on March 26, 1979. However, efforts at progress on the other framework, which provides for the establishment of transitional arrangments for the West Bank and Gaza, proved problematical. After Jordan and representative Palestinians declined to take part, the United States joined Egypt and Israel in the negotiations to shape an autonomous self-governing authority for the area. Some progress was made in bridging differences on the nature and responsibilities of the self-governing authority, but the negotiations ended in 1982 without a final accord on transitional arrangements.

In domestic policy, Sadat introduced greater political freedom and a new economic policy, the most important aspect of which was the *infitah*, or "open door." This policy relaxed government controls over the economy and encouraged private investment. Sadat dismantled much of Nasser's police apparatus and brought to trial a number of former government officials accused of criminal excesses during his predecessor's rule. This liberalization also included the reinstitution of due process and the banning of torture. Sadat tried to expand participation in the political process in the mid-1970s but later abandoned this effort. In the last years of his life, Egypt was racked by violence arising from discontent with Sadat's rule and sectarian tensions, and it experienced a renewed measure of repression.

On October 6, 1981, President Sadat was assassinated by Islamic extremists. Hosni Mubarak, vice president since 1975 and Air Force Commander during the October 1973 war, was elected president later that month. He was re-elected to a second term in October 1987. Mubarak has maintained Egypt's commitment to the Camp David peace process, while at the same time re-establishing Egypt's position as an Arab leader. Egypt's readmission to the Arab League in May 1989 effectively ended its ostracism from the Arab community. Egypt also has assumed a leading role for moderation in such international forums as the United Nations and the Nonaligned Movement. From July 1989 to July 1990, Mubarak was chairman of the Organization of African Unity. Domestically, Mubarak has supported the public sector of the economy while also encouraging the private sector. There has been a democratic opening and increased participation in the political

process by opposition groups. The 1987 parliamentary elections were the fairest since 1952 and resulted in the election of 100 opposition members out of a total of 458 seats. Freedom of the press has increased greatly. While concern remains that economic problems could promote increasing dissatisfaction with the government, President Mubarak enjoys broad support.

GOVERNMENT AND POLITICAL CONDITIONS

The Egyptian constitution provides for a strong executive. Authority is vested in an elected president who can appoint one or more vice presidents, a prime minister, and a cabinet. The president's term runs for 6 years. Egypt's legislative body, the People's Assembly, has 454 members—444 popularly elected and 10 appointed by the president. The constitution reserves 50% of the assembly seats for workers and peasants. The assembly sits for a 5-year term but can be dissolved earlier by the president. There is also a 210-member National Shura (Consultative) Council, in which 70 members are appointed and 140 elected. The Shura Council has little real power. Below the national level, authority is exercised by and through governors and mayors appointed by the central government, and by popularly elected councils.

Although power is concentrated in the presidency and the National Democratic Party's majority in the People's Assembly, opposition parties organize, publish their views, and represent their followers at various levels in the political system. In addition to the National Democratic Party, there are five legally constituted parties: the New Wafd Party, the Socialist Labor Party, the Nationalist Progressive Unionist Grouping, the Socialist Liberal Party, and the Umma Party. The New Wafd Party and the Socialist Labor Party (in alliance with the Socialist Liberals and the Muslim Brotherhood) won 90 seats in the People's Assembly in elections of April 1987. The law prohibits the formation of parties on religious or class lines, thereby making it illegal for Islamic or communist groups to organize formally as political parties. However, members of the Muslim Brotherhood, an organization legally proscribed under the provisions of this law, are members of the assembly as part of the Socialist Labor Party delegation.

Egypt's judicial system is based on European (primarily French) legal concepts and methods. Under the Mubarak government, the courts have demonstrated increasing independence, and the principles of due process and judicial review have gained greater respect. The legal code is derived largely from the Napoleonic code. Marriage and personal status are primarily based on the religious law of the individual concerned, which for most Egyptians is Islamic law.

The process of gradual political liberalization begun by Sadat has continued under Mubarak, but the political process remains significantly restricted. Egypt now enjoys unprecedented freedom of the press, and opposition political parties operate freely. Although the April 1987 parliamentary elections were marked by the greatest freedom of political expression seen in Egypt for more than three decades, opposition parties continue to make credible complaints about electoral fraud by the government; in the 1989 Shura Council elections, for example, the ruling NDP won 100% of the seats. Nevertheless, the November 1990 assembly elections—in which a number of independent and non-NDP candidates won seats—are generally considered to have been free and fair.

Principal Government Officials

President—Muhammad Hosni Mubarak
Prime Minister—Atef Sedky
Deputy Prime Minister and Minister of Foreign Affairs—Esmat Abdel Meguid
Minister of State for Foreign Affairs—Boutros Boutros Ghali
Ambassador to the United States—Abdel Raouf El-Reedy
Ambassador to the United Nations—Amr Musa

Egypt maintains an embassy in the United States at 2310 Decatur Place NW., Washington, DC 20008 (tel. 202-232-5400). The Washington Consulate has the same address (tel. 202-234-3903). The Egyptian Mission to the UN is located at 36 East 67th Street, New York, NY, (tel. 212-879-6300). Egyptian Consulates General are located at 1110 Second Avenue, New York, NY, 10022 (tel. 212-759-7120); Houston, 2000 West Loop South, Suite 1750, Control Data Building, Houston, TX, 77027 (tel. 713-961-4915); Chicago, 505 N. Lakeshore Drive, Suite 4902, Chicago, IL, 60611 (tel. 312-670-2655); and San Francisco at 3001 Pacific Avenue, San Francisco, CA, 94115 (tel. 415-346-9700).

ECONOMY

Egypt's gross domestic product was about $34.5 billion in 1987-88. Agriculture and industry each contributed about 20% and services about 33% of GDP.

Although Egypt's private sector is expanding, about 65% of its industry, including virtually all heavy industry, is owned by the state. State price controls affect many privately owned small- and medium-scale industries that often must compete with products subsidized by the government. Agriculture is mainly in private hands but is regulated through price controls, import allocations, and guidelines on production administered through local agricultural cooperatives. Construction, nonfinancial services, and domestic marketing are largely private.

Agriculture

More than one-third of the Egyptian labor force is engaged directly in farming, and many others work in the processing or trading of agricultural products. Practically all Egyptian agriculture takes place in some 2.5 million hectares (6 million acres) of fertile soil in the valley of the Nile and its delta regions. Although some desert lands are being developed for agriculture, fertile lands along the river are being lost to urbanization and erosion.

The climate and ready availability of water, especially since the building of the Aswan Dam, permit several crops a year on the same piece of land. Although improvement is possible, agricultural productivity is high. Egypt has little subsistence farming. Cotton, rice, onions, and beans are the principal crops. Cotton is the largest agricultural export earner.

The United States is a major supplier of wheat to Egypt, particularly through the PL 480 (Food for Peace) program, and other Western countries also have supplied food on concessional terms.

"Egypt," wrote the Greek historian Herodotus 25 centuries ago, "is the gift of the Nile." The seemingly inexhaustible resources of water and soil carried by this mighty river created in the Nile Valley and Delta the world's most extensive oasis; without the Nile, Egypt would be little more than a desert wasteland. The river carves a narrow, cultivated floodplain, never more than 20 kilometers wide, as it travels northward from Sudan and forms Lake Nasser behind the Aswan High Dam. It then winds past the archeological wonders of Luxor (ancient Thebes) and the cities of Qena and Asyut. Just north of Cairo, the Nile spreads out over what was once a broad estuary that has been filled by riverine deposits to form a fertile delta about 250 kilometers wide (150 mi.) at the seaward base and about 160 kilometers (96 mi.) from south to north.

Until the erection of dams on the Nile, particularly the Aswan High Dam, the fertility of the Nile Valley was dependent not only upon the flow of water but also upon the silt deposited by annual flood waters. Sediment is now obstructed by the Aswan High Dam and retained in Lake Nasser. The discontinuation of yearly, natural fertilization and the increasing salinity of the soil have detracted somewhat from the High Dam's value. Nevertheless, the benefits remain impressive: more intensive farming on millions of acres of land made possible by improved irrigation; prevention of damage caused by periodic serious flooding; and production of billions of kilowatt-hours of electricity yearly at very low cost. The Western Desert accounts for about two-thirds of the country's land area. For the most part, it is a massive sandy plateau marked by seven major depressions. One of these, Fayoum, was connected about 3,600 years ago to the Nile by canals and is now an important irrigated agricultural area.

Egypt has few natural resources other than the agricultural capacity of the Nile Valley. The major minerals are petroleum, phosphates, and iron ore. The fall in world oil prices during the mid-1980s had a severe impact on Egypt. In addition to a large drop in per-barrel oil earnings, Egypt's slow-moving price-setting mechanism prevented it from competing successfully for oil sales. As a consequence, Egyptian oil production in 1986 dropped below 1985 levels in spite of new additions to production capacity. As oil prices stabilized in late 1986, Egypt began to regain its share of the market. Petroleum exploration continues, particularly in the Western Desert. During 1988-89, Egyptian production of crude oil dropped 3.7% percent over the previous year to approximately 760,000 barrels per day. Egypt's crude oil exports in FY 1988/89 totaled $1.4 billion. The petroleum sector accounts for about 14% of Egypt's GDP and for about two-thirds of Egypt's exports.

Egypt has benefited from higher oil prices resulting from the gulf crisis. However, the crisis has lowered remittances from workers abroad and reduced revenue from tourism and the Suez Canal.

Transport and Communication

Transportation facilities in Egypt follow the pattern of settlement along the Nile. The major rail line runs from Alexandria to Aswan. Other important lines run along the north coast to the Libyan border and eastward to the Suez Canal. Most paved and improved roads are found in the Nile Valley and Delta, near the Suez Canal, and along the Red Sea and Sinai coasts. The Nile River system (about 1,600 km. or 1,000 mi.) plus another 1,600 kilometers of navigable canals are important for inland transport. Major ports are Alexandria, Port Said, and Port Suez.

Egypt long has been the cultural and informational center of the Arab Middle East, and Cairo is the region's largest publishing and broadcasting center. There are six daily newspapers with a total circulation of more than 1.7 million. In addition there are 14 weekly magazines and newspapers with a total circulation of 500,000 and a number of monthly newspapers, magazines, and journals. Every political party has its own newspaper contributing to a lively, often highly partisan debate on public issues.

Under President Nasser, Egypt led the Arab world in developing a comprehensive broadcasting system. State-run operations are coordinated under the Egyptian Radio and Television Federation. The Egyptian Broadcasting Corporation operates seven domestic and four international radio stations, transmitting in 32 languages for a total of 180 hours a day. The state-owned Egyptian Television Organization operates two channels, broadcasting to a rapidly growing national audience.

DEFENSE

Egypt's armed forces are among the largest in the region and are divided into four services: the army (300,000), air defense (80,000), air force (29,000), and navy (20,000). In 1979, the United States began a military supply relationship with Egypt. Egypt's inventory also includes equipment from European sources—France, Italy, the United Kingdom, and China. Much of its motorized equipment is of Soviet origin, reflecting the long period of almost exclusive Soviet supply from the late 1950s until the 1973 war with Israel. Most of this equipment is now obsolete. Seeking to bolster stability and moderation in the region, Egypt has provided military assistance and training to a number of African and Arab states.

FOREIGN RELATIONS

Under President Mubarak, Egypt ended its ostracism from the Arab community without sacrificing its commitment to its peace treaty with Israel. It was readmitted to the Arab League in May 1989, marking its

resumption of a leadership role among moderate Arab states. It now has formal diplomatic relationships with all Arab League members except Libya. In July 1989, Mubarak was elected to a 1-year term as Chairman of the Organization of African Unity, formalizing Egypt's growing leadership in African issues. Egypt actively works to resolve a number of difficult problems in Africa, including the dispute between Senegal and Mauritania, and the civil war in Sudan. Egypt has played a leading role in efforts to moderate the Nonaligned Movement and make it a more effective organization. There also has been a recent improvement in Egyptian-Soviet relations.

Egypt's relations with Israel have improved in recent years, despite some disappointments on both sides. The two countries have solved a number of difficult bilateral issues through negotiation. In 1989, Israel turned over to Egypt a strip of land known as Taba, ending the last remaining territorial dispute between the two countries. Egypt and Israel have engaged in a useful program of cooperative research in agriculture and marine sciences.

Throughout the 1980s, President Mubarak has led efforts to advance the Middle East peace process and has been highly supportive of US efforts. At the end of 1989, Egypt accepted US Secretary of State Baker's five points to begin discussions with Israel and the United States on Israeli Prime Minister Shamir's election plan. Egypt believes it is important to get Israel and Palestinians to begin negotiation, with the immediate focus on the proposal for elections in the occupied territories. It has encouraged serious consideration and discussion of Israel's election proposal by Palestinians.

US-EGYPTIAN RELATIONS

Since his election in October 1981, President Mubarak has strongly supported a special US-Egyptian relationship, based on shared interests in regional security and stability and the need for a peaceful resolution of outstanding problems. The two countries have worked together to promote a peaceful settlement of the Arab-Israeli conflict, to resolve a number of difficult conflicts in Africa, and to resist Libyan aggression against Chad and the Soviet invasion of Afghanistan. President Mubarak visited the United States twice during 1989, and he and President Bush discuss mutual concerns by phone periodically.

An important pillar of the bilateral relationship remains US security and economic assistance to Egypt, which expanded significantly in the wake of the Egyptian-Israeli peace treaty in 1979. In FY 1989, total US assistance levels to Egypt remained stable at $1.3 billion in foreign military sales (FMS) grants, $815 million in economic support funds grants, and $170 million in PL 480 food aid. The Egyptians have used FMS funds for their military modernization program—a transition from their former Soviet-model military structure to a smaller, higher quality military that is dependent on Western, primarily US, equipment, logistics, tactics, and training.

US assistance promotes Egypt's economic development and supports US-Egyptian cooperation. US economic aid helps stimulate economic growth by funding commodity imports, such as raw materials and capital equipment, and electric power, telecommunications, housing and transport projects. Powerplants built with US assistance generate more electricity than the Aswan Dam. In 1983, the United States agreed to a 5-year, $1 billion program to overhaul the water and sewage systems of Cairo, Alexandria, and othe Egyptian cities.

US military cooperation has helped Egypt modernize its deteriorating Soviet-supplied weaponry and improve

Travel Notes

Climate and clothing: Clothing should be suitable for hot summers and temperate winters. Modest attire is appropriate.

Customs: Visas are required. Travelers are advised to obtain visas through any Egyptian Embassy or consulate prior to travel. Visas usually can be obtained on arrival, but this can result in delays. Shots are not required by the Egyptian government for visitors coming from the United States or Europe, but cholera immunizations are required of travelers coming from infected areas. The Department of State Medical Division recommends that visitors to Egypt obtain cholera, typhoid, tetanus, polio, meningitis, and hepatitis (gamma globulin) immunizations; travelers should consult their physicians.

Health: Travelers should be aware of rabies hazards and malaria in some outlying areas.

Telecommunications: Telephone service can be erratic. Telegrams can be sent from the main post office and hotels, and telex service is available. Cairo is 7 time zones ahead of eastern standard time.

Transportation: Domestic and international airlines serve Cairo. Domestic air service from Cairo to Alexandria, Aswan, Luxor, Hurghada, and the Sinai is available. Rail service is available from Cairo to Aswan in the south and Alexandria in the north. Taxis are often shared with other customers. Settle on a price before entering a taxi.

Principal US Officials

Ambassador—Frank G. Wisner
Deputy Chief of Mission—Wesley Egan
Minister-Counselor for Economic Affairs—Paul Balabanis
Counselor for Political Affairs—Stanley Escudero
Counselor for Commercial Affairs—Frederic Gaynor
Counselor for Public Affairs—Kenton Keith
Counselor for Agricultural Affairs—Frank Lee
Counselor for Administrative Affairs—James McGunnigle
Consul General—Vincent Battle
Labor Affairs Officer—Gina Abercrombie-Winstanley
Director, AID Mission—Marshall D. Brown
Defense Attache—Col. David Lemon, USA
Chief, Office of Military Cooperation—Maj. Gen. William Fitzgerald, USA
Consul General in Alexandria—Robert Maxim

its ability to suppport regional security and stability. Under FMS programs, the United States provides F-4 jet aircraft, F-16 jet fighters, M60A3 tanks, armored personnel carriers, antiaircraft missile batteries, aerial surveillance aircraft, and other equipment. In addition to military assistance, the United States and Egypt participate in combined military exercises which include deployment of US troops to Egypt. Units of the US Sixth Fleet are regular visitors to Egyptian ports.

The US Embassy in Cairo is located at 5 Sharia Latin America, Garden City, Cairo; American Embassy, FPO NY, 09527 (tel. 355-7371; telex: 93773 AMEMB). The Consulate General in Alexandria is located at 110 Avenue Horreya; American Consulate General Alexandria, c/o American Embassy, Box 27, FPO NY 09527 (tel. 482-1911). ■

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background notes

Greece

United States Department of State
Bureau of Public Affairs

December 1990

Official Name: Hellenic Republic

PROFILE

Geography

Area: 131,957 sq. km. (51,146 sq. mi.) including islands; roughly the size of Alabama. **Cities:** *Capital*—(greater) Athens (3 million). *Other cities*—Thessaloniki (705,000), Patras (154,600), Iraklion (111,000). **Terrain:** Largely mountainous interior, with coastal plains; many islands. **Climate:** Temperate.

People

Nationality: *Noun and adjective*—Greek(s). **Population:** 10 million (1990 est.). **Ethnic Groups:** Greek 98%, other 2%. **Religions:** Greek Orthodox 97%, Muslim 2%, Other 1%. **Language:** Greek. **Education:** *Years compulsory*—9. *Literacy*—men 96%, women 89%. **Health** (1984): *Infant mortality rate*—13.8/1,000. *Life expectancy*—men 72 yrs., women 75 yrs. **Work force** (1988): *Agriculture*—29%. *Industry*—27%. Services— 43%.

Government

Type: Presidential parliamentary republic.
Independence: 1827.
Constitution: June 1975, amended March 1986.
Branches: *Executive*—president (chief of state), elected May 1990 for 5 years; prime minister (head of government). *Legislative*—unicameral parliament (*Vouli*) elected April 1990; parliamentary system with 4 year (maximum) term. *Judicial*— supreme court (*Areios Pagos*).
Major Political parties: New Democracy (ND), Panhellenic Socialist Movement (PASOK), Left Alliance (*Synaspismos*)—coalition of communist and leftist parties, principally the Communist Party of Greece (KKE) and the Greek Left (EAR).
Suffrage: Universal, 18 and over.
Administrative Subdivisions: 51 prefectures (*nomi*), 13 regional districts (*periferiarchies*).
Central Government Budget (1988 projected): $25.3 billion.
Defense (1988 projected): approximately 11% of central government budget, 5% of GDP.)
Flag: Four white and five blue alternating horizontal stripes, with a white cross on the upper staff corner.

Economy

GDP: $53.8 billion (1989).
Annual Growth Rate: -0.5% (1987); 2.4% (1988); 2.3% (1989)
Inflation (1989): 14.8%.
Natural Resources: bauxite, lignite, magnesite, oil.
Agriculture (12.8% of GDP, 1989): **Products:** grains, fruits (especially olives, olive oil, and raisins), vegetables, wine, tobacco, cotton, livestock, dairy products.
Industry (including mining, electricity and construction): *Manufactured goods* (30% of GDP, 1989)—processed foods, shoes, textiles, metals, chemicals, electrical equipment, cement, glass, transport equipment, petroleum products, construction, electrical power; *Services* (57% of GDP, 1989)—transportation, communications, trade, banking, public administration, defense.
Trade: *Exports* (1989)—$6 billion: textiles, metal products, cement, chemicals, pharmaceuticals. *Major Markets* (1988)—EC 64.2%, Middle East and North Africa 8.2%, USSR and Eastern Europe 4.3%, US 6.3%. *Imports* (1989)—$15 billion: petroleum, machinery, transport equipment, chemicals, meat and animals. *Major Suppliers* (1988) —EC 65.5%, Middle East and North Africa 4.2%, USSR and Eastern Europe 5.1%, US 4% (taken from Greek customs statistics, which exclude military equipment imports).
Exchange Rate: 150 drachmas = $1 US (1990).
US Economic and Security Assistance (1946-1989): $9.3 billion.

Membership in International Organizations

UN, EC, NATO, OECD, INTELSAT, Council of Europe.

PEOPLE

In ancient times Greece was a mosaic of ethnically similar small city-states. During the migrations and invasions of the Byzantine and Ottoman periods (4th-19th centuries AD), Greece's ethnic composition lost its homogeneity. Since independence (1827) and the exchange of populations with Turkey in 1923, however, Greece has reforged a national identity whose roots date back to the 13th century BC. Greece's pride in these Hellenic roots is reflected in its official name, *Hellas* or the Hellenic Republic; the name "Greece" derives from the Latin name. Greek society retains its traditional Mediterranean values of family, education, and personal honor (*philotimo*), despite the changes wrought by urbanization and industrialization.

From earliest times, Greeks have migrated across the country and across the Mediterranean, eventually creating Greek-speaking communities all over the globe. Emigration has been on such a scale that, by one count, there are more than 3 million people of Greek heritage in the United States alone. Over the past two decades, however, migration within Greece from rural to urban centers has been more extensive than emigration abroad. The 1961 census showed an urban population of 43% compared to a rural and semiurban population of 57%. By 1971, the urban population had grown to 53% and by 1981 to 58%. About one-third of Greece's total population lives in the greater Athens area.

Education is highly esteemed in Greece, not only because it transmits culture and knowledge but also because it contributes to social and cultural mobility.

Orthodox Christianity is the established religion. The Greek Orthodox Churc is self-governing under the spiritual guidance of the Ecumenical Patriarch, resident in Istanbul, Turkey. During the centuries of Ottoman domination, the churc preserved the Greek language, values, and national identity and became an important rallying point in the struggle for independence. The church is under the protection and partial control of the state, which pays the clergy's salaries.

The Muslim minority, concentrated in western Thrace, was given legal status by provisions of the Treaty of Lausanne in 1923

and is Greece's only officially recognized minority .

The Greek language dates back at least 3,500 years, and modern Greek preserves many features of its classical predecessor. In the 19th century, after Greece's war of independence, an effort to rid the language of Turkish and Arabic borrowings and to make it close again to the language of Homer's Odyssey and Iliad, led to a version known as *Katharevousa*. However, this never became the everyday language of most Greeks, and in 1976, it was abolished as the language of high school instruction and of the government. Today, spoken Greek is generally termed *Demotiki*; a more recent reform movement has given rise to *Nea Demotiki*, the version that is now considered standard Greek for everyday usage and for contemporary literature.

HISTORY

The eastern Mediterranean is one of the "cradles of civilization." Greece was inhabited as early as the Paleolithic period, and by BC 3000 had become home, in the Cycladic Islands, to a culture whose art remains evocative. Early in the second millennium BC, the island of Crete nurtured the sophisticated maritime empire of the Minoans, evidence of whose trade stretches from Egypt to Sicily. The Minoans were challenged and eventually supplanted by mainland Mycenaeans, who spoke a dialect of Greek. Homer's *Iliad* and *Odyssey*, composed probably around BC 800, drew on memories of the Mycenaeans, whose civilization collapsed around BC 1100, shortly after the Trojan war. This collapse left Greece, except the fortified citadel of Athens, open to migrating Dorian tribes from the north.

During the next few hundred years of political instability, the Greek polis or city-state came into existence. The polis included the city and its surrounding territory, its institutions, its way of life, and the unique values of its citizens. When the cities sent their excess population to found colonies around the eastern and western Mediterranean and in the Black Sea, the colonies remained linked to the mother city by common values and traditions. Despite their differences and frequent conflicts, the separate city-states shared the epics of Homer and other poetry; the Olympic and other games; and the same mythology, religion, and language which unified the Greek world. They were conscious of their common identity and called non-Greeks "barbarians."

Eventually two city-states emerged to dominate Greece—the Ionian city of Athens, a democracy and a sea power, and the Dorian city of Sparta, an oligarchy, a land power, and a militaristic society. In the fifth century BC, Persian invasions united the cities briefly, mainly under the military leadership of Athens. The subsequent "Golden Age" (BC 446-431) of Pericles, an Athenian leader, reflected an explosion of cultural and intellectual achievements which has had a profound influence on Western civilization.

The conflicting ambitions of Athens and Sparta led to the Peloponnesian wars (BC 431-404), which Athens lost. The war caused suffering throughout Greece but did not immediately diminish Athenian cultural achievements. A weakened Greece later fell under the domination of the Macedonians. Alexander the Great, whose tutor was the great philosopher Aristotle, spread Greek culture as he marched east to conquer the world, but he also adopted much from the Persian Empire he defeated. The fusion of Greek and Persian cultures created the Hellenistic civilization of Asia Minor, which later was an important influence in the culture of the Roman Empire and on Christianity and subsequent Western thought.

Rome conquered Greece in BC 146 and eventually ruled over the entire Hellenistic world. As Rome's power declined, one of its emperors, Constantine, split the empire by establishing his Greek-speaking capital, later called Constantinople, at the site of the ancient Greek city of Byzantium in AD 330.

Although Rome was overrun by migrating tribes and the western part of the empire fragmented in the fifth century AD, the eastern part flourished as the Byzantine Empire. Greek in language and culture, the empire was Roman in law and administration. The people called themselves Romans and tended to set aside the ancient Greek culture because it was pagan. Christianity was the official religion, and the empire was seen as ecumenical, embracing all Christians. By the 11th century, the Latin-speaking and the Greek-speaking churches split in the Great Schism, which still continues. Attacks by fellow Christians during the Crusades and increasing pressure from Central Asian peoples weakened the Byzantine Empire. It collapsed finally with the fall of Constantinople to the Ottoman Turks in 1453. The patriarch of Constantinople (subsequently renamed Istanbul), the capital of the Ottoman Empire, then became both the head of the Orthodox Church and the temporal leader of all Greek and many Orthodox subjects of the Sultan.

The Greek war of independence began in 1821, and the country obtained independence in 1827. Under the tutelage of England, France, and Russia, a monarchy was established with a Bavarian prince, Otto, named king in 1833. He was deposed 30 years later, and the European powers chose a prince of the Danish House of Glucksberg as his successor. He became George I, King of the Hellenes.

The *Megali Idea* (Great Idea), the vision of uniting all Greeks of the declining Ottoman Empire within the newly independent Greek State, exerted a strong influence on Greek political consciousness. At independence, Greece had an area of 47,515 square kilometers (18,346 sq. mi.), and its northern boundary extended from the Gulf of Volos to the Gulf of Arta. The Ionian Islands were added in 1864; Thessaly and part of Epirus in 1881; Macedonia, Crete, Epirus, and the Aegean Islands in 1913; western Thrace in 1918; and the Dodecanese Islands in 1947.

Greece entered World War I in 1917 on the side of the Allies and at the war's conclusion, took part in the Allied occupation of Turkey, where many Greeks still lived. In 1922, the Greek army marched from its base in Smyrna, now Izmir, toward Ankara but was forced to withdraw. At the end of the war with the exchange of populations, more than 1.3. million Greek refugees from Turkey poured into Greece, posing enormous problems for the Greek economy and society.

A continuing feature of Greek politics, particularly between the two World Wars, was the struggle for power between monarchists and republicans. Greece was proclaimed a republic in 1924, but George II returned to the throne in 1935, and a plebiscite in 1946 reconfirmed the monarchy. It was finally abolished by referendum on December 8, 1974, when, by a two-thirds vote, the Greeks supported the establishment of a republic.

Greece's entry into World War II was precipitated by the Italian invasion on October 28, 1940. That date is celebrated in Greece by the remembrance of the one-word reply—*ochi* (no)—given by the prime minister to a series of demands made by Mussolini. Despite Italian superiority in numbers and equipment, determined Greek defenders drove the invaders back into Albania. Hitler was forced to divert German troops to protect his southern flank and attacked Greece in early April 1941. By the end of May, the Germans had overrun most of the country, although Greek resistance was never entirely suppressed. German forces withdrew in October 1944.

With the German withdrawal, the principal Greek resistance movement, which was controlled by the communists, sought to take control of the country and undertook a siege of the British forces in Athens during the winter of 1944-45. When the siege was defeated, an unstable coalition government was formed. Continuing tensions led to the dissolution of that government and the outbreak of Civil War in 1946. First the United Kingdom, and later the United

States, gave extensive military and economic aid to the Greek government. Communist successes in 1947-48 enabled them to move freely over much of mainland Greece, but with extensive reorganization and American material support, the Greek national army under Marshal Papagos eventually was able to gain ascendancy. Yugoslavia closed its borders to the insurgent forces in 1949 after Marshal Tito of Yugoslavia broke with Stalin and the Soviet Union. Hostilities ceased in the fall of 1949 with some 80,000 Greeks killed. Twenty-five thousand more were either voluntarily or forcibly evacuated by the Greek communists to Eastern Bloc countries, and there were 700,000 refugees.

Greece sought, after the Civil War, to join the Western democratic alliance. In 1952, Greece joined the North Atlantic Treaty Organization (NATO). From 1952 to late 1963, Greece was governed by conservative parties (The Greek Rally of Marshal Papagos and its successor, the National Radical Union (ERE) of Constantine Karamanlis). In 1963, the Center Union Party of George Papandreou won the election and governed until July 1965. It was followed by a succession of unstable coalition governments.

On April 21, 1967, just before scheduled elections, a group of colonels led by Col. George Papadopoulos seized power. Civil liberties were suppressed, special military courts established, and political parties dissolved. Several thousand opponents were imprisoned or exiled to remote Greek islands. Papadopoulos' associate, Gen. Dimitrios Ioannides, took power in November 1973. Ioannides' decision in July 1974 to attempt to overthrow Archbishop Makarios, the President of Cyprus, and install a client regime on Cyprus brought Greece to the brink of war with Turkey, which, in response to the coup, militarily intervened and occupied almost 40 percent of the island.

Senior Greek military officers then withdrew their support from the junta. Leading citizens persuaded Karamanlis to return from exile in France to establish a government of national unity until elections could be held. Karamanlis' newly organized party, New Democracy (ND), won elections held in November 1974, and he became prime minister.

Following the 1974 referendum which resulted in the rejection of the monarchy, a new constitution was approved by parliament on June 19, 1975, and parliament elected Constantine Tsatsos President of the Republic. In the parliamentary elections of 1977, New Democracy again won a majority of seats. In May 1980, Prime Minister Karamanlis was elected to succeed Tsatsos as president. George Rallis was then chosen party leader and succeeded Karamanlis as prime minister.

In January 1981, Greece became the 10th member of the European Community. In parliamentary elections, held in October 1981, Greece elected its first socialist government when the Panhellenic Socialist Party (PASOK), led by Andreas Papandreou, won 172 of 300 seats with 48% of the popular vote.

On March 9, 1985, Prime Minister Papandreou announced that PASOK would not support President Karamanlis for a second term and nominated Supreme Court Justice Christos Sartzetakis. On March 29, 1985, Sartzetakis was elected President by the Greek Parliament, receiving the minimum 180 votes required on the third ballot.

Greece witnessed two rounds of parliamentary elections in 1989. In June, New Democracy won 146 of the 300 seats — not enough to form a government. The centrist-conservative party joined forces with the newly-formed coalition of communist and leftist parties called the Left Alliance to form an interim coalition government under Prime Minister Tzannis Tzannetakis (ND). The Tzannetakis government's mandate was limited to a program of national "catharsis," or cleansing. The focus was parliamentary investigations into crimes allegedly committed by ministers of the previous government, including former Prime Minister Papandreou, himself. Following months of hearings, parliament voted to lift the parliamentary immunity of most of the ministers incriminated, including Papandreou, and the Tzannetakis government resigned, turning the country over to an interim government in preparation for new Parliamentary elections in November.

The November elections were, if anything, even more inconclusive, with ND and PASOK (with Papandreou at the helm) both picking up additional seats at the expense of the Left Alliance. This time ND won 46% of the vote but still came up three seats short of a parliamentary majority. The stalemate led to the formation of a short-term, all-party coalition government tasked with addressing the growing crisis in the Greek economy under Prime Minister Xenophon Zolotas, an internationally-respected economist. The pressures of economic reform proved too much for the fragile coalition; the party leaders withdrew their support in February 1990, and elections were held on April 8.

New Democracy won 150 seats in the April 1990 election. With the cooperation of the single deputy elected from the centrist DIANA party, a New Democracy government headed by ND leader Constantine Mitsotakis won a vote of confidence in Parliament. The DIANA deputy subsequently changed his affiliation to ND, and a special Greek electoral court awarded a contested seat originally claimed by PASOK to ND, bringing ND's total to 152 seats.

GOVERNMENT AND POLITICAL CONDITIONS

The 1975 constitution, which describes Greece as a "presidential parliamentary republic," is similar to the 1952 constitution but has more extensive and precise guarantees of civil liberties and vests the powers of the head of state in a president elected by parliament and advised by the Council of the Republic.

On balance, the Greek governmental structure is similar to that found in most Western European countries and has been described as a compromise between the French and German models. As in most of Western Europe, the prime minister and parliament play central roles in the political process, but the Greek president also performs certain governmental functions in addition to ceremonial duties. The extent of the president's influence in the political process depends to a large degree on personal qualities and leadership.

Presidential Powers

Elected by parliament to a 5-year term, the president can be reelected once. The president has the power to declare war and to conclude agreements of peace, alliance, and participation in international organizations; a three-fifths parliamentary majority is required to ratify such agreements or treaties. The president can also exercise certain emergency powers, which must be countersigned by the appropriate minister.

On March 7, 1986, parliament amended 11 articles of the constitution, limiting many of the president's political powers. The president may no longer dissolve parliament, dismiss the government, suspend certain articles of the constitution, or declare a state of siege. To call a referendum, he must obtain approval from parliament. Restricting presidential authority has given more power to the parliament and prime minister. Prime Minister Papandreou's majority party (PASOK) supported the amendments.

Parliament

Parliamentary deputies are elected by direct, secret ballot for a maximum of 4 years, but elections can be called earlier.

Greece uses a complex, reinforced proportional electoral system. That system has discouraged splinter parties and made a parliamentary majority possible even if the leading party fell short of 51% of the popula vote. However, the constitution makes it

possible for Parliament to re-write the electoral law virtually at will. Prior to the June 1989 elections, the PASOK-majority parliament wrote a new electoral law that took a big step toward simple proportional representation, giving more power to the smaller parties and making it more difficult for any one party to win a majority in Parliament. In November 1990, parliament revised the electoral law again, lowering the percentage of the popular vote needed to win an absolute majority in parliament.

Political Parties in the Greek Parliament (April 1990)	
Party	**Seats**
New Democracy (ND	152
Panhellenic Socialist Party (PASOK)	124
Left Alliance	21
Muslim Independent (GUVEN)	2
Ecologists/Alternatives	1
Total	300

Local Administration

Greece is divided into 51 prefectures (*nomi*), each headed by a prefect (*nomarch*) appointed by the minister of the interior; 13 regional governments (*periferiarchis*) were established in 1987, headed by regional governors (*periferiarchs*), appointed by the minister of the interior. Although municipalities and villages have elected officials, they do not have an adequate independent tax base and must depend upon the central government for a large part of their financial needs and are subject to numerous central government controls.

Principal Government Officials
President Constantine Karamanlis
Prime Minister Constantine Mitsotakis
Foreign Minister Andonis Samaras
Ambassador to the United States Christos Zacharakis
Ambassador to the United Nations Antonios Exarchos

Greece maintains an embassy in the United States at 2221 Massachusetts Avenue NW, Washington, DC 20008 [tel. (202) 667-3168]. There are consulates general in San Francisco, Chicago, and New York, and consulates in New Orleans, Boston, and Atlanta.

ECONOMY

The Greek economy began modernizing in the late 19th and early 20th centuries with the adoption of social and industrial legislation and protective tariffs, along with the creation of the first industrial enterprises larger than artisan shops. Industry at the turn of the century was based primarily on food processing, shipbuilding, textiles, and simple consumer products. Greek economic progress was severely affected from the 1920s to the 1950s by an influx of refugees from Asia Minor, the global depression, Axis occupation, and civil war. Recovery began in 1953 with a drastic currency devaluation and reduction in government spending which brought greater price stability and increased exports. From 1955 to 1963, under Prime Minister Karamanlis, Greece's gross domestic product (GDP) almost doubled. Greece achieved high rates of growth in the late 1960s and early 1970s, which also saw some major foreign investments in Greece.

Since the 1970s, however, Greece has suffered a decline in its rate of GDP growth of output, ratio of investment to GDP, and productivity of investment. Between 1963 and 1988:

- Real GDP growth fell from 10% to less than 4% per year;
- Investment as a share of GDP fell from 27% to 16%; and
- The productivity of investment (inverseof incremental capital output ratio) fell from an average of 0.36 to .08 in the 1980s.

There were several reasons for this. Beginning in the mid-1970s, real labor costs and oil prices rose. In 1981, falling protective barriers as Greece entered the European Community (EC) hurt company profitability and private investment. Government policies also created structural supply-side problems which hampered development. The government elected in 1981 at first pursued expansionary policies, which in the face of supply-side constraints, caused inflation and balance-of-payments problems rather than growth in output or employment. Between 1980 and 1985:

- Net public-sector borrowing requirement (PSBR) on a cash basis rose from 8% to 18% of GDP;
- The current account deficit went from 5.5% to 10% of GDP; and
- Inflation accelerated from an annual average of 13% percent during the 1970s to over 20% percent between 1981 and 1985.

Non-debt capital inflows also fell and external debt increased from 15% to 48% of GDP. This economic performance compared poorly with the rest of the EC.

Growing public sector deficits were financed by direct borrowing. This was either domestic, crowding out the private sector, or in foreign markets, adding to the country's debt position. By mid-1985, the government was faced with rising inflation, a ballooning public sector deficit, and growing balance-of-payments problems.

Greece turned to the EC for help. In October 1985, supported by an ECU 1.75 billion loan from the EC, the government implemented a 2-year "stabilization" program with limited success. Incomes policy bore the brunt of the effort, and real wages fell by 13% in 1986-87. PSBR was cut from 18% of GDP in 1985 to 13% in 1987. Tighter monetary policy cut the growth of bank credit, pushed the public sector to borrow more from non-bank sources, and gradually established positive real interest rates on deposits and loans. The current account deficit fell from $3.3 billion in 1985 to $1.2 billion in 1987, and non-debt capital inflows (plus the EC loan) almost entirely financed the deficit, halting the growth of external debt.

Inflation remained a problem, and GDP growth remained sluggish. Inflation fell from 25% in 1985 to 16% in 1987, well above the target of 12%, and very high compared to EC norms. Real GDP growth lagged and was less than 1% during 1986 and 1987. Nonetheless, by December 1987, a good start had been made. Profits, private investment, and non-debt capital inflows all increased; net external borrowing ceased; and real interest rates were positive. External factors favored these improvements.

However, the good results did not last long, mainly because the program did not address underlying structural problems. Public sector inefficiencies and excessive spending continued to strain the economy. And, in 1988 the government relaxed incomes and financial policies.

The results were unfortunate. Real wages grew by 5%, twice the target rate. PSBR hit 16 percent of GDP due to high public spending and revenue shortfalls. Government borrowing was above target and, by the end of 1988, total public sector debt exceeded 100% of GDP. The money supply grew by 23%, and the drachma appreciated in real terms as exchange rate policy was used to dampen inflation. In the short term, this expansionary policy brought growth. Domestic demand soared and real GDP grew by 4.3%. Total investment increased by 9.3% in real terms, with public investment up 1.6% and private by 12% (although investment was low by historical standards).

But over the longer term, the economy was to suffer significantly. Strong inflationary pressures remained during 1988. Unit labor costs rose more than the GDP

deflator, eroding profit margins. Based on relative labor costs, the drachma appreciated by 8.5%, hurting competitiveness. The current account deficit fell to 2% of GDP between 1987 and 1988, but this improvement was due entirely to lower world oil prices. The non-oil trade deficit as a percentage of GDP reverted to its pre-1985 peak, and the current account deficit, excluding oil, widened by 0.6% of GDP.

Greece continues to rely on foreign borrowing to finance its balance-of-payments deficit. Total external debt was $21.5 billion by the end of 1989, and may top $23.5 billion by the end of 1990. This is 40% and 42% of GDP respectively. Greece faces a heavy repayment burden over the next 5 years.

The decrease in consumption caused by the stabilization program limited the rate of economic growth to 1.4% in 1986. In order to encourage third country investment, the Bank of Greece in July 1986 significantly liberalized repatriation regulations for dividends and profits for all new investment in "productive" activities made by US and other non-EC investors. However, EC investors still receive more favorable treatment.

The Greek economy is characterized by a strong services sector (56% of GDP) and a relatively large, inefficient agricultural sector (12% of GDP) which represents 26% of the labor force. Principal agricultural products are olive oil, fruits and vegetables, cereals, tobacco, and wines. Agricultural output increased by 1.5% in 1989 but is expected to decline in 1990 due to adverse weather conditions. The manufacturing, mining, electricity, and construction sector (30% of GDP) represents 20% of the labor force and accounts for 45% of Greece's exports—primarily textiles, cement, basic metals, petrochemicals and pharmaceuticals. Manufacturing output rose by 2% in 1989, and is expected to show a small increase in 1990. Construction registered a 10% increase in 1990. About half of the labor force is self-employed.

EC Membership

Greece is being forced to gradually align itself with EC economic and commercial practices during an extended transition period that began in 1981 following an 18-year period of associate membership. Greece has been granted derogations from certain aspects of the 1992 single-market program, which means delays in full liberalization until at least 1995.

EC membership is affecting all aspects of the Greek economy. Small Greek businesses will have to adjust to the strong competition of large EC firms, while the government will need to liberalize its economic and commercial practices. Also, the Greek agricultural sector has had to adjust to the lower intervention price set by the EC for Mediterranean products. Overall, however, Greece has been a net beneficiary of the EC budget. Net payments to Greece increased from $550 million by the end of 1982 to $1.4 billion in 1986 and to a $2.5 billion in 1989. The European Investment Bank has provided development financing of approximately $300 million annually. Together, these funds contribute significantly to Greece's current account balance, reduce the state budget deficit, and provide resources for investment—primarily in the public sector.

The EC's integrated Mediterranean programs (IMP), announced in 1985, in part to meet Greek objections to the entry of Spain and Portugal into the EC, will increase the flow of development funds to less developed regions of the community, including approximately $1.4 billion in grants for Greece over 7 years. Currently, Greece cannot fully draw on available EC structural funds, which require matching, because of a shortage of public funds.

Energy

Petroleum is Greece's largest single import. Based on import statistics for the last 5 years (1984-89), Greece imports an average of about 10 million tons of crude oil per year.

About 75% of imported crude is processed by the two state-owned refineries: Aspropyrgos and EKO, and the remaining 25% by the 2 privately owned refineries: Motoroil and Petrola (mainly export-oriented). The 4 Greek refineries produced about 16 million tons of petroleum products in 1988, of which about 2 million tons were exported.

Greece's main suppliers of crude are Saudi Arabia, Libya, the Soviet Union, and Kuwait. Greece began pumping oil from a modest oil field off the island of Thassos in the northern Aegean Sea in 1981 and is exploring and developing oil reserves found in the Ionian Sea. In 1988, Greece produced 1 billion tons of crude oil from its own fields.

Agreements on future purchases of natural gas are being negotiated with the Soviet Union and Algeria. The Soviet natural gas project will require the construction of a pipeline to be completed in 10 years at a cost of about $1 billion. Algerian liquefied natural gas could be used in the Athens region by 1992. Greece also plans to expand its use of hydroelectric power and lignite burning in power plants. Lignite, a soft, coal-like fuel widely available in Greece, provides about three-quarters of the country's electricity.

Tourism

Tourism is a major source of foreign exchange earnings. More than 8.4 million tourists visited Greece in 1989, injecting more than $2 billion into the Greek economy. US tourists (315,000 in 1989) covered about 4% of total tourist arrivals. Although US tourism increased in the last 3 years, it is still far behind the 1979 levels (600,000 arrivals from the US).

Commerce

Greece's location, maritime tradition, proximity to the Middle East and continuing unrest in that area have attracted regional marketing offices to Athens. The Greek government provides incentives to foreign enterprises conducting business exclusively outside of Greece (so-called "Law 89 companies"). Greece remains a net importer, in part because of its petroleum needs, but exports are significant, constituting about 11.5% of GNP. In 1989, Greece imported $15 billion worth of goods, while it exported $6 billion. Leading exports were textiles, metal products, cement, chemicals, petroleum products and pharmaceuticals.

More than 60% of Greece's trade is with other EC countries. EC membership has obliged Greece to eliminate or adjust many of its tariffs and quotas, making Greek businesses compete more directly with their EC counterparts.

The Middle East (including North Africa) is an important trading partner for Greece, due to Greece's reliance on foreign petroleum. In 1986 14% of its imports came from Middle Eastern oil-producing nations which purchased 11.7% of Greek exports. Greek firms continue to be involved in major projects in the Middle East. However, depressed oil prices have reduced Greece's exports to the Middle East.

In 1989, the United States supplied about 4% of Greece's non-military imports, led by machinery and transport equipment, coal, tobacco, corn, soybeans, fur skins, and iron and steel scrap, and purchased about 6% of its exports, with tobacco, petroleum products, antiques, iron and steel products, and fur apparel the major items.

Shipping

Greece is traditionally a seafaring nation and has built a successful shipping industry

due to its geographic location and the entrepreneurial ability of its shipowners.

In the 1980s, Greek shipowners began to abandon their national flag in favor of flags of convenience to cut costs and to avoid rigid government policies. The Greek flag fleet shrank from 3,896 ships displacing 42.5 million gross tons in 1981 to 2,002 ships and 20.6 million gross tons in February 1990. The Greek fleet thus dropped from first to fifth in the world league table.

Greek shipping does not play a central role in the domestic economy in that it trades internationally and is only marginally taxed on ship size and not on income generated. Nonetheless, it provides employment, and brings in invisible earnings which help Greece's balance-of-payments problems.

Greece's membership gives the EC 15% of the world's tonnage. The Greek fleet is the largest in the EC, with a third of the community's vessels and about 5% of the world's total tonnage.

FOREIGN RELATIONS

In addition to belonging to the European Economic Community, Greece is a member of NATO and, thus is a defense partner of the United States. Historically, Greece's foreign policy has focused on the eastern Mediterranean, particularly relations with Turkey, Cyprus, and the Balkans.

Greece, Turkey, and Cyprus

The 1974 coup against Cypriot President Makarios, inspired by the Greek military junta in Athens, and the subsequent Turkish military intervention in Cyprus, led to the junta's downfall, the creation of a large Cypriot refugee population, and a divided island. The Greek Cypriot community elects the government of the Republic of Cyprus, which is recognized by most other countries; only Turkey recognizes the regime in the Turkish-occupied territory north of the UN-controlled buffer zone.

The UN Secretary General has a mandate from the Security Council to use his "good offices" to help the Greek and Turkish Cypriot communities reach a mutually beneficial negotiated settlement to the Cyprus problem.

The Republic of Cyprus has received strong support from Greece in international fora. Greece has a military contingent on Cyprus, and Greek officers fill some key positions in the Greek Cypriot national guard. Greece and Turkey enjoyed good relations in the 1930s, but relations began to deteriorate in the late 1950s, sparked by the Cyprus independence struggle. Other issues dividing Greece and Turkey center on the Aegean, involving delineation of the continental shelf, territorial waters, territorial airspace, air traffic control, NATO command and control arrangements, and military forces in the area. Greek and Turkish officials held meetings in the 1970s to discuss differences on Aegean questions, but Greece discontinued these discussions in the fall of 1981. In 1983, Greece and Turkey held talks on trade and tourism, but these were suspended by Greece when Turkey recognized the Turkish-Cypriot declaration of independence of November 15, 1983. After a dangerous dispute in the Aegean in March 1987 concerning oil-drilling rights, the prime ministers of Greece and Turkey exchanged messages exploring the possibility of resolving the dispute over the continental shelf. Greece argues for an International Court of Justice decision. Turkey proposes bilateral political discussions. In early 1988 the Turkish and Greek prime ministers met at Davos in Switzerland and later in Brussels and agreed on various measures to reduce bilateral tensions and encourage cooperation. The Mitsotakis government has initiated a revitalization of the Greek-Turkish dialogue.

Central and Eastern Europe

Greece maintains full diplomatic, political, and economic relations with its eastern European neighbors. Efforts to promote multilateral Balkan cooperation and understanding began in the mid-1970s, and the Papandreou government supported a Balkan nuclear-free zone in these talks. Greece generally has had good relations with Yugoslavia since the early 1950s. Diplomatic relations with Bulgaria were restored in 1965, after a 24-year break, when Bulgaria renounced its claim to Greek Thrace and Macedonia, an obstacle to Greek-Bulgarian cooperation since World War I. Diplomatic relations were restored with Albania in 1971, but the Greek government did not lift the declared state of war with Albania until September 1987. In early 1990, relations between Greece and Albania were strained by reports of mistreatment of the ethnic Greek minority in Albania and an incident in which Albanian police reportedly entered the Greek embassy in Tirana and forcibly removed an asylum seeker.

Greek governments in recent years have pursued improvements in Greek-Soviet relations. Soviet Prime Minister Tikhonov's 1983 visit to Greece reciprocated an official visit by then Prime Minister Karamanlis to Moscow in 1979. Prime Minister Papandreou visited the Soviet Union in February 1985, but a reciprocal visit by Soviet President Gorbachev has yet to take place. Trade with Central and Eastern Europe and the Soviet Union accounted for about 4.3% of Greek exports and 5% of its imports in 1989. The Tikhonov visit concluded with the signing of a 10-year economic and technical cooperation agreement, including Soviet assistance in financing and building a $500 million alumina plant in Greece. The Soviet Union will purchase the plant's entire planned annual production of 600,000 tons for a period of 10 years. The plant is scheduled to be in operation by 1992. In June 1987 the Soviet Union and Greece agreed in principle to the construction of a $1 billion gas pipeline through which the Soviets would supply 80% of Greece's natural gas needs. The two countries also signed a shipping protocol agreement in May 1987.

Middle East Policy

Greece has a special interest in the Middle East because of its geographic position and its economic and historic ties to the area. Greece maintained relations with Israel at a level just below that of full diplomatic representation since 1948, until May 1990, when full recognition was extended. In December 1981, the Greek government raised the status of the office of the Palestine Liberation Organization (PLO) in Athens to a similar level. Greece cooperated with the United States and other countries in the PLO evacuation from Beirut in 1982 and from Tripoli in 1983.

DEFENSE

The Greek armed forces number about 185,000 active duty personnel, of which 142,000 serve in the army, 19,500 in the navy, and 23,500 in the air force. The army includes 1 armored division, 1 mechanized division, 11 infantry divisions, 1 parachute/commando division, and a variety of smaller specialized formations. The navy has 10 submarines, 14 destroyers, 7 frigates, 27 fast attack craft, and other vessels. There are almost 300 combat aircraft in the air force. All Greek males must serve approximately 2 years of military service, depending on the branch.

The United States has had 4 major and 12 secondary defense facilities in Greece which serve important missions, including strategic airlift, training, naval support for the US Sixth Fleet, reconnaissance, storage of reserve materials, and communications. Some 3,700 US servicemen are stationed at

Principal US Officials

Ambassador—Michael G. Sotirhos
Deputy Chief of Mission—James A. Williams
Chief, Military Advisory Group—BG Edmond Solymosy
Counselor for Political Affairs—Samuel C. Fromowitz
Counselor for Political Military Affairs—Laurel M. Shea
Counselor for Economic Affairs—J. Michael Cleverley
Counselor for Commercial Affairs—Jerry K. Mitchell
Counselor for Consular Affairs—Danny Root
Counselor for Administrative Affairs—Peter Flynn
Counselor for Public Affairs—Arthur Guiliano
Regional Security Officer—Art Manuel
Defense Attache—Stanley Kozlowski
Labor Affairs Officer—John L. Klekas
Consul General, Thessaloniki—Larry C. Thompson

The US Embassy is located at: 91 Vasillisis Sophias Avenue, Athens 101 60 (tel. 721-2951). The Consulate General is at: 59 Leoforos Nikis (Nikis Avenue), Thessaloniki (tel. 266-121).

these facilities, primarily at Hellenikon Air Base in Athens, the Nea Makri Communications Station at Marathon, and Souda Air Base and the Iraklion Communications Station on the island of Crete. As part of a worldwide structural readjustment, in early 1990 the US announced plans to withdraw from Nea Makri in 1990 and to close Hellenikon in 1991.

Greece joined NATO in 1952. Bordering on the Warsaw Pact and strategically located along the air and the sea lanes of the eastern Mediterranean, Greece plays a key role in the defense of the alliance's southern flank. Following the 1974 Cyprus crisis, the Greek government, in protest, withdrew from NATO's military wing but remained a member of the alliance. In October 1980, an arrangement with NATO provided for Greece's reentry into the alliance's military structure. Nevertheless, Greek-Turkish differences led Athens to withdraw from NATO exercises in the Aegean.

US-GREEK RELATIONS

The United States and Greece have longstanding historical, political, and cultural ties based on a common heritage and shared values. Following World War II, when Greece was threatened by the communist-led civil war, the United States proclaimed the Truman doctrine and began a period of substantial financial and military aid: more than $8.5 billion in economic and security assistance since 1946. Economic programs were phased out by 1962, but military assistance has continued. In FY 1987, Greece was the fifth largest recipient of US security assistance, receiving $343 million in foreign military sales credits.

Relations between the United States and Greece were strained at times during the Papandreou/PASOK years. As Prime Minister, however, Papandreou signed a new Defense and Economic Cooperation Agreement with the United States in 1983 allowing for the continued operation of US bases in Greece and was negotiating toward a new one when talks were recessed in May 1989 for Greek elections. Prime Minister Mitsotakis, shortly after taking office in April 1990, told parliament that his government would attach "particular importance to the normalization of relations with the United States." He added that the conclusion of a new defense agreement would be mutually beneficial. US-Greek negotiators signed a new mutual defense cooperation agreement in July. This entered into force in November 1990. ■

TRAVEL NOTES

Climate and clothing: Lightweight clothing May-September; woolens October-April.

Customs: Greek visas are required of holders of official and diplomatic US passports, but not of visitors holding US tourist passports and intending to stay less than 2 months. Visitors wishing to extend their stay must submit an application 20 days before the expiration of the 2-month period. No special inoculations are required, but health requirements change. Travelers should check the latest information.

Telecommunications: Telephone service within Athens is satisfactory, and calls to the US may be made easily. Athens is 7 standard time zones ahead of the eastern US.

Transportation: Streets and highways in Greece are hard-surfaced; smaller roads are sometimes rough and ungraded. Tourists wishing to drive must have an international driver's license. The international car insurance card is valid if Greece is listed on the card. Intercity and local public transportation is adequate, inexpensive, and crowded at rush hours. Taxis are numerous in Athens, but because they are relatively inexpensive they are difficult to find during rush hours.

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ARABIC VOCABULARY

This vocabulary follows the guide developed by Farouk el-Baz for Dover Publications' *Say it in Arabic (Egyptian Dialect)*. If you like their approach in this limited sample, or you want to expand your conversations, be sure to pick up a copy of their inexpensive, handy guide (available in the U.S. or in Egypt).

Speaking in Arabic entails frequent and complex gender changes which are indicated as follows: "(m)" = a male speaking to anyone; "(f)" = a female speaking to anyone; "(to m)" = anyone speaking to a male; "(to f)" = anyone speaking to a female; and "(to g)" = anyone speaking to a group.

Pronunciation Marks

An apostrophe (') represents the glottal stop, the gulp-like sound formed in the back of the throat, heard for example in place of the omitted *tt* in the Cockney pronunciation of "better" or the colloquial New York pronunciation of "bottle."

A ū indicates the vowel sound as in "pull"; an ī indicates the vowel sound as in "rice." An ẖ indicates the harsh, guttural sound formed at the back of the mouth, produced by whispering the *h* loudly. An ṛ indicates the guttural sound similar to that produced by gargling.

For more notes on pronunciation, see page 121.

GREETINGS

Hello—sah-EE-dah
Good morning—sah-BAH al-KHAY-re
Greetings (hello and/or goodbye)—mas-sa-LA-mah
How are you? (to m)—iz-ZĪ-yak?
(to f)—iz-ZĪ-yik?
(to g)—iz-zī-YOH-kūm?
Very well (m)—KWI-yis
(f)—kwī-YI-sah
Thanks be to God—al-HAHM-doo lil-LA
Please (to m)—min-FADH-luk
(to f)—min-FADH-lik
(tog)—min-fadh-LOH-kūm
Thank you—SHŪK-run
very much—alf SHŪK-re
You're welcome—AF-wan/af

PRONOUNS

I—A-nah
you (m)—EN-tah
you (f)—EN-tee
you (plural)—EN-too
he—HOO-wah
she—HEE-yah
we—EḪ-nah
they—HOHM-Mah

PEOPLE

man—RAH-gill
lady—sitt
boy—WA-lad
girl—bent
friend (m)—SAḪ-bee
(f)—saḪ-BI-tee
my husband—GOH-zee
my wife—me-RAH-tee
my son—IB-ne
my daughter—BEN-tee
my mother—wal-DI-te
my father—WAL-dee
my brother—ah-KHOO-ya
my sister—ŪKH-tee

COMMON EXPRESSIONS

Yes—ī-wah
No—la'
Maybe—YIM-kin
Is it possible?—YIM-kin?
God willing—en-SHAH-allah
Come in —et-FAHD-dull
(f)—et-fahd-DŪL-lee
Just a moment—dee-EE-a WAḪ-da
Excuse me (to m)—es-MAḪ-lee
(to f)—es-mah-ḪEE—lee
(to g)—es-mah-ḪOO-lee
I am sorry (m)—A-nah A-sif
(f)—A-nah AS-fah
Never mind/it doesn't matter—mah-LESH
There is—fee
There isn't—ma-FEESH
I need (want) (m)—AH-wiz
(f)—OW-zah
What?—ay?
When?—EM-tah?
Where?—fayn?
Here—HE-nah
There—he-NAK
Who [is it]?—meen?
How long?—ad-dee-AY?
Why?—lay?
Why not?—lay la?
How?—iz-ZI?
How many?—Kam?
How much?—bee-KAM?
What do you want (to m)—AH-wiz ay?
(to f)—OW-zah ay?
(to g)—ow-ZEEN ay?

COMMUNICATING

Do you speak English? (to m)—EN-tah be-tit-Kal-lim en-gel-LEE-zee?
(to f)—EN-tee be-tit-kal-LI-mee en-ge-LEE-zee?
Do you understand me? (to m)—fe-hem-TI-nee?
(to f)—fe-hem-TEE-nee?
(to g)—fe-hem-TOO-nee?
I understand—fe-HEMT
I don't understand—mahf-HEM-tish
I know (m)—A-nah AH-rif
(f)—A-nah AHR-fah
I don't know (m)—A-nah mish AH-rif
(f)—A-nah mish AHR-fah
How do you say ___ in Arabic?—YAH-nee ay ___ bil-AH-rah-bee?
What is the matter?—ay al-ḫe KA-ya?
Look out (to m)—ḪA-sib
(to f)—ḪAS-bee
(to g)—ḪAS-boo
Show me (the way)—wah-REE-nee (is-SIK-ka)
good—KWĪ-yis
bad—mish KWĪ-yis
Where is the bathroom (washroom)?—fayn DOH-ret al-MI-yah?
May I smoke?—AH'-dahr ah-DAKH-ahn?

GETTING AROUND

Take me to ___—wahd-DEE-nee ___
Where is ___?—fayn?
Street—SHAR-yah
near—oh-RI-yib
far—bay-EED
turn right—yi-MEEN
left—shi-MAL
north—shi-MAL
south—ga-NOOB
east—shar'
west—ṛahrb
straight ahead—AH-lah tool
When does ___ open?—Em-tah ___YIF-tah?
close?—YE'-fill?
How far is it?—bay-EED ad-dee-AY?
entrance—id-doh-KHOOL
exit—al-khoh-ROOG
airplane—tay-YA-ra
airport—al-mah-TAHR
office—MAK-tab
station—may-ḪAH-tet
train station—may-ḪAH-tet is-SIK-ka al-ha-DEED
platform—ir-rah-SEEF
arrival—woo-SOOL
departure—ee-YAM
taxi—tax
driver—sow-WA'
Please call me a taxi—min-FAHD-luk na-DEE-lee TAK-si

bus stop—may-HAH-tet al-oh-toh-BEES
bus—al-oh-toh-BEES
ticket—tahz-KAH-rah
roundtrip—rah-yeh-GI
Please tell me where to get off—min-FAHD-luk UL-lee AN-zill fayn
Stop—bash/KWI-yis
reserved seat—KUR-see mah-GOOZ
reservation—HA-giz
timetable—da-LEEL
first class—DAH-rah-gah OO-lah
second class—DAH rah-gah TAN-ya
bicycle—AH-gah-lah
boat—MAR-kib

CARS

car—ah-rah-BEE-ya
gas station—may-HAH-tet ban-ZEEN
gas—ban-ZEEN
Fill it up—im-LA-ha
oil—zayt
brakes—fah-RAH-mil
horn ka-LAKS
map—kha-REE-tah
air—HAW-wa
battery—bat-tah-REE-yah
mechanic—me-ka-NEE-kee
jack—af-REE-ta
tire—AH-gah-lah

SERVICES

telephone—te-le-FOHN
number—NIM-rah
post office—BOSH-tah
letter—gah-WAB
police—boh-LEES
He is not here—mish mow-GOOD

TIME

hour—SA-'a
minute(s)—dee-EE-a (dee-AA-yi)
What time is it?—is SA-a' kam?
(eight) o'clock—saa-'a (ta-MAN-ya)
___A.M.—___is-SOB-he
___P.M.—___bahd id-DOH-re
Half past three—ta-LA-ta wi nos
Quarter past three—ta-LA-ta wi rob'
Quarter to four—ahr-BAH-ah IL-la rob'
In the morning—is-SOB-he
In the afternoon—bahd id-DOH-re
In the evening—al-AHS-re
At noon—id-DOH-re
night—al-LAYL
day—in-nah-HAHR
today—in-nay-HAHR-dah
tonight—al-lay-LA-dee
yesterday—em-BA-reh
tomorrow—BOK-rah

ACCOMMODATIONS

hotel—loh-KHAN-dah
I have a reservation [for tonight]—A-nah HA-giz [al-lay-LA-dee]
a room—OH-dah
with bath—bee hahm-MAM
with a shower—bee dush
key—mohf-TAH
The door doesn't lock—al-bab ma-bee-YE'-filsh
double—OH-dah lit-NAYN
fan—mar-WA'-ha
with air conditioning—OH-dah moo-ki-YA-fa
bed—si-REER
pillow—may-KHUD-da
blanket—but-tah-NEE-ya
sheet—mee-LA-ya
towel—FOO-tah
soap—sah-BOON
toilet paper—WA-ra' toh-wah-LET
hot water—MI-yah SOKH-na
cold water—MI-yah bard

DINING

restaurant—mat-AHM
breakfast—foh-TAHR
supper—AH-sha
dinner—RA-da (in early afternoon)
menu—LIS-ta
knife—kik-KEE-na
fork—SHOH-ka
spoon—mah-LA-a'
napkin—FOO-tah
plate—TAH-bah'
glass—kub-BA-ya
sugar—SUK-kar
salt—MAL-he
pepper—FILL-fill
butter—ZIB-da
bread—aysh
ice—TAL-lag
sandwich—san-da-WITSH
European coffee—Nescafe
with cream—bil-LA-bun
Turkish coffee—AH-wah
Turkish coffee (black)—AH-wah SA-da
with a little sugar—AH-wah REE-ha
with medium sugar—AH-wah muz-BOOT
with heavy sugar—AH-wah zee-YA-da
mineral water—MI-yah mah-da-NEE-ya
drinking water—MI-yet shurb
beer—BEE-ra
juice—ah-SEER
the bill—he-SAB
waiter—gahr-SOHN
a table—tah-tah-BEE-zah

NUMBERS

Egyptian numbers build logically off the names of those from one to 10, but be aware that the ending for 30, 40, 50, etc., is TEEN so Egyptians will often confuse 30, for example, with 13; you may easily do the same.
zero—SIF-re
one—WAH-hed
two—et-NAYN
three—ta-LA-ta
four—ahr-BAH-ah
five—KHAM-sa
six—SIT-ta
seven—SAB-ah
eight—ta-MAN-ya
nine—TES-ah
ten—AH-shah-rah
eleven—he-DAH-sher
twelve—et-NAH-sher
thirteen—tah-laht-TAH-sher
fourteen—ahr-bah-TAH-sher
fifteen—khah-mahs-TAH-sher
sixteen—sit-TAH-sher
seventeen—sah-bah-TAH-sher
eighteen—tahm-mahn-TAH-sher
nineteen—tes-sah-TAH-sher
twenty—ish-REEN
The following numbers are made up of the one's digit followed by wi (and) and the tens digit.
twenty-one—WAH-hed wi ish-REEN
twenty-two—et-NAYN wi ish-REEN
thirty—ta-la-TEEN
forty—ar-bay-EEN
fifty—kham-SEEN
sixty—sit-TEEN
seventy—sab-EEN
eighty—ta-ma-NEEN
ninety—tes-EEN
one hundred—MAY-ya
one thousand—alf

DAYS OF THE WEEK

In Arabic, weekdays are named with derivations from the numbers.
Sunday—al-HUD
Monday—lit-NAYN
Tuesday—it-tl-lat
Wednesday—LAHR-bah
Thursday—al-kha-MEES
Friday—ig-GOHM-ah
Saturday—is-SABT

Money & Exchange Rates

Legal tender in Egypt is the Egyptian pound, abbreviated LE. One LE is broken up into 100 piasters. Paper bills will be marked in Arabic on one side, and in Western numbers on the reverse. However, be careful with the LE 10 and the LE 1: the similarity in background colors coupled with the Arabic 10, which is written with a one and an inconspicuous dot, can lead to confusion. Some merchants will not take worn or torn bills, so try not to accept them, nor will they accept some of the older coins. Hoard your change!!! You will need it for tips and perhaps baksheesh. And remember: save ALL your receipts — we may have to show these when departing the country.

When I travel, I carry a small card in my pocket that gives me a general idea of what things cost (so I don't have to do the arithmetic in my head), similar to the listing below. As of 6/15/92, one US dollar was worth 3.37 Egyptian pounds, so:

LE		U.S. $
LE 1	=	.34
LE 2	=	.68
LE 3	=	1.02
LE 4	=	1.36
LE 5	=	1.70
LE 10	=	3.40
LE 15	=	5.10
LE 20	=	6.80
LE 25	=	8.50
LE 50	=	17.00
LE 75	=	25.50
LE 100	=	34.00
LE 150	=	51.00
LE 200	=	68.00
LE 300	=	102.00
LE 400	=	136.00
LE 500	=	170.00
LE 1000	=	340.00

-Cleere, 6/15/92
Sources: Riggs National Bank, Washington

EGYPT

Hieroglyphics

Sign								
Translation	A	I	Y	A	P	W	B	F
Object Depicted	Egyptian Vulture	Flowering reed	Flowering reeds	Forearm	Stool	Quail or Chick	Foot	Horned viper
Sound	A As in FAT	Y	Y As in Hebrew "YODH"	AH As in father guttural	P	W	B	F

Sign								
Translation	M	N	R	H	H	CH	CH	S
Object Depicted	Owl	Water	Mouth	Reed sheltering field	Wick of twisted flax	Placenta	Animals belly with teats	Bolt folded cloth
Sound	M	N	R	H As in English	H Emphatic	CH As in Scotch Loch	CH As in German ich	S

Sign								
Translation	SH	Q	K	G	T	CH	D	J
Object Depicted	Pool	Hillslope	Basket with handle	Stand for jar	Loaf	Tethering rope	Hand	Snake
Sound	SH	Q As in Queen	K	Hard G	T	Ch As in chest	D	Emphatic S

Project Marco Polo1992

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LCDR GARCIA, KATHY	- COMMANDING OFFICER
LT SCANLON, GARY	- EXECUTIVE OFFICER
ENS BARSALEAU, JOANNE	- ENSIGN
LTJG HUDSON, PAM	- LIEUTENANT JUNIOR GRADE
ENS MIRANDA, MELODEE	- ENSIGN
LTJG SHUCH, DOUGLAS	- LIEUTENANT JUNIOR GRADE

ALLEN, GEORGE	-BMC-CHIEF BOATSWAIN'S MATE
MAYER, JOHN	-BM1-BOATSWAIN'S MATE 1ST CLASS
FITZGERALD, TIMOTHY	-BM3-BOATSWAIN'S MATE 3RD CLASS
TENHAVE, SCOTT	-BM3-BOATSWAIN'S MATE 3RD CLASS
THOMAS, ELLIOT	-BM3-BOATSWAIN'S MATE 3RD CLASS
WALTON, MARVIN	-BM3-BOATSWAIN'S MATE 3RD CLASS
HOLLIDAY, GREGORY	-DS2-DATA SYSTEMS TECHNICIAN 2ND CLASS
FITCH, DIRK	-DS2-DATA SYSTEMS TECHNICIAN 2ND CLASS
HORNBERGER, MARC	-DS2-DATA SYSTEMS TECHNICIAN 3RD CLASS
PRYOR, STEVEN	-EMFN-ELECTRIANS MATE, FIREMAN
LEE, CURT	-EA2-ENGINEERING AID 2ND CLASS
WILSON, PAUL	-EA2-ENGINEERING AID 2ND CLASS
MEDINA, BENJAMIN	-EM1-ELECTRICIAN'S MATE 1ST CLASS
RIOS, DAVID	-EM3-ELECTRICIAN'S MATE 3RD CLASS
HARRIS, FRANKLIN	-EN1-ENGINEMAN 1ST CLASS
EVANS, MARVINGAY	-EN3-ENGINEMAN 3RD CLASS
KITCH, JEANETTE	-EN3-ENGINEMAN 3RD CLASS
WOOD, HOPE	-EN3-ENGINEMAN 3RD CLASS
WENDLAND, RICHARD	-ETC-CHIEF ELECTRONIC TECHNICIAN
CAMBELL, SCOTT	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
CARRARA, GREG	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
DORSETT, SAMANTHA	-ET2-ELECTRONIC TECHNICAIN 2ND CLASS
LIMBAUGH, JAMES	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
SIMS, SHAWN	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
GUSMAN, JESSE	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
SCALF, SYLVIA	-ET2-ELECTRONIC TECHNICIAN 2ND CLASS
HIGHMAN, JOHN	-ET3-ELECTRONIC TECHNICIAN 3RD CLASS
JOHNSON, WILLIAM	-ET3-ELECTRONIC TECHNICIAN 3RD CLASS
MAURER, JEREMY	-ET3-ELECTRONIC TECHNICAIN 3RD CLASS
MCCLOSKEY, PATRICIA	-ET3-ELECTRONIC TECHNICIAN 3RD CLASS
REYNOLDS, JOHN	-ET3-ELECTRONIC TECHNICIAN 3RD CLASS
CLUMER, DANIEL	-FN-FIREMAN
COUNTRYMAN, DONALD	-FN-FIREMAN
PRZYBYLA, DAVIA	-FN-FIREMAN
CURTIS, JOHN	-LI1-LITHOGRAPHER 1ST CLASS
PECK, GREGORY	-HM1-HOSPITAL CORPSMAN 1ST CLASS
DIGNEY, THOMAS	-PH2-PHOTOGRAPHERS MATE 2ND CLASS
PARKER, THOMAS	-SKC-CHIEF STOREKEEPER
MILLION, JOHN	-SK3-STOREKEEPER 3RD CLASS
ROHDE, DANIEL	-SKSN-STOREKEEPER SEAMAN
ATKINSON, JANELL	-SKSN-STOREKEEPER SEAMAN
DIPIETRO, WILLIAM	-SN-SEAMAN
ROHDES, ISIAH	-SN-SEAMAN
WILLIAMS, WENDY	-YN3-YEOMAN 3RD CLASS
NEWELL, LEE	-YNC-CHIEF YEOMAN

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GSELL, WILLIAM	- OCEANOGRAPHER
SIMM, PATRICIA	- CHEMICAL OCEANOGRPAHER (BIOLOGY)
HOUSTON, JUDY	- HYDROGRAPHER/COMPUTER SPECIALIST

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WILISCH, PETER	- 2ND MATE
MIECZKOWSKI, JOHN	- 3RD MATE
KWICINSKI, CHESTER	- RADIO OFFICER
PERTUSINI, JUNE	- PURSER
BARNHARDT, VICKI	- STOREKEEPER
FOCARDI, JEFFERY	- SEAMAN
PLAISANCE, PAULA	- SEAMAN
DOLESE, TIMOTHY	- SEAMAN
KEEVAN, JAMES	- SEAMAN
SKUBINNA, THOMAS	- SEAMAN
DEHLMAR, GEORGE	- SEAMAN
SMITH, JIMMY	- SEAMAN
SNEED, THOMAS	- ORDINARY SEAMAN
NELSON, CARL	- ORDINARY SEAMAN
GRAHAM, MILTON	- ORDINARY SEAMAN
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LYONS, DAVID	- 1ST ASSISTANT ENGINEER
CAMMAROTO, PAUL	- 2ND ASSISTANT ENGINEER
COUGHLIN, SEAN	- 3RD ASSISTANT ENGINEER
WOODS, MATTHEW	- 3RD ASSISTANT ENGINEER
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PURVIS, BRETT	- REFERIGARATION
BONIN, ANTHONY	- OILER MAINTENANCE UTILITY
DECICCO, JOSEPH	- OILER MAINTENANCE UTILITY
FLEMING, JOHN	- OILER MAINTENANCE UTILITY
RODRIQUEZ, JOSE	- GENERAL UTILITY DECK & ENGINE
HOWELL, ROBERT	- GENERAL UTILITY DECK & ENGINE
FINCHER, CHARLES	- CHIEF STEWARD
JOHNSON, GREGORY	- CHIEF COOK
JOHNSON, ANDRE	- CHIEF BAKER
WRIGHT, ROBERT	- 2ND COOK
FENIMORE, DEUK	- 3RD ASSISTANT COOK
ADDISION, RICKY	- STEWARD ASSISTANT
LOPEZ, ARTURO	- STEWARD ASSISTANT
BOYKIN, EARLE	- STEWARD ASSISTANT
NIXON, BRYAN	- STEWARD ASSISTANT
KEVILLE, STEVEN	- STEWARD ASSISTANT
CORCHADO, ANGEL	- STEWARD ASSISTANT
JONASSEN, ARTHUR	- STEWARD ASSISTANT
ELLIS, STANLEY	- STEWARD ASSISTANT
RYBAK, BRUCE	- STEWARD ASSISTANT
WHITE-FLEMING	- STEWARD ASSISTANT
BELL, AMERICOS	- STEWARD ASSISTANT
FRANCIS, JAMES	- STEWARD ASSISTANT
MERCADO, LOUIS	- STEWARD ASSISTANT
WOODS, MONICA	- STEWARD ASSISTANT