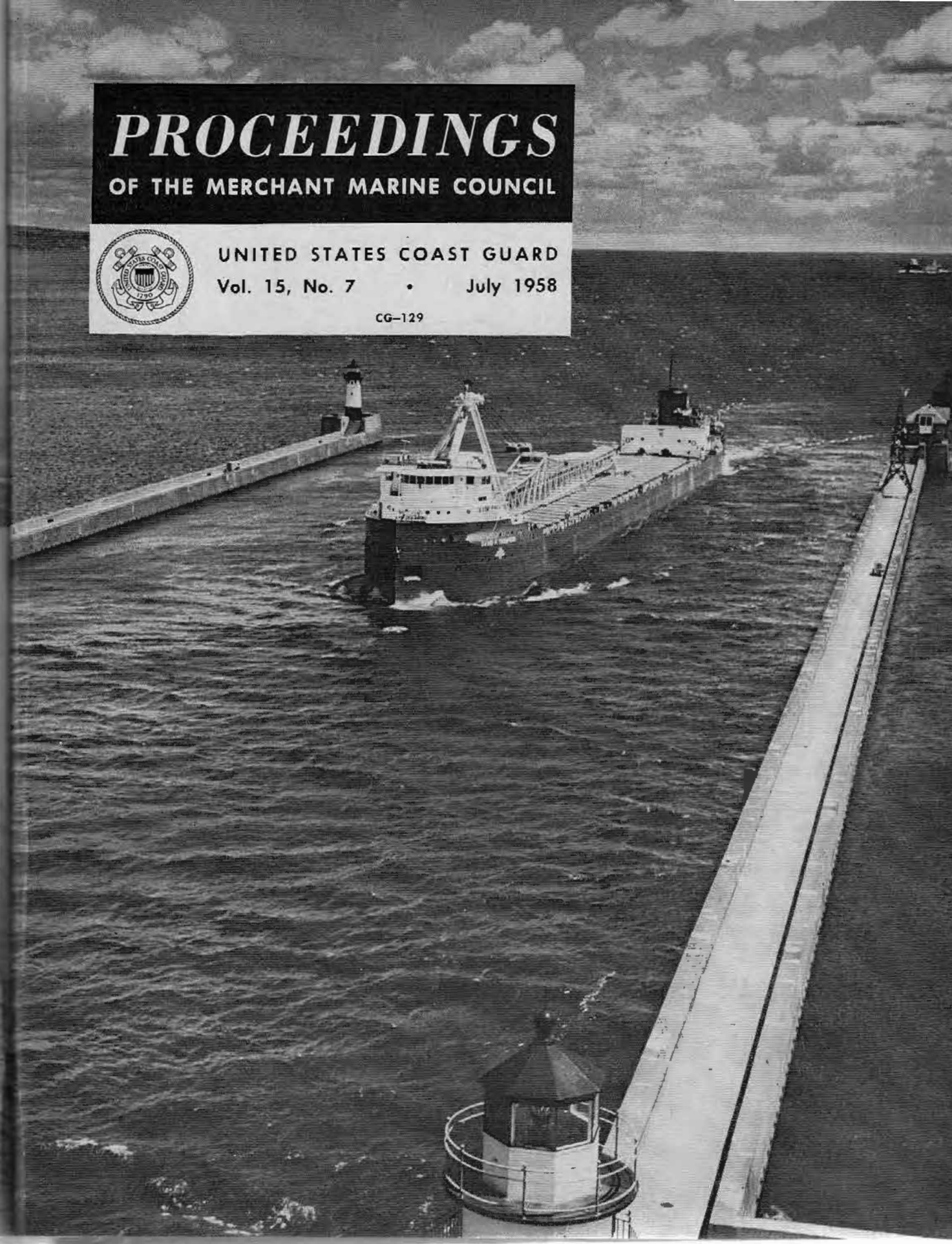
PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

UNITED STATES COAST GUARD

Vol. 15, No. 7 • July 1958

CG–129



PROCEEDINGS

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NATIONAL SAFETY COUNCIL AWARD

The *Proceedings* receives an Award of Merit from the National Safety Council for "exceptional service in the promotion of safety" for 1957. Vice Adm. A. C. Richmond, Commandant of the Coast Guard, is seen at the left presenting the award to Lt. B. F. Rush, Editor, in the presence of Rear Adm. H. T. Jewell, Chief of the Office of Merchant Marine Safety.

Twenty winners were selected by the Judges' Committee from 187 entries in the Employee Publication Division, and two of the awards went to the Coast Guard. One for the *Proceedings*, and the other for the *Safety News*, published by the Office of Engineering.

Our thanks to the National Safety Council for this honor and to the many contributors who made the award possible.

STATES MARINE LINES WIN SAFEST FLEET AWARD

HAPPY WINNERS in the 1957 National Safety Council contest are photographed at the recent award ceremonies held in New York. Left to right are: Mr. Warren Lindsay, Director of Safety, United States Lines; Mr. L. H. Quackenbush, Vice President, States Marine Lines; Mr. C. S. Walsh, President, States Marine Lines; and Mr. W. White, President, Alcoa Steamship Co.

IN A YEAR highlighted by a 10-percent decrease in shipboard accidents on cargo and passenger vessels, the States Marine Lines nosed out the Alcoa Steamship Co. by a statistical whisker to win the 1957 National Safety Council award as the safest privately operated seagoing fleet under the American flag.

With an overall average frequency rate of 7.30 in their category, States Marine chalked up an enviable 3.61 followed closely by Alcoa with 3.71. United States Lines, winner of the 1955 contest, was third with 5.02.

Significant improvement was recorded in the Council's breakdown for cargo and passenger vessels operated on inland waters and those operated by the Government. Inland showed a 15-percent decrease over 1956, and Government cargo and passenger vessels had a walloping 30-percent decrease.

Ocean and coastwise tankers were reported with no change over 1956, while inland tankers showed a 6-percent rise over the preceding year. Barge and towing vessels ended the contest year with a 22-percent increase, the Council reported.

The frequency rate is computed by multiplying the number of reportable accidents by a million and dividing this figure by the number of crewman days multiplied by 24. It can be seen by using this formula all accidents aboard ship must be kept at a minimum.

Complete statistics follow:

- **Cargo and Passenger Vessels**

Inland: Average rate 3.25

Tie for first between Michigan Limestone Division, United States Steel Corp., Rogers City, Mich., and Inland Steel Co., Chicago, Ill. Both with perfect accident-free records

Third place to the Cleveland Cliffs Iron Co., Cleveland, Ohio, 1.18

- **Tankers**

Ocean and coastwise

Average rate 2.98

1—American Oil Co. and subsidiary companies, New York, N. Y., 1.98

2—Sun Oil Co., Marcus Hook, Pa., 2.01

3—The Texas Co., Ocean Fleet, New York, 2.14

Inland Waterways

Average rate 4.46

A three-way tie for first, all with perfect records, between Standard Oil Co. (Indiana), Chicago, Ill.; Sun Oil Co., Marcus Hook, Pa.; and The Texas Co., Inland Fleet

- **Government—Class A**

Average rate 2.72

A clean sweep for the Military Sea Transportation Service, Department of the Navy, with these records:

MSTS, Atlantic Area, 2.29

MSTS, Pacific Area, 3.04

MSTS, Western Pacific Area, 3.37

- **Government—Class B**

Average rate 2.38

1—MSTS, Gulf-Sub Area, 3.04

All others below minimum requirements

- **Barge and Towing**

Over 8,000 man-days

Average rate 10.25

1—United States Steel, River Transportation Department, Clairton, Pa., .00

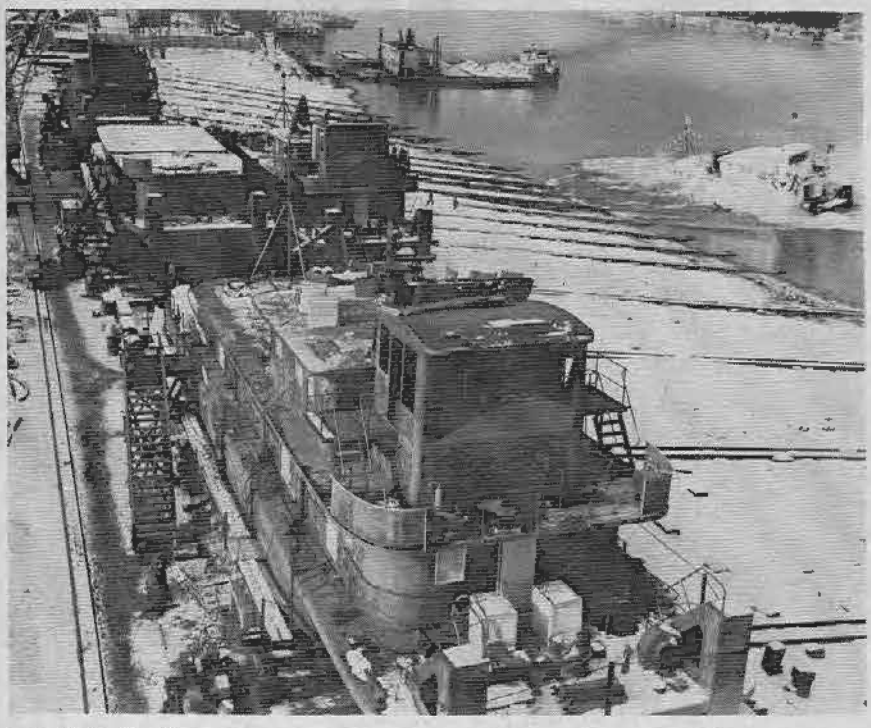
2—Ashland Oil & Refining Co., Ashland, Ky., 2.17

3—The Texas Co., Marine Department, 4.76

Under 8,000 man-days

Nine-way tie for first place, all with perfect records, between Armco Steel Corp., Huntington, W. Va.; Greenville Transportation Co., Inc., Greenville, Miss.; J. D. Streett & Co., Inc., St. Louis, Mo.; The New Haven Towing Co., New Haven, Conn.; Marquette Cement Manufacturing Co., Chicago, Ill.; Standard Oil Co. (Indiana), Chicago, Ill.; Dalehite Boat Service, Galveston, Tex.; Boat 1601, Inc., Houston, Tex.; and Ellis Towing Co., Galveston, Tex.

EVOLUTION OF THE INLAND TOWBOAT



A GRAPHIC EXAMPLE of the assembly-line method of construction at inland shipyards is seen at the Dravo Corp. plant. One towboat is being launched while work proceeds on four others. Photo Courtesy Dravo Corp.

THIS COUNTRY has undergone many changes since the early settlement days. Among the most dramatic has been the progress of transportation over the Nation's inland waterway system.

From the dugout canoes of the Indian, which were first used to move the earliest riverloads, to the modern diesel-powered towboat, which now provides well over 100 billion ton-miles of service annually, the river has seen many and varied types of craft.

The dugout canoes of the Indians proved inadequate for the needs of the early settlers. The flatboats, which succeeded them, were usually one-way craft. Loaded at an upstream point, they were floated down river where their cargoes were unloaded. For the most part, the boats were then dismantled and sold for lumber. However, some were poled upriver and reused.

Built normally for one trip, they were cheap and often poorly constructed, but their holds carried large quantities of merchandise at a time when river transportation was vital to the growing country.

This is the second of a series of articles on our inland waterways prepared especially for the *Proceedings* by the American Waterways Operators, Inc., a nonprofit trade association of domestic carriers and operators on the inland waters, intracoastal canals and waterways, bays, sounds, and harbors of the United States.

The keelboat was the first queen of river trade. A two-way traveler, it was long and narrow, with graceful lines, built to survive many trips. It could carry as much as 80 tons of freight. Floated down river, it was "cordelled" upstream, a practice which called for a crew of tough and hardy men, since cordelling was a process by which a crew on the bank towed the keelboat along against the current.

STEAMBOAT ERA

The invention of the steamboat in the early 19th century brought about a revolution in river commerce. In this golden era of the paddle wheeler, the steamboat not only hauled freight, but offered comfortable passenger accommodations. Even more important, it could travel upstream almost as easily as it traveled downstream.

On its decks it carried cotton and other produce to market and returned with the staples and fineries available only from the coastal ports. It brought visitors to the interior of the country and furnished the transportation that linked the newly settled areas with the larger seaboard cities.

The packet boat brought a phenomenal increase in river traffic. By 1849 there were more than 1,000 packets, approximating 250,000 gross tons. The packet was the principal means of transportation until the latter part of the 19th century when the expanding railroads diverted the traffic from the rivers until the packet trade almost died completely.

It is difficult to fix a date for the beginning of towboat navigation, since the transition from packet to towboat was so gradual that for many years it was not apparent.

The modern towboat operation was first conceived when packets began towing 1 or 2 barges alongside for extra cargo space. The practice eventually evolved into the current operation of carrying the cargo in the deadweight barges, with the towboat acting as the "business end" by providing the propulsion.

During World War II, river transportation once again assumed an important role. The towboat with its gigantic bargeloads carried nearly 2 billion barrels of petroleum over the sheltered inland river system, away from the devastating attacks of Nazi submarines in coastal waters. Other strategic commodities were moved efficiently and safely over the rivers and nearly 4,000 seagoing vessels were floated to the sea from inland shipyards.

The modern towboat is the key which boosted inland water carrier service from 34 billion ton-miles in 1947 to an estimated 123 billion in 1957. In this postwar resurgence of the water carriers, the inland water share of the total intercity transportation has risen from 3.5 percent to 8.1 percent.

BASIC NEEDS

Basic requirements in modern towboat design are based on the following factors: (1) Speed desired with full load; (2) tonnage to be pushed; (3) length of trip; (4) whether the tow is to operate in open river or in areas of the rivers where there are

locks and dams, or a combination of both; (5) depth of channel; (6) capacity of terminals and the speed with which the barges can be loaded or unloaded at these facilities; and (7) whether the towboat will push integrated barges with various lengths, breadths, rakes, and drafts.

Of prime importance in the construction of the towboat is the hull design. Towing on the shallow inland waterways system requires shallow draft vessels. The deep-sea vessels have deep drafts and plenty of room for propellers to obtain the water they need.

But with the shallow draft towboat, providing the propellers with sufficient water is a problem that calls for careful attention.

The answer is a hull design that permits a maximum amount of water to flow freely to the stern. This free-flowing design also reduces drag through lowered resistance. The bow design also offers minimum resistance to the wake behind a fleet of barges.

A large number of modern towboats are being constructed with tunnels in the stern to carry out this free-flow design. Without such tunnels, it would be impossible to use the large propellers found on modern towboats. The tunnels are hollowed-out areas in the stern which provide room for the tip of the propellers to emerge above the level of the waterline. The result would be wasted power were it not for the shape of the tunnels and the Kort nozzles, which keep the propeller fully immersed when the towboat is underway.

However, a number of towboats are constructed for use in areas where the Kort nozzle and tunnel arrangement are not particularly advantageous to their operation.

The sweep of the stern lines also contributes to propulsion. A longer, leaner stern means less resistance to water flowing to and away from the propellers. It prevents the water from eddying up to dissipate the thrust. The main force of the propeller stream is directed horizontally below the waterline.

Among the most significant advancements in towboat technology was the development of the Kort nozzle. Under normal towing conditions, the properly designed Kort nozzle can increase horsepower 25 percent over the best open-screw design. These nozzles are designed to blend smoothly into the hull structure, and the other appendages such as rudders and struts are placed and shaped to suit each hull and nozzle combination.

Design of towboat propellers, especially for river vessels with their heavy emphasis on backing, is a highly specialized field. A large surface area is required to utilize horsepower effectively, both for operating ahead and for backing.

The greater the surface area, the more horsepower the propeller will convert to effective thrusts. Determining the diameter of the propeller and the number of blades is based on such factors as the size and hull shape of the boat, engine horsepower, freedom from vibration, speed, and other characteristics of the tow.

REDUCTION GEARS

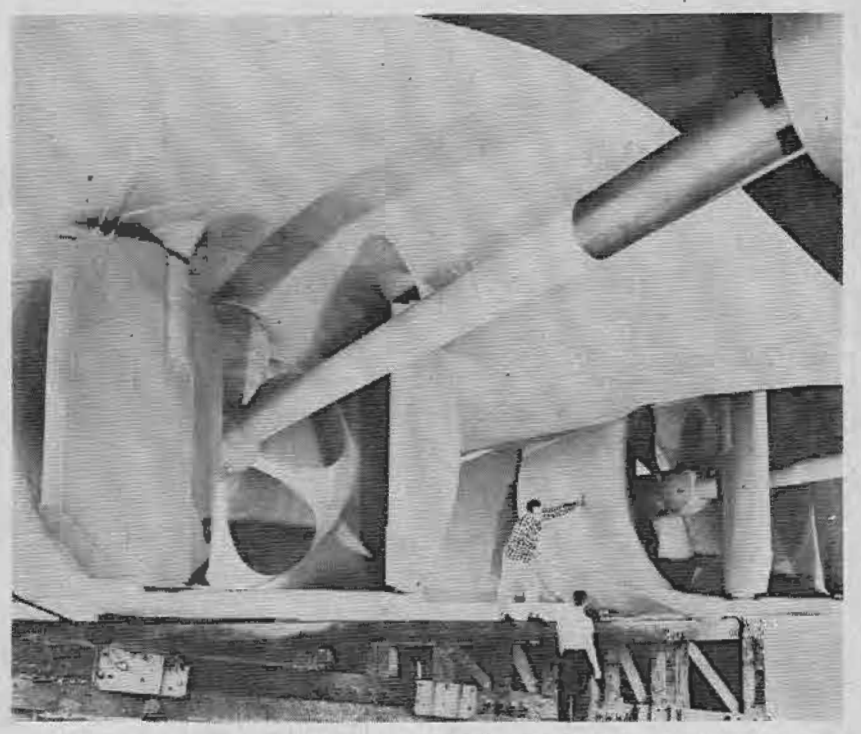
The use of reduction gears enables designers to use slower speed propellers which are more efficient. Efficiency of the propeller improves as the depth of water below the propeller increases. However, if the propellers are designed for close to maximum efficiency, it will create an overload when the towboat is running in the normally low water of the inland channels. In an effort to correct this situation, controllable pitch propellers have been installed on some boats. Under this arrangement, the pitch of the propellers in deep water, or when under light load, is increased, and the pitch decreased in shallow water or when under very heavy load. This changing of pitch allows the engines to run at their rated speed and develop full horsepower under all conditions.

Piloting a towboat calls for experience, skill and good judgment, but the pilot's qualifications mean little if his boat fails to respond properly to speed and directional controls. Sensitive maneuvering in all directions can be achieved by placing 1 rudder aft and 2 rudders forward of each propeller. The rudders are operated by two hydraulic rams, one of which controls the steering rudders aft of the propellers and the other the flank rudders forward. Both rams are driven by a hydraulic system. Steering levers in the pilothouse indicate the exact position of the rudders.

A towboat's only brakes are its engines. In order to bring thousands of tons to a dead stop the towboat requires: (1) Swift reversal of the propellers; (2) engines with adequate backing power; and (3) propellers designed to utilize this power efficiently.

In today's advanced design, reverse reduction gears reverse the propellers swiftly without the necessity for stopping and reversing the engines. A single lever for each engine serves as throttle and clutch to control engine speed and the reversing gear. With the best system of engine controls, this reversing process is completely automatic. The process is so timed that the engines and other

(*Continued on page 129*)



WORKERS ARE DWARFED by the size of the stern of this river towboat. Note the two rudders on each propeller for complete control of the craft. The cast steel Kort nozzles encasing the propellers weigh 16 tons each. Photo Courtesy *Dravo Corp.*

ATMOSPHERIC REFRACTION AND RADAR

By Lawrence E. Truppi
U. S. Weather Bureau
Courtesy the *Mariners Weather Log*

IN THE ARTICLE "Radar and Weather" printed in the March 1958 issue of the *Proceedings* the influence of precipitation on radar operation was discussed, and the various configurations of PPI scope echoes associated with different types of storms were described. However, the radar set is not only affected by stormy weather, but sometimes by the cloud-free atmosphere as well. The nature of the atmosphere is such that it can bend radar waves in much the same manner as it does light waves. As the human eye detects phenomena like "looming" and "sinking," the radar PPI scope can display similar effects.

From a ship's bridge 50 feet above the sea surface the visible horizon is 8.1 nautical miles, and the radar horizon from the same height is 9.3 nautical miles under "average" atmospheric conditions. The bridge of another vessel or land 50 feet high should be barely detectable at 16.2 miles by sight and 18.6 miles by radar, and yet objects are sometimes visible at sea beyond the expected range. Indeed, surface radar has detected ships at ranges up to 200 nautical miles and land masses up to 1,700 miles.

The explanation of the phenomenon is that the atmosphere is not of constant uniform density, and as radar or light waves pass through successive layers of differing densities, they travel in curved rather than straight lines. In *figure 1* the ship and the low land mass would not ordinarily be detected as they would be below the radar horizon, that is, the radar beam would pass over them at a height of about 500 feet. Since radar energy is confined to the radar beam, no energy would be reflected from the ship or the low land, and therefore, no target pips would be displayed on the PPI scope. However, as the drawing illustrates there is a layer of cool, moist air next to the sea (appears dense to radar waves), above which is air that is warm and dry (less dense to radar energy). As the radar waves pass from the dense air to the less dense they are "refracted" or curved back toward the denser air. If the downward refraction exceeds the curvature of the earth (superrefraction) the radar waves are bent back to the sea's surface where they are reflected upward, to be refracted once again. The atmospheric layers of different refractive properties and the sea surface have formed a "radar duct," or it is said that radar waves are "trapped." The ship and the land in *figure 1* are displayed on the radarscope because of extended radar coverage as a result of trapping.

When the trapping is present there will be instances when land masses, which are beyond the apparent range of the radar equipment, will appear on the radarscope as distinct land masses seemingly within range. Radar targets within the maximum range of the set, say 40 miles, will not be seen, but long-range echoes from beyond 100 miles may appear. For example: If your radar employs a pulse repetition frequency (p. r. f.) of about 1,216.0 pulses per second (p. p. s.) when using the 40-mile range setting, an object 140 miles from the ship will appear as an echo at 40 miles on the radarscope;

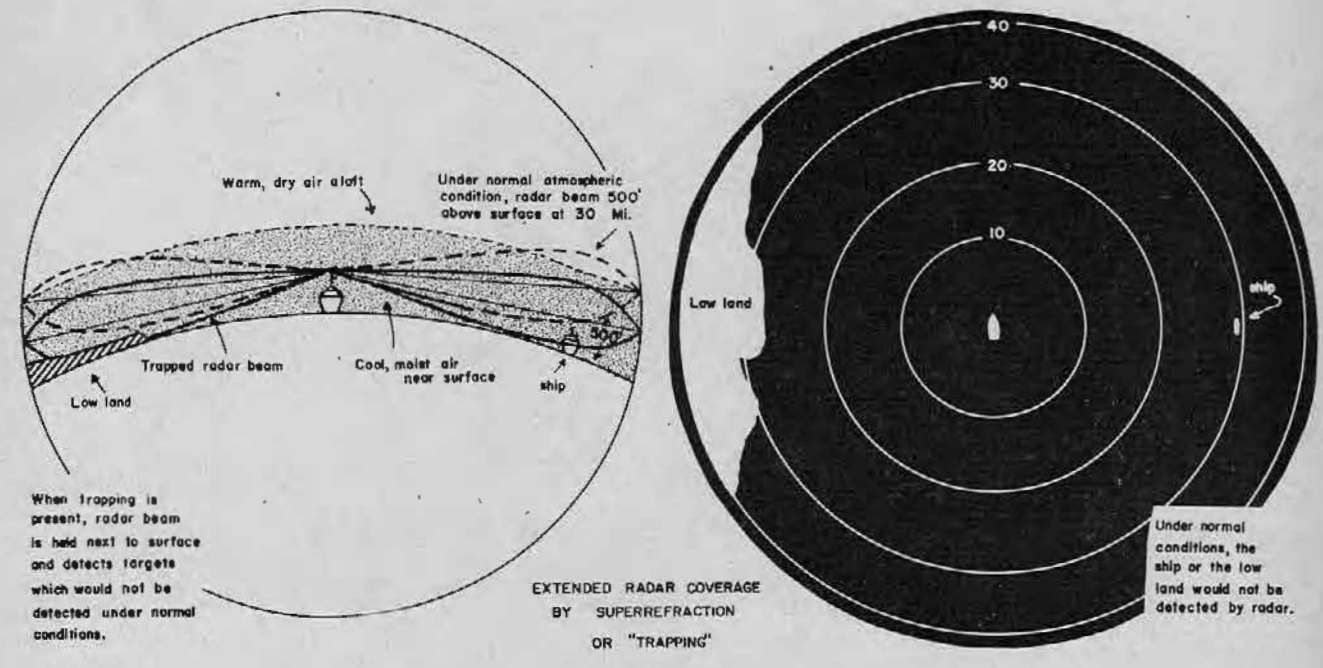


Figure 1.

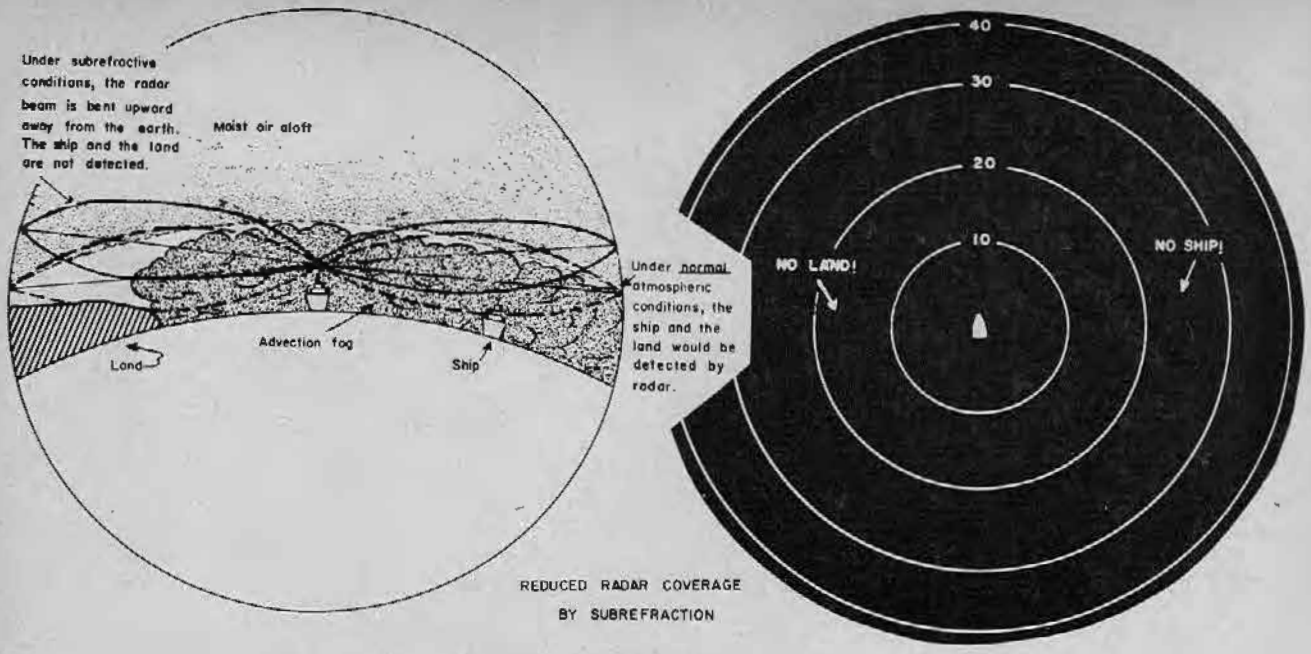


Figure 2.

an object 120 miles will appear as an echo at 20 miles; and so forth. An echo of a shoreline will disappear into the center of the radarscope at a range of 100 miles, and will later reappear when its true range is 40 miles. Such echoes are known as "ghosts" or "second trip" echoes. Some favored oceanic areas for radar trapping and associated phenomena include:

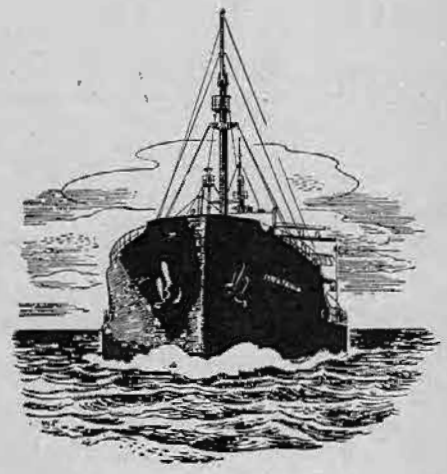
1. Mediterranean Sea in summer.
2. Coast of French West Africa near the Canary and Cape Verde Islands.
3. Gulf of Aden in summer.
4. Persian Gulf in summer.
5. Northern part of Arabian Sea in March, April, and May.
6. Bay of Bengal.
7. West coast of India except during southwest monsoon.
8. North coast of Australia except during northwest monsoon.
9. Northwest coast of Australia all year round, but particularly in summer.
10. West and south coasts of Australia and New South Wales in summer.
11. Around North Island, New Zealand in summer.
12. Southeast coast of South Island, New Zealand during nor'wester.
13. The Japan - Formosa - Luzon region in winter.
14. Western Atlantic in the region of Bermuda in summer.

Although meteorological effects usually act to extend radar coverage, the phenomenon of "subrefraction" is possible and has been observed. *Figure 2* illustrates what might occur if the condition causing superrefraction were reversed. One of the most common causes of subrefraction at sea is the formation of advection fog, caused by the advection of moist air over a cooler sea surface. Moisture may be condensed out (fog) of the lower layers thus tending to give rise to an increase in humidity with height. Advection fog is very common near the Aleutian Islands and off Newfoundland. However, the presence of fog at sea does not necessarily indicate subrefraction. In other types of fog, such as steam fog, formed when cold, dry air passes over a warmer sea surface, a standard atmosphere will prevail, or a radar duct might even develop. Subrefraction may also accompany the low visibilities found ahead of an approaching warm front.

At ranges of 10 miles or less, it is not likely that any targets would be lost because of subrefraction since the influence of the upward curvature of the radar beam only becomes significant at long ranges. Manufacturers operator's manual or handbook should always be consulted as to the proper adjustments or range settings to employ.

The following are some rules of thumb concerning atmospheric refraction and marine radar.

1. Weather conditions that indicate the possibility of radar trapping are: A warm, moderate breeze from a continental land mass; smoke, haze, or dust that fails to rise but spreads out horizontally; or the moisture content of the air at bridge level is considerably less than that just above the sea, and the air is relatively calm.
2. Fog may bring reduced radar coverage at ranges beyond 10 miles, or it may lead to extended radar coverage, and trapping.
3. It is not advisable to permit the radar to stand idle. Radarscope interpretation requires experience; there is no substitute for it. In addition, some manufacturers advise that radar equipment be operated at least 2 hours per week to prevent condensation of moisture within the equipment case which might cause arc-overs in high voltage circuits.



SONIC DEPTHFINDERS

By Lt. Comdr. N. L. Fendig, USCG
Merchant Vessel Personnel Division,
Coast Guard Headquarters

IMPROVEMENTS in instruments using the speed of sound in water to determine the depth have reached the point where other types of equipment previously used for this purpose have become obsolescent. Even the inland boatman has supplemented, if not supplanted, his sounding pole with sonic devices which can give him immediate and continuous information on the depth of the water under the keel of his tug or tow. In some models, the instrument is portable, and information on depth conditions at the head of a large, integrated tow is available to the pilot of the pushing towboat.

Prior to World War II most of the sonic depthfinders in use had transmitters operating within the audible range. These generally consisted of a solenoid powered hammer in the bottom of the hull, and the thud of the oscillator as it was called, could often be heard when the vessel possessing it was on soundings.

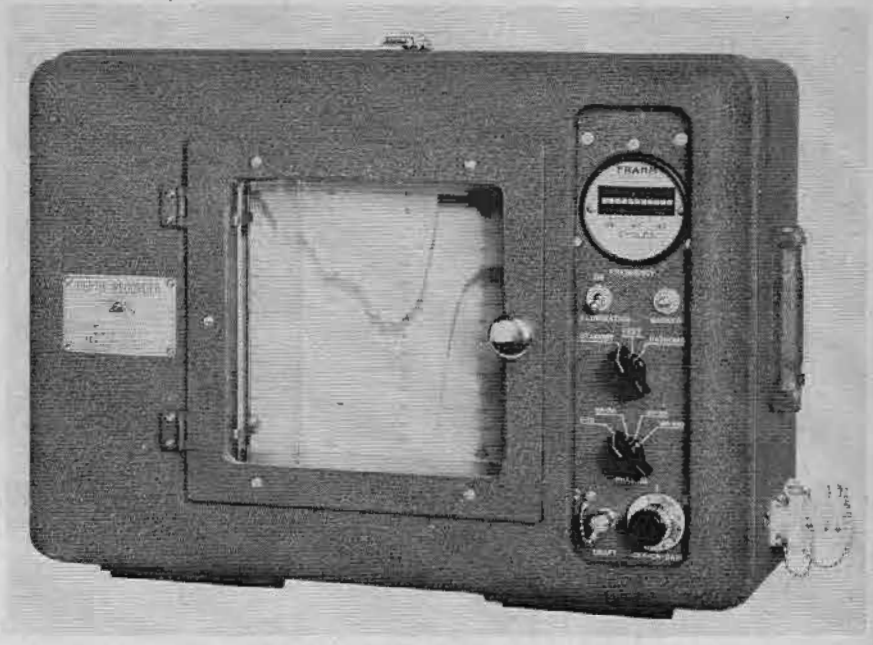
During and subsequent to the war, the trend in sonic depthfinders has been toward the use of supersonic frequencies operating outside the audible range of sound. The advantages gained by the use of these higher frequencies include:

1. Use of simpler, more compact, and reliable transducers.
2. Combination of functions in that the transmission and reception of the sound impulse could be done with a single transducer.
3. Minimum effect of sound in the audible range on the efficiency of the depth determination.
4. Better directional qualities could be imparted to the sound impulse.

Transducer is the name for a device to convert energy from one form to another; in sonic depth finding equipment it converts electrical energy into acoustic energy, and, conversely, acoustic energy into electrical energy.

TRANSDUCERS

Transducers operating in the supersonic frequencies use either piezoelectric crystals or magnetostriction in metals for the generation and reception of high frequency sound. The piezoelectric crystals depend on the dimensional change in certain types of natural and artificial crystals when these are subjected to an electric field. The crystals are set to vibrating by the electric current, enabling them to generate sound. The pressure of the returning sound impulse generates electric current which is then amplified to actuate the indicator when the transducer acts as a receiver. Magnetostrictive-type transducers are similar in effect, but their action depends on the dimensional change in certain metals when subjected to a magnetic field.



A GOOD EXAMPLE of a depth recorder is seen in this photograph.
Courtesy the *Edo Corp.*

The short wavelengths of the high frequency sound permits transducers to be small in size, but capable of resonance with the sound wave. This not only improves the efficiency of the device, but imparts directional qualities to the sound pulse. The shorter wavelengths of sound are less readily diffracted in the water, which also assists in keeping the pulse directed at the bottom under the vessel rather than spreading in a diffused pattern. Unfortunately, however, the short wavelength signal is more rapidly attenuated.

SPEED CORRECTIONS

In salt water the speed of sound is generally assumed to be 4,800 feet per second. Increases in temperature, salinity, and pressure cause an increase in the speed of sound. While the errors caused by using a constant speed of 4,800 feet per second are normally of small magnitude, a correction should be made if soundings of high precision are desired. Curves are available with the operating instructions for many makes of instruments which provide data on the speed of sound under various conditions. The principal cause of the change in the speed of sound from standard conditions in salt water is temperature.

The manner of applying these corrections can be readily determined. If the instrument is based on a speed of sound of 4,800 feet per second and the conditions indicate that a speed of 5,000 feet per second would be more likely, then the distance covered by the sound pulse would be 50/48 of the distance indicated by the instrument. Corrections for other conditions differing from the standard may be reasoned in a similar manner.

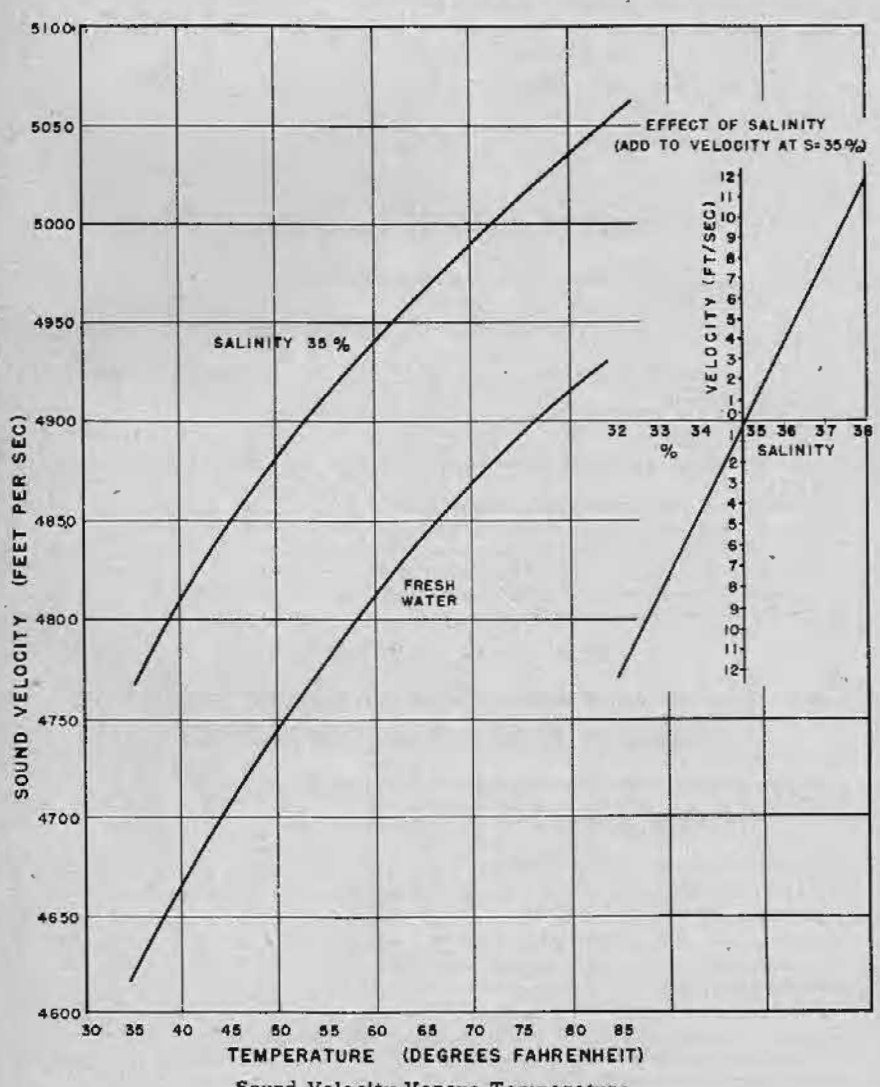
The speed of sound in fresh water is approximately 97 percent of that in salt water. For a sounding of high accuracy in fresh water on an instrument calibrated for salt water use, this correction should be applied, or a more precise correction determined from the curves. Some instruments designed for principal use in fresh water are based on the velocity of sound in that medium and consequently need no correction for salinity.

Another possible source of error in soundings arises from voltage fluctuations. The indicators are usually driven by synchronous motor which rotate a neon bulb or move a stylus on recording-type instruments. If the frequency of the alternating current developed by a rotary converter or motor alternator varies significantly because of variation in the speed of the d. c. motor driving it, the depth indicated may be in error. Vibrators are often used to convert d. c. into a. c. because the frequency is then controlled by the mechanical design of the vibrator instead of the input voltage. Some instruments are equipped with frequency meters to insure that a. c. current of the correct frequency is being used.

POPULAR DEVICE

Although subject to the possible errors cited and malfunctions of the electrical or mechanical parts, the convenience, dependability, and accuracy of sonic-type depthfinders have increased their popularity. As improved charts of deep ocean areas become available, and the range of depths which the instruments can measure increases, the usefulness of the instrument is widened. Sounding machines using a wire to lower a hollow glass tube to measure the pressure corresponding to the depth are not only far less convenient, but subject to more serious errors as well. The usual Kelvin (hollow glass tube) sounding device is not adapted to fresh water use because the silver salts in tubes depend on the chloride ions in sea water for discoloration by metathesis to record the length of tubing into which water has been forced by the pressure at the bottom.

Use of sound on modern ships is not limited to depthfinding alone. Fishermen have adapted the device to locate schools of fish. Other types of sonic equipment are used for measuring the thickness of hull and tank plating without the need for drilling holes. Nondestructive testing of castings for flaws is possible for shipyards. Other industries have developed sound equipment for cleaning surfaces, drilling and machining metals, and emulsification of liquid mixtures, among other uses, many of which may be adapted for the marine industry.



Sound Velocity Versus Temperature

Illustration Courtesy Edo Corp.

LEGAL OPINIONS

Negligence of assisting tug: a tug assisting in mooring is negligent not to expect, anticipate, and avoid usual maneuvers of the ship being assisted. In *Grace Line, Inc.*, v. *Tug C. Hayward Meseck*, 1958, A. M. C. 325, the U. S. Court of Appeals, Second Circuit, affirmed the decision of the court below (150 F. Supp. 425, 1957 A. M. C. 1805) in holding an assisting tug liable for collision with the assisted ship's propeller because the tug failed to anticipate and avoid the usual maneuvers of mooring. The ship was determined to be not negligent in failure to sound three blasts though backing full because the tug was attached to her by line making the two as one for the purposes of the Pilot Rules.

Vessel, not in navigation when deactivated. In *Owens* v. *U. S., et al.*, 1958 A. M. C. 216, a Liberty ship, owned by the United States, had been deactivated and put in the Reserve Fleet. Her boilers and engines were not in operation, there was no water in her tanks, and the pipes had been disconnected for drainage and greased internally. Some years later she was withdrawn from the Reserve Fleet and towed as a dead ship to a shipyard for reactivation to enable her to be placed in navigation. At the time the libellant was injured, the vessel was under the complete control of the repair contractor. The District Court, in a decision favorable to the Government, said, among other things: "A deactivated vessel in the custody and control of a ship repair contractor undergoing reactivation repairs is not a vessel in navigation subject to the warranty of seaworthiness."

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PUBLICATIONS? THIS IS WHERE YOU CAN OBTAIN THEM

IN ANSWER to numerous inquiries relative to where charts, maps, light lists, and other material useful to the mariner can be obtained, the following list includes those most frequently requested:

● U. S. Navy Hydrographic Office

Extensive range of nautical and aeronautical charts and publications covering the navigable waters of the world. Available to the public through authorized Hydrographic Office sales agents and the Hydrographic Distribution Offices. Purchasers are urged to order through local sales agents whenever possible, but if there is no agent in your area, orders may be submitted from purchasers west of the Mississippi River (except the Gulf of Mexico and the Canal Zone area) from the:

Hydrographic Distribution Office
Naval Supply Depot, Clearfield
Ogden, Utah

All other localities are requested to order from:

Hydrographic Distribution Office
Naval Supply Depot, Scotia
New York

● U. S. Coast Guard

Light Lists, United States coasts and possessions. For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., and from Coast Guard Sales Agents.

● U. S. Coast and Geodetic Survey, Department of Commerce

Tide Tables, United States and Foreign Waters; Current Tables, Coast Pilots (United States coasts and possessions); United States Inside Route Pilots; coast and harbor charts of the United States and possessions and aeronautical charts of the United States. For sale by Coast and Geodetic Survey Agents.

● U. S. Geological Survey, Department of the Interior

Topographic and geological maps of the United States and possessions.

● Mississippi River Commission (Secretary, Vicksburg, Miss.)

Charts of the Mississippi River from its source to the Delta.

● U. S. Naval Observatory, Navy Department

Nautical Almanac, $2; American Ephemeris and Nautical Almanac, 1957 ed., $4.50; American Air Almanac, printed for 4-month periods of each year, beginning with January, $2. For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

● U. S. Engineer Office, Louisville, Ky.

Charts of the Ohio River.

● U. S. Lake Survey Office, Detroit, Mich., and

U. S. Engineer Office, Buffalo, N. Y.

Charts of Lake Champlain, Oneida Lake, New York canals, the St. Lawrence River above St. Regis and Cornwall, and charts of the Great Lakes (but not harbor charts in Canada nor charts in Georgian Bay).

● U. S. Weather Bureau, Department of Commerce

A chart showing the principal types of clouds is sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.; price 5 cents. In booklet form, 35 cents.

● U. S. Civil Aeronautics Administration

Airman's Guide, Flight Information Manual, Federal Airways Manual of Operations, Civil Aeronautics Bulletins, and Civil Air Regulations. For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

● U. S. Army Map Service, Washington 25, D. C.

Maps of Ohio River.

● U. S. Engineer Office, Omaha, Nebr.

Maps of Missouri River.

● U. S. Engineer Office, St. Louis, Mo.

Maps of Illinois and Mississippi Rivers.

● U. S. Engineer Office, Chicago, Ill.

Maps of Illinois Waterway (Lakes to Gulf).

COAST GUARD LISTINGS

PACIFIC COAST, 1958 EDITIONS

Volume I, 11th Coast Guard District, from Mexican border to Point Arguello, Calif., price $0.75.

Volume II, 12th Coast Guard District, from Point Arguello, Calif., to St. George Reef, Calif., price $0.75.

Volume III, 13th Coast Guard District, from St. George Reef, Calif., to Alaska, price $1.25.

Volume IV, 17th Coast Guard District, Alaska, price $0.75.

Volume V, 14th Coast Guard District, Hawaiian and Pacific Islands, price $0.75.

Volume I–V (Combined), List of Lights and Other Marine Aids, covering the Pacific Coast and Islands, price $2. This volume is a composite list of Volumes I to V, inclusive, with suitable cross-references to facilitate its use by navigators operating in more than one Coast Guard district.

GREAT LAKES, 1958 EDITION

Light List, Great Lakes, United States and Canada, price $1.75.

MISSISSIPPI RIVER SYSTEM, 1958 EDITION

Light List, Mississippi and Ohio Rivers and their tributaries, price $1.75.

OTHER PUBLICATIONS ON AIDS TO NAVIGATION

Aids to Marine Navigation of the United States, CG–193—Explains briefly the significance of the various colors and characteristics of lights, electronic aids, fog signals, daybeacons, and buoys, price $0.25.

Ocean Electronic Navigational Aids, CG–157–1—Explains the operational features of electronic aids—loran, radiobeacons, microwave beacons, and other radar aids operated by the Coast Guard, price $0.50.

The above light lists, which furnish information concerning aids to navigation maintained by or under authority of the U. S. Coast Guard for the waters indicated, and the other publications on aids, may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., or from his sales agents located in the principal seaports for the prices stated.

CAN YOU TOP THIS?

REPORTS of personal accident aboard ship cover almost every situation, but it must be agreed that this one is a little unusual:

"While milking a cow the one nearby kicked me." Result: Broken arm.

Among the hundreds of accident reports forwarded to Coast Guard Headquarters are included some of the following:

Ship rolling heavily, man braced himself by holding to frame of door—door closed catching his right hand. * * * Apparently misjudged handrails and fell down ladder from messhall to deck below—possible head injuries. * * * While securing gangway bridle, the davit arm guyline parted causing the davit arm to swing striking seaman on the head. * * * In disconnecting an air hose from the main deck air line without securing the air supply, received second-degree air burns on the back of both hands. * * * This seaman pulled a ¾" rubber hose into the fire room from the grating above and suffered severe scalp wounds when the coupling struck him on the head. * * * Trying to carry two portable fire extinguishers this seaman slipped and fell, suffering a fracture of his left wrist. * * * In standing on an engineroom handrail, this seaman slipped and fell to the deck below, suffering broken ribs.

A continuing review of these accident reports shows carelessness one of the prime reasons for shipboard accidents.

Here are some: In walking aft this seaman stepped on a piece of line which rolled under his foot causing him to lose his balance and fall to the deck with a wrenched back. * * * In backing down the ladder from the main deck to a store's deck guiding a 53-gallon drum of lube oil, this seaman slipped and fell with the heavy drum on top of him. * * * In unhooking drafts of lumber being lowered into the hold, this seaman was struck on the head by an empty cargo hook. * * * Seaman was standing on a folding chair attempting to hang a picture—the chair slipped and he fell to the deck. * * * In slacking a spring line this man caught his thumb between the line and mooring bit, amputating part of his thumb.

Among those accidents which are reported with almost monotonous regularity are those involving gangways, knife cuts in the galley, and falls. While some of the following may be a little unusual, they all were lost-time accidents.

In securing hatch tarpaulins, this seaman stepped from the hatch to a deck padeye turning his ankle. * * * Standing on a winch, adjacent to a resistor house, slipped and fell to the deck below. * * * In removing heavy steam pipe guard this wiper had a finger crushed when the guard slipped back in place. * * * This man had the end of his middle finger cut off when the wheelhouse door closed on his hand. * * * In carrying a load of napkins, this waiter slipped and fell ascending a stairway. * * * While closing a dining room port light cover, the cover slipped and fell on his hand. * * * Lacerated hand—caught in mooring line. * * * Slipped and fell on engineroom deck—injuring left leg. * * * In ascending an engineroom ladder this FWT slipped and fell backward to the deck below, suffering a broken arm. * * * While scaling deck a piece of rust blew into this seaman's right eye, incapacitating him for 30 days. * * * In unhooking a wire sling, a broken strand punctured this man's left forefinger.

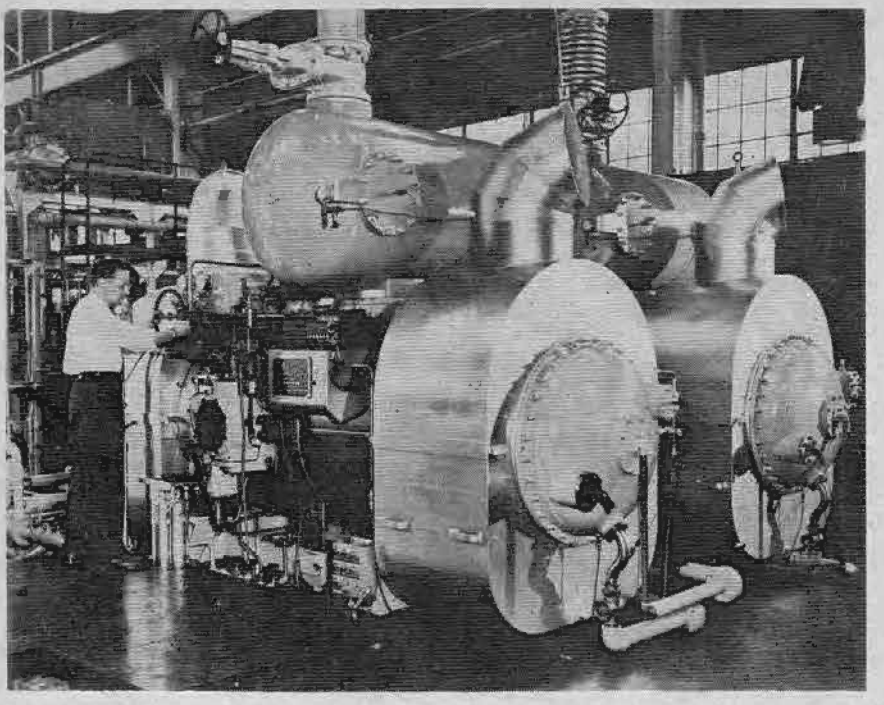
To be really effective, safe practices must become habitual. Men must form the habit of doing things safely so that they do them that way automatically, *all the time*, even without thinking.

ACCIDENTS IN BRIEF

Here is a condensation of some accidents reported to Coast Guard Headquarters during the past month. A capsule glimpse into the cause . . . and the effect. In each case the victim was incapacitated for at least 72 hours.

CAUSE	EFFECT
Hand on cradle while cradling boom	Crushed fingers.
Failed to secure bottom of ladder	Fell from stack. Injured back and head.
No safety line on stage	Two men hospitalized.
Bologna on galley deck	Sprained foot.
Grapes on ladder to reefer flat	Two broken ribs.
Oil spill not cleaned up	Fall; broken hand.
Jumped from rail to dock, going ashore	Broken knee cap.
Using folding chair as a ladder	Chair folded. Bruised back and chest.
Flattening nail with sole of shoe	Thin sole (and foot) penetrated.
Failed to secure chillroom door	Lost 2 fingers.
While cleaning slicing machine thoughtlessly touched switch.	Lacerations of 3 fingers.
Hand outside of small boat when coming alongside.	Finger required amputation.
Sudden strain on mooring line while surging on drumhead.	Multiple bruises when tossed over drumhead. (He held on.)
Flareback	Second degree burns to fireman.
Wrench dropped from upper level	Contusions on head.
Hatch cover missing	Broken leg, broken arm, facial laceration.
Failed to use steady rest on grind wheel	Finger caught; deep lacerations.
Climbing across, instead of walking around deck cargo.	Sprained ankle.

GTS JOHN SERGEANT



TWO OF THE THREE gasifiers for the GTS *William Patterson* are shown in this view before installation aboard ship. Photo Courtesy *Cleveland Diesel Engine Division of General Motors.*

Full satisfaction with the operating performance of the power plant of the Gas Turbine Ship *John Sergeant*, the world's first large vessel completely propelled by a gas turbine, was reported by the Maritime Administration.

Since the ship's conversion in September 1956, the experimental gas turbine and controllable-pitch propeller have operated some 4,700 hours to April 1958. Normal operation during this time has been at 6,000 shaft horsepower or better, and the average speed was slightly in excess of 16 knots where sea conditions permitted. The original Liberty ship speed was 10 knots under the same conditions.

The GTS *John Sergeant* is the third of four wartime Liberty ships withdrawn from the National Defense Reserve Fleet by the Maritime Administration in its $12 million Liberty Ship Conversion and Engine Improvement Program. Objectives of this program are to determine the most economical types of propulsion to upgrade these 10-knot emergency standard vessels, of which the Government still holds title to some 1,400, and to test advanced forms of propulsion for the American merchant marine.

The *Sergeant's* installation includes special and novel provisions for the treatment of residual or Bunker C fuel oil to avoid the harmful effects of turbine deposits caused by chemical elements in this low cost fuel. The method of fuel treatment provided on board consists essentially of water washing to remove or reduce the sodium and calcium content and to make inert the vanadium element by treating the fuel before combustion with a small amount of a chemical additive. This process has effectively demonstrated that it will protect the gas turbine, thereby insuring efficiency and long life of the prime mover. Although the *Sergeant's* commercial service has been with a selected grade of Bunker C fuel, recent moves are looking toward demonstrating ship operation with run-of-mine Bunker C fuels.

Present experience also shows that the gas turbine prime mover has been completely reliable and trouble free. In addition, operation proves that the favorable overall fuel economy of this installation, as well as its low maintenance record, has begun to challenge the position of modern and well established steam turbin propulsion in our merchant marine.

TALK ABOUT SAFETY

One of the most refreshing approaches to shipboard safety is presented monthly in the *"Talk About Safety"* bulletins distributed to the American President Lines fleet. Edited by Capt. John P. Chiles, assistant to the vice president, operations, the newsletter encourages its readers to "talk about safety—and do something about it." Each issue is highlighted with quotes from accident reports followed by comments from the editor.

After a series of reefer-box casualties, Captain Chiles had this to say:

"Calories are not the only hazardous content of an icebox. The doors are specially constructed to assault you when you're not looking; the gratings do their best to hold every bit of fat you drop for better slippage and they resent scrubbing as much as Junior on Saturday night; cases of pork lie there licking their chops over the prospect of breaking somebody's toe or straining his back; open pans of food carefully stored and covered by conscientious cooks take advantage of the first opportunity to shake off their lids in order to absorb dirt and dust from cases and crates lying nearby. With a little education by all concerned, these refrigerators, big and little, can learn to like neat stowage, proper handling, cleanliness, and respect for the human body. It's all a matter of degree attention as well as temperature."

In addition to listing lost-time and total accident-frequency rates for their ships by class, the APL bulletin makes an important contribution by listing the top 10 masters and top 10 chief mates for the year. Capt. Theodore Judah tops the former list with a perfect record of 240 accident-free days while master of 2 vessels. H. H. Hagler, chief mate of the SS. *President Huyes* chalked up a frequency rate of 5.74 for 242 days.

SUBMARINE AREAS

Caution regarding submarine operations.—Boundary limits and designations of submarine operating areas are shown on the charts in solid purple lines. As submarines may be operating in these areas, vessels should proceed with caution. During torpedo practice firing, all vessels are cautioned to keep well clear of naval target vessels flying a large red flag at the highest masthead.

COMMENDATION

JOHN A. McKENNA, quartermaster of the Sun Oil Co.'s MV *Passaic Sun*, is pictured above receiving a Coast Guard commendation for his rescue of a woman in the East River, from Capt. Arthur W. Johnsen, USCG, Officer in Charge of the New York Marine Inspection Office, in ceremonies held recently. Comdr. R. T. A. McKenzie, Senior Inspector of Personnel, New York, is seen at the left. In addition to the Coast Guard citation, Mr. McKenna was the second man to receive the Sun Oil Co.'s highest honor for heroism, the J. Howard Pew Award, recognizing his fearlessness and devotion beyond the call of duty. The Coast Guard citation is quoted below:

MR. JOHN A. MCKENNA
502 West 213th Street
New York, N. Y.

DEAR MR. MCKENNA:

The U. S. Coast Guard as the principal agency of the United States responsible for the safety of life and property afloat, takes pleasure in this opportunity to commend you for the courage and initiative you displayed on May 1, 1957, while serving as quartermaster of the M/V *Passaic Sun*, in your rescue of Mrs. John Daamean from the East River, New York, N. Y.

The report of the official investigation of the incident discloses that at about 1755 e. s. t. on May 1, 1957, when the *Passaic Sun* was downbound in the East River, the auxiliary sailboat 10 B 1442 was seen to founder leaving four persons struggling in the water. Due to her light draft, the *Passaic Sun* was so affected by the existing wind and tide that she could not be maneuvered to the direct aid of the distressed persons, and efforts to toss them life preservers were ineffectual. Recognizing that the situation was critical, you jumped overboard with a lifering and swam an estimated 200 yards where you succeeded in keeping Mrs. Daamean afloat until further aid arrived. Her husband sank before you could reach them.

It appears certain that but for your fearlessness and timely action in this emergency another life would have been lost. Your achievement was in keeping with the highest traditions of the American Merchant Marine.

Very truly yours,

A. C. RICHMOND,
Vice Admiral, U. S. Coast Guard,
Commandant.

MERCHANT MARINE STATISTICS

There were 952 vessels of 1,000 gross tons and over in the active oceangoing United States merchant fleet on May 1, 1958, according to the Maritime Administration. This was 22 less than the number active on April 1, 1958.

There were 36 Government-owned and 916 privately owned ships in active service. These figures did not include privately owned vessels temporarily inactive, or Government-owned vessels employed in loading grain for stowage. They also exclude 34 vessels in the custody of the Departments of Defense, State, and Interior.

There was a decrease of 19 active and an increase of 21 inactive vessels in the privately owned fleet. One new tanker, the *Esso Lexington*, went into operation, and one Liberty tanker, the *Pandora*, was returned to United States flag from foreign registry. This increased the total privately owned fleet by 2 ships to 998 ships.

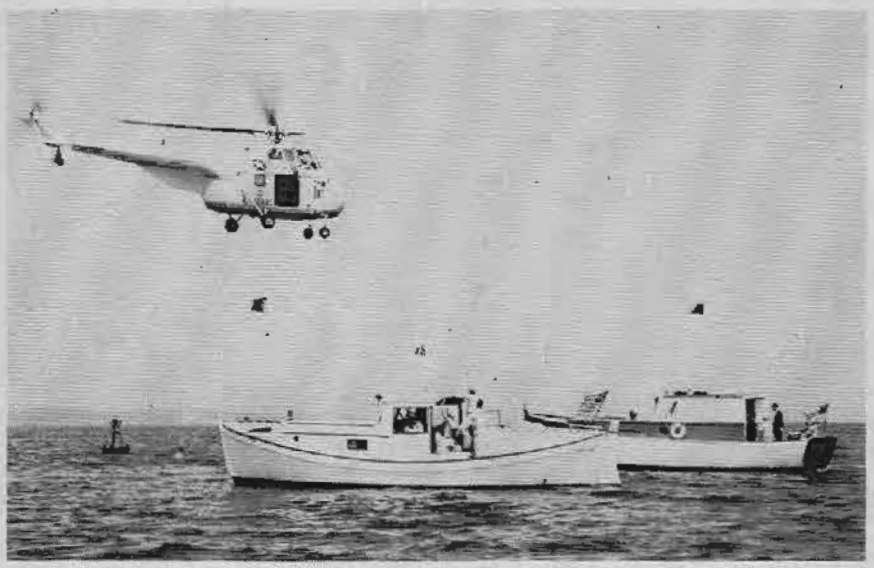
Of the 82 privately owned inactive vessels, 16 dry-cargo ships and 36 tankers were laid up for lack of employment. Most of the others were undergoing repair or conversion.

The Maritime Administration's active fleet decreased by 3, while its inactive fleet decreased by 2. Three Liberty ships, *Fort Laird*, *Fort Lawrence*, and *William Hawkins*, were sold for scrap. One tanker owned by the Navy was turned over to the Administration. One Liberty ship and two Navy ships in fleet custody were turned over to the Navy. This made a net decrease of 5 in the Government fleet, which totaled 2,120. There was a net decrease of 3 vessels in the total merchant fleet, active and inactive, which numbered 3,118 on May 1, 1958.

No new contracts were placed. One new private tanker, the SS. *Esso Lexington*, and 1 new and 3 converted Great Lakes bulk carriers, and 1 converted dry-cargo ship were delivered, while 2 new tankers were postponed and 1 tanker conversion was canceled. The total of large merchant ships on order or under construction in United States shipyards dropped to 108.

Seafaring jobs on active United States-flag ships of 1,000 gross tons and over, excluding civilian seamen manning Military Sea Transportation Service ships were 51,846. Prospective officers in training in Federal and State nautical schools numbered 1,902.

MARITIME SIDELIGHTS



A UNIQUE METHOD of displaying storm warning signals to small craft out of sight of shore signal stations is demonstrated by this Coast Guard helicopter in the busy Boston area. The appropriate signals are displayed beneath the aircraft in plain view of the boating public. Approved by the U. S. Weather Bureau, this system is used to supplement signals displayed at regular shore stations.

The Mississippi Shipping Co. has reported a 25 percent reduction in accidents for the first quarter of 1958 in their 14-ship fleet. For 1957, the SS *Del Monte* won the safest ship award for the second year in a row with only one lost-time accident.

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The SS *Seatrain Georgia* entered the month of May with a record of 462 days without a lost-time accident, it was reported in the Seafarers Log.

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A study of "Seafaring Fringe Benefits" has been published by the Maritime Administration, and can be obtained from the Government Printing Office, Washington 25, D. C., for 5 cents a copy. The study examines the historical background of negotiated welfare benefits, and presents detailed tabulations of employer contributions for seafaring pensions, welfare, and unemployment. Included are thumbnail sketches of the origin and development of fringe benefit plans, trends, and scope of maritime labor-management negotiations, and data showing the amount of employer contributions per man-day for the respective program.

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A good foc's'le question might be: What is the most common fish in the sea? According to the International Oceanographic Foundation the most common fish in the sea is a species of *Cyclothone*, a deepwater fish sometimes called bristle-mouth. This fish is about the size of a small minnow, and it is rarely, if ever, seen by the average person.

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Moore-McCormack Lines' $26 million cruise ship SS *Brasil* will begin her maiden voyage to South America on Friday, September 12, it was announced by company officials. The ship is expected to make the 12,000-mile round-trip between New York and Buenos Aires in 31 days, cutting a week off the running time formerly required.

A crew from the Norwegian MV *Havtroll* won the 19th annual International Seaman's Lifeboat Race held Memorial Day in the Narrows off Bay Ridge, Brooklyn.

Another Norwegian entry, from the MV *Oslofjord*, was second. The 2 American boats came in seventh and eighth in the field of 9.

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The current issue of the Isthmian Lines *Safety Bulletin* shows a sizable reduction in shipboard accidents for its 24-ship fleet for 1957.

In 1956 the company reported 306 accidents in all departments, and during 1957 this total was pulled down to 287. By departments, the deck gang cut its accidents from 168 to 153; the engine department from 97 to 77; while the stewards department increased from a 1956 high of 41 to 57.

On an overall basis the SS *Steel Artisan* led the fleet with a 95.76 rating with the SS *Steel King* a close second with 94.98.

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En route from New York to the Canal Zone, the SS *Cristobal* picked up a 43-year-old Danish seaman swimming unhurt without a life preserver. Lost overboard from the Norwegian tanker *Anne*, the seaman had been in the water over 5 hours when he was rescued.

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The new Grace Line passenger ships, SS *Santa Rosa* and SS *Santa Paula*, will call at Port Everglades, Fla., it was announced by company officials.

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The Weyerhaeuser Steamship Co. has borrowed a page from its lumber operation and is using "water blasting" to prepare a ship's underbody for painting. In the lumber operation the bark is stripped from logs by using water under high pressure, and this principle has been applied to their drydocked vessels to remove marine growth and loose hull paint. The *New York Times* reported that water under 1,500 pounds per square inch is used in the operation.

nautical queries

Q. What is magnetic variation?

A. Variation is the angle between the magnetic and geographical meridians at any place, expressed in degrees east or west to indicate the direction of magnetic north from true north. Called MAGNETIC VARIATION when a distinction is needed to prevent possible ambiguity. Also called magnetic declination.

Q. What is compass error?

A. Compass error is the angle by which a compass direction differs from the true direction; the algebraic sum of variation and deviation; the angle between the true meridian and the axis of the compass card, expressed in degrees east or west to indicate the direction of compass north with respect to true north.

Q. What is the vernal equinox?

A. (a) That point of intersection of the ecliptic and the celestial equator, occupied by the sun as it changes from south to north declination, on or about March 21. Also called March equinox, first point of Aries.

(b) That instant the sun reaches the point of zero declination when crossing the celestial equator from south to north.

Q. What is a solstice?

A. (a) One of the two points of the ecliptic farthest from the celestial equator; 1 of the 2 points on the celestial sphere occupied by the sun at maximum declination. That in the northern hemisphere is called the summer solstice and that in the southern hemisphere the winter solstice. Also called solstitial points.

(b) That instant at which the sun reaches one of the solstices, about June 21 (summer solstice) or December 22 (winter solstice).

Q. What is refraction?

A. (a) Refraction is the change in direction of motion of a ray of radiant energy as it passes obliquely from one medium into another in which the speed of propagation is different. Atmospheric refraction is caused by the atmosphere and may be further designated astronomical refraction if the ray enters from outside the atmosphere, or terrestrial refraction if it emanates from a point on or near the surface of the earth. Super-refraction is greater than normal and subrefraction is less than normal.

(b) The change in direction of motion of a fluid wave due to currents or variations in depth.

Q. Define magnetic deviation and state its cause.

A. Deviation is the angle between the magnetic meridian and the axis of a compass card, expressed in degrees east or west to indicate the direction in which the northern end of the compass card is offset from magnetic north. Deviation is caused by disturbing magnetic influences in the immediate vicinity of the compass, as within the craft. Called magnetic deviation when a distinction is needed to prevent possible ambiguity.

Q. What is a sidereal day?

A. A sidereal day is the duration of one rotation of the earth on its axis, with respect to the vernal equinox. It is measured by successive transits of the vernal equinox over the upper branch of a meridian. Because of the precession of the equinoxes, the sidereal day thus defined is slightly less than the period of rotation with respect to the stars, but the difference is less than 0.01 second. The length of the sidereal day is 24 hours of sidereal time or 23 hours, 56 minutes, 04.091 seconds, of mean solar time.

Q. What is interpolation?

A. Interpolation is the process of determining intermediate values between given values in accordance with some known or assumed rate or system of change. Linear interpolation assumes that changes of tabulated values are proportional to changes in entering arguments. Interpolation is designated as single, double, or triple as there are 1, 2, or 3 arguments or variables, respectively. The extension of the process of interpolation beyond the limits of known values is called EXTRAPOLATION.

Q. What is a conversion angle?

A. A conversion angle is the angle between the rhumb line and the great circle between two points.

Q. What is meant when two celestial bodies are said to be in—

(a) Conjunction;

(b) Opposition?

A. (a) Two celestial bodies are said to be in conjunction when they have either the same celestial longitude or the same sidereal hour angle.

(b) Two celestial bodies are said to be in opposition when their celestial longitude or sidereal hour angles differ by 180°.

Q. Define:

(a) Aphelion;

(b) Perihelion;

(c) Apogee;

(d) Perigee.

A. (a) Aphelion is that orbital point farthest from the sun when the sun is the center of attraction.

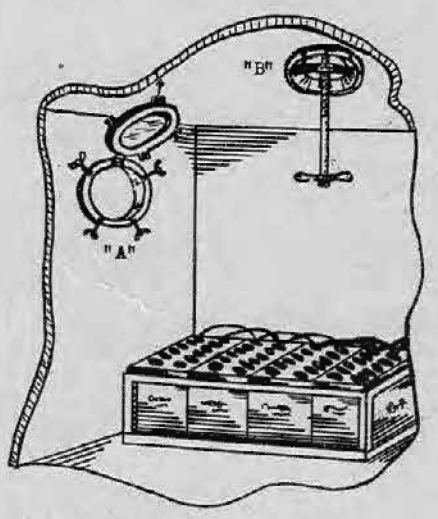
(b) Perihelion is that orbital point nearest the sun when the sun is the center of attraction.

(c) Apogee is that orbital point farthest from the earth when the earth is the center of attraction.

(d) Perigee is that orbital point nearest the earth when the earth is the center of attraction.

SHIP CONSTRUCTION

Q. Is a mushroom vent as at "B" or a porthole as at "A" satisfactory for venting a battery room? Why?



A. The mushroom at "B" would meet requirements while the porthole at "A" would not. The hydrogen gas evolved in the charging of batteries is lighter than air and unless an exhaust vent is located at the overhead an explosive mixture could accumulate at the top of a room.

OIL POLLUTION

Pollution of the seas and harbors by oil is a very serious problem.

It is **DANGEROUS.** Any spill is hazardous to shipping and harbor facilities and could result in the loss of life.

It is **EXPENSIVE.** Effective clean-up of even minor spills is very costly.

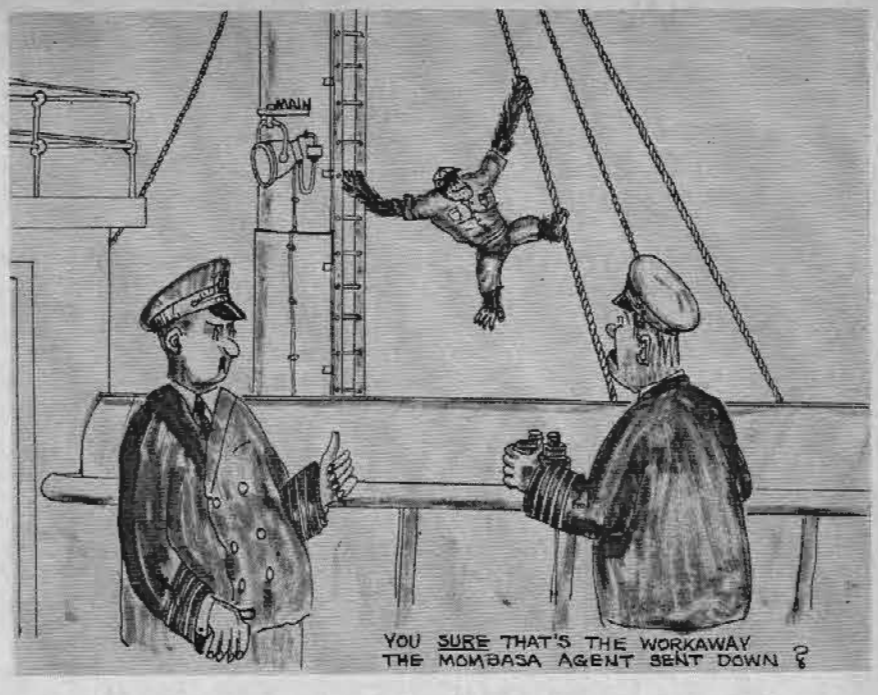
It is **ILLEGAL.** Not only the company involved, but individuals as well, are subject to prosecution for oil spills under Federal, State, and local laws.

The records indicate that most spills involve only a small amount of oil and are the result of preventable accidents, or negligence. Common excuses which are repeated time and again for oil spills include:

"Overflowed while topping off."
"Error in valve manipulation."
"Siphoned through air vent."
"Air Bubble."
"Too much pressure."
"Left to secure another valve and tank overflowed before I could get back."

This type of excuse does not indicate willful negligence, but does indicate inattention and carelessness on the part of those responsible.

Oil pollution has been the subject of international conferences and agreements. Stringent antipollution laws are in force in many countries besides the United States. There are State and local laws prohibiting oil pollution. The Oil Pollution Act of 1924 (33 U. S. Code 432 to 437) is the basic Federal antioil pollution law of the United States. It prescribes severe penalties for violation, including suspension or revocation of licenses, as well as both fine and imprisonment. Administration and enforcement of the law is a responsibility of the Secretary of the Army, acting through certain officers and employees of the Corps of Engineers, U. S. Army. Enforcement of the law is also a duty of the U. S. Coast Guard and U. S. Customs Service.



Investigation of oil pollution incidents takes time and money and in every case there is the possibility of prosecution. Prosecution is undertaken when there is sufficient evidence to assure conviction.

We are taking this means to solicit your fullest and continuing cooperation in preventing oil spills. Careful attention to equipment and procedure by management, to planning by supervisors, and to the job at hand by those who actually do the work can be more effective in preventing oil pollution than all the laws ever written. The prevention of minor spills can result in the prevention of a major catastrophe. The earnest desire of all concerned with the problem of oil pollution is to prevent oil spills rather than to obtain convictions for violations of the antipollution laws. Your constant alertness to this problem will be the most effective means of controlling careless spilling with resultant economy, safety, and compliance with the antipollution laws.

SHIPBUILDING OUTLOOK

A Shipbuilders Council of America report shows the United States in eighth place among 26 merchant shipbuilding nations last year.

As of January 1, there were 2,726 ships totaling 34,494,214 gross tons on the ways or planned.

The following table shows the number of vessels, the gross tonnage they represent and the percentage of total shipbuilding activity as of January 1, of the top ten nations in the report:

	Vessels	Tonnage	Percent
Great Britain	495	5,734,007	16.6
West Germany	517	5,524,235	15.7
Japan	296	5,079,780	14.7
Sweden	250	3,758,885	10.9
The Netherlands	190	2,395,440	6.9
France	146	2,213,100	6.4
Italy	143	2,185,740	6.3
United States	93	2,172,412	6.3
Norway	143	1,804,400	5.2
Denmark	86	921,726	2.6

NEWS IN BRIEF

The Association of German Shipowners announced there were 1,106 oceangoing ships in the German fleet on January 1, 1958. Of this number, 1,004 were dry cargo and passenger ships and 102 were tankers and ore/oil carriers.

* * *

Newest flag to appear on the maritime scene is that of the United Arab Republic which is Egypt and Syria. The flag has 3 horizontal stripes of red, white, and black with 2 green stars vertically in the center of the white stripe.

40 YEARS AGO:

On July 5, 1918, the excursion steamer *Columbia* grounded in the Illinois River about midnight with 456 passengers and 32 crew on board. The officers of the vessel, instead of holding the steamer alongside the bank, proceeded out into midstream with the result that the vessel sank in deep water and 92 persons lost their lives. Charges have been preferred against the master and the pilot on watch by the local inspectors at St. Louis, Mo.

* * *

Other accidents reported include the following: The freight steamer *F. A. Kilburn* en route from Havana to New Orleans was destroyed by fire, which originated in the vicinity of the oil-pumping apparatus. The vessel was valued at $150,000.

* * *

The freight steamer *Onondaga*, 2,696 tons, owned by the Clyde Steamship Co., grounded and was declared a total loss. Value was set at $500,000.

* * *

30 YEARS AGO:

During the month of June 1928 the commanding officer of the Coast Guard cutter *Chicopee* stationed at Portland, Maine, was specifically designated to assist in the examination and certification of lifeboatmen under the provisions of the Seamen's Act.

* * *

The steamer *Point Reyes* suffered $14,750 damage when she grounded entering Cartagena Harbor due to an error on the chart covering these waters.

* * *

20 YEARS AGO:

Inherent dangers in entering unventilated tanks was pointed up in the July issue of the *Bulletin* in the case of the tanker *Francis E. Powell*. The after-peak tank of this vessel had been closed for about 8 months and prior to ship-yard repairs the second assistant entered the tank to determine its condition prior to filling with fresh water. In descending the vertical ladder he lost consciousness due to a lack of oxygen and fell. In turn, the first assistant, chief engineer, and an ordinary seaman entered the tank to rescue the stricken second assistant, and all became unconscious. By using fresh-air masks other members of the crew removed the fallen men. All subsequently regained consciousness with the exception of the first assistant. The cause of this disaster resulted from the men entering the tank without first ventilating it or definitely ascertaining its condition.

* * *

On June 1, 1938, American shipyards were building, or had under construction to build for private shipowners 156 vessels, aggregating 423,933 gross tons. Motorboats in the United States on July 1, 1938, were totaled at 221,546.

* * *

15 YEARS AGO:

Changes in the titles of merchant marine inspectors have been announced by Coast Guard Headquarters. The supervising merchant marine inspector has been changed to marine inspection officer. Merchant marine inspector in charge has been changed to officer in charge, marine inspection; and merchant marine inspector has been shortened to marine inspector.

* * *

A new publication of the Coast Guard, "Nautical Rules of the Road," bringing together in comparative form the international, inland, and pilot rules is ready for distribution. Two other publications, "Specimen Examinations for Merchant Marine Deck Officers" and the same for engineer licenses are available to officers and men of the merchant marine as preparation material for original or raise in grade of licenses.

machinery are fully protected even if the control levers are jammed from full ahead to full astern.

HEAVY PLATING

Hull plating and scantlings on a river towboat are much heavier than required for a comparable size ocean vessel. The hazards of shallow water, shifting sandbars, lock walls, and the constant contact with barges, requires that great emphasis be placed on hull strength.

In addition to building lighter, higher speed engines, the diesel engine manufacturers have increased the engine horsepower by turbo-charging and aftercooling their newer designs.

Since fuel cost is approximately one-third of the total operating cost of the bargeline, the towboat utilizes comparatively inexpensive mixtures of diesel fuel.

Superstructure and deckhouse size depends upon crew requirements for a particular service. In the modern towboat all controls are centered in the pilothouse and mounted for the captain's convenience. He is provided with as many navigation aids as are desirable for his particular vessel's scope of operations. These include radar, ship-to-shore telephones, depth finders, gyrocompasses, searchlights, horns, and intercommunication systems. The engine room is equipped with controls and gages that enable the engineer to make the necessary adjustments in the engine's normal functions and warn him of breakdowns or improper running conditions.

Every effort is made to make the living and operating conditions on boats as comfortable as possible. Modern space-heating equipment is essential and air conditioning of the living quarters is provided on many boats. All-electric galleys frequently are equipped with such time- and labor-saving features as automatic dishwashers, stainless steel sinks and cabinet tops.

Ranging up to 6,000 horsepower, towboats are built in lengths varying from 100 to 200 feet and in breadth from 30 to 40 feet.

These boats are constructed in a large number of widely scattered cities, since most of the major ports on the inland waterway system have either shipbuilding or ship-repair facilities.

(The next article will describe the many varied uses of the barge and its relationship with the towboat in the transportation of commodities over the inland water system.)

APPENDIX

AMENDMENTS TO REGULATIONS

[EDITOR'S NOTE.—The material contained herein has been condensed due to space limitations. Copies of the Federal Registers containing the material referred to may be obtained from the Superintendent of Documents, Washington 25, D. C.]

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

Subchapter C—Aids to Navigation

[CGFR 58-2]

PART 70—INTERFERENCE WITH OR DAMAGE TO AIDS TO NAVIGATION

PART 74—COSTS AND CHARGES

REVISION OF STANDARD CHARGES

The purpose of the amendments to the regulation in this document is to increase charges for the preparation of replacement aids to navigation, charges for vessel time involved in the placement of replacement aids to navigation on station, and incidental service charges to coincide with actual operating costs for such service rendered during fiscal year 1957.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order Nos. 167-3 (18 F. R. 2962) and 167-23 (21 F. R. 5852) to promulgate regulations in accordance with the statutes cited with the regulations below, the following amendments to the regulations are prescribed which shall become effective upon the date of publication of this document in the Federal Register.

[Federal Register of May 8, 1958.]

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter F—Marine Engineering

[CGFR 58-16]

PART 55—PIPING SYSTEMS AND APPURTENANCES

SUBPART 55.10—PUMPING ARRANGEMENT AND PIPING SYSTEMS

BILGE AND BALLAST PIPING

The requirements in 46 CFR 55.10-25 (c) (1) and 55.10-25 (l) are inconsistent and a request has been made respecting the intent of the regulations governing bilge and ballast piping. 46 CFR 55.10-25 (c) (1) applies to all vessels and requirements for stop-check valves in the machinery space for controlling bilge suctions from various compartments, while 46 CFR 55.10-25 (i) deals with bilge and ballast piping for Great Lakes' cargo vessels and permits a common bilge and ballast line for cargo spaces on Great Lakes' vessels, which would preclude the use of stop-check valves for controlling the bilge suctions from these compartments. Bilge and ballast valving arrangements employing stop valves in the manifold in lieu of stop-check valves are the generally accepted practice on Great Lakes' cargo vessels. The amendment in this document to 46 CFR 55.10-25 (c) (1) eliminates this apparent inconsistency in the requirements.

Because this amendment to 46 CFR 55.10-25 (c) (1) is in the nature of an editorial clarification which does not impose any additional requirements, it is hereby found that compliance with the Administrative Procedure Act respecting notice of proposed rule making, public rule making procedures thereon, and effective date requirements, is unnecessary.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Orders 120, dated July 31, 1950 (15 F. R. 6521), 167-14, dated November 26, 1954 (19 F. R. 8026), and CGFR 56-28, dated July 24, 1956 (21 F. R. 5659), to promulgate regulations in accordance with the statutes cited with the regulation below, the following amendment to 46 CFR 55.10-25 (c) (1) is prescribed and shall become effective upon the date of publication of this document in the Federal Register:

§ 55.10-25 *Bilge and ballast piping.*

* * *

(c) (1) Bilge suctions shall be led from manifolds, which shall be controlled above the floor plating in the compartments in which they are located, and shall be easily accessible at all times. Except as otherwise permitted by paragraph (i) of this section for Great Lakes' cargo vessels employing a common bilge and ballast system for the cargo spaces, valves in the machinery space controlling bilge suctions from various compartments shall be of the stop-check type.

(R. S. 4405, as amended, 4462, as amended, 46 U. S. C. 375, 416. Interprets or applies R. S. 4399, as amended, 4400, as amended, 4417, as amended, 4417a, as amended, 4418, as amended, 4421, as amended, 4426-4431, as amended, 4433, as amended, 4434, as amended, 4453, as amended, 4491, as amended, sec. 14, 29 Stat. 690, as amended, 41 Stat. 305, as amended, 49 Stat. 1544, as amended, secs. 2, 3, 17, 54 Stat. 1028, as amended, 347, as amended, 166, as amended, sec. 3, 68 Stat. 675; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404-409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. 198; E. O. 10402, 17 F. R. 9917, 3 CFR, 1952 Supp.)

Dated: May 5, 1958.

[SEAL] J. A. HIRSHFIELD,
Rear Admiral, U. S. Coast Guard,
Acting Commandant.

[F. R. Doc. 58-3537; Filed, May 9, 1958: 8:49 a. m.]

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

Subchapter C—Aids to Navigation

[CGFR 58-17]

PRIVATE AIDS TO NAVIGATION ON THE OUTER CONTINENTAL SHELF AND WATERS UNDER JURISDICTION OF THE UNITED STATES

Notices regarding proposed changes in the navigation and vessel inspection regulations were published in the Federal Register dated February 12, 1958 (23 F. R. 905-910), and March 1, 1958 (23 F. R. 1268-1270), as Items I through XVIII of an Agenda to be considered by the Merchant Marine Council. Pursuant to these notices a public hearing was held on March 18, 1958, by the Merchant Marine Council at Washington, D. C.

[Federal Register of May 20, 1958.]

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

Subchapter B—Merchant Marine Officers and Seamen

[CGFR 58-18]

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

PART 70—GENERAL PROVISIONS

PART 183—ELECTRICAL INSTALLATION

MISCELLANEOUS AMENDMENTS

Notices regarding proposed changes in the navigation and vessel inspection regulations were published in the Federal Register dated February 12, 1958 (23 F. R. 905-910), and March 1, 1958 (23 F. R. 1268-1270). Pursuant to these notices a public hearing was held on March 18, 1958, by the Merchant Marine Council at Washington, D. C.

This document is the third of a series covering the regulations and actions considered at this public hearing and annual session of the Mer-

chant Marine Council and contains the final actions taken with respect to Item IV of the Agenda. The first document, identified as CGFR 58–8 (23 F. R. 2604), contained miscellaneous amendments to inspection requirements to implement the act of May 10, 1956, as amended (46 U. S. C. 390–390g), which were based on Item III of the Agenda. The second document, identified as CGFR 58–17, contains the requirements governing private aids to navigation on the outer Continental Shelf and waters under the jurisdiction of the United States, which were based on Item I of the Agenda.

All the comments, views, and data submitted in connection with the items considered by the Merchant Marine Council at this public hearing are very much appreciated. The effective date of the new requirements respecting "radar observers" will be January 1, 1959, and after that date every applicant for an original deck officer's license, raise of grade, or increase in scope of license for service on ocean, coastwise, or Great Lakes vessels of 300 gross tons or over shall be required to demonstrate, by professional examination, his qualifications as a "radar observer." No changes were made in the proposals in Item IV—Renewal of Merchant Mariner's Licenses and Requirements for Radar Observers (46 CFR 10.02–9, 10.05–46). The regulations and amendments in this Item are adopted without change and are set forth in this document.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Orders 120, dated July 31, 1950 (15 F. R. 6521), 167–14, dated November 26, 1954 (19 F. R. 8026), 167–20, dated June 18, 1956 (21 F. R. 4894), and CGFR 56–28, dated July 24, 1956 (21 F. R. 5659), to promulgate regulations in accordance with the statutes cited with the regulations below, the following amendments are prescribed and shall become effective upon the date of publication of this document in the Federal Register except the new requirements designated 46 CFR 10.05–46 which shall become effective on and after January 1, 1959:

[Federal Register of May 21, 1958.]

AFFIDAVITS

The following affidavits were accepted during the period from April 15, 1958, to May 16, 1958:

American Bosch Arma Corp., Springfield 7, Mass., VALVES AND FITTINGS.

Linde Co., Division of Union Carbide Corp., 30 East 42d Street, New York 17, N. Y., VALVES AND FITTINGS.

MARINE SAFETY PUBLICATIONS AND PAMPHLETS

The following publications and pamphlets are available and may be obtained upon request from the nearest Marine Inspection Office of the United States Coast Guard, except for cost publications which may be obtained upon application to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Date of each publication is indicated following title.

CG No.	*Title of Publication*
101	Specimen Examinations for Merchant Marine Deck Officers. 1–50
108	Rules and Regulations for Military Explosives. 5–15–54
115	Marine Engineering Regulations and Material Specifications. 3–1–58
123	Rules and Regulations for Tank Vessels. 10–1–56
129	Proceedings of the Merchant Marine Council. Monthly Motorboat Safety. 1957–1958
169	Rules to Prevent Collisions of Vessels and Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico. 4–1–58
172	Pilot Rules for the Great Lakes and Their Connecting and Tributary Waters. 4–1–58
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids. 7–2–51
175	Manual for Lifeboatmen and Able Seamen, Qualified Members of Engine Department, and Tankerman. 6–1–55
176	Load Line Regulations. 11–1–53
182	Specimen Examinations for Merchant Marine Engineer Licenses. 5–1–57
184	Pilot Rules for the Western Rivers. 7–1–57
190	Equipment Lists. 3–1–56
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel. 9–15–55
200	Marine Investigation Regulations and Suspension and Revocation Proceedings. 4–13–53
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels. 4–1–57
227	Laws Governing Marine Inspection. 7–3–50
239	Security of Vessels and Waterfront Facilities. 6–16–52
249	Merchant Marine Council Public Hearing Agenda. Annually
256	Rules and Regulations for Passenger Vessels. 3–1–57
257	Rules and Regulations for Cargo and Miscellaneous Vessels. 6–1–55
258	Rules and Regulations for Uninspected Vessels. 7–1–55
259	Electrical Engineering Regulations. 6–1–55
266	Rules and Regulations for Bulk Grain Cargo. 2–13–53
267	Rules and Regulations for Numbering Undocumented Vessels. 1–15–53
268	Rules and Regulations for Manning of Vessels. 9–3–57
269	Rules and Regulations for Nautical Schools. 11–1–53
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935. 11–19–52
290	Motorboats. 7–1–57
293	Miscellaneous Electrical Equipment List. 4–15–58
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf. 1–2–57

Official changes in rules and regulations are published in the Federal Register, which is printed daily except Sunday, Monday and days following holidays. The Federal Register is a sales publication and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. It is furnished by mail to subscribers for $1.50 per month or $15.00 per year, payable in advance. Individual copies desired may be purchased as long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue and will be 15 cents unless otherwise noted on the table of changes below.

Changes Published During May 1958

The following have been modified by Federal Registers:
CG–115 Federal Register, May 10, 1958.
CG–191 Federal Register, May 21, 1958.
CG–320 Federal Register, May 20, 1958.

U. S. GOVERNMENT PRINTING OFFICE: 1958

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