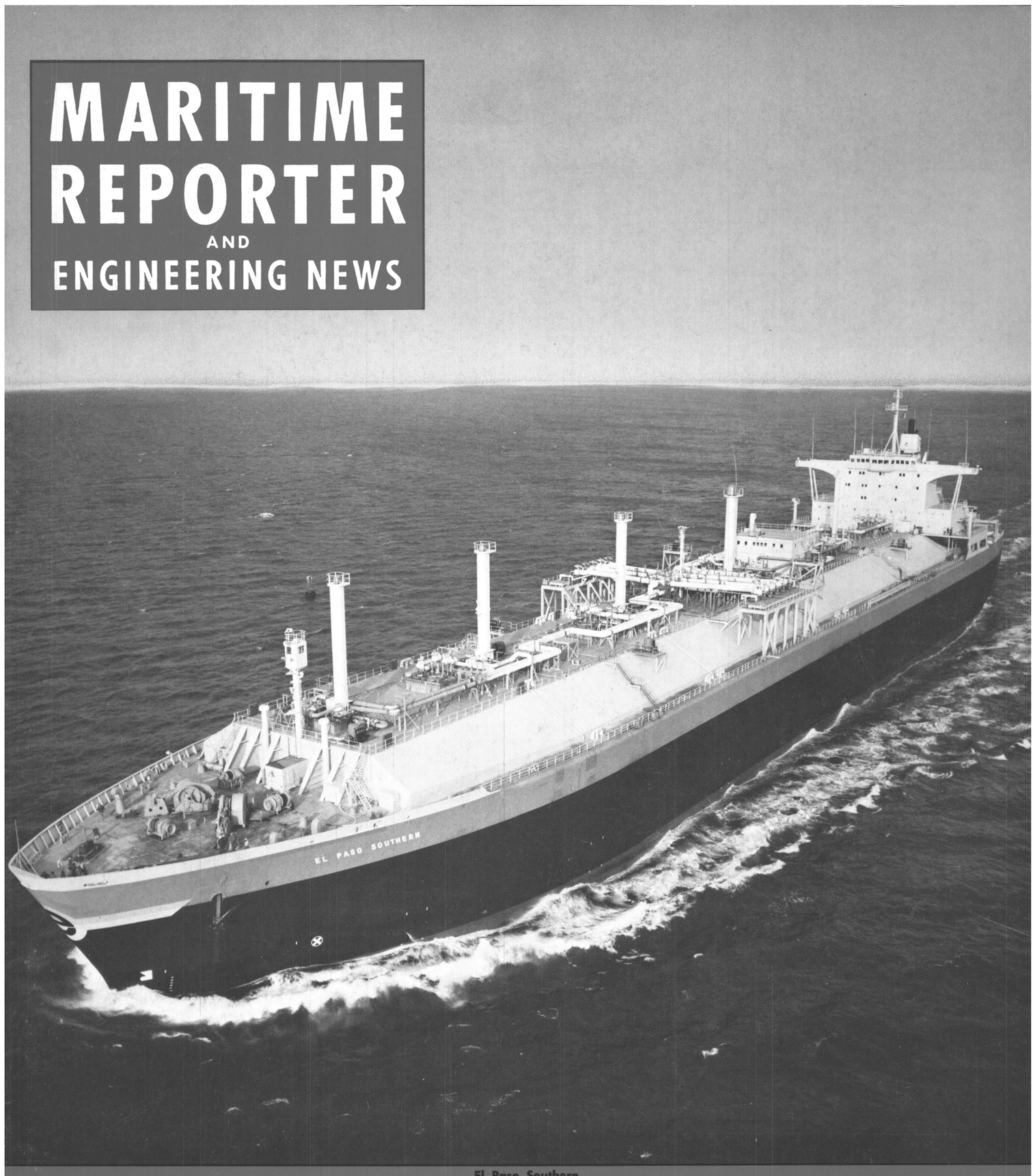
MARITIME
REPORTER
AND
ENGINEERING NEWS



El Paso Southern

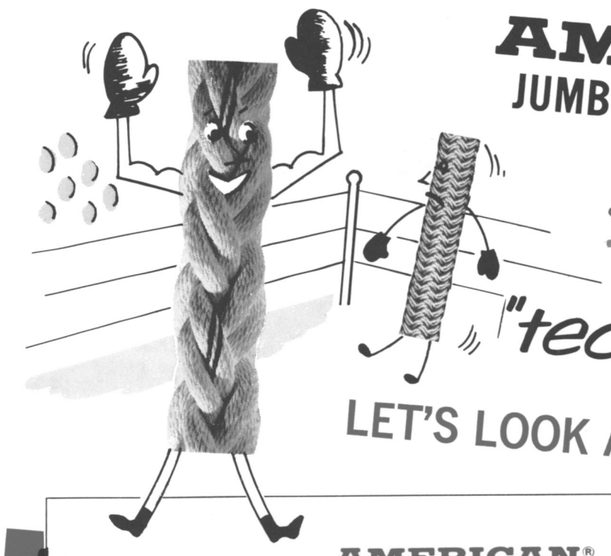
First LNG Carrier Built By Newport News Delivered To Subsidiary Of El Paso LNG Company

(SEE PAGE 10)

Maritime Day

(SEE PAGE 16)

JULY 1, 1978



AMERICAN® JUMBO-8-BRAID NYLON *Scores on a "technical" KO!*

LET'S LOOK AT THE CARD...

	AMERICAN® JUMBO-8-BRAID NYLON	ROUND BRAID NYLON (braid over braid)
Round 1 — Lowest Cost	YES... as much as 18%.	*
2 — Safer	YES... strand construction permits easy inspection for internal wear.	NO... "woven cover" construction conceals internal defects.
3 — Easy Splicing	YES... anytime, by average deck hand.	NO... particularly difficult after use due to hardening and fusing of fibers.
4 — Sheds water and dirt	YES... water and foreign materials pass between the strands.	NO... traps water and dirt causing freezing and internal wear.
5 — Non-kinking	YES... defies kinking and hockling. Minimizes need for special handling.	NO... the internal yarns become twisted inside the cover.
6 — Physically Fit	YES... sturdy working strands even out the working stresses.	NO... when the cover yarns go, the rope is finished.
7 — Stronger	YES... American's special 8-strand nylon rope provides highest breaking strength.	*
8 — Longer Life	YES... by far.	*
9 — Easy to Handle	YES... sheds moisture and remains light.	NO... picks up extra weight when wet. Freezes.

* NO CONTEST

What's more, our AMERICAN® 3-STRAND TWISTED ROPE will also take on all comers... and LET YOU BE THE JUDGE because AMERICAN ROPES have more going for them in every way.

AMCO®

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MANUFACTURING COMPANY, INC.
CORDAGE DIVISION

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VERSATILITY

Photographic simulation of pilot house being elevated 28′ height of eye to 45′.

Tug Marjorie B. McAllister in notch of 18,000 ton/125,000 barrel barge.
Pilot house elevated to 45′ height of eye.

Tug Marjorie B. McAllister with barge on hawser,
pilot house lowered to a conventional 28′ height of eye.

McAllister Brothers, Inc. Towing and transportation. 17 Battery Place, New York, N.Y. 10004. (212) 269-3200. Serving the ports of New York, Norfolk, Philadelphia, and San Juan.

McAllister

Booklet Shows Foreign Flag Vessels Owned By U.S. Parent Companies

The Maritime Administration has released a report on 677 foreign-flag oceangoing merchant-type ships of 1,000 gross tons and over owned by United States parent companies located and incorporated in the United States, either by direct ownership or through foreign subsidiary companies. Prepared by MarAd's Office of Subsidy Administration, the report contains information as of December 31, 1976.

"Foreign Flag Merchant Ships Owned by U.S. Parent Companies" can be purchased through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. (Stock No. 003-007-00086-3).

MarAd Releases Ocean Thermal Energy Conversion Report

The Maritime Administration has released a technical report which discusses the maritime and construction aspects of Ocean Thermal Energy Conversion (OTEC) plant ships as a promising means of helping alleviate national energy problems, contributing to a more favorable balance of payments, and providing new employment opportunities in the maritime and related industries.

A tropical-grazing OTEC plant ship would use the temperature difference between the warm surface waters near the equator and the colder waters one-half mile below to drive a heat engine to produce electric power that would be converted into an energy-intensive product aboard ship.

The study, performed by the Johns Hopkins University Applied Physics Laboratory, indicates that OTEC offers greater promise than fossil and nuclear power, and recommends that high priority be placed on the development of OTEC plant ships.

The report, "Investment in Commercial Development of Ocean Thermal Energy Conversion (OTEC) Plant Ships," is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. The order number is PB 280922/AS, and the price is $8.

MARITIME REPORTER AND ENGINEERING NEWS

107 EAST 31st STREET
NEW YORK, N. Y. 10016
(212) 689-3266, 3267, 3268, 3269

ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc. Controlled Circulation postage paid at Waterbury, Connecticut 06701.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 107 East 31st Street, New York, N.Y. 10016.

Member BPA Business Publications Audit of Circulation, Inc.

No. 13 Volume 40

Huthnance Awards Jackup Rig Contract To Bethlehem Beaumont

Huthnance Drilling Company has awarded Bethlehem Steel Corporation's Beaumont, Texas, shipyard a contract for construction of a new jackup rig, the Acadian Spirit.

The new rig, expected to be delivered in June 1979, will drill off Louisiana under a one-year contract with The Superior Oil Company.

In announcing the award, **Sherman Perry,** general manager of the Beaumont shipyard, said that the contract brings to six the number of offshore jackup rigs currently under contract by Bethlehem, and will provide additional employment for about 225 workers in the yard.

The Acadian Spirit will be capable of drilling wells to 25,000 feet while operating in water depths of 12 to 112 feet. The rig is designed for drilling in a variety of soil conditions found in the Gulf of Mexico, ranging from the extremely soft bottoms near the mouth of the Mississippi River to the firm soils offshore Texas.

Headquartered in Houston, Texas, with an operations office in New Iberia, La., Huthnance Drilling Company is currently operating three platform rigs in the Gulf of Mexico under contracts with Exxon, Gulf Oil and Pennzoil.

William Huthnance, head of Huthnance Drilling, noted at the contract agreement that this is the fourth time he has been associated with the Beaumont shipyard. The other occasions were during construction of Rangers I, II and III, all workover rigs for shallow-water use.

American President Lines Appoints F.D. Finlayson To Newly Created Post

William B. Hubbard, senior vice president-operations for American President Lines, Ltd., Oakland, Calif., has announced the appointment of **F. Douglas Finlayson** to the new position of assistant vice president-marine operations.

F. Douglas Finlayson

A 26-year veteran of vessel operations and design management, Mr. **Finlayson** will function as second in command for all areas of APL vessel operations, reporting to **Charles M. Deering,** vice president-marine operations. He will also be responsible for the coordination of the input from all segments of the Operations Division into APL's vessel replacement program. He will actively participate as the Operations representative in all phases of that program.

Mr. **Finlayson** joins APL, having served Marcona Corporation since 1965 in positions as naval architect, general manager-design construction, and since 1974, vice president-marine operations.

A graduate of the University of Strathclyde in Glasgow, Scotland, with a degree with distinction in naval architecture, he served as deck officer in the British and Canadian merchant fleets, and as an officer in the Royal Canadian Navy. He has also held various positions with Philip F. Spaulding & Associates, a Seattle, Wash.-based consulting engineering firm specializing in naval architecture.

Mr. **Finlayson** is a member of the American Bureau of Shipping Committee on Naval Architecture, and The Society of Naval Architects and Marine Engineers.

Golten To Represent Akasaka Diesels Ltd.

Golten Marine Co., Inc., has been licensed as the worldwide supplier and repair shop for Akasaka Diesels Limited of Tokyo, Japan. The Japanese firm joins the distinguished roster of leading diesel manufacturers represented by Golten. The growing list of Golten-serviced diesels and components now includes such famous names as Sulzer, M.A.N., B&W, Gotaverken, GMT Fiat, Kockums, Gebr. Stork, Kobe, Bergen, Wartsila, MAK, Norwinch, Eureka, and MKK.

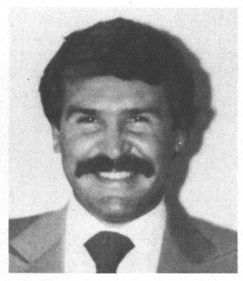
Complete inventories of Akasaka diesel spare parts will now be available through Golten's bonded warehouses, and Golten's patented in-place repair processes are immediately available for diesel engines in operation throughout the world. Centrifugal rebabbitting of bearings, in-place machining and crankshaft grinding, and overhaul of fuel-injected equipment are among the many Golten services offered.

The addition of Akasaka follows the opening of the new Golten repair facility in Miami—both phases in Golten's continuing expansion program. Golten now has major installations in Brooklyn, N.Y., Wilmington, Calif., Portland, Maine, New Bedford, Mass., and Miami, Fla., as well as throughout Europe.

For more information, write to **Norman Golten,** Golten Marine Co., Inc., 160 Van Brunt Street, Brooklyn, N.Y. 11231.

George Buntrock III Joins Oceaneering International

Nick S. Campise, vice president-sales of Oceaneering International, Inc., Houston, Texas, has announced that **George E. Buntrock III** has joined the company as manager of Government programs.



George E. Buntrock III

Mr. **Buntrock's** responsibilities include all relations with the U.S. Navy, compliance with USN regulations for Oceaneering's ongoing contracts, and the administration and supervision of all Government programs.

Mr. **Buntrock** served with the U.S. Navy for six years prior to joining Oceaneering. He spent the last two years in England as project manager for equipment development at the Admiralty Experimental Diving Unit under an exchange program.

J. Ray McDermott & Co. Building Four Offshore Vessels For Briley

Briley Offshore, Inc., 1001 Pinhook Road, Lafayette, La., has applied for a Title XI guarantee to aid in financing the construction of four offshore towing/supply vessels.

The applicant, a new corporation formed to operate the four vessels, indicated that they will be employed initially in the Gulf of Mexico, but ultimately may be used in other offshore areas, including the Gulf of Alaska, and East and West Coasts of the United States. They are designed to service the offshore oil and related industries, and are capable of transporting fuel, water, frozen foods, construction equipment and other materials.

J. Ray McDermott & Company, Morgan City, La., was awarded the contract to construct the four vessels. Each of the 192-foot vessels—capable of operating year-round in most waters of the world—will be powered by two diesel engines with a combined horsepower of 2,600 to 3,000.

The Title XI guarantee would be for approximately $9,677,000, which represents 87½ percent of the total cost of the four vessels.

MarAd Approves Offshore Logistics Title XI Guarantee

Deputy Assistant Secretary **Samuel B. Nemirow,** U.S. Department of Commerce, Maritime Administration, has approved in principle the application by Offshore Logistics, Inc., 1001 Pinhook Road, Lafayette, La., for a Title XI guarantee to aid in financing the construction of four 210-foot, ocean towing vessels.

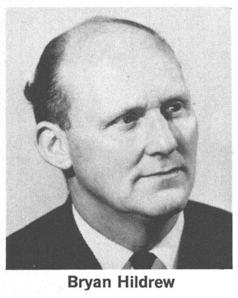
Offshore Logistics has arranged for sale-lease financing, using Continental Illinois National Bank and Trust Company as owner trustee. The owner trustee will own the vessels for the benefit of Continental Illinois Leasing Corp., which will bareboat charter the vessels to Offshore Logistics. The charters will be for 25 years on a "Hell and High Water" basis.

The vessels are being constructed by J. Ray McDermott & Co., Amelia, La. They are rated at 2,900 horsepower, and will have a service speed of 12 knots.

Offshore Logistics will employ the vessels initially in the Gulf of Mexico, and later off the U.S. Atlantic Coast. They will be operated by an affiliate of the company.

The estimated actual cost of each vessel is approximately $3,350,000. The Title XI guarantee will cover 87½ percent of the actual cost.

IACS Elects Hildrew Chairman For 1979-80



Bryan Hildrew

At the 11th IACS Council Meeting in May, **Bryan Hildrew,** managing director of Lloyd's Register of Shipping, was unanimously elected chairman of the International Association of Classification Societies for the next biennial term (1979-1980).

The Member Societies of IACS are American Bureau of Shipping, Bureau Veritas, Det norske Veritas, Germanischer Lloyd, Lloyd's Register of Shipping, Nippon Kaiji Kyokai, Polish Register of Shipping, Registro Italiano Navale, and USSR Register of Shipping.

Associate Members are Yugoslav Register of Shipping, Korean Register of Shipping, and DDR-Schiffs-Revision und Klassifikation.

Robert Hague Post Guard Of Honor Ball Set For Oct. 21 At Waldorf

Comdr. **Christian A. Bendixen,** Robert L. Hague Merchant Marine Industries Post #1242, American Legion Department of New York, has announced the date of that Post's 38th Annual Guard of Honor Ball, to be held at the Waldorf-Astoria's Grand Ballroom, Saturday, October 21, 1978, in New York City.

James A. Farrell Jr., chairman of the board, Farrell Lines Incorporated, will be the guest of honor and receive the American Legion's Distinguished Service Citation for a lifetime of service to the American merchant marine and the maritime industry. Commander **Bendixen** said that Mr. **Farrell** was awarded the Hague Post's American Merchant Marine Achievement Trophy in 1964.

He also said that only two other executives have received the dual honor in the more than a quarter-century of the awards. They were Adm. **John M. (Dutch) Will,** and **Thomas J. Smith** of Farrell Lines.

Considered to be the highlight of the maritime industry year, the ball has been held in the Waldorf since 1946, and draws a crowd of 1,000 annually.

Direct daylight viewing without hoods or curtains.

Only Mariners Pathfinder® 12 and 16-inch Radars can be viewed directly in all ambient light conditions, even bright daylight. A welcome change for daytime watches. No more hoods, curtains, or sore eyes. No more interrupted vision because of dark-to-light eye adjustment. Moreover, two or more members of a watch can view the scope simultaneously.

Two-level video enhances targets and minimizes clutter.

All 12 and 16-inch Mariners Pathfinder® Radars feature Raytheon's exclusive two-level digitized video-enhancement. As a result, larger and taller targets are displayed even more brilliantly than smaller or lower targets. The two-tone "three-dimensional" effect is both remarkable and useful. Tall buildings, vessel superstructures, and similar targets are clearly defined for easy identification.

With two levels of video, rain and sea clutter appear at a lower signal level than targets. This improves the effectiveness of clutter suppression circuits and increases target definition.

Interference rejection reduces noise, improves contrast, and provides positive after-glow trails.

Raytheon's remarkably effective "sweep-comparison" interference rejection gives you a picture that is free of RF interference and noise. Contrast is improved, especially for weak targets. Most important, moving targets leave well defined after-glow trails for positive assessment of surrounding traffic.

Accurate, digital readout ranging out to 64 miles.

Raytheon's Variable Range Marker gives continuous digital readouts from 0 to 64 miles.

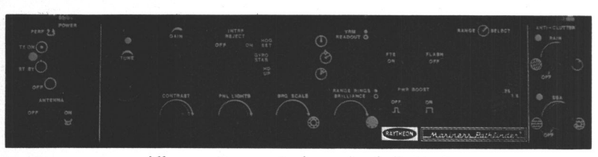
Automatic intensity control increases scope life.

Even with bright display

viewing, you can rely on Raytheon for increased scope life. Special video amplifier circuits selectively reduce gain on strong, short-range echoes. This automatically assures a uniform intensity level over the entire scope on all ranges. Viewing is easier... and scope life is increased by eliminating excessive intensity in the center of the scope.

Easiest of all nighttime operation.

You'll also find 12 and 16-inch Mariners Pathfinder® Radars are designed for the easiest nighttime operation. For fast identification all operating controls and legends are carefully "back-lighted" with adjustable illumination. In addition, a specially selected orange/red phosphor is used for the scope. The end result is more efficient nighttime operation... even for prolonged periods, without excessive eye strain or impaired night vision.



All operating controls are back-lighted.

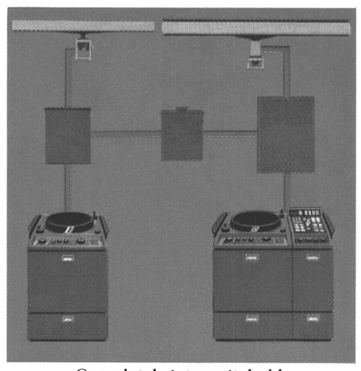
Superior resolution and long-range performance.

Both 3 and 10-cm Mariners Pathfinder® Radars feature transmitters with very high "average-power" outputs. This ensures maximum long-range target detection.

With its longer wavelength and high 60kW peak power, the 10-cm unit is unbeatable at "punching through" adverse weather to pull in distant targets.

Interswitchable 3 and 10-cm systems for optimum radar versatility.

Raytheon has provided over 3000 vessels with dual 3 and 10-cm radar interswitch systems. Connecting the antennas, transmitters and the Mariners Pathfinder® displays, Raytheon's Interswitch Unit lets the operator select any desired combination of 3 and 10-cm presentations.



Completely interswitchable.

Typically, one display might be used with 3-cm and the other with 10-cm transmission. However, weather or navigational requirements might dictate that both displays be used on either 10 or 3-cm... one on long range, one on short range... one relative motion, the other true motion.

Whatever the situation demands, Raytheon's Interswitch System lets you select the best radar combination for the job.

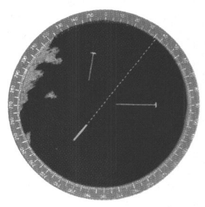
Choice of two relative/true-motion units... with simple collision assessment, or computerized collision warning and avoidance.

A true motion display, in which fixed objects remain stationary while your ship and other vessels move across the scope on their true courses, improves navigation and collision avoidance capabilities. Raytheon gives you a choice of two units, each with an Electronic Bearing Line (EBL) that may be positioned anywhere on the display.

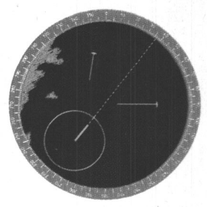
The low-cost TM/AC unit provides a microprocessed true-motion presentation for both the 12 and 16-inch relative motion displays. For collision assessment it displays true and relative courses for up to eight selected targets.

Raytheon's new computerized Anti-Collision Unit (ACU) is one of the most advanced relative and true-motion displays available. It is designed to meet U.S. Coast Guard proposals and MARAD requirements for merchants ships.

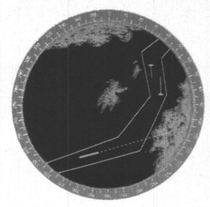
A compact unit that attaches directly to a Mariners Pathfinder® 16-inch display, the ACU will automatically track as many as 20 targets with computer-generated collision warning and digital-readout collision avoidance data. The Raytheon ACU also gives you trial maneuver information, collision avoidance guard rings around the ship, navigational fairways, CPA (Closest Point of Approach) and TCPA (Time to CPA) for tracked targets, and much more.



ACU vectors show true course and speed of tracked targets.



ACU alarm sounds when approaching target penetrates guard ring.



ACU electronic bearing lines set up navigation fairways.

Unmatched warranty and worldwide service back-up.

All Raytheon products have a two-year limited parts warranty plus one-year free on-board service within 50 miles of any of our U.S. dealers and worldwide service network in major ports everywhere.

For more information, contact an authorized dealer or the Raytheon Marine Company office nearest you.

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676 Island Pond Road
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Telephone: (603) 668-1600
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Raytheon Marine Sales and Service Company
Siljangade 6
DK-2300 Copenhagen S, Denmark
Telephone: (451) 57 06 11
Telex: 31473 RAYCO DK

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Telephone: (045) 212-3633
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Telephone: 01-828-6172
Telex: 919571 RAYTAG LDN

RAYTHEON

COMSAT General Reduces MARISAT Telex Rate

COMSAT General Corporation, 950 L'Enfant Plaza, Southwest, Washington, D.C. 20024, has announced that, effective Thursday, June 8, it has reduced its charges for commercial telex services via the MARISAT satellite system by one-third, from $6 to $4 per minute. This action by the satellite communications company advanced by nearly six weeks the effective date of its new, lower telex rate. COMSAT General had announced earlier that the new rate was to become effective August 1.

The $2-per-minute rate cut is COMSAT General's first rate reduction since commercial MARISAT service began in 1976. It applies to COMSAT General's regular telex service and its COMTEX service between the contiguous United States and ships or offshore facilities at sea equipped to operate with MARISAT satellites. COMTEX is a special ship-to-shore telex / mail service.

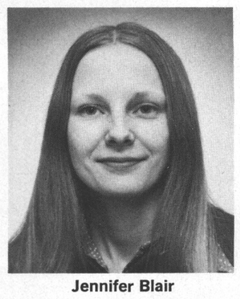
Unaffected by the announcement is COMSAT General's plan to effectively reduce the cost of its MARISAT telex and telephone service to and from Hawaii by including Hawaii in its rate structure for the 48 contiguous states, effective August 1.

The MARISAT System, in operation since mid-1976, provides high-quality satellite communications to the U.S. Navy and the commercial shipping and offshore industries. COMSAT General, which also serves as Systems Manager, offers telex, as well as telephone, facsimile and data communications to maritime users via MARISAT. The System is interconnected with worldwide voice and record networks.

MARISAT satellites are positioned in geostationary orbits over the Atlantic, Pacific and Indian Oceans. Shore stations for commercial maritime traffic are at Southbury, Conn., and Santa Paula, Calif.

Marinette Marine Corp. Names Jennifer Blair

Marinette Marine Corporation, Marinette, Wis., has announced the appointment of **Jennifer Blair** to the position of supervisor-contracts administration. She will be responsible for data requirements for all contracts.



Jennifer Blair

Mrs. Blair joined Marinette Marine in March of 1975, and served in the capacity of clerk-contracts administration. She is an honor graduate of Michigan State University, holding a Bachelor of Science degree. She is also a member of Omicron Nu, honorary home economics sorority.

North Atlantic Ports Assn. Election Of Officers

Martin C. Pilsch Jr., port director, Massachusetts Port Authority, Boston, Mass., has been elected as president of the North Atlantic Ports Association at a meeting held June 15 in Baltimore, Md.

The other officers include **William J. Torpey,** general manager, Fall River Port Authority, 1st vice president; **Walter C. Boyer,** deputy port administrator, Maryland Port Administration, Baltimore, 2nd vice president; Capt. **C.V. Storer,** general manager, operations, Marine Terminals Department, Port Authority of New York and New Jersey, secretary; and **Arthur W. Jacocks,** director of traffic, Virginia Port Authority, Norfolk, Va., treasurer.

Tilston Roberts Corp. Appoints John Crosthwaite

Tilston Roberts Corp., the New York-based steamship agents, stevedores and vessel charterers, has announced the appointment of **John H. Crosthwaite** as director of projects and sales.

Mr. **Crosthwaite** will be responsible for all Tilston Roberts sales and project cargo activity, as well as advertising and sales promotion.

A graduate of the U.S. Merchant Marine Academy, Mr. **Crosthwaite** served with American Export Lines for 15 years before joining Tilston Roberts.

Avco Lycoming Powers Hovercraft Carrying 400 People & 45 Cars

On June 4, a unique French hovercraft made its inaugural "flight" across the English Channel between Dover, England, and Calais, France. The vessel is powered by five marine gas turbines manufactured by the Avco Lycoming (Stratford, Conn.) Division.

The craft, designated N500-2, was built by the French SEDAM Company for the French National Railways (SNCF). It is operated by British Hovercraft, Ltd., a wholly owned subsidiary of the British Railway Board. The N500-2 has been christened The Engineer Jean Bertin, in honor of the French engineer who developed many unique hovercraft features. It is the largest fully amphibious hovercraft in the world. Capable of transporting 400 passengers and 45 mid-size cars at a maximum speed of 70 knots, The Engineer Jean Bertin will cruise the Channel at 48 to 58 knots, depending on sea conditions, with scheduled crossings of 28 minutes. The 260-ton, 164-foot hovercraft can safely transport its 85-ton payload in seas cresting at over 13 feet. The two-deck arrangement emphasizes passenger comfort, allowing a panoramic view through picture-window-size ports located 42 feet above the water.

The five Avco Lycoming Super TF 40 turbines which power the N500-2 were built at Avco Lycoming's Stratford facility. Each Super TF 40 turbine is capable of producing 4,600 shp. Two of the turbines provide lift, while three provide propulsive power.

In addition, Avco Lycoming's Engineering Department at Stratford supervised, checked, and approved the craft's total engineering interface. A company spokesman commented, "Lycoming's outstanding engineering effort again demonstrates the company's technical competence and leadership in both the marine and the aviation environments."

Avco Lycoming's marine turbines are compact, lightweight, virtually vibrationless, and highly efficient.

The Avco Lycoming family of marine turbines, the Super TF 25, Super TF 35, and Super TF 40, ranging from 2,500 to 4,600 shp, are currently serving in diverse types of marine applications around the world. In addition to hovercraft, they are adapted for ferryboat, landing craft, and river and coastal patrol boat applications.

Kockums Group Names Hallenborg Chairman, Sigurdsson President

Nils-Hugo Hallenborg, president of Kockums Shipyard, Malmo, Sweden, and of parent Kockums Group, has been elected chairman of the board of directors, taking over from **Lars-Erik Thunholm.**

Mr. **Hallenborg's** successor as president of both organizations is **Olafur Sigurdsson,** deputy managing director of the shipyard. **Hans-Erik Ovin,** former deputy managing director of the Kockums Group, was named to the board of directors.

The Kockums Group has companies over the world in forest industries, logging, transport, automation, construction, chemicals, marine equipment, shipping and shipbuilding.

1978 Maritime Day Program In The Port Of New York — New Jersey

A musical salute to "Merchant Marine Heroes From the Past," and brief, dignified tributes to the merchant marine industry of the present were the highlights of the Port of New York-New Jersey National Maritime Day ceremonies held Monday, May 22, on the plaza of the World Trade Center, New York, N.Y.

Some 200 midshipmen from the United States Merchant Marine Academy at Kings Point, N.Y., participated in a thrilling 20-minute musical pageant honoring merchant seamen through the ages. It featured the Merchant Marine Academy's Regimental Band, Color Guard and Star Spangled Banner Brigade, under the direction of Comdr. **Kenneth R. Force,** USMS, Director of Music of the Academy, who staged and directed the colorful review. Three-hundred invited sponsors and guests and more than 2,000 of the general public were in attendance at the plaza during the noon-day lunch hour.

Merchant marine heroes in the exciting pageant included symbolic Egyptian, Roman and Viking seamen, as well as Christopher Columbus, Henry Hudson, John Paul Jones, Robert Fulton, the fictional Captain Ahab, and World War II merchant seamen from Britain and the United States.

The flag brigade included 100 cadets — 50 carrying American flags, and an equal number bearing the 50 state flags. The 75-piece Kings Point Regimental Band played stirring martial music appropriate to the merchant marine heroes who were being honored.

Capt. **Robert E. Hart,** USN (ret.), president of the Marine Index Bureau and general chairman, Maritime Day-1978 in the New York-New Jersey Port, was master of ceremonies for the event held on the World Trade Center Plaza.

Peter C. Goldmark Jr., executive director of The Port Authority of New York and New Jersey, welcomed the invited guests, as well as the lunch-hour crowd of 2,000 of Trade Center and downtown area employees who gathered on the spacious plaza. Mr. **Goldmark** called attention to the importance of international trade and transportation to the states of New York and New Jersey, as well as the nation as a whole, and noted that Maritime Day marked the opening of the 1978 World Trade Week.

Howard G. Sloane, president of Hernasco Corporation and chairman of the 1978 World Trade Week Committee, and **James P. McAllister** of J.P. McAllister Associates, honorary chairman, World Trade Week for the Maritime Industry, also gave brief welcome messages.

Christian A. Bendixen, Commander of the Robert L. Hague Merchant Marine Post, was called

(continued next page)

WREATH CEREMONY—Left to right (1st row): **Thomas Martinez,** national secretary-treasurer, National Maritime Union of America; **Frank Drozak,** executive vice president, Seafarer's International Union of N.A.; Capt. **Carl W. Swenson,** executive vice president, Farrell Lines Inc., and Vice Adm. **William F. Rea III,** USCG. Left to right (2nd row): the Reverend **James R. Whittemore,** director, Seamen's Church Institute; Capt. **Robert E. Hart,** USN (ret.), president, Marine Index Bureau, Inc., and general chairman, Maritime Day-1978; **Howard G. Sloane,** president, Hernasco Corporation, chairman, 1978 World Trade Week Committee; **James P. McAllister** of J.P. McAllister Associates, honorary chairman, World Trade Week for the Maritime Industry, and the Reverend Monsignor **Thomas McGovern,** Port Chaplain, New York and New Jersey.

FORMER RECIPIENTS, MERCHANT MARINE TROPHY—(Left to right): Adm. **John M. Will,** USN (ret.), president, Arthur Tickle Engineering Works, Inc.; **Howard Pack,** vice chairman, Seatrain Lines, Inc.; **Ran Hettena,** president, Maritime Overseas Corporation; Rear Adm. **Sheldon Kinney,** president, State University of N.Y. Maritime College, and **Frank Braynard,** Father of OP SAIL-1976.

MERCHANT MARINE HEROES FROM THE PAST—Pageant featuring John Paul Jones, with 300 invited sponsors and guests and 2,000 public in background. Pageant was a feature of the colorful review which was presented on the plaza of the World Trade Center during Maritime Day ceremonies.

Merchant marine heroes in the exciting pageant included symbolic Egyptian, Roman and Viking seamen, as well as Christopher Columbus, Henry Hudson, John Paul Jones, Robert Fulton, the fictional Captain Ahab, and World War II merchant seamen from Britain and the United States.

Maritime Day—

(continued from page 16)

upon to report on the American Legion Robert L. Hague Merchant Marine Achievement Award. The purpose of this award is to encourage a continuing betterment of the American merchant marine in every segment of the merchant marine industry. The American Bureau of Shipping was announced as the award winner for the year 1977. The actual presentation of the trophy to **Robert T. Young,** chairman of the board, ABS, will be made later through the office of the President of the United States. Former recipients were special dais guests, and these included Adm. **John M. Will,** USN (ret.), president, Arthur Tickle Engineering Works, Inc.—1958; **Howard Pack,** vice chairman, Seatrain Lines, Inc.—1965; **Ran Hettena,** president, Maritime Overseas Corporation—1973; **Sheldon H. Kinney,** president, State University of New York Maritime College—1974, and **Frank O. Braynard,** Father of OP SAIL—1976.

A highlight of the musical program was a special rendition of "Our Merchant Marine March" by its composer-lyricist **Earl W. Clark. Mr. Clark,** who is 76 years old, is a former Deputy Maritime Administrator of the United States Maritime Administration, as well as the holder of numerous other government posts and positions in the steamship industry.

The chorus, printed in the program for all to join in, went:

"There's a banner in the breeze/ floating o'er the seven seas/It's the emblem of our merchant fleet/ our merchant marine/So we'll lend our heart and hand/to the commerce of our land/as we hail the Fourth Arm of Defense/our merchant marine."

The program closed with a moving wreath ceremony and musical response in which wreaths to those who gave their lives serving the merchant marine were brought to the speakers' platform by sponsors representing government, labor and management. The wreath sponsors included **Frank Drozak,** executive vice president, Seafarer's International Union of N.A.; **Thomas Martinez,** national secretary-treasurer, National Maritime Union of America; Vice Adm. **W.F. Rea III,** United States Coast Guard Eastern Area Commander, and Capt. **Carl W. Swenson,** executive vice president, Farrell Lines Incorporated.

Earlier in the day, the Reverend Monsignor **Thomas McGovern,** Port Chaplain, New York and New Jersey, and the Reverend **James R. Whittemore,** director of the Seamen's Church Institute, officiated at an ecumenical service at the Institute. Additional dais guests at the plaza ceremony included **William O. Savage** of Tampa, Fla., National Executive Committee, The Propeller Club of U.S.; Capt. **Thomas A. King,** Eastern Region Director, Maritime Administration; and Rear Adm. **Arthur B. Engel,** USCG (ret.), Superintendent, United States Merchant Marine Academy.

Maritime Day is observed by law since 1933, on May 22 of each year. It commemorates the departure from Savannah, Ga., on that date in 1819, of the S/S Savannah on the first trans-Atlantic voyage by any steamship. The Maritime Day program opening the 1978 World Trade Week observance in the Port of New York-New Jersey is sponsored by maritime government, labor and management, including both American and foreign-flag shipping companies, as well as related maritime associations and industries.

Following the hour-long ceremony in the plaza, a reception and luncheon was held for sponsors and guests at One World Trade Center, "Oval Room."

The Suez Canal And Its Impact On Tanker Trades And Economics

The Suez Canal Authority is presently engaged on a two-phase development project which, if completed, will involve the expenditure of at least $1,200 million over the next six to seven years. Roughly half of this amount is to be financed from Egypt's reserves of foreign currency, and to date the Canal Authority has negotiated $503.3 million in foreign loans. Can such expenditure be justified? "The Suez Canal and its Impact on Tanker Trades and Economics," No. 62 in a series of shipping studies issued by HPD Shipping Publications, in considering this question, raises serious grounds for doubt.

In the study, the volume and distribution of tanker traffic through the Canal at the height of its popularity in 1966—the last full year before the waterway was closed due to the Middle East war—is contrasted with that following the reopening of the Canal in 1975. The contrast is as startling as it is informative: In 1966, it is estimated that of the total potential volume of oil available to be routed via the Canal, 74 percent (or 175.6 million tons out of a total potential trade of 236.6 million tons) actually transited via Suez. By comparison, in 1976 just 5 percent of all inter-area oil movements potentially available for movement via the waterway actually used this route.

In terms of distribution, the pre- and post-closure figures are equally revealing. The Arabian Gulf to Southern European and Mediterranean route has now superseded the Gulf to Northern Europe route as the major trade for tankers using the Canal. Indeed, from a tracking analysis, it has been estimated that Southern European and Mediterranean destinations now account for 70 percent of all northbound oil tonnage transiting the Canal.

This reordering of the volume and distribution of oil traffic through the Canal reflects the enforced changes in the world tanker fleet structure following the 1967 closure. At that time, 95 percent of the tanker fleet were able to transit the Canal in a full or part-laden condition, with 72 percent capable of fully laden transits. Today, only 17 percent of the fleet can use the Canal in a fully laden condition, and the economies of scale offered by the use of VLCC and ULCC tonnage utilizing the Cape route has seriously undermined the competitiveness of the Canal, with its present draft restrictions.

The proposed development of the Canal, intended to be completed by 1983-84, will eventually allow the passage of 260,000-dwt tankers fully laden, with tankers of 300,000 dwt able to transit part-laden. On the basis of the existing fleet and newbuildings planned for delivery by 1980, these improvements will allow 66 percent of the tanker fleet to transit the Canal fully laden. However, as the detailed costing analysis contained in the study demonstrates, where there is a way there may not always be a will.

The economic analysis in the study embraces several ship sizes, with their transportation costs calculated both on the underlying cost of ship operations and on the rates prevailing in the market (both a "low" and "high" market position are considered). The analysis concludes that the economic benefits resulting from the use of Suez rather than the Cape depend upon the major variables of tanker size, the distance saved by using the Canal, and the level of rates in the tanker market.

With the present tanker surplus in excess of 100 million dwt, the planned expansion of the Canal would serve only to prolong the disequilibrium between tanker supply and demand, and so extend the period of low tanker freight rates. In such a market situation, the ability to attract large tonnage through the Canal would

depend on the Authority's willingness to accept a low level of Canal dues. The existence of the SUMED pipeline (considered in the study) further complicates the issue by detracting from the total potential traffic available for the Canal.

In view of these comments, it is open to doubt whether Phase Two of the Suez expansion scheme makes any economic sense, and whether such a development can ever generate the revenues needed to pay for its costs. Both the Egyptian national economy, and the world tanker industry might be better served by the abandonment of all Suez expansion after the work now in hand has been completed.

"The Suez Canal and its Impact on Tanker Trades and Economics," No. 62 in a series of reports on various aspects of shipping, prepared by the Research Division of HPD Shipping Publications, 34 Brook Street, Mayfair, London W1Y 2LL, England, is available at a single copy rate of U.S. $85 (all overseas orders) or £35 (U.K. only) or on a subscription basis U.S. $325 (all overseas orders) or £135 (U.K. only) for the series 61- 70.

Kobelt Introduces Single Lever Pneumatic Propulsion Control Head

Kobelt has introduced another marine control head to their line of die-cast brass propulsion controls. The Model 2545, pneumatic, propulsion control head is fitted with twin levers for a twin-engined vessel. Each lever controls both clutch and throttle on one engine. Also available is a Model 2544 for single engine use.

These controls are designed for use in any 30-250-foot vessel which has a fixed-pitch wheel unit. The controls can also be adapted to any existing type of clutch.

Made of silicon brass for greater corrosion resistance, the controls have stainless-steel hardware and chrome-plated, solid-brass dome covers and handles. Solid, polished brass or black, nylon-coated, anti-glare domes and handles can also be supplied.

Standard on these controls are a neutral detent, neutral switch and firmer, positive action which is neither stiff nor jerky.

Although noncorrosive brass is usually more expensive than aluminum or zinc products, Kobelt's unique die-casting process makes these controls marketable at very competitive prices. Controls carry a five-year parts and labor warranty on all metal parts, with a two-year parts and labor warranty on the synthetic parts.

For further information, write to **Al Pickering,** J. Kobelt Manufacturing Co. Ltd., 235 East 5th Avenue, Vancouver, B.C., Canada V5T 1H2.

New Brochure Describes Alco Power Boss Diesels

Alco Power Inc., Auburn, N.Y., is offering a new four-color, 20-page brochure which describes their line of POWER BOSS diesel engines.

The brochure, "The Alco POWER BOSS," details the company's five basic 6, 8, 12, 16 and 18-cylinder engines in a complete range of configurations. These are all four-cycle diesel engines, ranging in size from an 800-bhp in-line six-cylinder through a 4,500-bhp V-18. Full-color photographic cutaway views reveal internal design features of the Alco engines and all components. The brochure contains complete engine specifications and details. It completely describes Alco-manufactured turbochargers, a worldwide parts and service complex, as well as an engine remanufacturing and unit exchange program called "The Alco Extended Engine Life Program." Accompanying the brochure are recently published rating sheets which list the specific ratings for each cylinder size in all applications.

For a free copy of "The Alco POWER BOSS" and new rating sheets, write to **Edward T. Mosley,** Alco Power Inc., 100 Orchard Street, Auburn, N.Y. 13021.

Cleveland-Cliffs Plans To Build 1,000-Ft. Self-Unloading Vessel At A Cost Of $40 Million

The Cleveland-Cliffs Iron Company, Cleveland, Ohio, has announced that construction planning is proceeding for a new super-class, self-unloading vessel to transport bulk cargoes on the Great Lakes.

The new ship will be designed to carry three million tons of western coal annually for The Detroit Edison Company from Superior, Wis., to the utility's powerplants in St. Clair and Monroe, Mich.

Cleveland-Cliffs and Detroit Edison have signed a letter of intent and plan a definitive agreement by year-end. The companies have agreed on option provisions that could result in Cleveland-Cliffs constructing one or more additional vessels when the utility's western coal requirements increase.

M. Thomas Moore, senior vice president-control, said that plans to build the vessel follow the award of a 20-year contract to Cleveland-Cliffs by Detroit Edison to transport western coal.

Although specific design for the company's new ship has not been completed, it is anticipated that the Detroit Edison coal will be carried in a 1,000-foot-long self-unloading type vessel.

Mr. **Moore** said the capital commitment for the new ship, which will be the first 1,000-foot vessel to join the Cliffs Great Lakes fleet, will amount to more than $40 million.

As part of Cleveland-Cliffs' fleet improvement program, the company's 826-foot S/S Walter A. Sterling presently is being converted to a self-unloader for the 1978 Great Lakes sailing season. Its 767-foot flagship S/S Edward B. Greene also will be converted to a self-unloader for the 1979 sailing season.

Both the Sterling and the Greene were lengthened to their current size within the last three years to increase their cargo capacity. With the addition of the new ship to the fleet, the company's fleet improvement commitment to date will exceed $60 million.

According to **John L. Horton,** Marine Division manager, "This program significantly increases our participation in the growing self-unloader movement of iron ore and western coal from the Lake Superior region and the movement of eastern coal up the lakes."

Headquartered in Cleveland, Ohio, Cleveland-Cliffs' primary business is the mining, processing and transportation of iron ore. It owns or leases and manages active iron ore properties containing more than three billion tons of natural and low-grade reserves in the United States, Canada, and Australia. It has also become active in the energy minerals business.

The company has pioneered in the Great Lakes maritime industry for more than a century and operates 14 bulk carriers ranging in length from 600 to 826 feet, with a total trip capacity of 240,000 long tons.

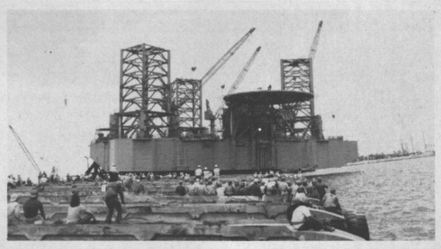
Butterworth Systems Appoints C.J. Hendry Co. As Distributor

Butterworth Systems Inc. (BSI) has appointed C.J. Hendry Co. of San Pedro, Calif., as their greater Los Angeles area distributor of tank-cleaning machines, hose, and accessories. **A.J. Kelly,** president of BSI, made the announcement at corporate headquarters in Florham Park, N.J.

For almost 50 years, BSI has been one of the world's leading manufacturers of tank-cleaning machines, hose, and accessories. BUTTERWORTH® tank-cleaning machines are designed for water washing and crude oil washing (COW). BUTTERWORTH tank-cleaning hose has set the highest standards for use with portable tank-cleaning equipment.

Since 1865, C.J. Hendry has been the full service ship's chandlery carrying a full line of marine and industrial equipment. They are located at 761 Channel Street, San Pedro, Calif. 90731.

For more information, contact **Donald Powell** at Butterworth Systems Inc., 224 Park Avenue, Florham Park, N.J. 07932.



MARATHON LAUNCHES KEYDRIL RIG—Marathon Manufacturing Company's Brownsville, Texas, shipyard recently launched a large Class 116-S-type jackup drilling rig being constructed for Keydril U.S.A. The keydril rig, Galveston Key, when complete, will be capable of drilling in 300 feet of water to drilling depths of 25,000 feet. The rig measures 247 feet long by 200 feet wide by 26 feet high, and has 410 feet of leg. Its first drilling assignment will be in the Gulf of Mexico.

Bath Iron Works Appoints Frank Kerr And Fred Kahrl

Two professional appointments to the staff of the vice president, Industrial and Community Relations, were announced by **John F. Sullivan**, president of Bath Iron Works Corporation, Bath, Maine: **Frank Kerr** as manager of public and community relations, and **Fred J. Kahrl** as employee services administrator.

Frank Kerr

Fred J. Kahrl

Mr. Kahrl is responsible for employee services within Bath Iron Works Corporation. Mr. **Kerr** is responsible for public, community and government affairs.

Mr. **Kerr** has been a free-lance writer and communications consultant the past seven years. He is a former newsman (Boston Herald-Traveler, United Press International, Ventura Star Free-Press, KUDU radio, KFMB-TV), and a former public relations manager of the General Dynamics Corporation.

While free-lancing, he wrote for such national magazines as TV Guide, covered the U.S. Congress as a magazine columnist, wrote and produced documentary motion pictures and television-radio marketing campaigns.

His film credits range from "Friendship 7," the nationally televised story of **John Glenn's** space flight, to "In the Wake of Heritage," with **Carroll O'Connor** (of TV's All in the Family), about the nation's maritime history. His film awards range from three Cine Golden Eagles to an Academy Award nomination.

Prior to coming to Bath Iron Works in 1976, Mr. **Kahrl** was employed as an editor for the Portland Press Herald, Portland, Maine, with responsibility for the newspaper's State Desk. He had previously worked for the Press Herald while attending Bates College, leaving to serve as a Coast Guard aviator in Alaska, where he later founded and published the Kodiak Island Times.

Sigma Treatment Systems Appoints Great Lakes Rep

Sigma Treatment Systems, Inc. has appointed Suppliers Marine & Industrial, Inc. as their Great Lakes representative.

George Efthimiou, president of Sigma, announced the appointment in accordance with an agreement reached with **Kevin P. Smith**, president of Suppliers.

Sigma Treatment Systems is a marine pollution product-oriented company based in New York, with distribution and manufacturing facilities at major ports of the world.

Suppliers Marine & Industrial, Inc. also represents Farboil Paint, Gamlen Chemicals, Line Fast Container and Trailer Systems, Mariners Astubeco Inc., Boiler & Condenser Tubing, and Valad Electric Co. for vent and duct heaters. Suppliers also provides various engine room spares such as pumps, turbines, diesel spares, and surplus equipment.

Further information on Sigma Sewage Treatment Systems may be obtained by writing to **George B. Efthimiou**, Sigma Treatment Systems, Inc., 603 Dean Street, Brooklyn, N.Y. 11238.

Marine Services Division Buys Remaining Interest In GIMC

Houston Natural Gas Corporation (HNG), Houston, Texas, has announced that the Marine Services Division of its wholly owned subsidiary Pott Industries Inc. of St. Louis, Mo., had purchased the remaining 50 percent interest in a previously held joint venture company, Gulf International Marine Corporation (GIMC). The Marine Services Division's previous partner in the joint venture was International Marine Services.

Terms of the purchase were not disclosed.

GIMC is engaged in the operation of marine service vessels for the offshore petroleum industry in the Arabian Gulf area and is headquartered in Dubai, United Arab Emirates. The company currently owns 17 vessels, including ocean tugs, supply and crewboats, and barges. Another Pott subsidiary, Gulf Mississippi Marine Corporation, also services the offshore petroleum industry in the Arabian Gulf, as well as the North Sea and the Gulf of Mexico.

Pott Industries and its subsidiaries are engaged in marine transportation on the United States inland and intracoastal waterways, service worldwide to the offshore petroleum industry, and construction and repair of towboats, barges and dredges. The Marine Services Division is headquartered in New Orleans, La.

HNG's other principal lines of business are intrastate natural gas transmission, oil and gas exploration and production, coal mining and production, and marketing of carbon dioxide and other industrial gases.

Gulf Oil Announces Organization Changes At GT&T Division

The following organization changes and personnel appointments have been announced by **H.I. Goodman,** president of Gulf Trading & Transportation (GT&T) Company, a division of Gulf Oil Corporation.

Named vice presidents in GT&T's Pittsburgh, Pa., offices were **David H. Bruce,** international crude and product sales; **Jack E. Harbaugh,** international marine, aviation and specialty sales; and **Arthur R. Larocque,** government crude and product acquisition. **Jon N. Deakin** remains vice president-supply and transportation, and **Richard I. Hoskins** remains vice president-marine.

Mr. **Bruce,** who had been vice president-trading and marine division in Tokyo since 1976, joined Gulf as sales coordinator in his native London in 1962. He attended Winchester College and New College, Oxford, receiving a B.A. degree in politics, philosophy and economics in 1957.

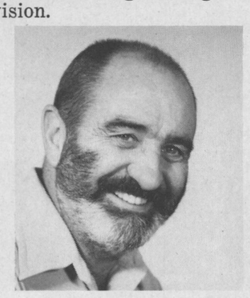
Mr. **Harbaugh,** who was executive vice president-Gulf International Trading Company, and vice president-product trading for GT&T, joined Gulf in 1949 as a sales trainee. He has served as assistant to the corporate president, secretary to the chairman's advisory council, president of Korea Gulf Oil, and vice president of marketing for Gulf Oil Company-South Asia. A native of South Bend, Ind., he is a graduate of the University of Michigan.

Mr. **Larocque,** who was vice president-international petroleum sales, joined Gulf in 1976 as general manager-international aviation sales. A native of Fall River, Mass., he holds a B.S. degree in civil engineering from Worcester Polytechnic Institute in Massachusetts.

These changes implement GT&T's recent organization shift to emphasize the company's primary roles of service to other Gulf operating companies, management of Gulf's foreign crude oil and tanker fleet, and profitable growth of international commercial activities.

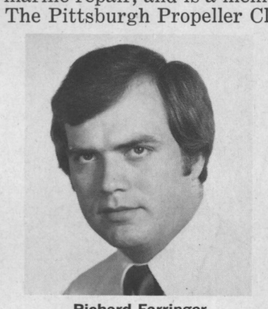
Dravo Corp. Names Hird And Farringer To Engineering Works Div.

Dravo Corporation has announced the appointments of **Jack Hird** as Eastern sales manager, marine, and **Richard Farringer** as contract manager of marine repair for its Engineering Works Division.



Jack Hird

Mr. **Hird,** formerly manager of marine repair, joined Dravo in 1939. He has 30 years' experience in marine repair, and is a member of The Pittsburgh Propeller Club.



Richard Farringer

Mr. **Farringer,** who succeeds Mr. **Hird** as contract manager of marine repair, joined Dravo in 1976 as a production engineer. He is a graduate of Pennsylvania State University in civil engineering.

Dravo's Engineering Works Division operates one of the nation's largest inland waterways shipyards at Neville Island, Pa., near Pittsburgh, where it designs and builds a wide range of marine products, including Viking towboats, barges, bulk material handling, and specialized equipment.

First Of Two Farrell Lines Containerships Christened At Bethlehem Sparrows Point Yard

Mrs. Margaret McFarlane poses before the bow of the Austral Pioneer just before she christened the 813-foot-long containership. With **Mrs. McFarlane** are, left to right: **Donald T. Burkhardt,** general manager of the Sparrows Point yard; **Thomas J. Smith,** president of Farrell Lines, and **Robert J. Blackwell,** Assistant Secretary of Commerce for Maritime Affairs. When completed early next year, the Austral Pioneer will go into service between U.S. Atlantic and Gulf Coast ports and Australia and New Zealand. **Mrs. McFarlane** is the wife of **Duncan McFarlane,** director of Thomas Borthwick & Sons, Ltd. in Australia.

The Austral Pioneer, the first of two containerships being constructed for Farrell Lines Incorporated, was christened on June 9, at Bethlehem Steel Corporation's Sparrows Point Yard, Baltimore, Md.

Mrs. Margaret McFarlane, wife of **Duncan McFarlane,** director of Thomas Borthwick & Sons, Ltd. in Australia, was the sponsor for the 27,340-deadweight-ton vessel being constructed under a Maritime Administration subsidy at a price of approximately $78 million. **Mrs. Malcolm McArthur,** also of Australia, was the matron of honor.

The keel for the Austral Pioneer was laid September 6 of last year, in the yard's 1,200-foot-long building basin where the christening was held. The keel for the second vessel was laid about two months later.

When delivered early next year, the Austral Pioneer will go into service on Farrell Lines' Australia-New Zealand run from Atlantic and Gulf Coast ports in the U.S. With a capacity of 1,708 twenty-foot equivalent containers, 768 of them refrigerated, the ship's primary northbound cargo will be frozen meat.

The Austral Pioneer is 813 feet 3 inches overall with a length between perpendiculars of 769 feet, a depth of 53 feet and a breadth of 90 feet. Designated a C8-S-85d class containership, she is similar to Farrell's C8-S-85c class ships now in service.

The ship's turbines, rated at 26,000 normal and 28,500 maximum continuous shaft horsepower, will deliver a designed speed of 22.5 knots at maximum continuous power and at normal draft of 29 feet.

Six of the 12 holds on the Austral Pioneer are insulated, and these have coamings extending high enough over the hatches to allow the stowage of two layers of containers in these refrigerated cocoons. In addition, provision is made on deck for 60 "plug-in" refrigerated containers.

Containers may be carried on deck two-high on the cocoon tops and up to four-high just forward and aft of the deckhouse. Forward of the refrigerated holds, containers will be carried on deck no more than two-high to preserve the line of sight from the bridge, which is designed for 360° visibility.

Four of the holds have movable guide structures to allow the carriage of either 20-foot or 40-foot containers.

Unitized cargo may be carried on the second deck below the deckhouse with 62,630-cubic-feet stowage capacity for such cargo if containers are also stowed below deck aft. Cargo oil may be carried in three independent tanks with 16,800 cubic feet provided.

A 30-ton swinging boom forward of number 1 hold can handle cargo for that hold and a 70-ton heavy lift boom, aft of the deckhouse, services hold number 9.

In order to keep heeling to a minimum during cargo operations, an automatic heeling correcting system is provided. A sensing device actuates valves to move anti-heel ballast water between the port and starboard wing tanks of holds 5B and 5C.

Cruising radius of the Austral Pioneer is 18,200 miles at 29-foot draft, and 16,500 miles at maximum load conditions of 33-foot 7/8-inch draft.

A 1,000-horsepower electrically driven bow thruster with a diameter of 6 feet 7 inches will assist in port maneuvering. Electricity is provided by a main 2,500-kilowatt ship's service turbogenerator and a 2,500-kilowatt ship's service generator. The latter normally will furnish the power for the bow thruster.

All accommodations are in deckhouse air-conditioned quarters and will provide for 12 passengers and a crew of 41. Passenger accommodations are on the cabin deck of the deckhouse, officers on the boat deck, and crew on the upper deck. The dining areas for all three groups are on the main deck.

Other features include a flume stabilizer, a cargo refrigeration liquid overfeed system, no requirement for fixed ballast, and an engine room designed for a one-man watch.

Following the christening ceremony, there was a luncheon in honor of the sponsor.

Western To Build Third Drilling Barge At Marathon LeTourneau

The Western Company of North America, 6100 Western Place, Fort Worth, Texas, has applied to the U.S. Department of Commerce, Maritime Administration for a Title XI guarantee to aid in financing the construction of a 250-foot cantilevered, independent leg, Triton-Class Marathon jackup drilling barge. The company plans to use the barge to drill oil and gas wells in offshore areas of the world. It will not be self-propelled.

The estimated actual cost of the barge is $26 million. The maximum Title XI guarantee would be for 75 percent of that amount. The Marathon LeTourneau Company, Brownsville, Texas, has been proposed as builder.

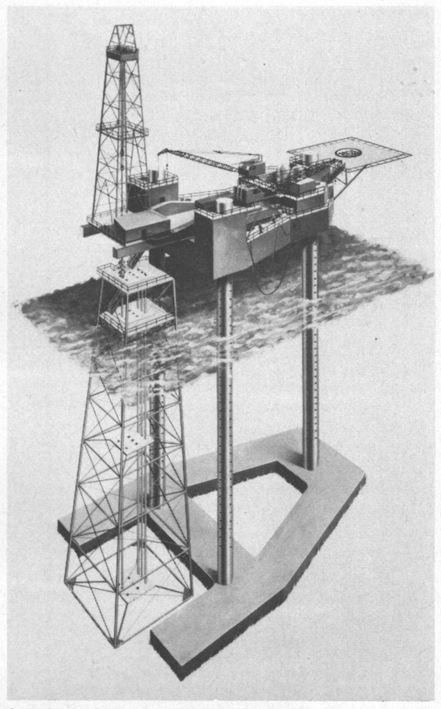
The Maritime Administration has recently approved in principle Title XI applications from the Western Company of North America for two similar drilling barges to be built at Marathon LeTourneau.

Bethlehem Beaumont Shipyard To Build Offshore Rig For Houston Offshore International

Houston Offshore International, Inc. has ordered construction of an offshore oil drilling rig from Bethlehem Steel Corporation's Beaumont, Texas shipyard.

Announcement of the contract was made by **Jerry E. Chiles,** president of Houston Offshore, and **Barry Long,** acting general manager of the yard.

The new rig, which is the third offshore rig ordered in three years by Houston Offshore, will be a jackup designed to operate in up to 200 feet of water. Work will begin this summer, with delivery scheduled for May 1979.



Artist's rendition shows design of the cantilevered offshore drill rig that Bethlehem Steel Corporation's shipyard in Beaumont, Texas, will build for Houston Offshore International, Inc. Work on the rig will begin this summer, with delivery scheduled for May 1979.

The unit will be similar to previous deep-water Bethlehem-designed, mat-supported jackup drill rigs but will have a cantilevered drill floor. This feature permits exploratory or developmental drilling from 15 feet to 45 feet aft of the platform while cantilevered over existing wellhead structures. With hook plus setback loads of 1 million pounds and full-size drilling equipment, the rig will be ideally suited for deep-well drilling in water depths ranging from 11 feet to 200 feet.

Mr. **Chiles** noted that the new rig for his company is only the second of its kind on order. He said, "We believe this unique design will give Houston Offshore the utmost flexibility in serving the needs of our oil company customers in the Gulf Coast area."

The drilling unit will provide onboard, air-conditioned living accommodations for 52 employees.

The rig will consist of a buoyant upper platform hull 157 feet long by 132 feet wide supported by a mat foundation 220 feet long by 185 feet wide. Three 11-foot-diameter columns affixed to the mat and passing up through the platform will provide the means for the platform to be jacked above offshore waters to provide sufficient wave clearance.

Norwegian Ship's Gear Exhibition Held In New York

New York Ship's Gear from Norway Exhibition participants, left to right: **Erich Neitsch,** Penco Inc., representing Spesialservice A/S; **Erik Ambjor,** Norcontrol; **Egil Ruud,** Unitor Ships Service; **Jarle Hektoen,** Robertson A/S Radio Elektro; **Johs. Christoffersen,** Kvaerner-Moss, Inc.; **O. Eidjord,** Maritime Protection A/S; **Gilbert Nelson,** Simrad, and **Arne Fonkalsrud,** The Export Council of Norway.

More than 200 guests representing over 35 American companies attended a special three-day-long Ship's Gear Exhibition in New York City, organized by The Export Council of Norway. Nine leading Norwegian suppliers of sophisticated ship's gear participated in the exhibition, which was held at the Seamen's Church Institute in downtown Manhattan.

Norway's Commercial Consul **Arne S. Fonkalsrud** said the purpose of the exhibition was to display to the specialized American audience a sampling of the advanced equipment and systems developed by Norwegian firms, to highlight the extent and breadth of Norwegian capabilities in this traditionally important area of activity, and to give both the exhibitors and the attendees an opportunity to form new business contacts. "Judging from the quality of attendance and enthusiasm, the exhibition was successful in all regards, and we believe that the participating companies will find an expanded interest in their products among U.S. buyers," **Mr. Fonkalsrud** said. "We hope to repeat the exhibit on an expanded basis again next year," he added.

Among the highlights of the three-day exhibition was a live demonstration of firefighting, safety, and rescue equipment by Unitor Ships Service. Other topics covered were marine electronics and advanced navigational aids, with presentations by Simrad A/S, Norcontrol and Robertson A/S Radio Elektro; tanker cargo discharging systems by Thune-Eureka A/S; tanker safety and inert gas systems by Moss Rosenberg Verft A/S and Maritime Protection A/S; hatch cover and ro/ro equipment design by Kvaerner Brug; and valve grinding equipment by Spesialservice A/S.

For further information, contact **Ole Martin,** The Export Council of Norway, 800 Third Avenue, New York, N.Y. 10022.

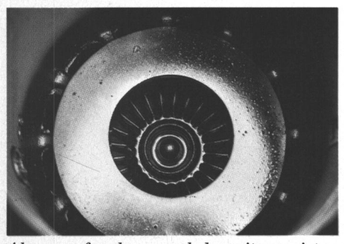
SNAME SECTION FIELD TRIP—Approximately 150 members and guests of the Northern California Section of The Society of Naval Architects and Marine Engineers recently held a field trip aboard a new Golden Gate Bridge District ferry in transit from San Francisco to Larkspur. The technical presentation included guided tours of the bridge and engine room, and unlimited access to all areas of the vessel. Operational problems resulting from this initial adaptation of gas turbine and water jet propulsion were discussed and their solutions demonstrated. Pictured aboard the ferry, left to right, are: **T.S. Winslow,** T&R Committee, American President Lines; **Stanley Kowleski,** author, Golden Gate Bridge District; **Rex McCardell,** author, Golden Gate Bridge District, and **Peter Fisher,** Papers Committee chairman, Matson Navigation Co.

A. E. "Bud" Dacus finds Caprinus *R Oil 40 helps keep EMD-567C s in top condition. "Works equally well in my Detroit Diesel 6-71 auxiliary diesels," he says.*

"I'm impressed–Shell's Caprinus® R Oil 40 keeps my EMD's in better condition than any other oil I've used in 20 years."

Says A. E. "Bud" Dacus, Chief Engineer of the M/V Crescent City since her launching in 1958.

"We've tried a good many engine oils in the Crescent City over the past 20 years," continues Mr. Dacus, veteran engineer for the Sioux City-New Orleans Barge Company of Hartford, Illinois.



Absence of carbon or ash deposits on piston undercrowns demonstrates outstanding stability of Caprinus *T and* Caprinus *R Oils.*

"Until recently, we considered Shell's *Caprinus**T Oil 40 the best. It kept our EMD's in fine condition. But *Caprinus* R Oil 40 looks even better."

Mr. Dacus made his comments during a routine teardown of his EMD 16-567Cs after 18,875 hours of service. The engine photographed had been on Shell's *Caprinus* T Oil and switched to *Caprinus* R Oil for the last 5,000 hours.

Exceptional Cleanliness

"I never saw an engine look so clean after 5,000 hours on any oil," adds Mr. Dacus. "It looked even cleaner at 18,875 hours than at the 13,000 hour mark. Top decks had just a light oil film. Intake ports were wide open. Practically no sludge in the sump. Minimum wear on rings."

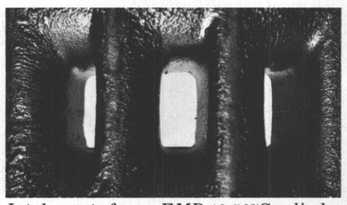
Guards against corrosion

Caprinus R Oil 40 is higher in initial alkalinity than *Caprinus* T Oil (10.2 TNB-E compared to 7.5) and *retains* effective alkalinity in extended high-stress service. It neutralizes combustion acids and guards against corrosive wear of rings and liners over long periods.

Filters frequently last longer, too. *Caprinus* R Oil's dispersant additive system helps keep insolubles in suspension, prevent heavy deposit buildup. Result — the possibility of significantly extended filter service life, an important maintenance saving.

The switch is on to *Caprinus* R

Top engine performance is why nearly 100 towboats, including ten from the Sioux City-New Orleans Barge Company, have already switched to Shell's *Caprinus* R Oil. Look into this high alkalinity engine oil for your vessels. It could mean important savings in operating costs for you!



Intake ports for an EMD 16-567C cylinder are completely free of deposits after more than 13,000 hours on Caprinus *T Oil and 5,000 hours on* Caprinus *R.*

Send for technical bulletin describing the properties and applications of *Caprinus* R Oil 40 in medium-speed diesels. Just write: Shell Oil Company, Manager, Commercial Communications, One Shell Plaza, Houston, Texas 77002.

Come to Shell for answers

*Caprinus *is a trademark and is used as such in this writing.*

Foster Wheeler Reprint Outlines Development Of Inert Gas Systems

Foster Wheeler Boiler Corporation, Livingston, N.J., is offering "Taming the Explosion Hazard," an article reprint from the Foster Wheeler organization's technical publication, "Heat Engineering." The article outlines the development of inert gas systems in blanketing hazardous cargoes, then goes on to describe the two configurations offered under license from Moss Rosenberg of Norway.

Within recent years, inert gas systems have drawn increasing attention from the maritime community as a means of protecting crude oil and liquefied gas tankers from fire and explosion. A recent proposal would require all tankers of more than 20,000 dwt calling on U.S. ports to be equipped with these systems.

Properly operated, inert gas systems have prevented explosions in the cargo tanks of vessels. This was graphically demonstrated as early as World War II, when the tankers of one operator never suffered a cargo explosion, even when torpedoed.

Last year, Foster Wheeler Boiler Corporation was licensed by Moss Rosenberg Verft A.S. of Norway to manufacture and sell the inert gas systems for marine and industrial applications. FWBC currently markets these units in the United States, Canada, Central and South America. A wholly owned subsidiary of Foster Wheeler Corporation, FWBC supplies marine steam generators to the world's fleets and industrial boilers for a wide range of stationary applications.

As described in the Foster Wheeler article, two basic inert gas system configurations are available. The simplest takes stack gas from a steam generator or furnace and cools and scrubs the gas stream of contaminants. Aboard ship, seawater may be used as the scrubbing medium. The clean, inert gas is then directed by blowers and a piping distribution system to the areas to be inerted. This design is suitable only if the quality of the flue gas is suitable and the volume from the boiler or furnace is sufficient to provide the amount of inert gas needed for cargo blanketing and leakage makeup.

A second, somewhat more sophisticated design, burns light fuel oil under controlled conditions in a special combustion chamber. The resulting gases are scrubbed and directed to the areas to be inerted.

In both designs, monitoring equipment and automatic controls assure that the oxygen content of the gas from the scrubbers is well below that needed to sustain combustion.

Request copies of this reprint from **Arnold Bendet,** Foster Wheeler, 110 South Orange Avenue, Livingston, N.J. 07039.

Red Fox Names Three Regional Managers In Sewage Treatment Div.

Red Fox Industries, New Iberia, La., has brought in three men to head its regional sewage treatment marketing efforts, according to **Robert C. Fox**. All three men have extensive backgrounds in marketing sewage treatment or related devices.

Jean F. Boulin will manage Red Fox's East Coast Region and operate out of offices in West Redding, Conn. Western regional manager, headquartered in Carlsbad, Calif., will be **Robert J. Buza**. And heading the Gulf Coast Region will be **John Talluto,** whose home base will be New Orleans, La. All three men will be responsible for both the sale and the service of Red Fox sewage treatment devices in their respective regions.

Red Fox Industries is involved in several aspects of the marine and oilfield service industries. The company manufactures Type II marine sanitation devices in 22 standard sizes to accommodate crew sizes from two to 2,500. All Red Fox MSD's exceed EPA standards, U.S. Coast Guard regulations, and IMCO requirements.

Crewboats by Swiftships. Known world-wide for quality and versatility.

In sizes 42' to 125', or to order, the Swiftships crewboat is specifically designed to carry large quantities of personnel, equipment and supplies. It's gained a reputation as the world's finest, with good reason. The entire construction is first class—geared for a variety of conditions and developed in tune with the offshore industry's trend to operate farther out to sea, in deeper water.

Specifically, the GM, MTU or Caterpillar engines provide for top speeds and maximum maneuverability. Fully outfitted, air-conditioned crew quarters and galley provide for year round comfort in any climate.

Just as important as the quality and versatility of our crewboats, is the way in which we work with our customers. From initial contact through approval of design, operational training for customer personnel, construction and delivery—each step is closely coordinated with our customers. When you buy from Swiftships, you not only buy a quality product but a quality company as well.

Swiftships quality and method have gained a substantial reputation for making a world of difference. *Crewboats, patrol boats, supply boats and utility vessels—built right, priced right.* Write or call for more information. P. O. Box 1908, Morgan City, Louisiana 70380 U. S. A., 504/384-1700 Telex 58-6453

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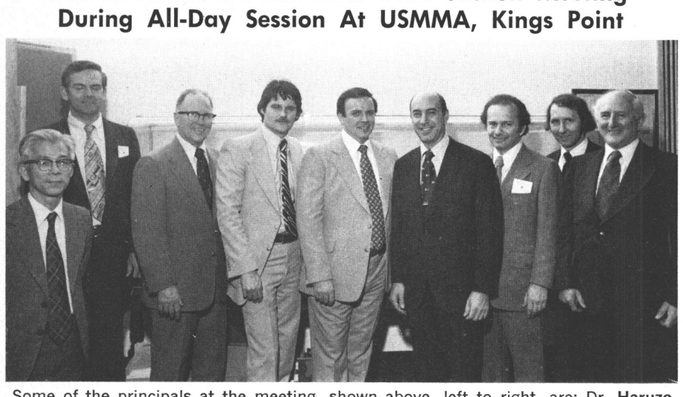
Five Papers On 'Ship Maneuvering And Control' Presented At SNAME New York Section Meeting During All-Day Session At USMMA, Kings Point



Some of the principals at the meeting, shown above, left to right, are: Dr. **Haruzo Eda, C. Lincoln Crane Jr.,** Dr. **Walter M. Maclean,** Dr. **Kent E. Williams,** and **George F. Chandler III,** authors; **Nicola F. Pergola,** Section chairman; and **John A. Norton, Thomas A. Lambly,** and **William McIlroy,** authors.

The New York Metropolitan Section of The Society of Naval Architects and Marine Engineers recently held an all-day meeting at the U.S. Merchant Marine Academy, Kings Point, N.Y., concerning various topics related to "Ship Maneuvering and Control."

During the morning, a low-speed ship maneuvering demonstration was given onboard the 143-foot oceangoing tug, the T.V. Kings Pointer, using a recently installed Bird-Johnson Company bow thruster unit. Also during this time, tours of the Computer Aided Operations Research Facility (CAORF), and new diesel training facilities took place.

In the afternoon four technical papers were presented. The first, "Dynamic Behaviour of Ships During Transit in Harbors," by Dr. **Haruzo Eda** of Stevens Institute of Technology, and **C. Lincoln Crane Jr.** of Exxon International Co., was presented by Dr. **Eda**. He described recently performed extensive studies on ship dynamic motions during transit in harbor areas, including a series of rotating-arm tests using models for tankers and a containership in deep and in various shallow-water areas; measurement of ship trajectory when tankers enter New York Harbor through Kill Van Kull to Bayway Terminal; computer simulation studies of ship dynamic motions during transit in harbors on the basis of these previously mentioned tests; a series of computer simulations to evaluate the maneuvering performance of various types of ships during transit in harbors under various environmental disturbances, such as wind and current; and an effort to correlate simulation results with actual ship trajectory measured during transit in New York Harbor.

The second paper, "Full Scale Tests of Thrusters on Dissimilar Vessels," by **John A. Norton** and **Thomas A. Lambly** of Bird-Johnson Company, was presented by Mr. **Norton**. He described tests for two very different vessels, one a large LNG tanker and the other an oceangoing tug, which were performed to evaluate the effectiveness of bow thrusters in low-speed maneuvering. The test data was compared with previously published information. Measured turning circles were shown for low-speed operations with rudder alone, thruster alone, and both rudder and thruster on one of the vessels, and various factors affecting thruster performance for low-speed maneuvering were discussed.

The third paper, "Man-in-the-Loop Control: Instrumentation and Aids to Navigation, Old and New," by Dr. **Kent E. Williams** (Mara-Time Marine Services Corp.), **William McIlroy** (Grumman Data Systems), and Dr. **Walter M. Maclean** (National Maritime Research Center) was presented by Dr. **Williams**. He discussed the general characteristics of the man-in-the-loop ship control problem and the effects of instrumentation and other aids to navigation on safety, precision, and efficiency of shiphandling under the harbor approach and restricted waterway conditions. The availability, accessibility, and processing of navigational behavior were presented and discussed in terms of the research approach utilized at the National Maritime Research Center using CAORF. The parameters of concern included types of information displayed, cognitive work load, shipboard navigational aids (buoys and other fixed references), and personnel qualifications.

The fourth paper, "On The Development of Design Criteria for Collision Resistance," was authored and presented by **Richard J. Burke**. He first discussed the phenomena which occur during the collision, and the analytical methods for predicting the loads imposed on and the energies absorbed by ships' structures during collision. This was then followed by a discription of a probabilistic basis for measuring collision resistance, with a rationale for using such measures. In conclusion, a description of how a design standard for collision protection using the technology could be developed using analytical methods and probabilistic approaches.

In the evening, dinner was served at the Officers Club, and a fifth technical paper titled "Professional Liability as it Relates to the Naval Architect/Marine Engineer and Other Maritime Professionals," by **George F. Chandler III** of Bigham, Englar, Jones and Houston. Among the topics discussed by the author were the practical explanation of what professional liability entails, reasons for the increase of lawsuits in this area, differences in liability with reference to commercial versus consumer cases and property damage versus personal injury cases, the leading cases affecting the professional with examples of how they might relate to common problems found in naval architecture/marine engineering, typical defenses available to defendents, dangers inherent in these lawsuits, such as large legal and expert expenses and disruption of business activities, insurance coverage as to types and availability including alternatives, categories of monetary damages, limitation and indemnity clauses, protection of assets, and recommendations for the evaluation of one's own business practices.

Columbia-Sentinel Engineers Relocates Washington Office

Columbia-Sentinel Engineers, Western, Inc., has announced relocation of its office from Bellevue to Seattle, Wash., Suite 1202, Olympic National Building, 914 Second Avenue 98104.

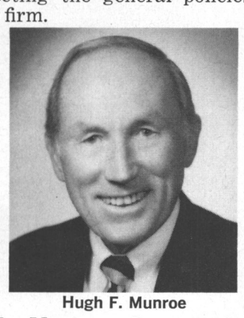
Specializing in the coordination of marine design with production planning, the firm looks forward to the logistical advantages of this more centralized location which, in association with its Portland, Ore., office, will more effectively serve the Pacific Northwest maritime communities. For details of the services offered by the firm, contact **Dan Mahler,** Manager and Principal Naval Architect.

Hugh F. Munroe Elected President Morris Guralnick Assoc.

Hugh F. Munroe has been elected president and chief executive officer of Morris Guralnick Associates, Inc., according to an announcement made by the firm. **Morris Guralnick,** founder of the 31-year-old San Francisco, Calif.-based firm of naval architects and marine engineers, was elevated to the position of chairman of the board, and **Gerald G. Graham** was elected executive vice president.

The announcement was made by Mr. **Guralnick,** who said: "In electing **Hugh Munroe** president, our board of directors has selected a man highly qualified to lead the firm during the period of great growth and expansion that we are now entering. Due to the increasing scope and range of work now being undertaken, we have established branch offices in San Diego, Calif., and Bremerton, Wash., in the past year, while a new office is presently being established in Baltimore, Md., and more new locations will undoubtedly become necessary in the future. A man of Mr. **Munroe's** experience and proven ability in managing and directing activities involving large staffs of highly skilled technicians is essential to our operation. We are pleased to have him aboard."

Morris Guralnick Associates, Inc. is currently engaged in ongoing programs related to the ocean thermal energy conversion concept, as well as major ship overhaul and conversion projects for both commercial and government clients. Mr. **Guralnick,** as chairman of the board, will continue to play a prominent role in directing the general policies of the firm.



Hugh F. Munroe

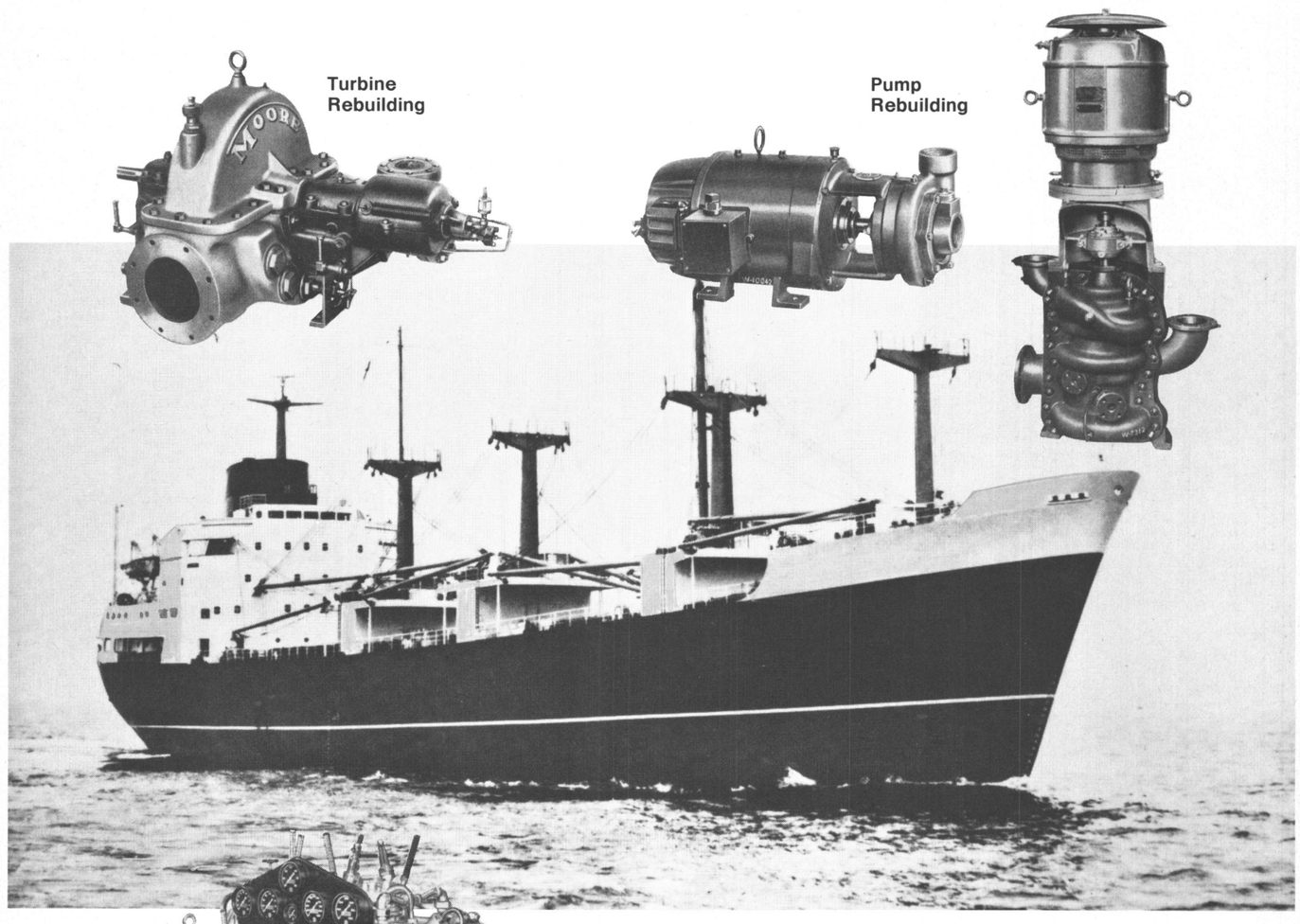
Mr. **Munroe,** who was already a member of the Guralnick organization's board of directors, is well-known throughout the maritime industry. He has been engaged for 28 years in the marine engineering, design and ship construction field. He holds a Bachelor of Science degree in mechanical engineering from the University of Washington, and a Bachelor of Science degree in naval architecture and marine engineering from the University of Michigan.

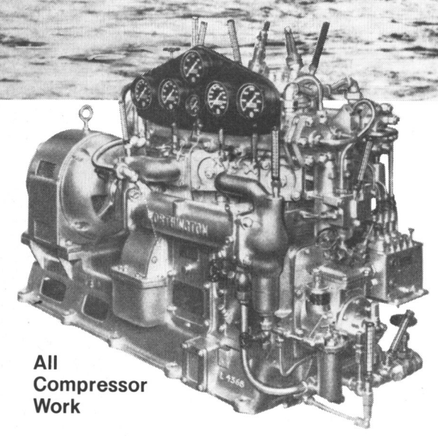
Mr. **Munroe** served 19 years (1955-1974) with American President Lines, the last 10 of those as director of engineering and vessel construction. In this position, he supervised all fleet studies, design, engineering contracting and construction and conversion during the complete replacement, expansion and upgrading of that firm's vessels. From 1974 to 1976, he served as project engineer in the Marine Projects Group of Bechtel Corporation, where his responsibilities included supervision of many design, construction and conversion projects and studies involving various types of vessels, as well as marine terminal and operating facilities.

Mr. **Graham,** who joined Morris Guralnick Associates, Inc. as project engineer in November 1972, holds a Bachelor of Science degree in design from the University of Cincinnati, and completed his graduate studies in ocean engineering at the University of California at Berkeley and University of California at Los Angeles.

Mr. **Graham** has been active in the marine design and engineering field for 23 years. His experience includes service with General Dynamics, Westinghouse Electric Company, and M. Rosenblatt & Son, Inc. Prior to joining the Guralnick organization, he served for three years as president of Sea Systems Co., a firm engaged in design, research and development in ocean engineering, naval and commercial marine design.

Total Marine Machinery Repair
That's a Job for WSC





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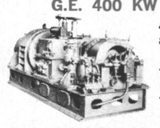
1500 KW — 450/3/1200 RPM —0.8 P.F.—2450 amps—525 PSI—850°TT—8145 RPM—11-stage geared 8145/1200—type FN4 — 3½" steam inlet. Unit will deliver full power at 440 lbs & 760°TT. OAL 16' 3-3/8"—OAW 6'6"—OAH 7'5¼"—wt. 36000 lbs. Almost equal to new. Very little use. With ABS or Lloyds.

G.E. 600 KW GEARED TURBO GENERATORS

2 

450/3/60/1200 RPM — 961 amps — type ATI — 0.8 PF. TURBINE: FSN-FN-20 6-stage—525 lbs/825°F — superheat 355°/371°F. GEAR: 10033/1200 — RPM 10033 — total—6390 lbs. steam/hr. steam flow.

G.E. 400 KW TURBO GENERATORS

3 

450/3/60/1200—0.8 PF—641 amps. TURBINE: 6-stage — 10059 RPM—525 lbs/825°TT — type GE 618N. Steam rate 5100 lbs/hr. — OAL 10' 10½" — OAW 4' 10½" — OAH 5' 5¼" — wt. 14,855 lbs.

400 KW WESTINGHOUSE TURBO GENERATOR SETS FOR BETH-SPARROWS POINT HULLS 4467 TO 5400; QUINCY HULLS 1600 SERIES

4 

400 KW (500 KVA) — 0.8 PF — 1200 RPM — 450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA — 400 KW—450 volts—641 amps—0.8 PF — 3-phase 60-cycle — 1200 RPM — CR 40° — excitation amps 41 — excitation voltage 120. Instruction book 5442. Switchgear available.

UNUSED WESTINGHOUSE 60 KW 120 VDC M-20-EH

5 

120 VDC — 1800 RPM. TURBINE: M-20-EH — 20 lbs dry & saturated — 25" vacuum. 7283 RPM. GEAR: 7283/1800. GENERATOR: 60 KW — 120 VDC — 500 amps — SK — stab. shunt wound.

UNUSED 500 KW DELAVAL-WESTINGHOUSE GEARED TURBO GENERATOR

6 

GENERATOR: Westinghouse 500 KW — 120/240 volts DC — 2080 amps — 1200 RPM — stab. shunt. TURBINE: DeLaval — 730 HP — 440 PSI working pressure condensing. Temperature 740° — 9977 RPM. HELICAL GEAR: 9977/1200 RPM. Serial # of turbine 245204 — weight 22,000 lbs.

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1 HP Turbine or rotor — Bethlehem
1 400 KW Stator only — Westinghouse
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1 Complete Westinghouse 400 KW turbo generator set
1 Forced draft motor fan
1 Anchor windlass — 2 11/16"
Steering gear motors — 15 HP
Forced draft fan impeller

WESTINGHOUSE C-25 CARGO PUMP TURBINE ROTOR
VICTORY-AP2 MAIN PROPULSION

8 Westinghouse AP2 19-stage HP rotor for 6000 HP Victory — serial #4A-2079 — equal to new.
Unused surplus AP2 — Victory Ship complete HP & LP turbines
Allis-Chalmers HP & LP
Westinghouse LP AP2 with throttle valve
G.E. HP & LP with throttle valve

VICTORY-AP3 MAIN PROPULSION NEW 8500 HP G.E. TURBINES

9 Large Victory or C-3
HP #72271 LP #72272
10 Boxes spare parts, tools & fittings. With maneuvering valves.

8500 HP G.E. — C-3 OR VICTORY

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L.P. — 8-stage — 3509 RPM — serial 62042
G.E.I. 16263

VICTORY SHIP AUXILIARY TURBO GENERATOR SET ROTORS

11 300 KW 5965 RPM JOSHUA HENDY

Turbine — 3H-69	Gear — 52269
Turbine — 3H-52	Gear — 52252
Turbine — 3H-62	Gear — 52262

ALSO WESTINGHOUSE 2A & 5A SERIES

— FOR T-2 VESSELS —

12

TURBINE: DORV-325M — 525 KW — 5645 RPM — 435 PSIG — 28" exhaust. REDUCTION GEAR: S-162 — form D — 5641/1200. A.C. GENERATOR: 500 KVA — 400 KW — 440/3/60 — 1200 RPM — 0.8 PF. D.C. EXCITATION GENERATORS: 75/55 KW — form AL — 110 volts DC. With new type amplydines.

538 KW WESTINGHOUSE T-2 AUXILIARY GENERATOR — COMPLETE

13 TURBINE: 538 KW @ 5010 RPM — 438 PSIG — 750°TT — 28½" vacuum. GEAR: 5010/1200 RPM. A.C. GENERATOR: 400 KW—450/3/60/1200—0.8 PF. DC EXCITER: 32.5 KW — 120 volts (variable voltage) — shunt — 4-pole — DC excitation 5 KW. ALWAYS WELL MAINTAINED BY MAJOR OIL CO.

T-2 UNUSED G.E. MAIN PROPULSION STEAM TURBINE WITH ROTOR

14 10-Stage — 435# — 720°TT — turbine complete with rotor — serial #109166 — 4925/5400 KW — 3600/3720 RPM — 28.5" vacuum.

WESTINGHOUSE MAIN PROPULSION STEAM TURBINE WITH ROTOR EX-CHEVRON VESSEL "MACGAREGILL"

15 Shrouded—like-new condition. Will sell rotor separately.
WESTINGHOUSE MAIN PROPULSION TURBINE
Ex"Pecos" — unshrouded — serial 2A-7733-2 type A

UNUSED G.E. MAIN PROPULSION STATOR

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Type ATB-2—serial #6978272. 2300/2370 volts — 60/62 cycles — 3-phase — 3600/3720 RPM — armature amps 1237/1315 — 4925/5400 KW — 1.0 PF.
Westinghouse stator — from Ex "Pecos"

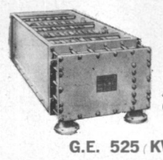
WESTINGHOUSE 538 KW AUX. GENERATOR EXCITER ARMATURE

17 

We have both types:
110 KW — 32 KW — 5.5 KW
110 KW — 28 KW — 5.5 KW

18 **538 KW WESTINGHOUSE AUXILIARY TURBINE ROTORS**

WESTINGHOUSE T-2 TANKER MAIN GENERATOR COOLERS & MAIN MOTOR COOLERS

19 

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G.E. 525 KW AUX. GENERATOR EXCITER ARMATURE

20 

75-55 KW

NEW STYLE AMPLIDYNE

21 

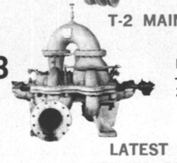
5LY148A2 — type A.M. — frame 605

AUXILIARY GENERATOR ROTORS

22 

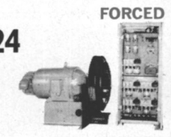
G.E. aux. generator rotors — DORV-325M — for 525 KW turbo generator sets

T-2 MAIN CARGO PUMPS

23 

Ingersoll-Rand 6GT — 2-stage — bronze — 2000 GPM — 280' head

LATEST DESIGN 5-SPEED FORCED DRAFT FAN MOTORS

24 

G.E. Model 5M505FE-1 — frame 5055—type M—440/3/60 — serial S.E.6731807. Controller available. (Complete with fan impeller)

T-2 SHIPS SERVICE AIR COMPRESSORS

25 

Worthington—5½x3½x3½ — VA2 — 20 C.F.M. — 100 lbs.—5 H.P. Motors—440/3/60 — 1750 RPM.

WESTINGHOUSE DRY TYPE T-2 CARGO PUMP TRANSFORMERS

26

200 KVA — single phase — 60 cycle 2300/450 volts—weight 3720 lbs. each. 4 available.

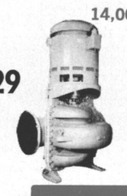
G.E. PYRONOL OIL COOLED TRANSFORMERS

27 200 KVA — single phase — 60 cycles — 2300/450 volts — 3 available.

MISCELLANEOUS DRY-TYPE TRANSFORMERS

28 Lighting Transformers—15 KW— 450/120 volts
Galley Power Transformers—15 KW—450/220 volts

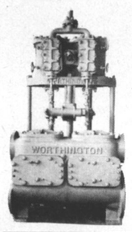
INGERSOLL-RAND 14,000 GPM MAIN CIRCULATOR

29 

14,000 GPM @ 25' head — model 24UCM — bronze — with 125 HP 440/3/60 580 RPM motor. 26" suction — 24" discharge. Can furnish with Westinghouse type CS frame B-876C or GE type KF vertical motors.

PUMPS

BRONZE T-2 TANKER STRIPPING PUMPS

30 

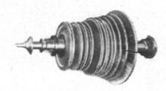
14x14x12 — 700 GPM at 100 lbs. Same pump available in steel for fuel oil transfer, etc.

31 **WESTINGHOUSE 200 H.P. CARGO PUMP MOTORS**
440/3/60 1750 RPM — 40°

MISSION TANKER T2SEA2 CIRCULATING PUMP MOTOR

32 150 HP — 440/3/60/590 RPM. Frame 6335 — type KF — 204 amps

T-2 MAIN ROTOR

33 

LARGE G.E. MAIN PROPULSION SCHENECTADY TURBINE ROTOR

Turbine serial 77418 — reconditioned with certificate. Just out of Beth shop 1970

T-2 MISCELLANEOUS, PUMPS ETC.

34 10 HP Labour Self-Priming Bilge Pumps • Rudder 13½" Rudder Stocks • Main Injection 3-Way Valve Main Condensate Pumps • Fuel Oil Service Pumps Magnablast Breaker • 1 Set New Bull Gear & Pinion for G.E. 525 K.W. Diesel Gen Model S-162 • 32", 24", 15" Rubber Expansion Joints • Mission Tanker Steering Gear Pumps

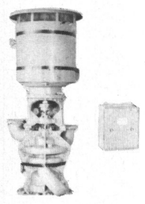
TURBINE FIRE PUMPS — BRONZE

35 Worthington turbine — 440# — 448° — 3500 RPM — 75 HP — 15# back pressure — 750 GPM @ 125 lbs — 6" suction — 4" discharge.

NEW BLACKMER FUEL OIL TRANSFER PUMP

36 

Rotary — 50 GPM — 50 lbs. — 2″ — 5 HP — 440/3/60 — with starter & spares

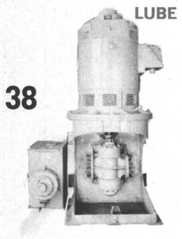


UNUSED BRONZE FEED-WATER BOOSTER PUMPS

37

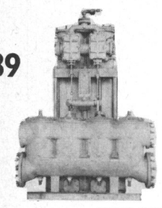
220/237 GPM @ 144′ head — 2-stage — 1750 RPM with 30 HP 440/3/60 motor control & spares. Built for USN

LUBE OIL SERVICE PUMP

38 

Quimby-Rotex — size 6D — 500 GPM @ 70 lbs — 6″x6″ flange — 720 RPM. MOTOR: Allis-Chalmers — 40 HP — 230 VDC — type EBV-147S — stab. shunt — 148 amps. Complete with starter and rheostat — designed originally for C-1MAV-1 vessels.

WORTHINGTON 16″x14″x18″ VERTICAL DUPLEX STRIPPING PUMP

39 

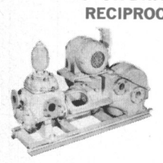
1400 GPM @ 110 PSI; suction lift 11.5 ft. Steam back pressure 15 lbs. Suction 14″ — discharge 10″ — steam 2½″ — exhaust 4″. Overall width 6′ 8″ — overall height 9′ 1½″ — depth 3′ 9½″ — approx. wt. 10,000 lbs.

NEW WORTHINGTON VERTICAL SUBMERSIBLE BILGE PUMP

40 

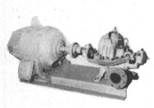
For emergency use on passenger ships, etc. PUMP: JAS — 264 GPM — 171′ head — two 6″ inlets — one 5″ outlet. MOTOR: 40 HP — 230 VDC — 149 amps.

MOTOR-DRIVEN GARDNER-DENVER RECIPROCATING BILGE PUMP

41 

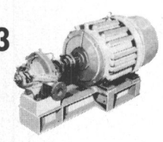
50 GPM — 150 PSI — Model ALAXE — serial #106335. 3¾″ bore—4″ stroke—2½″ suction — 2″ discharge. 51″ long — 21″ wide — 21″ high —weight 750 lbs. MOTOR: Diehl — 2.5 HP — 440/3/60 — 1750 RPM — 3.53 amps.

GOULD FIRE AND BILGE PUMP

42 

Ex-LST — horizontal centrifugal—bronze—4″ suction—3″ discharge—250 GPM @ 100 PSI — 2200 RPM. MOTOR: 30 HP — 230 VDC with magnetic starter.

AURORA HEAVY DUTY BRONZE FIRE SERVICE PUMP

43 

Single stage — 2½″ suction — 2″ discharge. 3000 RPM — 250 GPM. 100 lb. head. Impeller diameter 9½″. MOTOR: Air cooled heavy duty 25 HP Reliance T type ON-2S-2½ 230 VDC—110 amps —stab. shunt.

DIESEL GENERATOR SETS

410 KW ENTERPRISE DIESEL GENERATOR SET

44 Enterprise DSG-6 6-cylinder diesel engine driving Westinghouse generator. 250 volts DC — 1640 amps — 650 RPM — shunt wound.

MISCELLANEOUS

AUTOMATIC TENSIONING 12X14 STEAM WINCH

45 

American Engineering. Drum diameter 24″. Will stow 1500 ft of 1½″ in 8 layers. Capacity 1st layer: 20,000 lbs/100 FPM — 16,000 lbs/50 FPM. Drum width 2′ 6¾″. Steam inlet 3″—exhaust 4″. 8′ 4½″ wide over cylinders. Base 6′ x 6′ 3½″.

46 

16″ BRASS PORTLIGHTS

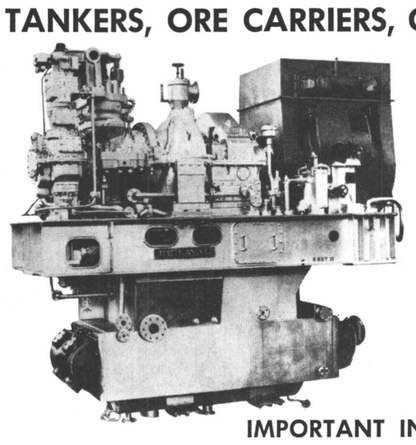
15″ and 16″ brass portlights. 16″ portlights are 3-dog type.

47

IF YOU'RE GOING TO JUMBO-IZE YOU CAN ECONOMIZE WITH THESE

ALLIS-CHALMERS — DELAVAL 1000 KW GEARED MARINE TURBO-GENERATORS

If you are contemplating the new construction of TANKERS, ORE CARRIERS, CONTAINER VESSELS, ETC.



YOU CAN SAVE THOUSANDS OF DOLLARS

with these modern, practically new units — built to highest Navy standards. Send for our free descriptive brochure. You'll be glad you did.... and money ahead!

IMPORTANT INFORMATION

DELAVAL TURBINE: 1442 HP — 10019 RPM — Class GJ-N — 9-stage — 10,000 RPM — 1050 PSI — 950°TT — condensing steam rate 10.30 lbs. Typical serial number 652468. DELAVAL DOUBLE HELICAL GEAR: 10000/1200 RPM—Allis-Chalmers—1000 KW—450 volts—3-phase —60 cycle—1200 RPM—0.8 PF—static excitation—totally enclosed air-to-water cooling—temperature rise: Stator 130°C—Rotor 110°C—class H insulation—typical serial number 160615 —type M.A.K.G. Complete with 525 sq.ft. condenser—190 lbs/hr air ejector—oil coolers—strainer—piping & valves—generator switchgear—static excitation control—voltage regulator. Total weight of unit 40,300 lbs. OAL 12′ 9″—OAW 6′. Turbo-generator height 5′ 8″—total height of turbo-generator & condenser 12′ 8″. UNITS IN EQUAL-TO-NEW CONDITION. Originally designed for DLG Guided Missile Frigate Program. Installed only about 2 years, then removed and carefully re-boxed by U.S.N. at Bath Iron Works 1964-65. Navy installed larger units due to increased load requirements.

PLEASE NOTE!

EFFECTIVE IMMEDIATELY

Our Marine Department and Warehouse

is now located at

250 Scott St. at McHenry – Baltimore, Md. 21230

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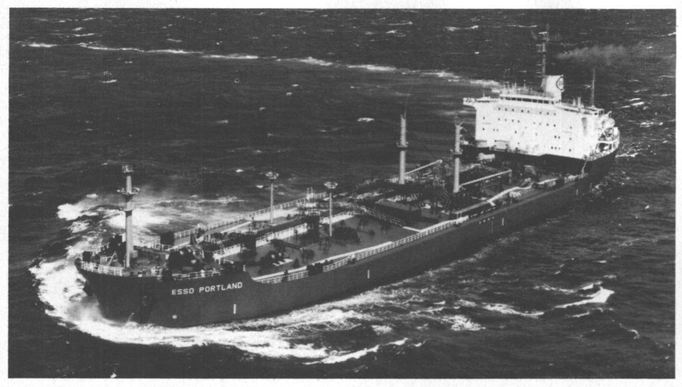


FIRST OF THREE FROM KAWASAKI FOR ESSO—The 50,000-dwt oil product carrier Esso Portland, built by Kawasaki Heavy Industries at its Sakaide Works in Japan, has been delivered to its owner, Esso Tankers Inc., Liberia. The Esso Portland is the first of three oil product carriers to be built by Kawasaki for Esso Tankers. Built to carry fuel oil, diesel oil and lubricating oil, as well as crude oil, the ship employs the exclusive-use ballast method. Principal particulars of the Esso Portland are: length overall, 196.50 meters (about 645 feet); length between perpendiculars, 186 meters (610 feet); breadth molded, 36.58 meters (120 feet); depth molded, 15.90 meters (52 feet), and draft at full load molded, 11.28 meters (37 feet). Classified ABS, the vessel has a gross tonnage of 27,439 and a deadweight tonnage of 50,084. With a cruising speed at full load of about 16.25 knots, the Esso Portland is powered by Kawasaki-M.A.N. K7SX 78/155 A diesel, with a maximum continuous output of 16,100 bhp at 122 rpm, and a normal output of 14,500 bhp at 118 rpm. It is also equipped with a bow thruster. The ship has a complement of 43.

National Cargo Bureau Announces Appointments

Capt. **Julius D. Greene** has been appointed deputy chief surveyor, National Cargo Bureau, Inc., Pacific Coast, succeeding Capt. **Allan B. Currie,** who has retired. Captain **Greene's** jurisdiction extends from Seattle, Wash., to San Diego, Calif., and also covers Hawaii, Guam and Alaska.

Captain **Greene** was transferred from the Bureau's Duluth, Minn., office, where he held the position of senior surveyor, having started with the Bureau in 1968 at the Baltimore, Md., office. He is a graduate of the U.S. Merchant Marine Academy at Kings Point, N.Y., class of '45, and put in his time at sea with United States Lines from 1945 to 1968 in various capacities, including that of master.

Effective with the opening of the Great Lakes Season in April 1978, Capt. **Arthur J. Maehl** was appointed senior surveyor in the Duluth office, succeeding Captain **Greene**. Captain **Maehl** has been with the Bureau for five years and has worked at many of the Bureau offices on temporary assignments. His sea career from 1943 to 1972 was spent with several steamship companies, including Moore-McCormack Lines, and Oliver J. Olson & Co.

National Cargo Bureau, Inc., New York, N.Y., is a nationwide, nonprofit, membership organization dedicated to the safe stowage, securing and unloading of cargo of all types of vessels. It formulates recommendations to governmental agencies on safe stowage of dangerous goods, grain and other cargoes, and offers low-cost loading inspection surveys (breakbulk and container), as well as inspection of cargo handling gear.

Stow Announces New Torque Limiting Clutch For Valve Operators

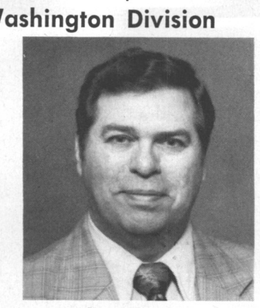
Stow Manufacturing Co. has announced a new breakthrough in torque protection for nuclear power and other service valves.

This new clutch has no pressure plates or other friction devices to go out of calibration or tolerance. It utilizes a unique series of ball and spring detents to achieve preset torque values. It has usable range, zero to 1,000 lb. inches, and is variable in 100 lb. increments by simply turning the Allen head adjustment screws, one complete turn. It is accurate to within 3-percent full range, and does not require lubrication or maintenance. It is small, lightweight and compact, measuring approximately 3 inches in diameter and 3 inches long. It is equipped with a positive override device which is engaged by pressing in on the spring loaded handwheel while opening or closing the valve. The override system is heavily spring loaded to prevent accidental engagement of the override feature.

The new clutch interchanges freely among the new line of Stow wall sleeves. It can be removed from service or added to an existing assembly without major rework or downtime.

For further information on the new clutch and other products for nuclear valve control, write to **Thom Holland,** Stow Manufactur-Co., 86 Bump Road, Binghamton, N.Y. 13902.

George Fenton Joins Gibbs & Cox, Inc. Washington Division



George Fenton

George Fenton has recently joined the Washington, D.C., division of Gibbs & Cox, Inc., in the capacity of senior staff engineer.

Mr. **Fenton** started his shipbuilding career in 1951, when he enrolled in the Apprentice School of the Newport News Shipbuilding and Dry Dock Company. Upon completion of his apprenticeship as a hull designer, he attended the University of Michigan where he earned a BSE degree and an MSE degree in naval architecture and marine engineering. Upon his return to Newport News Shipbuilding and Dry Dock Company, he became involved in submarine design work in which he has 15 years of experience.

Projects in which he has participated include the design of submarine tankers for transportation of crude oil, various materials and fittings related to submarines, and the Contract Design of the SSN 688 Los Angeles-Class submarines, in which he was responsible for all structure, weights, and arrangements.

At Gibbs & Cox, Inc., Mr. **Fenton** will head a group performing submarine design work, primarily for the U.S. Navy.

Puget Sound Press Assoc. Honors Sidney Campbell Foss Launch Chairman

Sidney D. Campbell

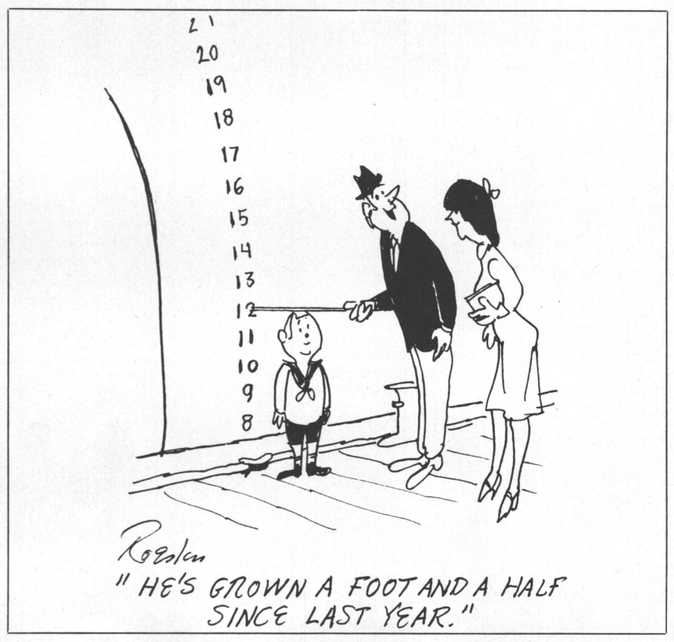
Sidney D. Campbell, chairman of the board of Foss Launch & Tug Co., a division of Dillingham Maritime, has been chosen 1978 Maritime Man of the Year by the Puget Sound Maritime Press Association.

The award was presented May 18 at the annual National Maritime Day Banquet, held at the Seattle (Wash.) Trade Center.

Mike Louisell, president of the Puget Sound Maritime Press Association, said that Mr. **Campbell's** selection as the 28th annual Man of the Year was based on his contributions to the commerce, development and general welfare of the area's maritime community.

Mr. **Campbell** began his career with Foss in 1936. He became board chairman in 1972, and was instrumental in the company's transition from a family-owned business to the leading division of the Dillingham Corporation's Maritime Group.

Mr. **Campbell** has been active in The Propeller Club, Northwest Towboat Association, Mayor of Seattle's Maritime Advisory Committee, Northwest Seaport Museum, and many other organizations.



Caterpillar Appoints Williams And Thorstenson To Managerial Posts

L. Williams

T.N. Thorstenson

L. (Larry) Williams, manager of Caterpillar Tractor Co., Industrial Division Marketing Department since 1969, has been named manager of a newly expanded worldwide engine marketing organization which includes all sales, sales development, and service functions.

Mr. **Williams** joined Caterpillar in 1952, after receiving a B.S. degree in geological engineering from the Colorado School of Mines. He served in the U.S. Marine Corps during World War II, and later worked for mining and machine repair companies. At Caterpillar, he has held numerous management positions, both foreign and domestic, in sales and in marketing.

T.N. (Terry) Thorstenson has been appointed manager of the new Sales Development Department. Manager of Industrial Division dealer sales since 1974, Mr. **Thorstenson** joined Caterpillar in 1959 after receiving a B.S. degree in mechanical engineering from the University of North Dakota. He has held several management positions, with sales responsibilities for both North and South America.

Most Loran-A Station Closings Postponed

Secretary of Transportation **Brock Adams** has approved a six-month postponement of the scheduled shutdown of U.S. Loran-A radio navigation service in several major coastal areas.

Loran (Long Range Navigation) is an electronic system using shore-based radio transmitters and shipboard receivers to allow ships to locate their positions at sea.

Loran-A is being replaced by the newer, more accurate Loran-C system, which is being expanded throughout the coastal waters of the continental United States and southern Alaska. Loran-C will overlap Loran-A until termination of the latter is completed. Once Loran-A is discontinued, only Loran-C will be available.

Loran-C's accuracy and dependability have already been proven on the West Coast and in the Northeast, and will give mariners a definite advantage over Loran-A, according to Coast Guard officials.

Mr. **Adams** acted on the recommendation of the U.S. Coast Guard to set new winter closing dates that would be less disruptive to maritime operations.

The Secretary approved the following schedule for the closing of the stations: Hawaii and the Aleutian Islands, July 1, 1979, as planned originally; Gulf of Alaska and West Coast stations, December 31, 1979, and Atlantic, Gulf of Mexico and Caribbean (West Indies) stations, December 31, 1980.

A Coast Guard-funded study of problems associated with Loran-A termination, conducted by Oregon State University, pointed out that planned termination dates coincided with peak operating seasons for most commercial fishermen and many other users of Loran-A. The study recommended that the closings be rescheduled to a period of relatively low maritime activity.

Consultation with Sea Grant Marine Extension Agents in all coastal areas, confirmed Coast Guard expectations that termination of Loran-A would be least disruptive to maritime operations during winter months. The Coast Guard found no evidence, however, that extension of Loran-A in the Aleutian and Hawaiian Islands would be beneficial.

Bailey Refrigeration Installs Heating And Refrigeration Aboard Modified SEABEE Barge

Bailey Refrigeration Co., Inc. of Brooklyn, N.Y., has engineered and installed refrigeration and heating systems aboard a modified SEABEE hopper barge for Lykes Bros. Steamship Co. This 97½-foot-long by 35-foot-wide barge has two complete and separate systems, one at either end. Each conditions a lower and new upper deck separately.

Eight cooling evaporators provide 64 tons of refrigeration and 24,000 cubic feet of air-per-minute. Power is furnished by an automatic 100-kilowatt diesel generator. The independent power is employed only when the barge is afloat. Otherwise, the ship's power is used when the barge is in transit aboard the mother ship, which is presently the Doctor Lykes.

With this new semimonthly service between the U.S. Gulf and Europe, Lykes Bros. can transport all kinds of chilled cargo, including fruit, produce, canned meat, poultry, cheeses and barreled beer, all of which require sensitive refrigeration while en route. As one example, it can accommodate as many as 19,320 cartons of grapefruit in standard ventilated cartons.

Bergeron Marine Begins Operations

Bergeron Marine, Inc., a wholly owned subsidiary of Bergeron Industries, Inc., has begun production at the company's new shipyard facility. The shipyard occupies a 40-acre site at the Port Bienville Industrial Park near Pearlington, Miss., and the Gulf Intracoastal Waterway.

Commenting on the opening of the new facility, **William T. Bergeron,** executive vice president and general manager of Bergeron Industries, stated: "With the opening of Bergeron Marine's Port Bienville facility, our company has reached another milestone in its development as a major shipbuilding entity. The additional production capacity generated by Bergeron Marine will contribute significantly to the overall successful operation of Bergeron Industries, and the ability of our company to adequately serve the ever-growing needs of its customers."

Bergeron Industries, a leading builder of barges, has offices at St. Bernard, La., with shipbuilding and repair facilities at Braithwaite, La. on the Mississippi River near the Port of New Orleans.

Waterman LASH barges built at Equitable Shipyards, New Orleans, were coated with Mobil's unique single package acid catalyzed inorganic zinc primer. UNI-PAK™ inorganic zinc rich coating — the newest member of the Mobilzinc® coatings family—was perfect for the job. It offered Equitable and Waterman all the benefits of a 2-package material—ready mixed in a single container, providing 82.5% metallic zinc in dried film and excellent early water resistance. UNI-PAK inorganic zinc coating results in a smooth cured film, uniform in color and appearance which can be applied with either conventional or airless equipment.

Both Waterman and Equitable Shipyards made wise decisions...and so can you. Contact your Mobil representative today or write for additional information to Mobil Chemical, Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 08817.

Mobil Chemical Company
MAINTENANCE & MARINE COATINGS DEPARTMENT
Edison, New Jersey
Beaumont, Texas
Kankakee, Illinois
Los Angeles area / Azusa, California

Santa Fe To Establish Base In Amsterdam At Cost Of $6 Million

Santa Fe International Corp., Orange, Calif., has announced plans to expand its ocean diving services with the establishment of a base in Amsterdam, the Netherlands, and the outfitting of four pipeline and construction vessels with deepwater saturation diving systems.

E. L. Shannon Jr., Santa Fe president, said new systems rated for dives to 1,500 feet will be installed on Choctaw II, Creek and Viking Piper, all operated by Santa Fe subsidiaries in the North Sea, and the company's pipelay reel ship Apache, now under construction in Galveston, Texas. The new diving equipment is scheduled to be operational by February 1979.

Victoria Machine Works, Victoria, Texas, has been awarded a contract for more than $2,000,000 to construct the initial high-pressure vessels for the four units. Overall cost of the expansion program is estimated at more than $6,000,000 for diving systems, onshore equipment, and the establishment of the operations base in Amsterdam.

With the North Sea equipment, Santa Fe will have six deepwater saturation diving systems. The first Cachalot-type system has been operated by a Santa Fe subsidiary in the Gulf of Mexico since 1976, and a similar unit is under construction for installation on the company's Choctaw I in the North Sea. Both of these systems are designed for dives to 1,000 feet.

Tom M. Angel, Santa Fe diving manager, said the new systems will be similar to the earlier models, except that they are designed for 50-percent greater depth capabilities.

Support equipment on the North Sea vessels will include blending facilities to provide the helium-oxygen breathing media needed for deep dives. Each vessel also will have storage capacity for 150,000 cubic feet of gas.

Marinette Marine Corp. Appoints Bill Shipley Vice Pres.-Engineering

Bill Shipley

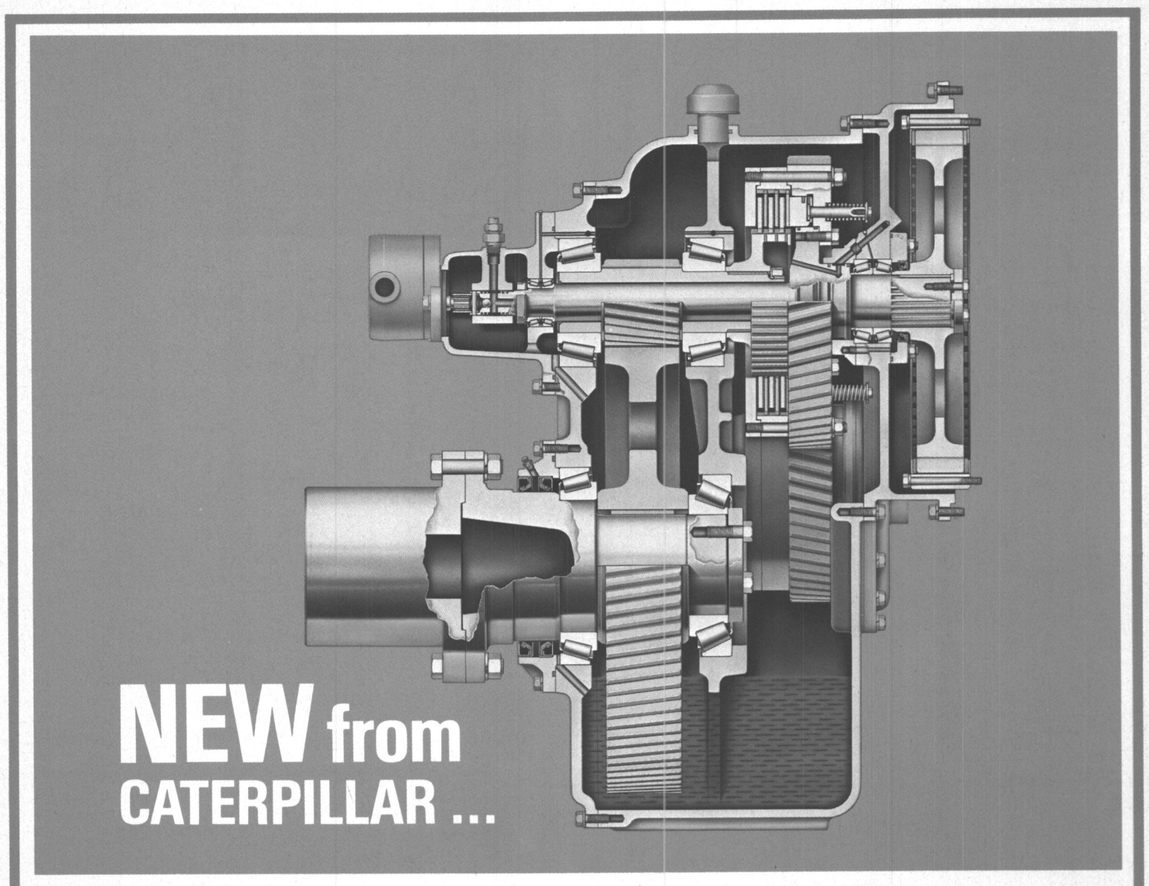
Marinette Marine Corporation, Marinette, Wis., has announced the appointment of **Bill Shipley** to the position of vice president-engineering. He has been with Marinette Marine since January of 1967, and has served as project engineer and manager-production planning and control.

Mr. **Shipley** received his Bachelor of Science degree in civil engineering from Montana State University. He is a member of The Society of Naval Architects and Marine Engineers, AMA, the Chamber of Commerce, the Kiwanis, L.A.P.T., and the Twicees.

Clemco Develops System To Remove Sand And Steel Grit

An abrasive vacuum system capable of removing up to 10 tons of sand per hour from a ship's hold and up to six tons of steel grit has been developed by Clemco Industries. The AVS-4000 includes a storage hopper, full-sized cyclone separator, and suction unit with integral dust collector. This permits recycling of abrasive in any enclosed or semi-enclosed area. The storage hopper holds three tons of sand (7.5-tons steel grit), and can load a blast machine directly.

For a complete description, write to **B. Blythe,** Clemco Industries, 2177 Jerrold Avenue, San Francisco, Calif. 94124.



CAT Marine Transmissions for 3408 and 3412 Engines

New Cat 7221 and 7211 Marine Transmissions are designed specifically for Cat 3412 and 3408 Marine Engines. Built to the same exceptional quality standards, the compact transmissions transmit full-rated continuous engine power in forward and reverse.

Oil-actuated clutch packs team with helical gears to ensure smooth, quiet, positive engagement. Clutches need no adjustment. Maintenance is fast and simple with all components readily accessible.

Complete specifications on the factory-mounted 7221 and 7211 Marine Transmissions are available from your Caterpillar Dealer. Call him today.

The chart below shows the propeller shaft rpm for each reduction ratio available for both the 7221 and the 7211 matched to a Cat 3412 or 3408 Marine Diesel.

Ratio	2.00:1	3.06:1	3.50:1	4.48:1	5.00:1	6.00:1
RPM	900	588	514	402	360	300

CATERPILLAR

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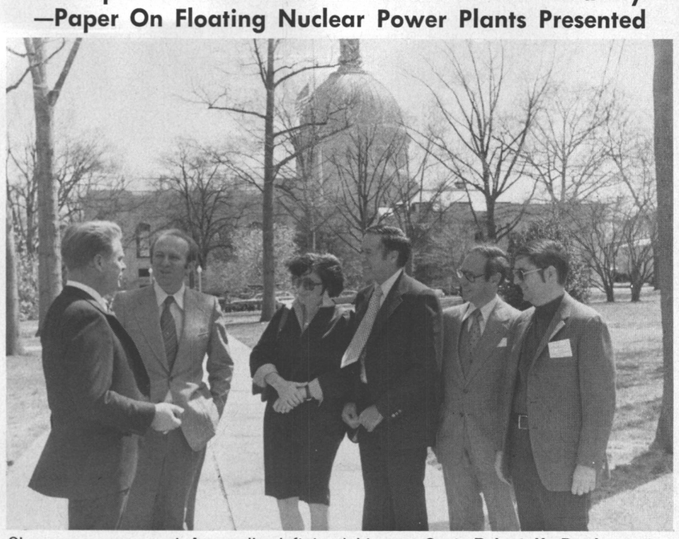
Raymond International Elects Laborde Director

Alden James Laborde was elected to the board of directors of Raymond International Inc., Houston, Texas, for a three-year term at the company's annual meeting in Houston.

Mr. **Laborde,** who received the Distinguished Achievement Award in 1977 from the Offshore Technology Conference, is also a board member of the Ocean Oil & Gas Co., the Whitney National Bank, the Ocean Drilling & Exploration Co., Tidewater, Inc., and Sub Sea International, all of New Orleans, La.

He serves on the Tulane University board of administrators, and is a trustee of the Catholic University of America, Washington, D.C.

Chesapeake Section Members Visit Naval Academy —Paper On Floating Nuclear Power Plants Presented

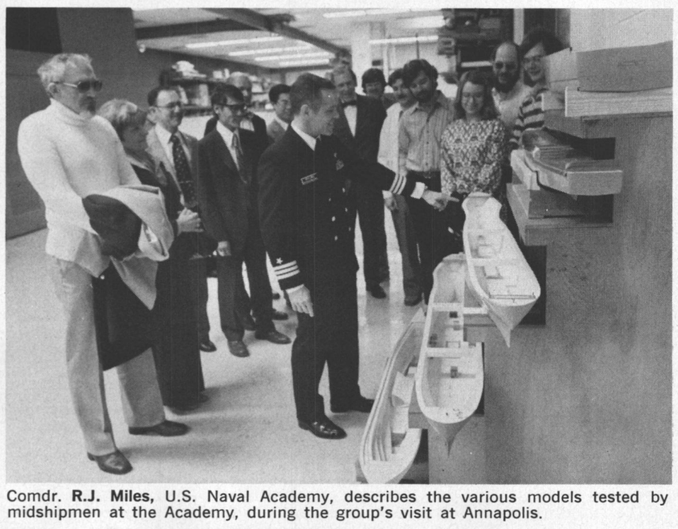


Shown on campus at Annapolis, left to right, are: Capt. **Robert K. Reed,** session moderator, Office of Assistant Secretary of the Navy; Dr. **Reuven Leopold,** chairman, Chesapeake Section, Naval Ship Engineering Center; **Mrs. Michlean Amir,** author's wife; **George G. Amir,** author, Designers & Planners, Inc.; **James L. Simmons,** author, Designers & Planners, Inc., and **Ralph E. Johnson,** Technical and Research Committee, USCG.

The April meeting of the Chesapeake Section of The Society of Naval Architects and Marine Engineers included a tour of the United States Naval Academy at Annapolis, Md., and a technical session at which the "External Effects Considerations in the Design of Floating Nuclear Power Plants" were presented by **George G. Amir** and **James L. Simmons.** The tour of the Academy was organized by the faculty for Society members and their families, and included stimulating technical presentations as well as an entertaining seakeeping demonstration. The highlight of the tour was an explanation of the automated features of the Academy's new towing tank which has been in operation less than one year.

The subsequent technical presentation covered design criteria development and implementation for floating nuclear power plants subjected to possibly damaging external effects. Capt. **Robert K. Reed** served as moderator for the session. Captain **Reed** is presently director of Ship Programs in the Office of Assistant Secretary of the Navy (Manpower, Reserve Affairs and Logistics). He formerly held the positions of Supervisor of Shipbuilding at Groton, Conn., Planning Officer at the Puget Sound Naval Shipyard, and Project Manager for the SSN 637-Class submarine. The authors of the technical paper are both members of Designers and Planners, Inc. in Washington, D.C.

Mr. **Amir,** general manager of the Washington office, was educated at the New York Institute of Technology, and Northeastern University. His varied career includes service as a merchant marine officer, design of power plant equipment for Ship Systems, where he was responsible for im-



Comdr. **R.J. Miles,** U.S. Naval Academy, describes the various models tested by midshipmen at the Academy, during the group's visit at Annapolis.

plementing shock design, analysis and test efforts to ensure that the DD-963-Class of destroyers and the LHA-1-Class of Amphibious Assault Ships meet the stringent U.S. Navy survivability requirements. A former member of the U.S. Nuclear Regulatory Commission, Mr. **Amir** has worked toward improving the structural safety of land-based and floating nuclear power plants.

Mr. **Simmons** attended the Massachusetts Institute of Technology, and Columbia University prior to receiving his commission in the U.S. Navy and his designation as an Engineering Duty Officer in 1957. Following various engineering duty assignments, he was ordered to the U.S. Naval Postgraduate School from which he received an M.S. degree in 1966. Subsequently, he had duty tours at the Portsmouth Naval Shipyard, in the USS Cadmus at the Naval Ship Engineering Center, and at the Headquarters of the Military Sealift Command. He is currently director, naval architecture, for the Washington, D.C., office of Designers and Planners, Inc.

In their presentation, the authors discussed design criteria and their implementation in the floating nuclear power plant (FNPP) when subjected to external effects. The FNPP idea was proposed in the late 1960s because of site flexibility, immediate abundance of water, possible decoupling from seismic shock, and because the concept lends itself to a high level of standardization. The current concept is in the final detailed design stages, and manufacturing facilities are nearly complete. The FNPP, when located offshore, must be protected by a breakwater to which it is permanently fastened by a mooring system. The major effects considered in the design of the FNPP are due to natural phenomena, accidents, and man-made adverse conditions. Tornadoes, hurricanes, tsunami waves and shipping accidents are considered for both safe operation and safe shutdown of the plant. Earthquakes, sub-marine slides, underwater currents and storms are considered for the breakwater design as well as for their effect on the FNPP through the mooring system. The above conditions are investigated by model test and analysis of the seabed-fluid-structure interaction. Accident conditions such as ship collisions with the breakwater, shipping accidents resulting in explosions (air blast), and aircraft crash may be examined by statistical and probability methods and by structural testing and analysis. The authors concluded that overall floating nuclear power plant safe design is only achieved by adhering to strict design criteria and by verification of the design by analysis, scale model, and limited prototype testing.

James L. Ketelsen Named To Top Post At Tenneco

James L. Ketelsen, 47 years old, has been elected chairman and chief executive officer of Tenneco Inc. He will continue as president, a post he attained last year. He succeeds **Wilton E. Scott**, 65, who will retire from Tenneco management but remain on the board.

Mr. **Ketelsen** joined a Tenneco subsidiary, the J.L. Case Company, as assistant controller in 1959. He became president of Case in 1967. In 1972, he moved to Houston Texas, as a Tenneco vice president with responsibility for financial affairs and, at various times, corporate-level responsibility for automotive component manufacturing, construction and farm equipment manufacturing, and oil operations and investments. He was elected president of Tenneco on June 1, 1977.

Tenneco, which has interests in oil and gas, natural gas pipelines, shipbuilding and other areas, had operating revenues of $7.4 billion and net income of $427 million last year.

CHINESE VESSELS DOCKED AT 'WHAMPOA'—Hongkong United Dockyards' new floating dock Whampoa recently docked the 40,000-dwt Chinese vessel Jia Hai, shown above, for its annual drydocking. Although HUD repairs ships from countries throughout the world, the Chinese fleet remains their largest single customer. In 1977, HUD repaired around 100 ships from People's Republic of China, and repair work is likely to remain at the same level this year. In anticipation of the upsurge in repair work and increased market demand, particularly for vessels up to Panamax size, HUD has embarked on a two-phase development project at Kam Chuk Kuk on the west coast of Tsing Yi Island. The floating dock Whampoa, which can handle vessels of up to 70,000 dwt for repair, conversion and maintenance, is part of the Phase I development.

NOAA Shows Distances Between 700 U.S. Ports And The Time It Takes

Do you know how far it is from Boston, Mass., to Anchorage, Alaska? As the crow flies, it's approximately 2,925 nautical miles. By ship, via the Panama Canal, the distance is 7,312 miles.

The 1978 edition of "Distances between United States Ports" gives the nautical distances between 700 U.S. ports, and much more, says the National Oceanic and Atmospheric Administration.

For example, how long would it take to go by ship from Boston to Anchorage? The publication includes a table which enables you to estimate the time it takes to travel so many nautical miles at varying speeds. Thus, a 7,312-mile trip would take 38 days and 2 hours at 8 knots, but only 15 days and 6 hours at 20 knots. In addition, there's another table which converts nautical miles to statute miles.

Issued by NOAA's National Ocean Survey, the pamphlet includes distances for the Great Lakes and the Mississippi River System. A chart showing junction points and references to the tables is also provided to facilitate use of the pamphlet.

Worldwide distances between ports can be estimated by using the pamphlet in conjunction with the Defense Mapping Agency Hydrographic Center publication of foreign port distances, titled H.O. Publication 151.

"Distances between U.S. Ports" may be purchased for $1.75 from the National Ocean Survey, Distribution Division (C44), Riverdale, Md. 20840. Mail orders sent to National Ocean Survey must be accompanied by check or money order payable to NOS, Department of Commerce.

Marinette Marine Corp. Appoints Thomas Lamb

Thomas Lamb

Marinette Marine Corporation, Marinette, Wis., has announced the appointment of **Thomas Lamb** to the position of vice president-design and development.

In this position, Mr. **Lamb** will provide all design, development and estimating support for Marinette's endeavors in the Naval and commercial markets, as well as for Sea Bridge Service.

He joined Marinette Marine in 1975, and served in the capacity of vice president-engineering until his recent appointment.

Prior to 1975, Mr. **Lamb** was manager of commercial ship design for Hydronautics, Inc. in Laurel, Md.

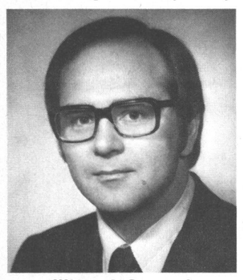
Ratchet Turnbuckle Brochure Available

Durbin-Durco, Inc. has published an illustrated brochure, Form SRBro/478, which features Ratchet Turnbuckles that are in stock and/or made to customer specifications. These products of securement are for barges (river and oceangoing), towboats, all types construction (water and land), reinforcements, industrial and tiedowns. They are featuring lightweight offset and standard pelican assembly ratchets, which are 100 percent American made. Also featured are long link river chain, pelican assemblies, power tensioners, locking levers, pipe-type turnbuckles, load binders and accessories. For your free copy, write to **L.E. Kellie,** Durbin-Durco, Inc., 1435 Woodson Road, St. Louis, Mo. 63132.

T.L. James & Co. Forms Joint Venture With Netherlands Dredging Firm

G.W. James Jr., president, T.L. James & Co., Inc., Ruston, La., has announced that his firm is in the process of forming a joint venture with Hollandshe Aanneming Maatshappij BV (HAM), Rijwijk, the Netherlands, for the purpose of entering the seagoing hopper dredging business. The venture plans to take construction bids on a small hopper dredge in the very near future, while concurrently developing designs for a second, larger vessel. T.L. James & Co., Inc., prominent in the heavy construction industry for over 50 years, has played a major role in keeping the nation's inland waterways open for the last 20 years through the use of its hydraulic and mechanical dredges. HAM is one of the world's major international dredging companies with current projects in Europe, the Middle East, Africa and Australia. The decision to enter into the hopper dredging arena, which includes operations in open seas, was prompted by a recent decision of the U.S. Congress and the U.S. Army Corps of Engineers to allow private industry to compete for projects previously accomplished exclusively by the Corps.

Walter Gregorek Joins Curacao Drydock (USA)



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R.R. Klattenberg, vice president of Curacao Drydock (USA) Inc., has announced that **Walter J. Gregorek** has joined the company as assistant vice president.

In this post, **Mr. Gregorek** will have a significant role in the administration and expanded operation of Curacao Drydock (USA) Inc., and representation of Curacao Drydock Company, Inc. in the United States and Canada.

A graduate of the U.S. Merchant Marine Academy, **Mr. Gregorek** was most recently employed by Wesley D. Wheeler Associates before joining Curacao Drydock (USA) Inc.

Curacao Drydock Company, Netherlands Antilles, has fully comprehensive facilities for repair, maintenance and conversion of all types of vessels, and for drydocking vessels up to approximately 120,000 dwt.

New Coolidge Catalog Describes Propellers And Related Equipment

A new 20-page, fully illustrated catalog which describes in detail propellers and related items for trawlers, towboats, seagoing and harbor tugboats, etc., has been published by Coolidge Propellers, Michigan Wheel Division, Dana Corporation, Seattle, Wash.

In addition to illustrating, describing, and chartering Coolidge's four major types of propellers in stainless steel and bronze — the Atlantic Type, Pacific Type, Type B and Type D — the new catalog also explains the efficiencies of ducted propeller systems, details propulsion shafting, charts SAE standard tapers for tailshafts and propeller hubs, and includes a time and speed table in statute or nautical miles per hour.

Various other related items are also illustrated and comprehensively charted including split steel shaft couplings; cone tail nuts and zinc caps; bronze stuffing boxes babbitted; bronze bulkhead stuff boxes; heavy duty bronze sea fittings; and fiber or rubber-lined stern bearings.

Copies of the catalog are available upon request to **H.R. Ginther,** Coolidge Propellers, Fairview Avenue, East, Seattle, Wash. 98102.

AWO Reports 15,000 Jobs Created Along Waterways

The American Waterways Operators, Inc., Washington, D.C., has announced that 124 industrial plant facilities located along the navigable waterways of the United States during the fourth quarter of 1977, creating over 15,000 permanent job opportunities.

Of the total, 97 facilities reported capital investments of $6,027,550,000, an average investment of $62.1 million per plantsite. Thirty-five of the facilities reported a total 15,400 new jobs, for an average 440 jobs per plantsite reporting.

The Great Southern Paper Company on the Chattahoochee River in Cedar Springs, Ga., is expanding its facilities, relying heavily on the river to receive fuel oil and coal used to fire its boilers. **James Stewart** of the company's transportation department stated that to transport the 375,000 barrels that will be used this year by any other means than water would "simply be prohibitive for several reasons, even if you could find enough railroad tank cars." AWO records show that 54 of the facilities were chemical and petroleum refining operations, 34 were metal-producing, 13 were paper and wood-producing facilities, four were terminals, docks and wharves, and the remainder were general manufacturing and miscellaneous installations.

The Mississippi River accounted for 31 of the plantsites, the Houston Ship Channel 12, the Gulf Intracoastal Waterway 10, and the Atlantic Intracoastal Waterway and Columbia River eight each.

This brings the total number of plantsites for 1977 to 418, with a total capital investment of $12,679,550,000. A total of 48,905 new jobs were created as a result of these investments in 1977. This represents a slight increase in total plantsites over 1976, but a more than double amount in total investment. Total job opportunities created also increased by 6 percent.

The total number of plantsites located or expanded along the waterways of the United States since 1952, when AWO began compiling data on water-oriented construction, has reached 10,621 facilities with a corresponding capital investment in excess of $190.6 billion.

Orbis Marine Agency Names Roger Peters Operations Manager

Roger Peters has been appointed operations manager of Orbis Marine Agency Inc.

Representing Ro-Lo Pacific Line, Mr. **Peters** will be headquartered in San Francisco, Calif. He will also be involved in setting up Ro-Lo Pacific Line's minibridge service.

Before joining Orbis, Mr. **Peters** served as port manager for Moram Agencies in Oakland, Calif.

Simrad Offers Literature On NL Doppler Speed Log

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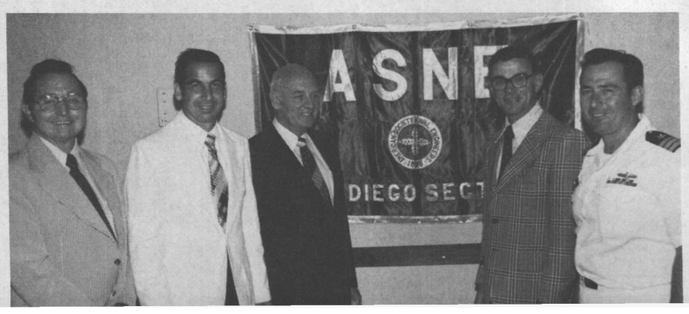
The unit tracks on Bottom Lock or Water Track with automatic switch from bottom to water track at 20 meters depth. Speed is displayed on 0-13 or 0-26 knot scales, only the scale in use is illumi-



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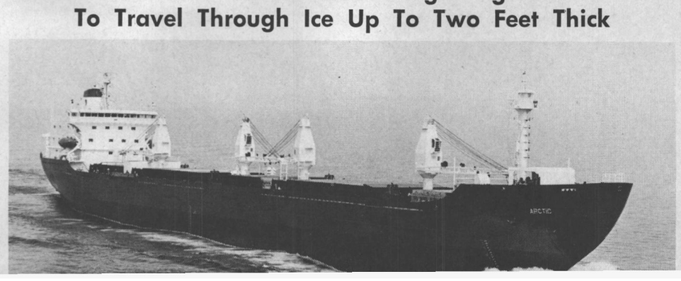

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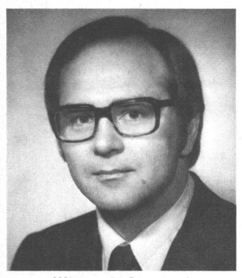

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Literature on the NL Speed Log is available from **Gilbert Nelson,** Simrad, Inc., One Labriola Court, Armonk, N.Y. 10504.

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ASNE SAN DIEGO SECTION MEETS — The San Diego Section of the American Society of Naval Engineers met recently at the Sheraton Harbor Island Inn in San Diego, Calif. The guest speakers for the evening were Comdr. **Joseph D. Fennick,** USN, Commanding Officer DATC/FMAGPAC, San Diego, and **Julian Porter,** president, Flame Spray Inc., a San Diego-based firm. Commander **Fennick** discussed the aspects and application of thermal spraying specifically used for corrosion control. Mr. **Porter** discussed the application of thermal spray processes in restoring dimensions to critical surfaces on rotating equipment, with emphasis on gas turbine engines. Pictured during the meeting, left to right: **P.D. Coyle,** secretary-treasurer for the Section; Comdr. **J.D. Fennick,** USN, guest speaker; **J. Porter,** guest speaker; **R. Stoklosa,** Section chairman, and Comdr. **C. Remoll,** Programs chairman.

R.I.NA. Appoints Coffer For Pacific Northwest

Registro Italiano Navale (R.I. NA.), the Italian Ship Classification Society, has appointed **Ian T. Coffer** as their non-exclusive agent-surveyor for the Seattle and Puget Sound Area of the Pacific Northwest. Mr. **Coffer's** office is located at Island Office Plaza, Suite 112, 2737 77th Avenue S.E., Mercer Island, Washington 98040.

Philadelphia Port Directory Available

The 1978 edition of the Philadelphia Maritime Exchange Port Directory is now on sale, according to **John W. Pinnel,** Maritime Exchange president. Copies of the comprehensive guide to ports of Philadelphia services and facilities can be obtained at $4 each by writing to the Philadelphia Maritime Exchange, 620 Lafayette Building, Philadelphia, Pa. 19106.

Port Weller Builds Icebreaking Cargo Vessel To Travel Through Ice Up To Two Feet Thick

Trials for the M/V Arctic were conducted on Lake Ontario, prior to her christening at Port Weller Dry Docks on June 2. This photo was taken when the ship was lightly ballasted, and shows the design of the icebreaking bow.

The M/V Arctic is an unusual ship with a historic role to play in the development of the Canadian Arctic.

For the first time in Canada, and quite possibly in the world, an icebreaking cargo vessel has been built to travel through ice up to 2 feet thick at a constant speed and with stop-go capability in much thicker ice. At the present time, the M/V Arctic is only exceeded in strength by Canada's most powerful icebreakers.

The new ship is designed to operate without icebreaker support for four to six months of the year in those portions of the Canadian Arctic where commercial development has begun. Until now, the operating season for conventional ships has been restricted to six weeks or less. The M/V Arctic is also designed for overseas trade, as well as the St. Lawrence Seaway and the Upper Great Lakes after the Seaway has closed for the season.

Following design studies and model testing by Camat International Transportation Consultants Ltd. of Mississauga, an order was placed with Port Weller Dry Docks of St. Catharines, a division of Upper Lakes Shipping Ltd. of Toronto. In addition to being low bidder on the $39-million contract, Port Weller has had considerable experience in building ice-strengthened ships.

Special features have been incorporated into the M/V Arctic to fit her for her demanding role, and to comply with Canada's Arctic Waters Pollution Prevention Regulations. One of these is her double hull throughout the entire ship providing additional strength, and as a precaution against the spillage of fuel oil should the outer hull be ruptured.

A system of compressed air generated aboard ship ejects bubbles through a series of openings along both sides of the ship below the waterline. The air bubbles will serve to reduce the friction of ice on the ship's hull. A ducted controllable-pitch propeller system will provide additional thrust for the Arctic's 14,770-bhp engine.

An ice-testing laboratory has been installed so that technicians aboard ship may record ice pressure on the hull. This information will be valuable in the design of future ships for Arctic work.

M/V ARCTIC
General Particulars

Vessel Cost:	$39 Million
Crew:	44
Length overall:	687½ feet
Breadth:	75 feet
Cargo cubic, including hatches:	1,273,125 feet
Horsepower:	14,770 bhp
Speed:	15.5 knots
Tonnage:	28,000
Classification:	LLoyd's + A-1 Ice Class 1A Super Strengthened
Owners:	Transport Canada; Federal Commerce and Navigation Ltd. of Montreal; Canada Steamship Lines Limited of Montreal; Upper Lakes Shipping Ltd. of Toronto.

While the M/V Arctic will not carry a helicopter, a landing area has been provided on the main deck so that personnel and supplies may be flown to and from the ship, should the need arise.

The ship was built for Canarctic Shipping Company Limited of Ottawa, with funding provided by the Royal Trust Company. Canarctic is a joint venture between Transport Canada, with 51 percent of the shares, and three firms, Federal Commerce and Navigation Ltd. of Montreal, Canada Steamship Lines Limited of Montreal, and Upper Lakes Shipping Ltd. of Toronto.

The ship will be managed and operated by North Water Navigation Ltd. of Montreal, a joint venture of the three shipping companies in the Canarctic consortium.

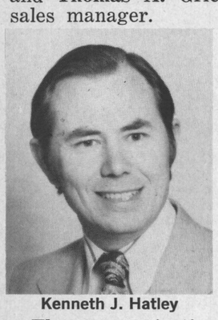
Philadelphia Gear Offers New Catalog Describing Epicyclic Gear Drives

A new, 12-page catalog has been published which explains the advantages, arrangements and applications of Philadelphia Gear's epicyclic high-speed gear drives. Also included are unit ratings and dimensions.

For a free copy of the catalog, write to **Robert C. Metzger,** Philadelphia Gear Corporation, King of Prussia, Pa. 19406. Specify PL-78.

Butterworth Systems Announces Marketing Dept. Reorganization —Hatley And Grieb Appointed

In a reorganization of the Marketing Department of Butterworth Systems Inc., Florham Park, N.J., **Kenneth J. Hatley** has been appointed manager, Tank Cleaning Systems, and **Thomas A. Grieb** has been appointed sales manager.



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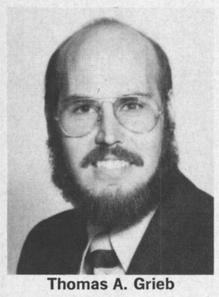

Thomas A. Grieb

The reorganization was sparked by the company's introduction of the lightweight BUTTERWORTH® LT tank cleaning machine and by the increased demand for retrofitting fixed-in-place tank cleaning machines. The new appointments, made by **A.J. Kelly**, president of the international company which manufactures tank cleaning, underwater hull cleaning, and oil/water separation equipment, are effective immediately.

In his new position, Mr. **Hatley** is responsible for the management and direction of the company's lines of tank cleaning machines and oil/water separators. He will be conducting a U.S. Shore Industry market test program later this year on the BUTTERWORTH®/SEREP SFC oil/water separator. Mr. **Hatley** formerly served as technology advisor.

Mr. **Grieb** heads the newly established Sales Division. His duties include all direct selling activities throughout the U.S.A. and the Western Hemisphere, as well as the coordinating of responsibilities for sales personnel. In the past, Mr. **Grieb** served as market plans advisor.

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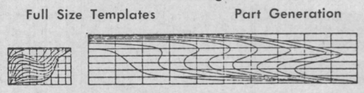

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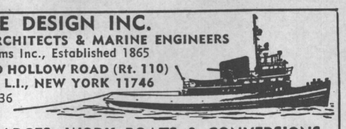

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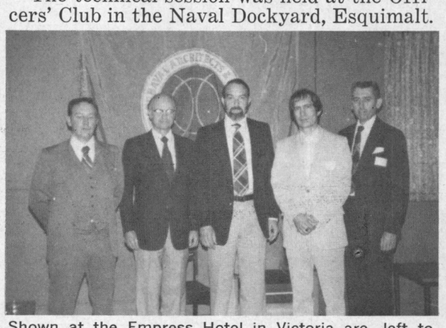
SNAME Pacific Northwest Section Spring Meeting In Victoria, B.C.

The three-day Spring Meeting of the Pacific Northwest Section of The Society of Naval Architects and Marine Engineers, held at the Empress Hotel, Victoria, British Columbia, Canada, was attended by more than 60 members and guests.

The technical session was held at the Officers' Club in the Naval Dockyard, Esquimalt.



Shown at the Empress Hotel in Victoria are, left to right: **C.R. Cunningham,** author, General Electric Co.; **W.E.G. Talbot,** chairman, Pacific Northwest Section; **J. Roni,** author, General Electric Co.; **D. Filley,** author, Puget Sound Naval Dockyard, and **R.M. Brown,** assistant secretary-treasurer, British Columbia Area.

The authors of the two papers presented were introduced by Pacific Northwest Section chairman **Gerald Talbot.**

The first paper offered, "Fuel Conservation Through Total Heat Recovery," was prepared by **A.L. Payne** and **W. Kerns** of Puget Sound Naval Shipyard, and presented by **D. Filley.** It was written to outline the problems encountered and solutions reached in converting the U.S. Coast Guard Icebreaker Burton Island to a floating platform on which to conduct international scientific experimentation with the vessel locked in the Arctic ice pack for a period of two and one-half years—the project to be known as the "Nansen Ice Drift."

The second technical paper, entitled "The Development of a Polyurethane Foam Insulation for Membrane Type LNG Ships," was jointly presented by **C.R. Cunningham,** manager of Thermal/Structural Analysis and Test, General Electric Co., Tacoma, Wash., and **J. Roni,** Cryogenics Projects manager, General Electric Co., Tacoma.

The purpose of this paper is to familiarize the marine industry with the GE/Technigaz Mark 3 Cryogenic Insulation System, as compared with the Technigaz Mark 1 Insulation System, both of the membrane containment type.

A question-and-answer period followed, and a written discussion paper was presented by **Les Coward.**

Copies of the papers can be obtained from the Section Librarian, **C.S. Bracken,** P.O. Box 24382, Seattle, Wash. 98124.

In the evening, a cocktail party/reception was held in the Georgian Lounge, followed by a dinner at which the ladies were presented with a china cup and saucer and door prizes drawn. An enjoyable evening of dancing took place.

Granges Repair Brochure Describes Varied Services

Granges Repair Service GmbH has published literature describing its facilities for emergency and planned ship repairs.

The company has developed its own systems and equipment for solving complicated repair problems onboard without dismantling. Granges specializes in grinding of crankshaft pins and journals; boring, facing and milling; welding; stress-relieving annealing; hot spraying, and metalocking.

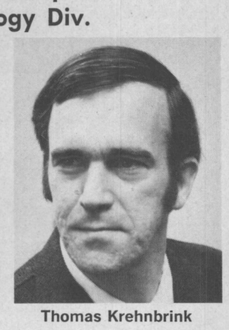
Repairs are made at sea and in all Scandinavian and German ports, and on passage through the Kiel Canal.

Granges has a total of 10 workshops, and the main workshops are in Hamburg and Goteborg. Machine parts such as diesel pistons of steel and aluminum, cylinder covers, exhaust valves, propellers, and rudder stocks/rudder pintles come from all over the world.

For a copy of the descriptive literature, write to **E. Erfeling,** Granges Repair Service GmbH, P.O. Box 3166, D-2000, Hamburg-Norderstedt, West Germany.

Sun Shipbuilding Names Four Managers To Corporate Science & Technology Div.

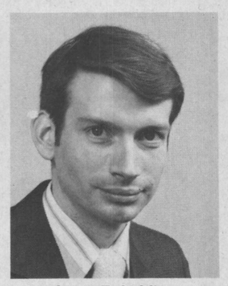
Gerald Swensson



Thomas Krehnbrink

Sun Shipbuilding & Dry Dock Company, Chester, Pa. 19013, has made four appointments to its Corporate Science and Technology Division. The company named **Gerald Swensson,** manager-Machinery Sciences, **Thomas Krehnbrink,** manager-Hull Sciences, **Richard Bicicchi,** manager-Material Sciences, and **Larry F. Liddle,** manager-Research Contracts. All four managers report to **Eugene Schorsch,** vice president, Corporate Science and Technology.

Richard Bicicchi



Larry F. Liddle

Mr. **Swensson** holds responsibility for powerplant technology, automation, instrumentation and communication. Mr. **Krehnbrink** holds responsibility for structures, hydromechanics, naval architecture and experimental mechanics. Mr. **Bicicchi** holds responsibility for welding, metallurgy, fracture mechanics, corrosion, coatings and nonmetallic materials. Mr. **Liddle** holds responsibility for development and maintenance of research contract services to external clients.

Corporate Science and Technology provides multidisciplined assistance to all shipyard departments in which technology can improve shipyard productivity or provide a better product. This division also provides research services under contract to the external community.

Ship Vibration Symposium Set For Oct. 16-17 In Arlington, Va.

An international Ship Vibration Symposium will be held at the Sheraton National Hotel in Arlington, Va., near Washington, D.C., on Monday and Tuesday, October 16-17, 1978. The symposium will be jointly sponsored by the interagency Ship Structure Committee and The Society of Naval Architects and Marine Engineers. This is the second in the scheduled series of symposia jointly sponsored by these two organizations, following the highly successful Ship Structures Symposium held in October 1975.

The purpose of this symposium is to bring together representatives of the maritime community, including ship operators, builders, designers, researchers and governmental and classification bodies to discuss all aspects of ship vibration, noise and hull/machinery incompatibility. The emphasis of the symposium will be the interfaces between hull structure, hydrodynamics, machinery and man. Within the past decade, a dramatic growth in the size and installed horsepower of vessels has taken place. The impact of shipboard problems has also increased substantially, due to the high capital costs of new vessels. During these years, substantial progress and developments have taken place in the vibration and noise fields. It is now time for these technological problems and new advances to be discussed in an open forum with all those engaged in ship design, construction and operation.

An enjoyable social program is also planned to enhance the technical benefits of the symposium. The registration fee for all persons attending the symposium will be approximately $80. This will include a reception on Sunday evening, luncheons on Monday and Tuesday, coffee during the technical sessions, and the reception/banquet on Monday evening. Also included will be a bound copy of the proceedings of the symposium.

The preliminary technical program is as follows:

"State of the Art for Shipboard Vibration and Noise Control," **E.F. Noonan** and **S. Feldman,** NKF Engineering Associates, Inc.; "Vibration from a Shipbuilders Point of View," **R.D. Glasfeld** and **D.C. MacMillan,** General Dynamics; "The Considerations of Vibration and Noise at the Preliminary and Contract Levels of Ship Design," **Naresh M. Maniar** and **John C. Daidola,** M. Rosenblatt & Son, Inc.; "Vibration and the Ship Operator," **G. Steele,** International Ocean Transport Corp.; "Noise and Vibration as Viewed by the Maritime Unions," **F. Schamann,** Marine Engineers Benevolent Association; "Costs of Vibration and Noise Problems," **F.J. Dashnaw,** Maritime Administration, and **J. Femenia,** Webb Institute of Naval Architecture.

"Noise Prediction and Prevention in Ships," **A.C. Nilsson,** Det norske Veritas; "Hydrodynamic Aspects Related To Propeller-Induced Ship Vibrations," **S. Hylarides** and **P. van Oossanen,** Netherlands Ship Model Basin; "Propeller Unsteady Pressure Forces on Ships," **W.S. Vorus,** University of Michigan; "Interaction and Compatibility Between Machinery and Hull from Static and Vibratory Point of View," **G.C. Volcy,** Bureau Veritas; "Systematic Experiments to Determine the Influence of Skew on Hull Vibratory Excitation Due to Transient Cavitation," **J.E. Kerwin, S.D. Lewis,** and **S. Kobayashi,** Massachusetts Institute of Technology; "Highly Skewed Propellers—Full Scale Test Results, Vibration and Economic Considerations," **N.O. Hammer** and **R.F. McGinn,** Maritime Administration.

"The Application of Acoustic-Suppression Material to a Ship Service Turbine," **F.A. Thoma,** DeLaval Turbine Div., DeLaval Corp.; "Approaches to Noise Exposure," **S. Wehr,** U.S. Coast Guard; "Propeller and Wave-Induced Hull Structure Vibrations," **S.G. Stiansen,** American Bureau of Shipping; "Computer Techniques for Use in Ship Hull Vibration Analysis and Design," **F.E. Reed,** Littleton Research and Engineering Corp.; "Vibration Instrumentation Utilized by the David W. Taylor Naval Ship Research and Development Center," Dawson, Brown and Shaver, David W. Taylor Naval Ship Research and Development Center; "Vibration Signature Analysis as a Preventative Maintenance Tool Aboard Ship," **J. Catlin,** IRD Mechanalysis, Inc.

Panel Discussion—A blue-ribbon panel representing industry and government.

General chairman of the Symposium Committee is **Norman O. Hammer,** and co-chairmen of the technical program are **William W. Wood** and **Jacques B. Hadler.** Meeting arrangements are in charge of **Ralph Johnson, Warren C. Dietz, R.W. Rumke, Theodore W. Chapman, Steven H. Davis, Thomas H. Robinson,** and **E.A. Chazal Jr.**

For those persons interested in attending the symposium, or for further details, write to: Lt. Comdr. **Steven H. Davis,** USCG, Registration Chairman, Ship Vibration Symposium '78, c/o U.S. Coast Guard Headquarters (G-DSA-1/TP44), Washington, D.C. 20590.

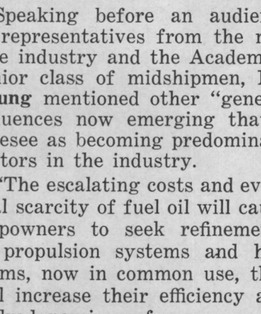
SNAME President Predicts Era Of Vitality Ahead For Maritime Industry

"As we approach and enter the next century, it is my conviction that it will be an era of vitality for the marine industry as mankind turns increasingly to the sea for energy, minerals, food, and entertainment, as well as for transportation and petroleum," says **Robert T. Young**, president of The Society of Naval Architects and Marine Engineers (SNAME).

Mr. **Young** presented this outlook in an address on May 25, 1978, at the California Maritime Academy's Fourth Annual Maritime Industry Symposium. The meeting focused on the subject of "The U.S. Maritime Industry Beyond the Decade of the 1980's."

Mr. **Young** said the maritime industry would meet the new emphasis on the oceans through the development of systems for generating energy from wind, current, tides, and gradients of salinity and temperature, and also of floating structures for purposes such as factories, powerplants, hotels, and fish farms.

On floating buildings and powerplants, Mr. **Young** pointed out the U.S. marine industry has been participating in their design, and in some cases, the construction and operation of first generation structures. "As they come into wider use, our industry will be in a good position of providing its expertise. I envision the merchant marine of the next century as one of science fiction coming to life with floating marine structures serving a myriad of functions from industrial to recreational."



Robert T. Young

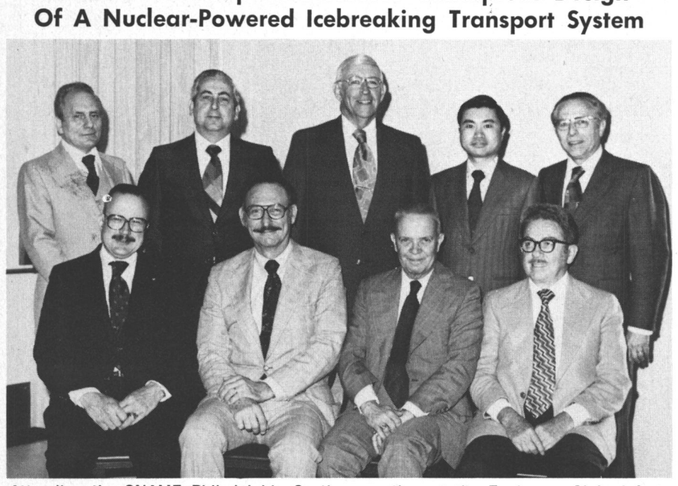
Mr. **Young**, chairman of the board of the American Bureau of Shipping, one of the leading international ship classification societies, cited recent contract awards that could help accelerate the use of vessels for energy purposes. "The Department of Energy has already contracted Lockheed Missiles & Space Company, Westinghouse, and by now possibly others to design an ocean thermal energy conversion system for generating electricity using the temperature difference between the warm surface and colder, deeper water in the oceans."

Speaking before an audience of representatives from the marine industry and the Academy's senior class of midshipmen, Mr. **Young** mentioned other "general influences now emerging that I foresee as becoming predominant factors in the industry.

"The escalating costs and eventual scarcity of fuel oil will cause shipowners to seek refinements in propulsion systems and hull forms, now in common use, that will increase their efficiency and hydrodynamic performance.

"This focus on operating economics will lead to closer attention being paid to the ways cargo is handled and space is used for storing cargo aboard ships," Mr. **Young** said. "With labor costs assuming an ever-increasing share of operating expenses, we can expect further advances in automated and mechanized methods to perform functions now requiring manual labor. I think there also will be increased study of space efficiency resulting in both internal refinements and more specialized types of vessels and more multipurpose vessels, such as RO/ROs and OBOs."

SNAME Philadelphia Discusses Conceptual Design Of A Nuclear-Powered Icebreaking Transport System



Attending the SNAME Philadelphia Section meeting at the Engineers Club, left to right: (standing) **K. Gyswyt,** secretary-treasurer of the Section; **David F. McMullen, A.C. Brown, David C. Weong,** all with J.J. Henry Co.; and **James J. Hibbits,** General Electric Co.; (seated) **F.W. Beltz Jr.,** chairman of the Section; Dr. **Zelvin Levine,** author, Maritime Administration; **Kent C. Thornton,** meeting coordinator, and **Hector T. McVey,** Sun Shipbuilding & Dry Dock Co.

The Philadelphia Section of The Society of Naval Architects and Marine Engineers' last technical meeting of the 1977-78 program was held on May 19, at the Engineers Club in Philadelphia, Pa. Sixty-five members and guests attended the meeting, which was preceded by a dinner and cocktails.

Section chairman **Fred W. Beltz Jr.** introduced **Kent Thornton,** J.J. Henry Co., Inc., as meeting coordinator. Mr. **Thornton** opened the technical session with a brief resume of the technical background of **A.O. Winall,** Newport News Shipbuilding and Dry Dock Co., and Dr. **Zelvin Levine,** Maritime Administration, co-authors of the evening's presentation titled "Conceptual Design of a Nuclear-Powered Icebreaking Transportation System."

Dr. **Levine,** using graphic slides as a part of his presentation, briefly described the concept set forth in the 41-page report. The paper, based on a study performed for the U.S. Maritime Administration, Office of Advanced Ship Development, by Newport News Shipbuilding, had as the principal objective the evaluation of trade routes, development of conceptual designs for the icebreaking tanker and related facilities, all of which comprise an overall "transportation system" for the movement of crude petroleum from Alaska's North Slope to the East Coast of the United States. A major oil company's marine division assisted in the study by providing ship operator/owner information and guidance in the assessment of suggested trade routes and alternative transport sites. Technical assistance, ice technology and icebreaker performance analysis was provided by Arctec Incorporated under subcontract to Newport News.

The paper includes the proposed location of the northernmost cargo terminal, as well as selections to be considered for the southern terminal site of the trade route. The terminal at the northern end, due to the topography of the site selected, will consist of a large offshore mooring and oil transfer tower with onshore oil storage and pumping facilities. The paper notes that transferring the cargo from icebreaker tankers to conventional tankers for the ice-free port of the voyage will permit the use of existing East Coast port facilities and/or future offshore terminals.

The report also includes selection of trade routes, terminal design criteria and design requirements and concepts for nuclear-powered icebreaking tankers.

The paper had originally been scheduled for presentation at the January meeting, but due to a severe snowstorm, was postponed. Discussions on the subject were presented by **Hector T. McVey** of the Sun Shipbuilding & Dry Dock Co., **Michael D. Comens,** Gulf Trading & Transportation Co., **J.M. Dempsey** and **David C. Weong,** both of the J.J. Henry Co., and **Samuel S. Morse** of Atlantic Richfield Co.

Both authors received a certificate of appreciation from chairman **F.W. Beltz Jr.**

Southwestern Barge Fleet Service Brochure Describes Operations

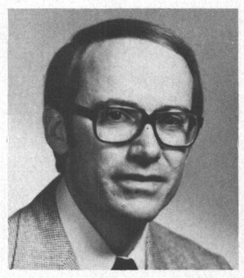
Southwestern Barge Fleet Service, Inc. of Highlands, Texas, on the San Jacinto River, has a new, four-page color folder showing the scope of their operation and explaining the exclusive services which they provide barge operators and workboat owners. The 20-year-old firm offers a complete line of barge-cleaning services and can repair boats and barges to USCG and ABS standards.

Southwestern Barge Fleet Service is the only terminal facility in the Houston-Galveston area which can purge LPG barges and clean poisonous cargoes and chemicals with a variety of washes. They have both a Port Authority approval and Texas Air Control Board permit.

For your copy, write **Hank Hilliard,** vice president, Southwestern Barge Fleet Service, Inc., Box 845, Highlands, Texas 77562.

Frank Amason Joins Worthington Pump Inc.

Frank W. Amason has joined Worthington Pump Inc. as general manager of the company's Taneytown, Md., pump manufacturing plant.



Frank W. Amason

Mr. **Amason** was previously vice president, operations of the Glendora, Calif., plant of Johnston Pump. Prior to joining Johnston in 1973, he had been with another Eastern pump manufacturer where his experience included positions in manufacturing engineering, application engineering, customer service, and data processing.

He is a 1960 graduate of the U.S. Merchant Marine Academy, Kings Point, N.Y., where he received a degree in marine engineering.

The Taneytown plant is one of the newest of the 21 manufacturing locations Worthington now operates in 13 countries.

Taneytown is the site of a sophisticated new test facility now being built by Worthington to test large, high-volume and high-pressure pumps.

Use Of Collision Avoidance Equipment Being Taught At U.S. Merchant Marine Academy

Seniors at the U.S. Merchant Marine Academy, Kings Point, N.Y., were recently given first-hand information on the advantages of computerized collision avoidance equipment by industry representatives.

At the invitation of Capt. **A.E. Fiore,** head of the Academy's Department of Nautical Science, **Lloyd Pearson,** vice president of Iotron Corporation, lectured to the upper classmen over a two-day period on the use of his company's DIGIPLOT®, a fully automatic radar plotter.

The demonstrations were part of the Merchant Marine Academy's Radar Observation Course conducted by Lt. Comdr. **Sam Bergman,** USMS.

According to Mr. **Pearson,** the principal advantage of automatic radar plotting is that bridge teams can tell at a glance which targets on the scope will pose a collision threat. Where it would take one man several minutes to determine the course and speed of an approaching ship, the fully automatic radar plotter can provide this information continuously on up to 40 ships at the touch of a button.

Information from Iotron Corporation's research shows that in most collision situations the seriousness of the ships' positions was recognized on radar no more than 10 minutes prior to impact. This means that bridge personnel have a very limited time to evaluate the movement of the other ship, decide on an appropriate maneuver, and execute it. Realizing that six to nine minutes are required to determine another ship's course and speed, and that some ships take almost two minutes to make a 40° course change, it becomes evident that not much time is available for decision-making. Fully automatic radar plotting can save up to seven minutes of computation and decision-making time, often meaning the difference between a near miss and a disaster.

Lloyd Pearson (center), vice president, Iotron Corporation, demonstrates state-of-the-art collision avoidance equipment to graduating seniors at Kings Point.

Marine operators have been under increasing pressure from environmental and governmental groups to make the use of collision avoidance equipment mandatory, and it is considered by many only a matter of time before all ships of any significant size entering U.S. waters will be required to have this type of approved computerized collision avoidance aid.

Halter Marine To Build Tug For Bouchard Transportation

Halter Marine Services, Inc., New Orleans, La., will build a 5,700-hp raised wheelhouse tug for Bouchard Transportation Co., Hicksville, N.Y. Signing the contract to construct the vessel are, left to right: **Bob Notine,** Halter Marine Services, Inc.; **Joseph H. LeBlanc Jr.,** president of Halter Marine Services, Inc., and **J. George Betz,** vice president of Bouchard Transportation Co., Inc.

This vessel will be the third in Bouchard's most recent expansion program, Halter having delivered the M/V Frederick E. Bouchard and Morton S. Bouchard in 1975. These tugs are employed on the East and Gulf Coasts towing Bouchard's fleet of 16 tank barges, which range in size from 20,000 barrels to 150,000 barrels.

Halter Marine owns and operates 10 shipyards in Louisiana, Mississippi, Alabama and Florida, and is the world's largest builder of support vessels for the offshore oil and gas industry.

Great Lakes/Great Rivers Section Hears Three Technical Papers At Spring Meeting In Marinette

The spring meeting of the Great Lakes and Great Rivers Section, The Society of Naval Architects and Marine Engineers, was held at the Holiday Inn in Marinette, Wis., on May 25, 1978, with about 110 registered members and guests. The technical session, following the morning business meeting, dealt with "T-ATFs," 116-169, "The Navy's New Fleet Tugs," by **J. Mott**. The second paper was entitled "Methods for Assessing Collision Avoidance at Sea," by **K.C. Ravenna**. The last paper of the technical session was by **T. Lamb,** and covered the subject "Engineering Requirements for Modern Shipyards." Following lunch at the Riverside Country Club, a tour of the Marinette Marine Corporation to view the Navy fleet tugs under construction was available for attendees. The next meeting of the Section will be held on October 12, 1978, at the Continental Regency Hotel in Peoria, Ill. Shown above standing, left to right: **G. Plude,** chairman; **T. Stewart,** secretary-treasurer; **J. Woodward,** incoming chairman, and **R. Jacobs,** vice chairman; seated, left to right: **T. Lamb, K. Ravenna,** and **J. Mott,** authors.

Northwest Marine Iron Works Designs Unique Time Saving Propeller Lifting Carriage

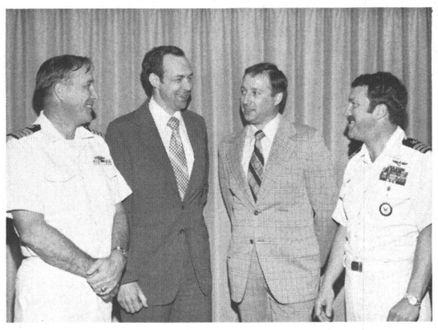
Northwest Marine Iron Works of Portland, Ore., has designed a unique propeller lifting carriage which results in significantly less man-hours in the installation of skewed propellers.

Initial test for the carriage, which was built in conjunction with the Port of Portland, came during a recent overhaul of the S/S Maine, the newest vessel in the States Line's fleet of ro/ro ships.

"We removed the old propeller and installed a new Ferguson skewed propeller in less than 36 hours," said **Jim Butler,** general manager of Northwest Marine Iron Works' Marine Division.

The lifting carriage, designed with wheels, allowed Northwest Marine Iron Works to shift the propeller from a horizontal position to the critical vertical position very rapidly.

Propellers weighing up to 70 tons with 30-foot diameters can be handled by the lifting carriage. The six-bladed skewed propeller installed on the Maine was 22 feet in diameter and weighed 45 tons. The propeller removed from the Maine was of conventional five-bladed design.



MATCHING MEN TO MACHINES — The Mechanicsburg (Pa.) Chapter of the American Society of Naval Engineers (ASNE) held a luncheon meeting recently, at the Commissioned Officers Club at the Mechanicsburg Defense Activities. The luncheon was attended by approximately 40 members and guests who heard Comdr. **M.D. (Mick) Miefert** of the Harrisburg Navy Recruiting District give a very interesting and dynamic presentation on the problems of matching man to machine in a stressful environment. Commander **Miefert,** whose credentials as a Navy flyer include some 400 combat missions over Vietnam, preceded his talk by a forceful movie on carrier flight deck operations, and concluded by detailing the problems of Navy recruiting in today's environment that requires ever more technically qualified personnel to operate the increasingly complex machinery of today's modern Navy. Pictured above, from left, Capt. **A.W. Gottschalk Jr.,** chairman of Section 5 of the ASNE; **L.W. Heacock,** secretary-treasurer of Chapter 5; **D.R. Straub,** vice chairman of Chapter 5, and the speaker, Commander **Miefert**.

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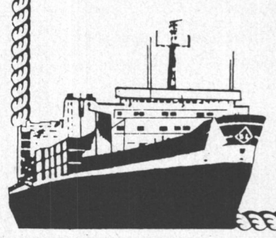

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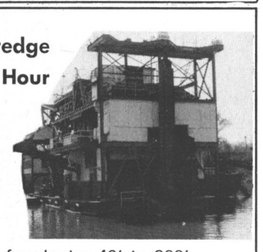

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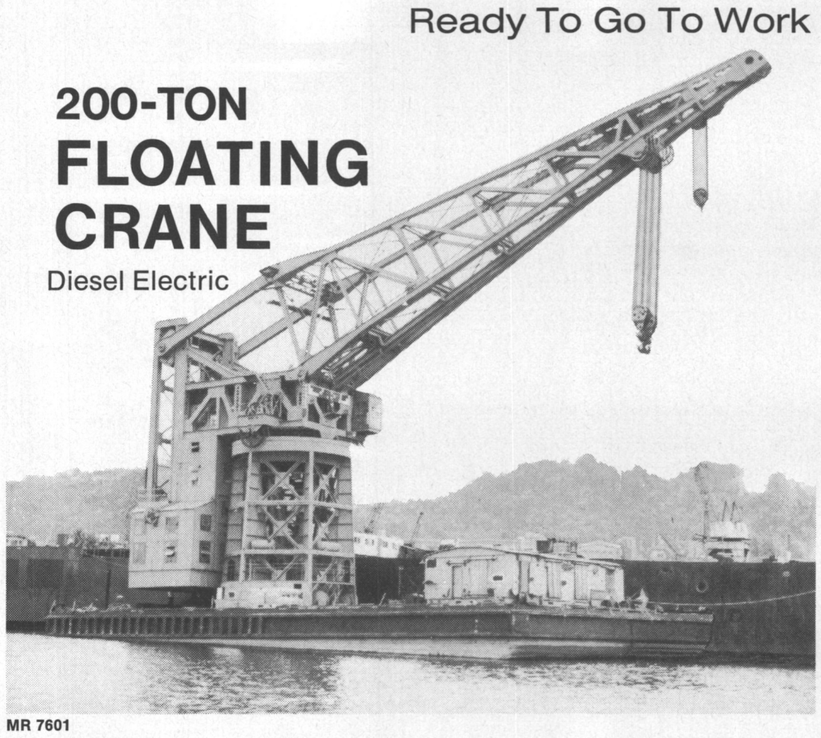

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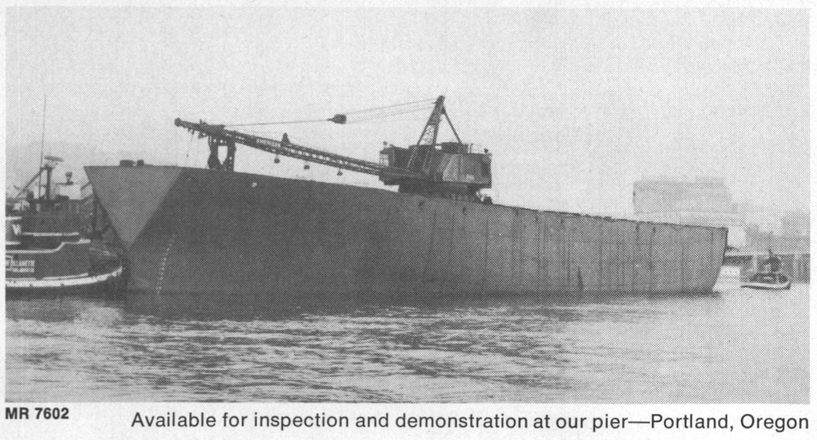

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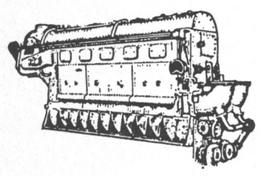

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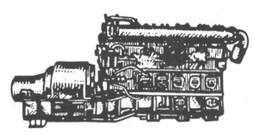

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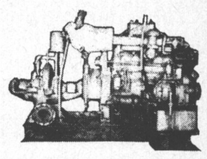
Size A½	Size A4	Size A10
Size A1	Size A5	Size A12
Size A2	Size A6	Size A16

FIRE PUMPS

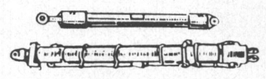


2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver, centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280' head, 6" suction and 5" discharge.

Electro-Mechanical STEERING GEAR

1—SPERRY No. 2, 5 HP, 230 Volts DC, complete with Steering Winch, Controller Panel, Ballast Resistor, Electro-Mechanical Steering Stand—with Steering Wheel (with Pull-out Knob).

HYDRAULIC CYLINDERS



Bore	Overall Stroke	Rod Diameter	Retracted Length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	double
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8"	4"	144"	double

AIR COMPRESSORS

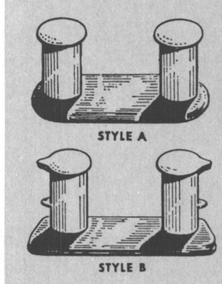
1—GARDNER-DENVER, 150 CFM, 125 PSI, Class WB, Size 7x5¾x5, with Diehl Motors, 45 HP, 230 Volts DC, 870 RPM, 167 Amperes.

3—INGERSOLL - RAND, Size 5x5x4x4, 50 CFM, 150 PSI, with G.E. Motor, 20 HP, 440/3/60.

1—INGERSOLL - RAND, Model 40B, 155 CFM, 110 PSI, 870 RPM, with 40 HP Motor, 230 DC.

2—WORTHINGTON, 20 CFH, 3000 PSI, 4 stage, 585 RPM, with Worthington Steam Turbine, 47 HP, 5502 RPM.

DOUBLE BITS



STYLE A

STYLE B

Used, clean, good, suitable for reuse. Predominantly 12" and 14" sizes, 2 styles, Many other sizes in stock, ranging from 6" to 18".

Specify quantity, size and style required for fast quotation.

ANCHOR CHAINS

USED - GOOD

1⅜" Size	2¼" Size
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2 1/16" Size	

FOR MARINE VALVES AND FITTINGS: A/C 503, 228-8691, ASK FOR "VALVE DIVISION."

FOR ELECTRICAL EQUIPMENT: A/C 503, 228-8691, ASK FOR "ELECTRICAL DIVISION."

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ANKER MARINE PAINTS

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Propulsion Engines 8-268-ANM bore and stroke:

6½" x 7"—450 HP—1200 RPM—with a Snow-Nabstad clutch and Farrell-Birmingham gear. Good Condition.

Generator Sets Gen. Electric Corp.
Type OMF-2 300 KW—315 Volts DC 952 Amps, 1200 RPM powered by G M 8-268-ANM with 450 HP at 1200 RPM. Good Condition.

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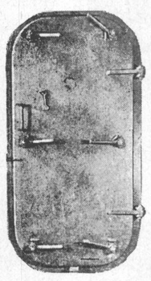
FOR SALE

NEW WATERTIGHT DOORS

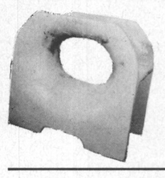
With Stainless Steel Dogs



6-Dog right and left hand hinged doors with frames. Constructed of 1/4" steel plate and meet Coast Guard regulations for above deck as well as below deck use. All dogs are bronze bushed.

SIZE
26"x48" 26"x66"
26"x60" 30"x60"
EACH DOOR

IMMEDIATE DELIVERY



NEW 7" RADIUS PANAMA CHOCKS
(MEET PANAMA REGULATIONS)

With extended legs for welding to deck. 14" Wide on base—length 28" — height 27¼". IMMEDIATE DELIVERY FROM STOCK.

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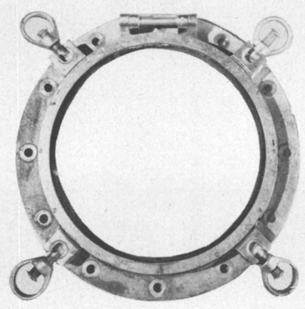
16" MARINE
4-DOG
PORTLIGHTS
CLEAN BRIGHT BRASS
all paint removed
THESE ARE NOT REPRODUCTIONS



Recently carefully hand removed from ocean vessels. Suitable for re-use on shipyard conversions or for marine ornamental use. Heavy marine standard glass . . . clear or can be furnished frosted for use in special locations. Have ½" spigots—depth over dogs 7"—overall diameter from 20½" to 22½". Bolt circle approx. 19½"—12 holes—⅝"—width of flange about 2"—62 lbs. Because each ship varies somewhat in portlight dimensions, all above dimensions are approximate.

Why buy replicas when you can buy the real thing.

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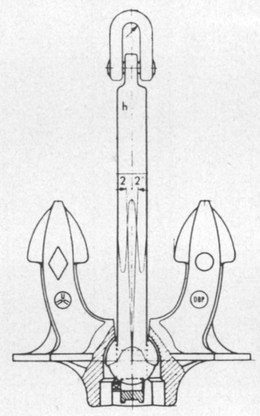
LARGE STOCKLESS ANCHORS



FOR SHIPBOARD, CONSTRUCTION AND MOORING USE.

1 Each available in the following Sizes

29,908 LBS	33,456 LBS
28,277 LBS	32,531 LBS
28,894 LBS	32,751 LBS

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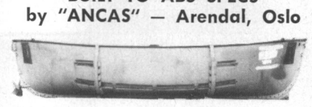
FIBERGLASS LIFEBOATS
BUILT TO ABS SPECS
by "ANCAS" — Arendal, Oslo



(1) Motor Lifeboat with 12.5 HP Lister Diesel Model SL3—36 person—365 CBF #3805—24' x 7' 10½" x 3.2' deep. Release gear made by Marine Safety Equipment Co., Farmingdale, N.J. All tanks, safety ropes & hang-on bars.

(1) Oar Propelled Lifeboat—38 person—384 CBF #3806—24' x 7' 10½" x 3.2' D. All tanks, safety ropes & hang-on bars.

AS REMOVED FROM "ARCO CHALLENGER"
For Foreign Flag Ships use. Meet all International Classifications.

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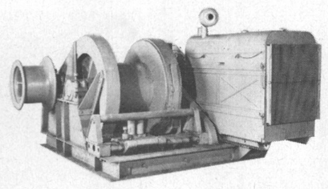
BAYARD TOWING WINCH WIREROPE WINDLASS



12,000 lbs at 38.5 feet per minute. 2176 lbs at 170 feet per minute. Drum diameter 22"—drum width 18½"—flange 39". With declutchable drum, level wind device and compression brake. Powered by Chrysler 6-cylinder gasoline engine. Weight of unit 10,470 lbs.

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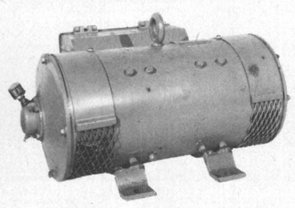
NEW—UNUSED
M. G. SETS
FOR GENERAL RADIO AND ELECTRONICS USE



1/4 KVA OUTPUT
NAVY RATING 1/4 KVA ON NAME PLATE
1/2 KVA COMMERCIAL RATING

MOTOR: 120 volts DC — 4.6 amps .65 HP 1800 RPM. GENERATOR: .25 KVA — 115 volts — 1 phase — 60 cycles — 2.17 amps — .85 PF. 2-Bearing ball-bearing — class B insulation. With radio noise filters. Built by Safety Car Lighting Co. for U.S. Navy. Type CAKG-211260 BUSHIPS. Wt. 200 lbs. OAL 22 5/8" — OAW 15½" (including noise filter) — OAH 13 5/16".

$169.50 each

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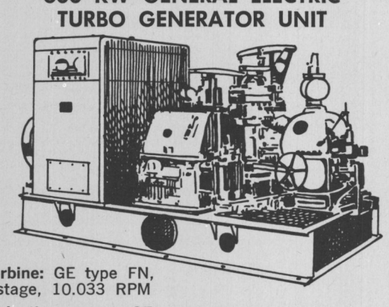
TURBO GENERATORS

750 KW GENERAL ELECTRIC TURBO GENERATOR UNIT

Turbine: Type FN3-FN24, seven (7) stage, 10033 RPM. **Reduction Gear:** Single helix, single reduction, 10033/1200 RPM. **Generator:** 750 KW, Type ATI, 450 V, 3 phase, 60 cycle. Steam conditions 525 lb. psi gage at 825 degrees F. total temp. at throttle and one (1) lb. psi absolute back pressure at turbine exhaust flange.

600 KW GENERAL ELECTRIC TURBO GENERATOR UNIT



Turbine: GE type FN, 6-stage, 10.033 RPM

Reduction gear: GE triple-helix, triple reduction, 10033/1200 RPM. **Generator:** GE type, ATI, 600 KW, 6-pole, 0.8 pf, 450 VAC, 3 phase, 60 cycle, 1200 RPM. **Exciter:** GE type MPLI, 7.5 KW, 120 VDC, direct connected. **Air cooler:** Surface type, for generator, complete with control panel.

538 KW WESTINGHOUSE TURBO GENERATOR UNIT

Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg. vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter. (3) 110 KW, 125 VDC, 1200 RPM, constant voltage generator. (4) 5 KW, 125 VDC, 1200 RPM, ship's service Generator-Exciter. **Reduction Gear:** Ratio 5010/1200 RPM.

535 KW GENERAL ELECTRIC TURBO GENERATOR UNIT

Complete with L.O. Coolers and exciters. **Turbine:** General Electric Mfg. drawing P-8453535, 3 stages, type DORV-325, 5645 RPM, rating 535 KW, inlet pressure 590 lbs., Superheat 325 degrees F., exhaust pressure 1¾ ABS. **Reduction Gear:** General Electric, type S-162-D, Class, 535 KW, Mfg. dwg, T-8453535, 5645/1250 RPM. **Generator:** General Electric, Dwg, T-8453535, type ATB-976, KNA 500, 450 volts AC, 3 phase, 60 cycle, 400 KW, 642 amps, 1200 RPM, PF .8, Frame 976, Exciter 120 volts DC. Control panel: General Electric, Dwg. 6367270, Type XF-100492, 6 circuits, 450 volts AC.

525 KW GENERAL ELECTRIC AUXILIARY TURBO GENERATOR UNIT

Complete with L.O. Cooler. **Turbine:** General Electric 525 KW, Type DORV-325M, 5645 RPM. **Reduction Gear:** General Electric Type S-162-D, 5645/1200 RPM, single helical. **Generators:** General Electric. (1) Type ABT, 3 phase, 400 KW, 450 VAC, 1200 RPM. (2) Type MPC, 75 KW, 110 VDC, 1200 RPM, Exciter. (3) Type MPLI, 55 KW, 120 VDC, 1200 RPM, Generator. (4) Auxiliary DC generators.

CENTRIFUGES

DeLaval, Type 1716, Serial No. 2562983, RPM 750
Westfalia, Type ON 1516, Serial No. 1647991, RPM 9450, Heavy Liquid 1.1 kg/dm³, Solids 1.1 kg/dm³.

PROPELLER

Koppers Mfg. Co., solid, 4-bladed, right hand, dia. 19'6", pitch 17'5" at 6.5 R.

STRIPPER PUMP

National Transit, horizontal rotary, GPM 400, disch. head 100', with motor.

STRIPPER PUMP

Worthington, vertical duplex, GPM 700, disch. head 100#, 14" x 12" x 12".

ANCHOR WINDLASS

American Engineering Co., triple spur geared with double horizontal steam cylinders, 12" x 14", steam press. 175#/sq. in.

MAIN FEED PUMP

Pump: Coffin Turbo Pump Co., single stage, centrifugal, size CG-12A, 6980/7030 RPM, 240/280 GPM, 254/280 HP, 6" x 3", 750 psi @ 1760 ft. head, complete with turbine, w/A.B.S. **Price: $9,700.00**

MAIN FEED PUMP

Coffin, turbine drive, Type F, 7200 RPM, 200 GPM, 150 HP, 150 psi w 1329 ft. head.

Mission and Standard T2SEA1

MAIN TURBINE

G.E. 4925/5400 KW, 3600/3715 RPM, Steam press. 435#, temp. 720°F, exh. press. 1.75", 10 stages.

MAIN GENERATOR

G.E. Type ATB-2, Form HL, 3 phase, 60/62 cycles, 2300/2370 volts, 4925/5400 KVA, 3600/3715 RPM, 1237/1315 armature amps, 1.0 PF, excitation amps 100, field amps 155/160 cent. duty 60°C, armature 85°C.

SWITCHBOARD — MAIN

G.E. Model 43A1.

POWER TRANSFORMERS

G.E. Type H, Form RA, 60 cycles, voltage rating 2300/400/450, 450°C rise.

BILGE PUMP

National Transit, horizontal, rotary, GPM 200, dis. head 40#, with motor.

MAIN CARGO PUMP

Ingersoll Rand, horizontal cent. GPM 2000, disch. head 280', with motor.

MAIN CIRCULATING PUMP

Ingersoll Rand, vertical centrifugal, GPM 14,000, disch. head 25', with motor.

MAIN STEERING UNIT

2 — motors, G.E. Model 5K444 PMI, 220/440 volts, Type, FL, 30 amps, 3 phase, 60 cycle, 20 HP, 700 RPM, Code H, cont. 50°C.
1 — Hele-Shaw pump, American Engrg., Size SLP, 850 RPM, Press. 1000#.
1 — Gear box, American Engrg., MA3
1 — Telemotor, American Engrg.

EX: SANTA ANA T2SEA2 (MISSION)

2 each — Steering Gear, Rams
2 each — Steering Gear Pumps & Motors
1 each — Refrigeration Compressor, Carrier 7H5, with G.E. Motor
2 each — Auxiliary Turbo Generators, G.E. 535 KW
1 each — Main electrical control board
1 each — Auxiliary Electrical Control Board
3 each — G.E. forced draft turbines, 50 HP
1 each — Mooring Winch, American Engineering, 9 x 12

★ ★ ALSO AVAILABLE !! ★ ★

DC MOTOR

885 HP, 700/950 RPM, 230 V, 3085 amps, 120 V excitation @ 60°C rise. Shunt wound. Self aligning roller bearings. **DC Generator** for use with above motor for variable speed control constant torque also available. Rated 710 KW, 230 volt.

Ideal for drilling rig operation

NEW MAIN MOTOR FOR T2

Gen. Elect. #5690714 Type TSM-80, 6000 HP, 90 RPM, form H.L., 2300 volts. Amps. arm. 1160, P.F. 1.0., KVA 4625 phase 3 cycle 60, exciter volts 120, amps field 390 contin. @ 60°C. rise. Spare coils available (stator).

T2 RUDDER — w/A.B.S. CARGO STRIPPING PUMP

Worthington (steam). Size: 16" x 14" x 18" 1400 GPM @ 110 psi. Bronze liquid end.

PUMP — AUXILIARY CIRCULATING

Warren, Size & Type 14-DBV-16, 690 gpm, 25 ft. he., 6500 RPM with motor.

PUMP — FUEL OIL SERVICE

DeLaval Imo Pump, 42 GPM, 1750/870 RPM, 375 psi disch. with motor.

PUMP — BILGE & BALLAST

Warren, Steam reciprocating, 12" x 8½" x 12" vertical duplex, 275 gpm, with motor.

BUTTERWORTH HEATER

Ross heat exchanger, surface 705 sq. ft., salt water heater.

Design press.	tube 250	shell 150
Hydro press.	500	300
Design temp.	300	480

LUBE OIL COOLER

Davis Engineering Corp., "Paracoil", 2X156C, Shell test 120#, Tube test 100#.

PUMP — BILGE & BILGE PRIMER

Buffalo Forge, Size 4", 600 GPM, 1750 RPM, 13.5 BHP, Type or Model SL, Total head 30 psi, 10" dia. imp. 50 psi, with motor.

MAIN CARGO PUMP UNIT

Pump: Ingersoll Rand, type 2 stage horizontal, size 6-GTM, 1750 RPM, 2000 GPM, 12" x 12", 100 psi @ 280 ft. head. With motor.

FUEL AND LUBE OIL PUMP

Pump: Quimby, size 2½ head screw, 1200/600 RPM, 15 GPM @ 325 psi disch. press. **Motor:** General Electric, Model 5KF364PP1, Frame 364, 7.5/3.75 HP, 1160/580 RPM, 440 volts AC, 10/9.7 amps, 3 phase, 60 cycle, complete with controller.

LUBE OIL SERVICE PUMP

Pump: Quimby, Type vertical rotex, size 4-B, 1150 RPM, 175 GPM @ 60 psi with 20 ft. head, 6" x 5". **Motor:** General Electric, Model 5KF365AJX1, Frame 365, 5 HP, 1170 RPM, 440 volts AC, 20 amps, 3 phase, 60 cycle, complete with controller.

MAIN CONDENSATE PUMP

Pump: Ingersoll Rand, size 2VHM, 1760 RPM, 180 GPM @ TDH 165 ft., 5" x 2", disch. press. 67 psi. **Motor:** General Electric, Model 5KF365AJN-1, Frame 365V, 20 HP, 1765 RPM, 440 volts AC, 3 phase, 60 cycle, 25.5 amps, with controller.

MAIN CIRCULATING PUMP

C4, Warren type. 24 MFP, 18000 GPM, 690 RPM, 16 TDH vertical w/150 HP, 440/3/60 motor w/spare parts.

ORIGINATING FROM 70,000 DWT TANKER BARRACUDA CLASS

MAIN PROPULSION TURBINES

Newport News Shipbuilding & Drydock Co., HP 13,500 SHP @ 5851 RPM, LP 10,210 SHP @ 3286 RPM.

ANCHOR WINDLASS

American Engineering Co., 13" x 14", Chain speed 30 fpm, Inlet steam 135-175 psi.

TURBINE-GENERATOR 1000 KW

Turbine: DeLaval, 7 stages throttle steam, 825 psig, 850°F, Exhaust 1.75 in Hg ABS, 9313 RPM, Atmo. relief valve, 2 psig. **Reduction Gear:** DeLaval single reduction, pinion 9313 RPM, Gear 1200 RPM, speed ratio 7.761:1.

DISTILLER PLANTS

Griscom-Russell, Horizontal Low pressure, Double effect. Single effect capacity 9250 gpd, Clean tube capacity 12,000 gpd.

PUMP — CARGO TANK BALLAST

Ingersoll-Rand Centrifugal, Size 10 HLV, hydraulic test 200 **Turbine:** G.E. Marine, Model No. 7TDPY125MR72, 600 HP, 5923 RPM, Steam press. 775-800, Max. 535°F TT, Exh. 17.9. **Reduction gear:** G.E. Type S-233, Form AE, Class 600 HP, 5923/1860 RPM.

PUMP — MAIN CIRCULATING

Warren Pump Co., Size & Type 30-SLMV, cap. 22,500 gpm, 25 ft. head, 500 RPM, with motor.

PUMP — MAIN CONDENSATE

Warren Pump Co., Size & Type 4-2CVP-13, 380 GPM, 280' head, 1750 RPM, with motor.

PUMP — AUXILIARY CONDENSATE

Warren, Size & Type 4-2CV-P-13, 380 gpm, 280 ft. hd., 1750 RPM with motor.

PUMP — MAIN FEED

Pacific Steam Turbo Pump, Size 2" x 6" x 4" x 8", Type TBA, 9600 RPM, 730 HP, 660 gpm, 2625 ft. hd., 35 NPSH. Ft., **Governor:** Woodward #A033304, Drive shaft speed 700-900, RPM control air pressure 25-5 psi.

HUNDREDS OF OTHER ITEMS ALSO AVAILABLE!

CURRENTLY DISMANTLING

C3, C2, AP3, S4, AND T2

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Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 19523
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

BATTERIES
Saft Corp of America, Industrial Battery Div., 402 Myrtle Ave., Boonton, N.J. 07005

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Morse Chain Company, Div. Borg Warner, So. Aurora St., Ithaca, N.Y. 14850
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

BLASTING—Cleaning—Equipment
Atlantic Sandblasting & Coatings, Inc., 505 Faulkenburg Road, Tampa, Florida 33619
Clemco Industries, 2177 Jerrold Ave., San Francisco, Ca. 94124
Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031

BOILERS
Combustion Engineering, Inc., Windsor, Connecticut 06095
Indeck Power Equipment Co., 1075 Noel Ave., Wheeling, Ill. 60090
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

BOW THRUSTERS
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Omnithruster Inc., 10880 Wilshire Blvd., Suite 614, Los Angeles, CA 90024
Schottel of America, Inc., 21 N.W. South River Dr., Miami, Fla. 33128

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Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
Riggs Marine Corp., 29 Broadway, New York, N.Y. 10006

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Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019

CABLE—Electrical
Seacoast Electrical Supply Corp., 225 Passaic St., Passaic, N.J. 07055

CARGO TRANSFER & ACCESS EQUIPMENT
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CLOCKS
Wempe Chronometerwerke Germany, Stubbenhulk 25 2000 Hamburg 11, Germany

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Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CONTAINER LASHINGS & COMPONENTS
Line Fast Corp., 805 Grundy Ave., Holbrook, N.Y. 11741

CONTROL SYSTEMS
Automated Marine Systems Division, Litton Systems Canada Limited, 21101 Oxnard St., Woodland Hills, CA 91364
Delaval Turbine Inc., (Gems Sensors Div.) Spring Lane, Farmington, Conn. 06032
Foxboro Marine Operations, P.O. Box 435, Burlington, Mass. 01803
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Marine Electric RPD Inc., 166 National Road, Edison, N.J. 08817
Propulsion Systems Inc., 21213 76th Ave. South, Kent, Wash. 98031
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

CORROSION CONTROL
Carboline Co., Marine Div., 350 Hanley Industrial Court, St. Louis, Mo. 63144
Engelhard Industries, Capac Systems, 2655 U.S. Rt. 22, Union, N.J. 07083

CRANES—HOISTS—DERRICKS—WHIRLEYS
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Diamond Manufacturing Co., P.O. Box 608, Savannah, Ga. 31402
AB Hagglund & Soner, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
M. P. Howlett, Inc., 410 32nd St., Union City, N.J. 07087
Marathon LeTourneau Company, P.O. Box 2307, Longview, Texas 75601
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

DECK COATINGS—Non-Slip
O'Neill Company Inc., 5515 Belair Road, Baltimore, Md. 21206

DECK COVERS—Chain Pipe
Lockstad Co., Inc., 179 West 5th Street, Bayonne, N.J. 07002
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, N.J. 07016
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY—Cargo Handling Equipment
AB Hagglund & Soner, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
New England Trawler Equipment Co., 291 Eastern Ave., Chelsea, Mass. 02150

DIESEL ACCESSORIES
Controls, Inc., 2655 U.S. Rt. 22, Union, N.J. 07083
Exhaust Controls, Inc., 2655 U.S. Rt. 22, Union, N.J. 07083
General Thermodynamics Corporation, 150 Ballardvale St., Wilmington, Mass. 01887

DIESEL ENGINES
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Burmeister & Wain, One State Street Plaza, New York, N.Y. 10004
Caterpillar Tractor Co., Industrial Division, Peoria, Ill. 61629
Electro-Motive Division General Motors, La Grange, Illinois 60525
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Indeck Power Equipment Co., 1075 Noel Ave., Wheeling, Ill. 60090
M.A.N. AG Werke Augsburg Postfach 10 00 80 D-8900 Augsburg 1 Germany
Mitsui Engineering & Shipbuilding Co. Ltd., 6-4 Tsukiji, 5-chome, Chuo Ku, Tokyo, Japan
MTU/Motoren-und Turbinen-Union, Friedrichshafen GmbH, P.O. Box 2040, D-7990 Friedrichshafen, W. Germany
Oosterhuis Industries Inc., 1800 Engineers Road, Belle Chasse, La. 70037
Power & Propulsion Systems, Inc., 9821 Katy Freeway, Houston, Texas 77024

DIVERS
International Underwater Contractors Inc., 222 Fordham Street, City Island, New York 10464
RMP Marine Services, Inc., Pier D, Berth 34, Long Beach, Calif. 90802 — Norfolk, VA, Houston, TX, Honolulu, HA
Undersea Systems, 112 W. Main St., Bay Shore, N.Y. 11706

DOCK BUILDERS
DeLong Corporation, 29 Broadway, New York, N.Y. 10006
GHH Sterkrade, Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004

DOORS—Watertight—Joiner
Walz & Krenzer Inc., 400 Trabold Road, Rochester, N.Y. 14624

EDUCTORS
Vita Motivators Co., 200 West 20th Street, New York, N.Y. 10011

ELECTRICAL EQUIPMENT
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N. Y. 10013
Marine Industrial Products Co., 1275 Bloomfield Ave., Fairfield, N.J. 07006
Merrin Electric, 1120 Clinton Street, Hoboken, N. J. 07030
Midland Ross Corp., Electrical Products Div., P.O. Box 1548, Pittsburgh, Pa. 15230
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Port Electric Supply, 157 Perry Street, N.Y., N.Y. 10014
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EQUIPMENT—Marine
Alexander Industries, Inc., 1901 Julia Street, New Orleans, LA 70113
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N. Y. 10013
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 1120 Clinton Street, Hoboken, N.J. 07030
Peck Equipment Co., 3500 Elm Avenue, Portsmouth, Va. 23704
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

EVAPORATORS
Riley-Beaird, Inc., P.O. Box 1115, Shreveport, La. 71130

EXPANDED METALS
Niles Expanded Metals Inc., 700 North Pleasant Ave., Niles, Ohio 44446

FAIRLEADS—Blocks and Rigging
Crosby Group, Box 3128, Tulsa, Okla. 74101

FANS—VENTILATORS
Coppus Engineering Corp., 344 Park Avenue, Worcester, Mass. 01610
Dasic International Corp., 1035 Southeast Ninth Street, Portland, OR 97214
Merrin Electric, 1120 Clinton Street, Hoboken, N.J. 07030
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Dock & Vessel
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004
Johnson Rubber Co. (Marine Div), 16025 Johnson St., Middlefield, Ohio 44062
Morse Chain Company, Div. Borg Warner, So. Aurora St., Ithaca, N.Y. 14850

FINANCING—Leasing
General Electric Credit Corp., P.O. Box 8300, Stamford, Conn. 06904
Kidder, Peabody & Co., Inc., 10 Hanover Square, New York, N.Y. 10005
Lehman Brothers Inc., One Williams Street, New York, N.Y. 10004

FITTINGS & HARDWARE
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207
Superior Switchboard & Devices, Division of Union Metal Manufacturing Company, P.O. Box 590, Canton, Ohio 44701

FURNITURE
Bailey Joiner Co., Inc., 74 Sullivan Street, Brooklyn, N.Y. 11231

GANGWAYS
Rampmaster Inc., 1226 N.W. 23rd Ave., Fort Lauderdale, Fla. 33311

HULL CLEANING
East Coast Marine Associates, Inc., 80 Broad Street, New York, N.Y. 10004
MP Industries Inc., 1200 Ponca St., Baltimore, Md. 21224
Phosmarin Equipement (Phoceenne Sous-Marine S.A.), 21 Boulevard de Paris, 13002 Marseille, France
RMP Marine Services, Inc., Pier D, Berth 34, Long Beach, Calif. 90802 — Norfolk, VA, Houston, TX, Honolulu, HA

HYDRAULICS—Launching Equipment
Hydranautics, P.O. Box 1068, Goleta, Calif. 93017

HYDRAULIC POWER
Abex Corp., Denison Div., 1160 Dublin Rd., Columbus, Ohio 43216

INERT GAS—Generators—Systems
Airfilco Engineering, Inc., 1901 Julia St., New Orleans, La. 70113

INSULATION—Cloth, Fiberglas
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 5 World Trade Center, Suite 6433, New York, N.Y. 10048
R.B. Jones Insurance, 911 Main St., Kansas City, MO 64199
R.B. Jones Insurance, 120 S. Central Ave., St. Louis, MO 63105
R.B. Jones Insurance, 160 Water St., New York, N.Y. 10038
Marsh & McLennan Inc., 1221 Ave. of the Americas, New York, N.Y. 10020

KEEL COOLERS
Johnson Rubber Co. (Marine Div), 16025 Johnson St., Middlefield, Ohio 44062

LADDERS
Duo-Safety Ladder Co., 513 West 9th Ave., P.O. Box 497, Oshkosh, Wisc. 54901

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Automatic Power Inc., 213 Hutchinson Street, Houston, Texas 77003
Midland Ross Corp., Electrical Prod. Div., P.O. Box 1548, Pittsburgh, Pa. 15230
Oceanic Electrical Mfg. Co., 157 Perry Street, New York, N.Y. 10014
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Port Electric Supply Corp., 157 Perry Street, New York, N.Y. 10014
Tideland Signal Corp., P.O. Box 52430, Houston, Texas 77052

MACHINE TOOLS
Master Machine Tools, Inc., 1300 East Avenue A, Hutchinson, Kansas 67501

MARINE MACHINERY REPAIR
Worthington Service Corp., 233 Mount Airy Road, Basking Ridge, N.J. 07920

MARINE VALVES—Manhole Covers Gauge Hatches
J.M. Huber Corp., P.O. Box 2831, Borger, Texas 79007

MOORING SYSTEMS
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., Suite 500, 2341 Jefferson Davis Highway, Arlington, Va. 22202
Alpha Engineers, 7215 N.E. 13th Ave., Vancouver, Wash. 98665
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, Md. 20015
Anchorage Marine Services Incorporated, 844 Biscayne Boulevard, Miami, Florida 33132
J.L. Bludworth, P.O. Box 5217, Houston, Texas 77012
Boquer & Associates, P.O. Box 30184, New Orleans, La. 70190
Breit & Garcia, Naval Architects, 441 Gravier St., New Orleans, La. 70130
CADCOM Inc., 2024 West St., Suite B, Annapolis, Md. 21401
R.A.CADY-Marine Survey Practice, 2301 Leroy Stevens Road, Mobile, Ala. 36609
Catalina National, Inc., 1725 Monrovia Ave. (Suite A4), Costa Mesa, CA 92627
C.D.I. Marine Co., Regency East, Suite 222, 9951 Atlantic Blvd., Jacksonville, Florida 32211
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Daniel Yacht & Ship Brokerage Ltd., 1861 S.E. 17th St., Suite 206, Ft. Lauderdale, Fla. 33316
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners Inc., One State Street Plaza, New York, N.Y. 10004
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Christopher J. Foster, Inc., 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Ltd., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Arthur A. Grant & Son, Inc., 1745 First National Bank of Commerce Bldg., New Orleans, La. 70112
Phillip Gresser & Associates (PTE) Ltd., 122 Eng Neo Ave., Singapore 11
Morris Guralnick Associates, Inc., 550 Kearny Street, San Francisco, Calif. 94108
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hydronautics, Incorporated, 7210 Pindell School Road, Howard County, Laurel, Maryland 20810
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Maritime Service Company, 1357 Rosecrans St., Suite B, San Diego, CA 92106
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Nelson & Associates, Inc., 2001 N.W. 7th Street, Miami, Florida 33125
Nickum & Spaulding Associates, Inc., 811 First Ave., Seattle, Wash. 98104
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 SW 57th Ave., Fort Lauderdale, Fla. 33317
Proto-Power Management Corporation, P.O. Box 494, Mystic, Conn. 06355
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
Sargent & Herkes, Inc., 611 Gravier St., New Orleans, La. 70130
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
Seaworthy Engine Systems, 73 Main Street, Essex, Conn. 06426
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver, Canada V5Y 1N2
SRS Shipping Research Services Inc., 205 S. Whiting St., Alexandria, VA 22304
The Stanwick Company Maritime Systems Department, 3661 E. Virginia Beach Blvd., Norfolk, VA 23502
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler Inc., 8 Columbia St., Milford, Del. 19963
H.M. Tiedemann & Co., Inc., 295 Greenwich Ave., Greenwich, Conn. 06830
Thames Engineering Consultants Inc., P.O. Box 589, New London, Ct. 06320
Timsco, 951 Government St., Suite 2161, Mobile, Alabama 36604
Uhlig & Associates, Inc., 8295 S.W. 188th St., Miami, Florida 33157
Undersea Systems, 112 W. Main St., Bay Shore, N.Y. 11706
Wesley D. Wheeler Associates, Ltd., 104 East 40 St., Suite 207, New York, N. Y. 10016

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschuetz of America, 444 5th Ave., New York, N.Y. 10018
Automated Marine Systems Division, Litton Systems Canada Limited, 21101 Oxnard St., Woodland Hills, CA 91364
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Comsat General Corp., 950 L'Enfant Plaza, S.W., Washington, D.C. 20024
Electro-Nav, Inc., 1201 Corbin St., Elizabeth Marine Terminal, Elizabeth, N.J. 07201
Griffith Marine Navigation, Inc., 134 North Avenue, New Rochelle, N.Y. 10801
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Intermarine Electronics, Inc., Flowerfield Bldg. #7, St. James, N.Y. 11780
Iotron Corp., 5 Alfred Circle, Bedford, Mass. 01730
ITT Decca Marine Inc., P.O. Box G, Palm Coast, Fla. 32037
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Konel Corporation, 271 Harbor Way, So. San Francisco, Calif. 94080
Krupp Atlas—Elektronik, A Div. of Krupp Intl. Inc., P.O. Box 58218, Houston, Texas 77058
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal 90503
Mieco, Inc., 109 Beaver Court, Cockeysville, Md. 21030
Nav-Com, Inc., 2 Hicks Street, North Lindenhurst, N.Y. 11757
North American Philips Corp., Communications Systems Div., 31 McKee Drive, Mahwah, N.J. 07430
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Simrad Inc., 1 Labriola Court, Armonk, N.Y. 10504
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Tracor, Inc., Industrial Products Div., 6500 Tracor Lane, Austin, Texas 78721

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BUYERS DIRECTORY (continued)

OIL PURIFIERS—Separators
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231

OILS—Marine—Additives
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Mobil Oil Corporation, 150 East 42nd St., New York, N.Y. 10017
Texaco, Inc. (International Marine) 135 East 42nd St., N.Y., N.Y. 10017

PAINT—Coatings, Protective
Carboline Co., Marine Div., 350 Hanley Industrial Court, St. Louis, Mo. 63144
Devoe & Reynolds Co., Inc., P.O. Box 7600, Louisville, Ky. 40207
International Paint Co., 17 Battery Place North, Suite 1150, New York, N.Y. 10004
Mobil Chemical Co., Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 08817
Petterson Sargent Co., 1471 Jersey Ave., New Brunswick, N.J. 08901
Products Research & Chemical Corp., (PRC Coating and Sealants Div.) 5430 San Fernando Road, Glendale, California 91203

PETROLEUM SUPPLIES
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PILOT LADDERS—Wood Products
A.L. Don Co., 58 Grant Avenue, Carteret, N.J. 07008

PIPE—HOSE—Cargo Transfer, Clamps, Couplings
Camlock Flange Sales Corp., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Hydro-Craft, Inc., 4223 Edgeland, Royal Oak, Mich. 48073
Kubota, Ltd., 22, Funade-cho 2-chome, Naniwa-Ku, Osaka, Japan
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

PLASTICS—Marine Applications
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231

PLATENS
Welding Wholesale Co., Div. J.A. Cunningham Eqpt., Inc., 2151 Dreer St., Philadelphia, Pa. 19125

PROPELLERS: NEW AND RECONDITIONED—SYSTEMS
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
The Columbian Bronze Corp., 216 North Main Street, Freeport, N.Y. 11520
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Lips BV, Lipsstraat 52, Drumen, Netherlands
LIPS Propeller Works Inc., 420 Lexington Ave., New York, N.Y. 10017
Voith Schneider — U.S. Agent: Krupp International, Inc., 550 Mamaroneck Ave., Harrison, N.Y. 10528

PROPULSION—Marine
Combustion Engineering, Inc., Windsor, Connecticut 06095
Delaval Turbine Inc., Turbine Div., Trenton, N.J. 08602
In-Place Machining Co., 1929 N. Buffman St., Milwaukee, WI 53212
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Schottel of America, Inc., 21 N.W. South River Dr., Miami, Fla. 33128
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523

PUMPS—Repairs—Drives
Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Worthington Pump Inc., P.O. Box 1250, Mountainside, N.J. 07092

RATCHETS
CM American, Division Columbus McKinnon Corp., P.O. Box 74, McKees Rocks, Pa. 15136

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry Street, New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 19523

RIGGING & BLOCKS
Crosby Group, P.O. Box 3128, Tulsa, Okla. 74101
Superior Switchboard & Devices, Division of Union Metal Manufacturing Company, P.O. Box 590, Canton, Ohio 44701
D. Van Beest En Zn.B.V., P.O. Box 57, Merwestraat 1-5, Sliedrecht, The Netherlands

ROPE—Manila—Nylon—Hawsers—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
The Cordage Group, Columbian Drive, Auburn, N.Y. 13021
Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SCAFFOLDING EQUIPMENT—Work Platforms
Chamberlain Manufacturing Corp., 845 Larch Ave., Elmhurst, Ill. 60126
Patent Scaffolding Co., 2125 Center Ave., Fort Lee, N.J. 07024
Spider Staging Sales Co., P.O. Box 182, Renton, Washington 98055
Trus Joist Corp., P.O. Box 60, Boise, Idaho 83707

SEWAGE—Pollution Control
Argo Marine, Pollution Systems Division, 140 Franklin St., New York, N.Y. 10013
Clear Water, Inc., N. Main Street, Walworth, WI 53184
Colt Industries, Water & Waste Management Operation, Beloit, Wisc. 53511
Demco, Inc., P.O. Box 94700, Oklahoma City, Oklahoma 73109
Engelhard Industries, Chloropac Systems, 2655 U.S. Rt. 22, Union, N.J. 07083
Marine Moisture Control Co., Inc., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Marland Environmental Systems, Inc., N. Main Street, Walworth, WI 53184
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Red Fox Industries, P.O. Drawer 640, New Iberia, La. 70560
Research Products/Blankenship, 2639 Andjon, Dallas, Texas 75220
St. Louis Ship FAST Sewage Systems, 611 East Marceau St., St. Louis, Mo. 63111

SHAFTS, SHAFT REVOLUTION INDICATOR EQUIP.
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

SHIPBREAKING—Salvage
American Ship Dismantlers, Inc., Division of Schnitzer Industries, 3300 N.W. Yeon Avenue, Portland, Ore. 97210
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Levin Metals Corp., 1310 Canal Blvd., Richmond, CA 94807
National Metal & Steel Corp., 691 New Dock St., Terminal Island, Cal. 90731
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
Arab Shipbuilding & Repair Yard Co., P.O. Box 5110, Bab-Al-Bahrain Building, Bahrain, Arabian Gulf
Astilleros Espanoles, S.A., 17, Padilla, Madrid 6, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Bergeron Industries Inc., P.O. Box 38, St. Bernard, La. 70085
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blohm + Voss AG, D-2000 Hamburg 1, P.O.B. 10 07 20
Blohm + Voss Co., 55 Morris Ave., Springfield, N.J. 07081
Blount Marine Corp., P.O. Box 368, Warren, RI 02885
Bludworth Shipyard, Inc., (Subsidiary of Elpac, Inc.), 8502 Cypress St., Houston, Texas 77012
Boston Marine Industrial Park, Public Drydock No. 3, 60 Congress St., Boston, Mass. 02109
Carrington Slipways Pty, Ltd., Old Punt Road, Tomago, N.S.W., Australia 2322
CCL Shipcare Limited, Easton Lane Winnall Estate, Winchester Hampshire, England SO237QU
China Shipbuilding Corp., c/o Allegro Transportation Supply Co., 393 Seventh Ave., Room 234, New York, N.Y. 10001
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Co., Inc., P.O. Box 153, Willemstad, Curacao, Netherlands Antilles
Curacao Drydock, 26 Broadway, Suite 741, New York, N.Y. 10004
Dravo Corporation, One Oliver Plaza, Pittsburgh, Pa. 15222
Dravo Steelship Corp., R.4, Box 167, Pine Bluff, Ark. 71602
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, La. 70122
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
General Dynamics, Quincy Division, Quincy, Mass. 02169
Gladding-Hearn Shipbuilding Corporation, 1 Riverside Avenue, Somerset, Mass. 02725
Granges Repair Service GMBH, P.O. Box 3166, Gutenbergring 64, D-2000 Hamburg-Norderstedt Germany
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Harland & Wolff Shipbuilding & Engineering, Queens Island, Belfast, Northern Ireland
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., P.O. Box 510, Brownsville, Pa. 15417
Hitachi Shipbuilding & Engrg. Co., Ltd., 47 Edobori 1-Chome, Nishi-Ku, Osaka, Japan
Hongkong United Dockyards Ltd., Kowloon Docks, Hong Kong
Hyundai Mipo Dockyard Co., Ltd., 456 Cheonha-dong, Ulsan, Korea
Hyundai Shipbuilding & Heavy Industries Co., Ltd., 5 World Trade Center, Suite 679, New York, N.Y. 10048
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Heavy Industries, Ltd., Kawasaki Kisen Kaisha, Ltd., 8 Kaigan-dori, Kuta-ku, Kobe, Japan
Kockums Shipyard, S-201, 10 Malmo 1, Sweden
Lantana Boatyard, Inc., 808 N. Dixie Hwy., Lantana, Fla. 33460
Lisnave Estaleiros, Navais de Lisboa, Apartado 2138, Lisbon 3 Portugal
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Dunbartonshire, G81-1YB, Scotland
Marinette Marine, Ely Street, Marinette, WI 54143
Matton Shipyard Co., Inc., P.O. Box 645, Cohoes, New York 12047
Maxon Marine Industries, Inc., P.O. Box 349, Tell City, Ind. 47586
J. Ray McDermott & Co., Inc., P.O. Box 60035, New Orleans, LA 70160
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
Misener Industries, Inc., 5353 Tyson Avenue, P. O. Box 13625, Tampa, Fla. 33681
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
Murray & Stewart (Marine) (PTY) Ltd., Ocean Road-Table Bay Harbour, P.O. Box 1909, Cape Town 8000, South Africa
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Neorion Shipyards Syros, Ltd., Syros, Greece
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
Northwest Marine Iron Works, P. O. Box 3109, Portland, Oregon 97208
O.A.R.N. (Officine Allestimento-Riparazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearison Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
Port Allen Marine Service, Inc., P.O. Box 108, Port Allen, LA 70767
St. Louis Shipbuilding—Federal Barge, Inc., 611 Last Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Sun Shipbuilding, Foot of Morton Ave., Chester, Pa. 19013
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Tampa Ship Repair & Dry Dock Co., P.O. Box 1277, Hookers Point, Tampa, Fla. 33601
Terrin Shipyards, Societe Provencale des Ateliers Terrin, 287, Chemin DeLa Madrague, 13345 Marseille—Cedex 3, France
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada
Wall Shipyard, P.O. Box 419, Harvey, La. 70058
Wiley Mfg., a unit of AMCA International Corp., Suite 200/Stockton Bldg., University Office Plaza, Newark, Del. 19702

SHIP STABILIZERS
Pacific Marine Products, Inc., P.O. Box 11, Kenmore, Wa. 98028
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

SHOCK CORDS
Wm. B. Bliss Inc., 381 Park Ave. So., New York, N.Y. 10016

SMOKE INDICATORS
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928

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Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062

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TANK CLEANING
Butterworth Systems Inc., 224 Park Ave., P.O. Box 352, Florham Park, N.J. 07932
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

TANK LEVELING INDICATORS
Gems Sensors Div., Delaval Turbine Inc., Spring Lane, Farmington, Conn. 06032

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Transportation Concepts & Techniques, Inc., 551 Fifth Avenue, New York, N.Y. 10017

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Chotin Transportation, Inc., 1414 One Shell Square, New Orleans, La. 70139
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Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
Gulf Mississippi Marine Corp., 225 Baronne St., New Orleans, La. 70112
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
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Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305
B.V. Bureau Wijsmuller, Postbus 510, Ijmuiden, Holland

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Undersea Systems, 112 W. Main St., Bay Shore, N.Y. 11706

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Contromatics Div., Litton Industrial Products, Inc., 222 Roberts St., East Hartford, CT 06108
Demco, Inc., P.O. Box 94700, Oklahoma City, Okla. 73109
Dover Corporation/Norris Division, P.O. Box 1739, Tulsa, Oklahoma 74101
Leslie Company, 399 Jefferson Road, Parsippany, N.J. 07054
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027
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Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186

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Victoria Machine Works, P.O. Box 1939, Victoria, TX 77901

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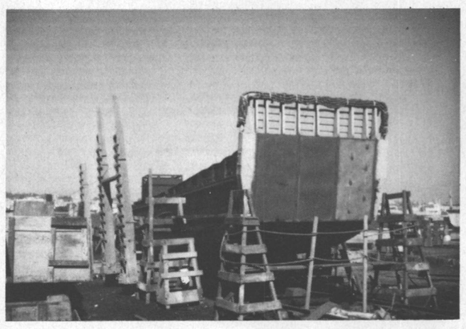

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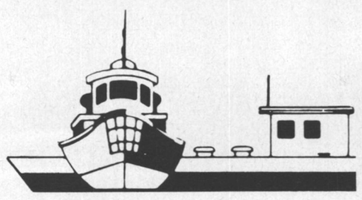

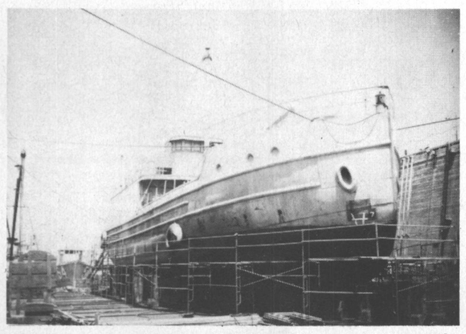

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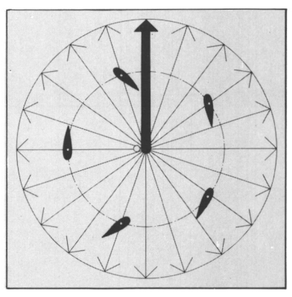

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