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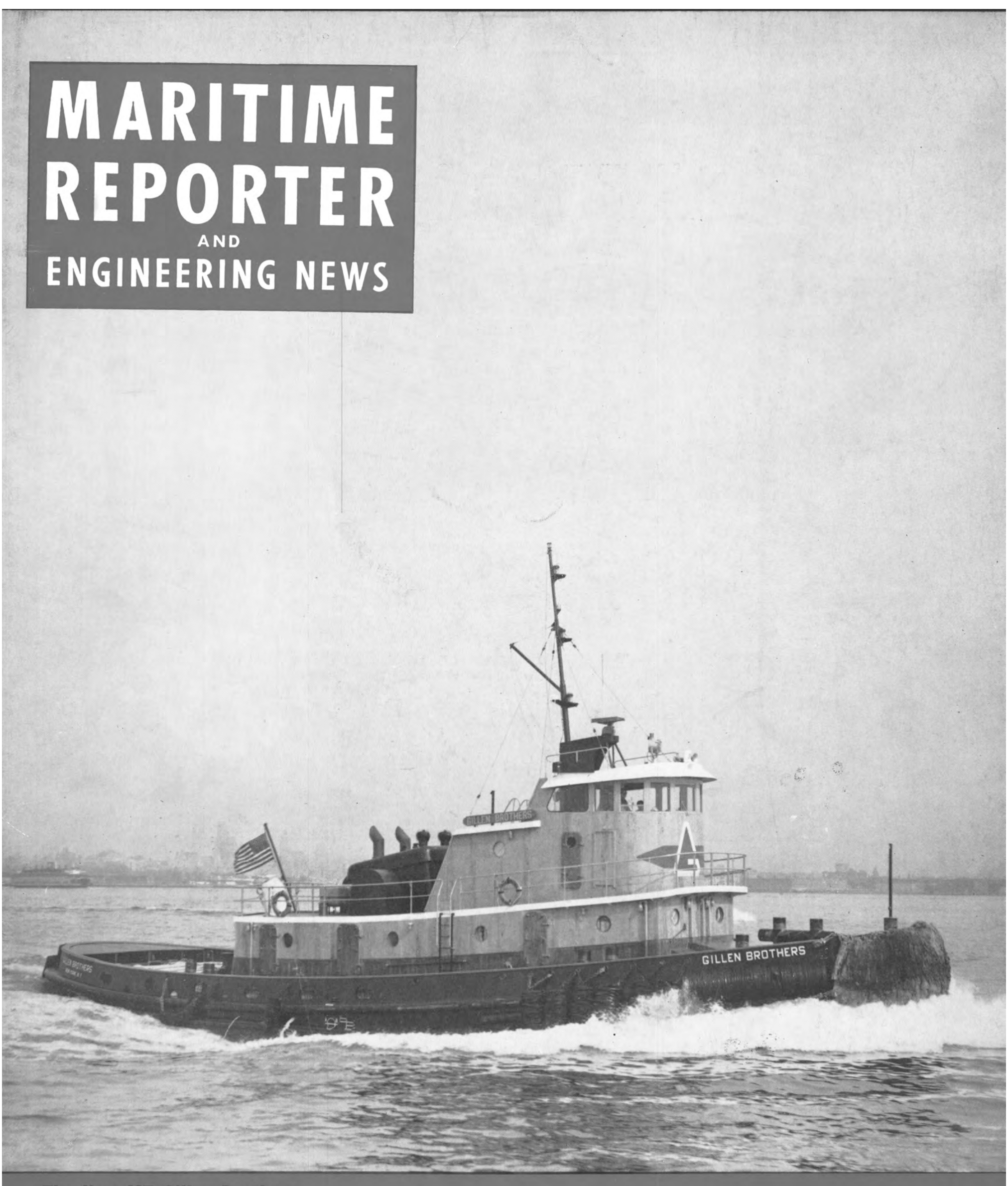

The New MT Gillen Brothers Placed In Service At New York

(SEE PAGE 6)

APRIL 15, 1969

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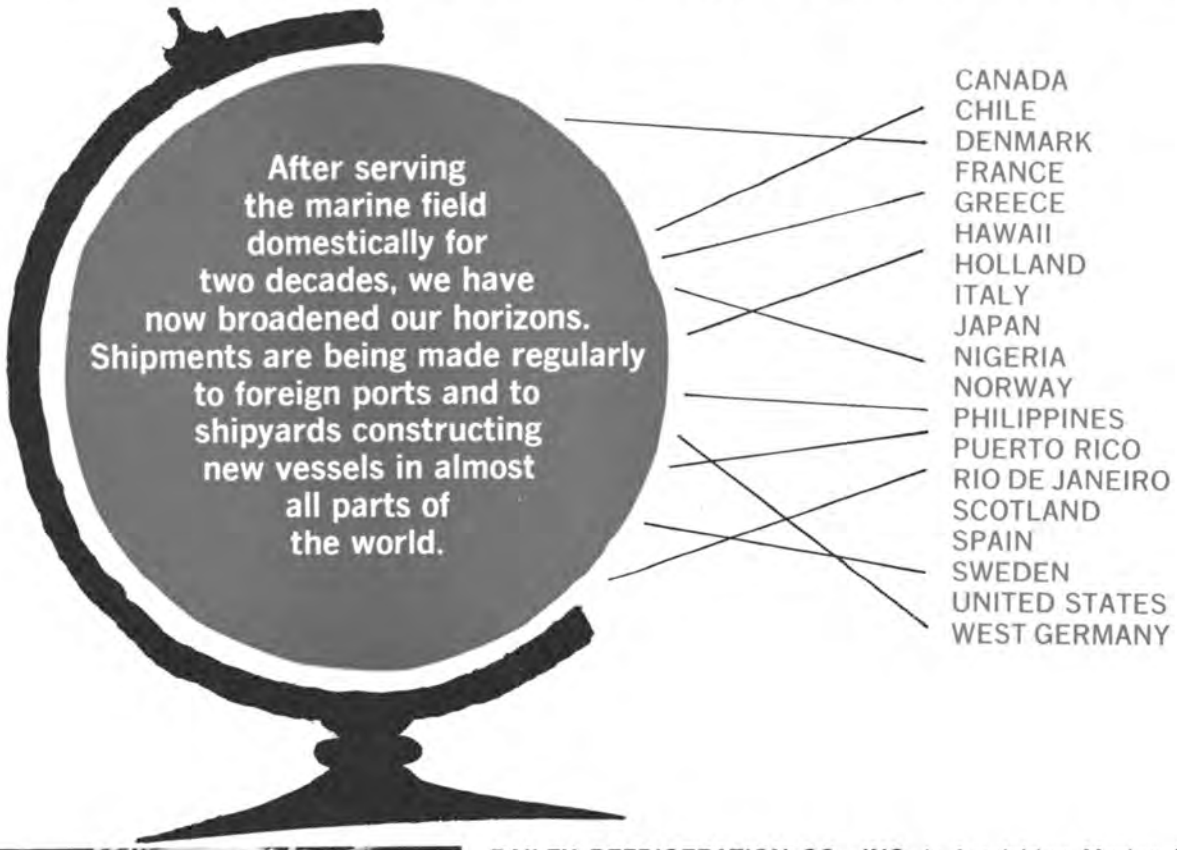

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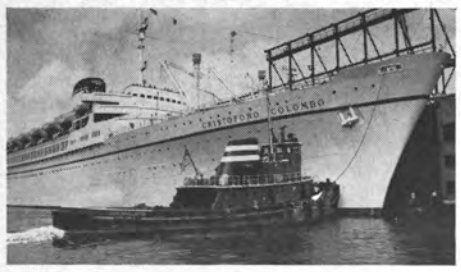

Cristoforo Colombo discovers the new McAllister.

Docking and undocking now faster, more efficient than ever.

The newest addition to the McAllister fleet, the 3160-hp Kort-nozzle tug "Jane McAllister," is shown here undocking the pride of the Italian Line, "Cristoforo Colombo." The "Jane's" flanking rudder system gives her a powerful edge in manuverability that pays off in speed, economy and safe conduct of the ship.

The "Jane" is only one of four new powerful tugs that are swelling the McAllister fleet. Supertugs for superships. So, whatever your harbor movement needs, including tug and barge transportation, why not discover for yourself the new McAllister?
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Mac has the knack.

SNAME Spring Meeting To Be Held On May 21-24 In Beverly Hills, Calif.

James J. Henry, president of The Society of Naval Architects and Marine Engineers, and president of J. J. Henry Co., Inc., New York, has announced that the Annual Spring Meeting of the Society will be held this year in Beverly Hills, Calif., on May 21-24, 1969. The Los Angeles Metropolitan Section, one of the 15 regional sections of the Society, is the host for this meeting. The current chairman of the Section is Capt. **Henry P. Rumble,** USN (ret.), Engineering Sciences Department, The Rand Corp., 1700 Main Street, Santa Monica, Calif.

The Steering Committee, composed of members of the Los Angeles Metropolitan Section, has arranged an outstanding program of technical sessions and social events, all of which bear to some degree on the meeting's theme of Vista Pacific.

A total of 10 technical papers, authored by distinguished leaders in the marine field, will be presented on Wednesday, May 21, and Thursday, May 22.

A harbor tour of the Long Beach/San Pedro/Los Angeles Harbor complex will vie with other social events such as the president's reception, dinner dance, fashion shows and tours of the movie land and Disneyland areas.

Navy Requests Bids For 24 Patrol Craft And A Patrol Escort

Naval Ship Systems Command, Washington, D.C., issued contract IFB-N-00024-69-B-0510 for the construction of twenty-four 50-foot, aluminum patrol craft, fast (PCF), Mark 2, together with spare propulsion engines, to various shipyards. Any other firms interested in bidding for the prime contract are invited to request bid sets from NAVSHIPS.

Another contract, IFB-N00024-69-B-0589, for the construction of patrol escort F-PF107, was issued to the following yards by NAVSHIPS: American Ship Building Co., Lorain, Ohio; Bethlehem-Baltimore Yard; Levingston Shipbuilding Co., Orange, Texas; Norfolk Shipbuilding & Dry Dock Corp., Norfolk, Va.; Bath Iron Works Corp., Bath, Maine; Defoe Shipbuilding Co., Bay City, Mich.; National Steel & Shipbuilding Co., San Diego, Calif., and Todd-Houston Yard.

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Dravo-built *Lillian Clark (above)* and sister ship *Rita Barta* are Mississippi Valley Barge Line's newest boats for tow service on the middle and lower Mississippi. *Photo, left,* Shell Representative Vern Barth (right) checks operating data with *Lillian Clark's* Chief Engineer Tim Perry. Each of the *Lillian Clark's* two new-series 20-cylinder GM diesels weighs less than 50,000 pounds and is rated at 3,225 continuous bhp at 800 rpm. The crankcase lubricant is Shell's new Tornus Oil.

SHELL

Twin-Screw Diesel Tug For Unlimited Operations

The MT Gillen Brothers

Tug Gillen Brothers, shown in New York Harbor, is classed by ABS for ocean service.

When the MT Gillen Brothers recently joined the fleet of Henry Gillen's Sons Lighterage, Inc., it marked an expansion move that added considerably to the potential of this over 100-year-old firm. This tug is classed by the American Bureau of Shipping for ocean service. This addition to the fleet expands the firm's facilities for all types of towing operations — harbor, coastal and ocean.

The Gillen Brothers was built by Jakobson Shipyard, Inc. at Oyster Bay, Long Island, N.Y. It has an overall length of 100 feet, a beam of 28 feet 9 inches and a depth of 13 feet 6 inches.

Twin-screw propulsion is provided by two Caterpillar, Model D399, 16-cylinder turbocharged diesel engines. Each engine is rated at 1,225 hp, having a full-load rpm of 1,225. The engines drive the propellers through Lufkin reverse-reduction gears, with a reduction ratio of 5.25 to 1. The exhaust from each engine is led through a Baird-Maxim spark arresting silencer. Air for engine starting is provided by two Quincy, Model D325-12 compressors. The compressors are operated automatically by a Square D pressure switch set to start the compressors at 120 psi and to shut off at 150 psi.

The main engines and the clutches are controlled from either the engine room or the wheelhouse by means of a Westinghouse Air Brake engine control system.

Electric power is supplied by two 40-kw, 240/480 volt, three-phase, 60-cycle General Electric generators driven by Caterpillar, Model D320 diesel engines. Each engine exhausts through its own Baird-Maxim muffler. The electrical system includes an H.O. Penn generator switch panel, Empire Electric distribution switch panel and General Electric 10-kva transformer.

The steering gear was supplied complete by Propulsion Systems Inc. Following the present-day trend, the helmsman's wheel has been replaced by a lever. The system includes full follow-up in the pilothouse and a non-follow-up after deck steering unit.

Quarters have been provided for ten men. However, the normal operating crew consists of six men. The vessel is equipped with a central ventilation system for the quarters, using a Buffalo Forge fan. The engine room has two separate Buffalo Forge air-supply fans. Heat for the tug is supplied by a Crane boiler, Model 82-396, with a maximum working pressure of 15 psi and equipped with an Automatic Burner Corp. oil burner. Hot water is supplied by a Crane, 82-gallon electric heater.

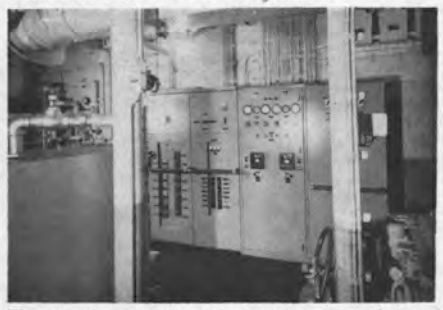
The combined galley and messroom is modern in all respects. The electric range is an Akron Model G-436K1R. There is a large Foster refrigerator/freezer installed in the galley along with stainless-steel sinks, racks, etc.

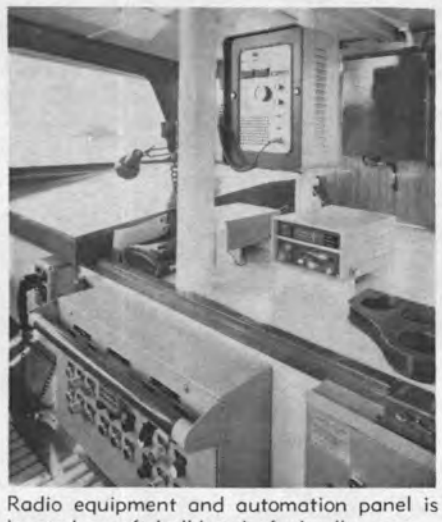
Deck equipment, besides the efficiently located bitts and cleats, consists of a New England Trawler capstan on the aft deck which is driven by an Imperial Electric two-speed, 20-hp motor. All rope was supplied by Cating Rope Works, Inc. of Maspeth, L.I., N.Y.

The wheelhouse provides for a clear view in all directions. The large Kearfott window in front of the helmsman is electrically heated and fitted with a Sprague air windshield wiper. It is completely outfitted for harbor, coastal and ocean service. There is installed a Sperry Mark XIV, Model 1 master gyro compass, a Kelvin White 7-inch Constellation magnetic compass, a Decca radar, and an Apelco Model DFR-200 direction finder.

Radio communication is provided by a Kaar Electronics Model TR222A radio telephone and Clipper II VHF marine radio. For interior communication there is a Hose-McCann sound-powered telephone system connecting the pilothouse, engine room, chief engineer's room, control room and the galley. Navigation lights are controlled from a Hose-McCann panel. Portable Light Company supplied 1,000-watt searchlights for the pilothouse top and the boat deck, while the floodlights were supplied by Pyle-National.

The MT Gillen Brothers is a worthy successor to the first vessel with the same name. The original Gillen Brothers was a wooden-hulled steam lighter built in 1909. It saw service around New York Harbor for over 30 years.


Electrical switchboard contains distribution panel (left), generator panel (center), and capstan control (right).


Radio equipment and automation panel is located on aft bulkhead of wheelhouse.


Automation control is located in control room on the main deck.


Wheelhouse has equipment conveniently located for easy use by the tug's master.


Combined galley and messroom is equipped for long voyages with freezer and storerooms.


Engine room provides ample work area around Caterpillar engines and Lufkin reverse/reduction gears.

New Sludge Barge Enters Operation For Ocean Disposal Co. In New York Area

Ocean Disposall No. 1, being handled by two Moran tugs, returns to New York Harbor after discharging sludge at sea.

Barge Ocean Disposall No. 1 is an all-welded, full ocean American Bureau of Shipping classed sludge vessel now operating in New York Harbor in the fight against pollution. The barge has a capacity of 6,300 tons and is capable of handling cargoes of liquids, slurries or suspended materials. It is 226 feet long, 56 feet wide and has a 20-foot depth.

Designed by naval architect **Robert Simons,** to owners specifications, and built by the Gretna Machine and Iron Works of Harvey, La., the barge will be operated by Ocean Disposal Co., Inc., a subsidiary of Weeks Stevedoring Co. Inc., located at 570 North Broad Street, Elizabeth, N.J. Direct responsibility for the overall operation of the vessel has been given to **Thomas R. Pedersen.**

Weeks Stevedoring Co. Inc. is a firm well-known for over 50 years to the New York Harbor area. The Weeks organization provides a complete and wide range of services to the marine industry with a varied fleet of over 50 vessels. Their services include full revolving floating cranes to 75-ton capacity for bulk stevedoring, heavy lifts, container services and wreck removal. Bulk movements are handled with a fleet of modern, steel, welded deck scows operated by Harbor Transportation Co., Inc. Dredging and underwater contracting projects are efficiently and expeditiously handled by a fleet of clamshell and dragline dredges, in conjunction with 2,200 cubic yards steel dump scows by Weeks Dredging & Contracting Inc.

Construction and design of terminal facilities is also a major service the Weeks Organization provides. Floating pile drivers and locomotive cranes are used for pier construction, demolition, repairs and jetty rehabilitation by Deepwater Contracting Co., Inc. Another specialized service available to the marine trades is sounding and survey rigs with qualified personnel under Atlantic Sounding Co., Inc.

Ocean Disposal Co., Inc. is the most recent addition to the growing aggressive and diversified group of companies operating under the direction of **Richard N. Weeks.** This program of expansion has been based upon solving expensive problems for our customers, efficiently and economically, with new and well-designed engineering answers. The Ocean Disposall No. 1 is but one more example. This modern vessel is capable of saving municipalities, the public and industry vast sums of money.

Ocean Disposall No. 1 is classed as an unmanned barge, is radio controlled from the towing tug and has an average unloading time of 30 minutes. The interior of the cargo tanks received special protection of an anticorrosive coating specifically designed by the Woolsey Paint and Color Co. Their laboratory developed this coating for the extreme range of chemical constants found in wastes and digested sewage materials.

The barge was developed under the close liaison with the American Bureau of Shipping, U.S. Coast Guard and other governmental agencies.

Colberg To Build Two Twin-Screw Towboats

Colberg, Inc., of Stockton, Calif., has been contracted by Red Stack Towing Co., Sag River, Calif., for the construction of two twin-screw towboats. To be powered with 1,000-total-bhp diesels, each towboat is to have the following dimensions: 50 feet by 22 feet by 8 feet.

The Offshore Company Orders Drilling Ship From Mitsui, Japan

The Offshore Company's subsidiary, Offshore International, S.A. has contracted with Mitsui and Co., Ltd. of Tokyo for the construction of a self-propelled drill ship, to be named the Discoverer III.

The $8.5-million drill ship will be constructed at the Tamano yard of Mitsui in Okayama Prefecture with completion expected June 10, 1970.

The 374-foot vessel will be 18 feet longer than its sistership, Discoverer II, one of the industry's most modern drill ship, and will have centerline propulsion power of 4,000 hp supplemented by three 800-hp thrusters. The new ship will feature The Offshore Company's patented turret mooring, special flume-stabilization system and automated pipe-handling equipment. These features have been proven under field conditions aboard the Discoverer II in Bass Strait, Australia and in waters off New Zealand, where drilling operations were carried out in severe sea conditions accompanied by 50-mile-per-hour winds.

The Discoverer III will bring The Offshore Company's fleet to 30 marine drilling units including three drill ships.

First Refrigerated Ammonia Ship Delivered By Newport News To Marine Chemicals

Marine Eagle, first refrigerated ammonia carrier, waits to be christened at dock.

The first American-flag vessel for coastal transport of refrigerated anhydrous ammonia has been delivered by Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

The Marine Eagle, a 615-foot chemical tanker, has been built for Marine Chemical Carriers, Inc., and will be operated by its parent company, Marine Transport Lines, Inc., of New York, under long-term charter to the Du Pont Company. **Mrs. Edward R. Kane** of Greenville, Del., the wife of a Du-Pont vice-president, christened the vessel ten days before delivery.

The Marine Eagle will operate between Gulf ports, principally Beaumont, Texas, and Delaware River and New York ports. The ship has a capacity to transport 1,000,000 cubic feet of chemicals—enough to make up a train of 10,000-gallon tank cars more than five miles long.

Forebody of the Marine Eagle represents new construction by Newport News Shipbuilding and Dry Dock Company. The stern section, including propulsion machinery, bridge, crew's quarters and operating areas, was modernized and reconstructed from the Parkersburg, a T-2 tanker.

The Marine Eagle includes the latest engineering advances for the refrigeration and safe handling of anhydrous ammonia, in port and under way. Monitoring devices on the bridge and in a special remote control room assist the crew in transporting this chemical at a constant temperature of minus 28°F.

The Marine Eagle takes its name in part from its owner and in part from an early sailing vessel, the American Eagle, which brought the Du Pont family to the United States from France in 1800. Her first cargo consisted of anhydrous ammonia from Beaumont, Texas, to Gibbstown, N.J., where Du Pont has an underground storage cavern for this chemical intermediate.

Principals at the christening of the Marine Eagle at Newport News Shipbuilding Co., left to right: **D. A. Holden,** chairman of the board, Newport News Shipbuilding; **Miss Susan Kane,** maid of honor; Dr. **E. R. Kane,** vice-president, Du Pont; **Mrs. Kane,** sponsor; **Henry B. Du Pont,** member of the board, Du Pont; **Miss Christine Kane,** maid of honor, and **L. C. Ackerman,** president and chief executive officer, Newport News Shipbuilding.

Hood Urges U.S. To Respond To Soviet Sea Power Challenge

The same "national attitude of determination and dedication" which enabled the United States to overtake and surpass the Soviet Union in outer space is urgently needed to prevent Russian domination of the world's oceans, according to the spokesman for the nation's shipyards.

Edwin M. Hood, addressing a Propeller Club audience in Beaumont, Texas, stressed that while the United States accomplishments in space now overshadow those of the Soviet Union, it is in danger of losing control of the seas to Russia's burgeoning naval and merchant fleets. Said Mr. **Hood:**

"Year by year, the Russians have perceptibly narrowed the margin of U.S. sea power superiority. Year by year, U.S. naval and merchant fleets have been undergoing progressive qualitative decline, though it must be recognized that the too few ships constructed or being built in this country are perhaps the most sophisticated ever conceived by man."

The shipyards' spokesman cited a score of statistics reflecting contrasting trends of Soviet and United States' sea power developments.

"The Russians have been building many more merchant ships than we have. Last November, they were constructing 458 ships compared to our 62. There are other startling statistics: for the past several years new ship deliveries to the Russian merchant fleet have outpaced U.S. deliveries by a ratio of nearly 6 to 1 . . . about 80 percent of the Soviet shipping fleet today is less than 10 years of age, while approximately 80 percent of the American merchant marine is 20 years of age or older . . . in the past 20 years more than 1,000 ships have been added to the Russian merchant marine, while in the same period our shipping fleet has contracted by about 1,000 vessels . . . 58 percent of the ships in the U.S. Navy are at least 20 years of age, and less than one percent of the Soviet Navy's surface combatant ships and submarines are 20 years old or older."

Mr. **Hood** pointed out that his concern over "the changing power structure on the oceans" is shared by high naval officials and government leaders, including President **Nixon.** Additionally, he said that there is considerable evidence of mounting public concern over the nation's sea power posture.

The shipyard official reminded his audience that President **Nixon,** during his presidential campaign last year, expressed dismay over the qualitative decline of the naval and merchant fleets and pledged his Administration's efforts to maintaining a U.S. Navy second to none and restoration of the United States to the rank of a first-class maritime power.

Although the President has not yet announced the programs and policies to fulfill these goals, Mr. **Hood** said there is "a national attitude of optimism" favoring their achievement.

UNDERWATER TECHNOLOGY — Gideon Wycanski, chief engineer of Lockheed Ocean Systems, addressing a recent meeting of the San Francisco Bay Chapter of the U.S. Merchant Marine Academy Alumni Association. Mr. **Wycanski,** with the aid of movies and slides, explained Lockheed's present capability for search and rescue in the ocean depths, which recently included the discovery of the flight recorder for the SAS airliner which sank off Los Angeles airport. He further outlined the scope of current contracts and future developments being undertaken by his group. These include a vehicle capable of attaching itself to a damaged submarine resting on the bottom and evacuating the personnel.

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D1

SNAME And ASNE Sections Discuss

Submarines And C-P Propellers

E. B. Williams*

The Southeast Section of The Society of Naval Architects and Marine Engineers is rapidly gaining a position of eminence with regard to the quality and importance of technical papers presented under its sponsorship. The recent joint meeting with the Charleston Section of the American Society of Naval Engineers at the Sheraton-Fort Sumter Hotel in Charleston lays emphasis to this claim, but of equal importance to the success of this or any technical meeting is the planning and execution of the program. In this case credit is given to Lt. Cmdr. **Thomas A. Marnane,** Charleston Naval Shipyard, under whose guidance the entire affair was executed with utmost precision. It was generally agreed that the two groups would make a practice of meeting together once every year.

Frank DeGrim, estimator, Jacksonville Shipyards, Inc., served as moderator during the morning session. Mr. **DeGrim** is papers chairman of the Southeast Section. The first paper, "Submarine Pressure Hull Circularity" was presented by **John B. Kruse,** supervisory naval architect, SSBN & Hull Integrity Branch of Hull Sub-Division, Charleston Naval Shipyard. This paper describes some of the philosophy, design conditions and types of hull failures; also the methods of measurement and tolerances, with respect to circularity, on the pressure hull of a submarine.

In the opening paragraphs the basic structure of the submarine is described and illustrated. This is followed by the design considerations, pointing out that it is essentially an externally loaded pressure vessel, the shell of which is periodically stiffened by ring frames. The effect of non-circularity of these components on the collapse strength is reviewed. An important feature of Mr. **Kruse's** paper is his approach to the effects of eccentricity on strength. Actual numbers are not given for any specific vessel because of the confidential nature of some of the informaion. The paper lists and describes five approved methods of measuring submarine circularity, viz., (1) internal sweep arm, (2) ring template, (3) bridge gauge, (4) optical square, (5) partial template.

Paper No. 2, "Economic Consideration of Controllable Pitch Propeller With Diesel Main Propulsion," by **D. E. Ridley,** vice-president of Bird-Johnson Company and **O. H. Midttun,** sales and application engineer, was presented by Mr. **Midttun.** This paper considers some aspects of environmental influence, hull deterioration and certain other factors relating to an economic comparison between a controllable-pitch propeller and a fixed-pitch propeller driven by a diesel prime mover.

The paper is an economic study, primarily, begininng with the capital acquisition cost differential, comparative operating costs, and following through with certain intangibles, reliability and life cycle costs, concluding with the statement that "any ship study envisioning the use of a diesel prime mover should incorporate the use of a controllable-pitch propeller."

As stated in the abstract, the paper is based upon a literature search discussing various aspects of the subject matter plus information from various vessel operators. Since this type of propulsion plant has been used much more widely in foreign countries, most of the material comes from these areas.

Discussion of this paper consumed the remaining time of the morning session. Comdr. **E. Venning Jr.,** USN, member of both societies, in his written discussion, emphasized the importance of a "conscious effort on the part of the hull designer, the propeller designer and the powerplant designer to come up with a coordinated system."

The moderator for the afternoon session was Capt. **E. T. Westfall,** USN, production officer, Charleston Naval Shipyard. Capt. **Westfall** is a member of both societies. Paper No. 3, "Adhesive Attached Test Blanks For Installed Submarine Sea Valves," was presented by **H. H. Nathan,** assistant chief design engineer, Marine and Mechanical Branch, Charleston Naval Shipyard.

Naval shipyards have a requirement to hydrostatically test submarine sea valve to hull joints to 150 percent of design pressure. This paper illustrates several ingenius methods of accomplishing non-destructive tests by means of test blanks attached to the hull with adhesives. The illustrations given in the paper are exceptionally clear and deal with various testing situations. Actual figures were withheld for security reasons, but the principles involved are equally applicable to commercial work. Following a description of the paper, using flip charts, Mr. **Nathan** pressurized a full-scale joint in a demonstration.

Members and guests of both societies were then taken on a bus tour of the Charleston Naval Shipyard. There were brief tours of selected shops and a visit to a dry dock where a fleet ballistic missile submarine was undergoing an overhaul. The tour was followed by a reception at the commissioned officers' mess.

Returning to the hotel, a buffet banquet was served. **Rudolph F. Matzer,** chairman of the Southeast Section, SNAME, acted as toastmaster, introducing the officers of the two groups and expressing the Section's gratitude to the Naval Engineers and their ladies who entertained the visiting ladies during the day by showing them many of the charming and historical points of interest in Charleston. Capt.

Capt. **Charles N. Payne,** USN, commander of Charleston Naval Shipyard, introducing the dinner speaker at the joint SNAME and ASNE Sections meeting.

Charles N. Payne, USN, commander, Charleston Naval Shipyard, and a member of both societies, spoke for the ASNE and introduced the speaker of the evening, Capt. **William M. Nicholson,** USN, project manager, Deep Submergence Systems Project, Department of the Navy.

Capt. **Nicholson** described the tremendous progress that has been made during the last few years and the thrilling plans for the immediate future for the deep submergence project, and also presented movies of SEALAB II during its 30-day voyage to the bottom of the sea. One of the highlights was Comdr. **Scott Carpenter's** solo, accompanied by himself on his guitar, 300 feet below the surface. Capt. **Nicholson** described in considerable detail, the immediate plans for the submergence of SEALAB III to the ocean floor, 600 feet below the surface.

Mr. **Matzer** closed the meeting with the announcement that the Southeast Section would next meet in Miami, April 25. The H-12 Panel (Planing Boats) of the Hydrodynamics Committee will meet jointly with the Section at the Sheraton Four Ambassadors Hotel in downtown Miami. An outstanding program of six papers is planned.

An interesting note on the Charleston meeting is that not only were many members of both ASNE and SNAME Societies present, but also **Hollinshead de Luce,** chairman, Committee on Sections, New York; **Harold F. Robinson,** honorary vice-president, and **Leigh R. Sanford,** honorary vice-president and 50-year member.

*Mr. **Williams,** former vice-president of American Ship Building Company, was the organizing chairman for the Southeast Section of The Society of Naval Architects and Marine Engineers and also was organizing chairman, several years ago, of the Great Lakes and Great Rivers Section.

Reviewing Paper No. 1 are, left to right: Lt. Comdr. **T. A. Marnane,** USN, CNS design superintendent; **Rudolph Matzer,** SNAME Section chairman; **J. B. Kruse,** author, and Capt. **E. T. Westfall,** USN, CNS production officer and ASNE Section chairman.

Dinner speaker at the joint meeting of the SNAME Southeast Section and ASNE Charleston Section was Capt. **W. M. Nicholson,** USN, who described the Navy's Deep Submergence Project to date and future plans, plus showing movies of SEALAB II at work.

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MARINE DIVISION
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Carvill Named Manager Marine Transportation By Commonwealth Oil

William C. Carvill has been appointed manager, marine transportation, Commonwealth Oil Refining Company, Inc., San Juan, P.R., **John E. Brewster,** executive vice-president announced.

Mr. **Carvill** has served in the marine field in many parts of the world, and has been instrumental in introducing new techniques into the field of bulk liquid organic chemical transport.

From 1965 to 1968, he was director of chemical development for United Tanker Corporation and director of chemical transportation for Pittston Marine Corporation.

Following these assignments, he served as consulting naval architect on chemical transportation for Trident Tankers, Ltd. of the British P & O Group, and as technical and commercial consultant on chemical transportation to A. L. Burbank & Co., N.Y., in their work with the Hunting Group of Newcastle, England.

A native of Bath, Maine, Mr. **Carvill** attended Johns Hopkins University, New York University and Stevens Institute of Technology. At Stevens he did graduate work in marine fields.

Following World War II service as a pilot in the Pacific theatre, he worked for George B. Drake and Sparkman and Stephens, Inc., New York-based naval architectural firms.

In 1952, he joined National Bulk Carriers, Inc. as assistant manager of construction, and soon was named assistant to the president. He remained with the firm for seven years. In early 1960, he joined the Steuber Chemical Group as marine manager, and subsequently became vice-president, marine, and a director of the parent Steuber Company.

Carlin To Coordinate Marine Bunker Sales For Refineria Panama

William J. Carlin

William J. Carlin has been appointed bunker sales coordinator of Refineria Panama, S.A., according to a recent announcement by the firm.

Before joining Refineria, Mr. **Carlin** received his B.S. in marketing from Fordham University and had broad bunker sales experience on the international level.

Reliability And Maintainability Analysis Discussed By Hampton Roads Section, SNAME

Attending the Hampton Roads Section meeting were, left to right: **J. G. Price,** past chairman; **J. D. Deal Jr.,** papers committee; **A. E. Cox,** Section chairman; **J. J. Henry,** SNAME president; Rear Adm. **J. A. Brown,** USN, Section vice-chairman, and authors **R. L. Harrington, J. W. Coats** and **F. E. Farley.**

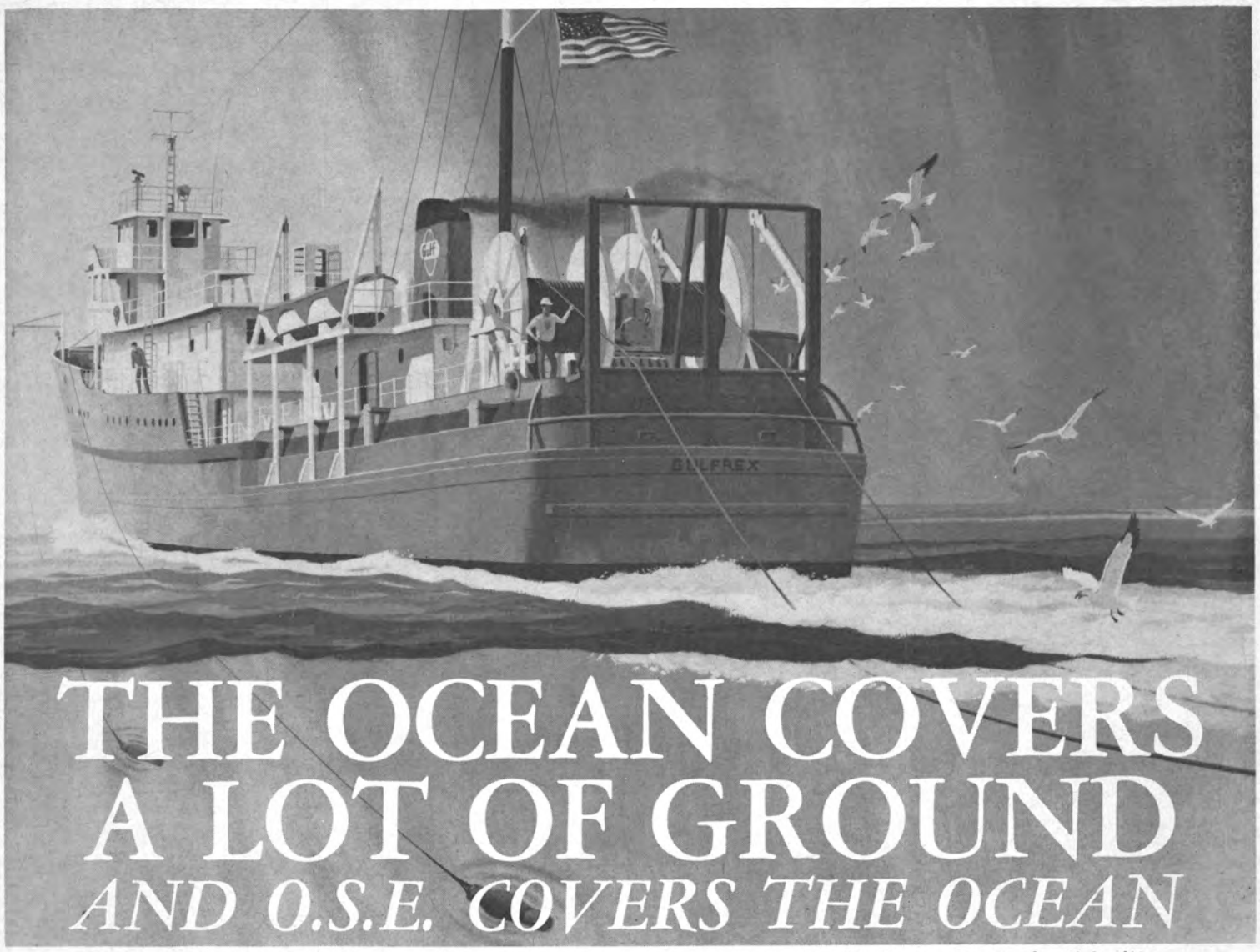
The Hampton Roads Section of The Society of Naval Architects and Marine Engineers, recently held their third meeting of the season at the Norfolk Naval Shipyard in Portsmouth, Va. It was one of the finest meetings of the year which included a briefing on the shipyard's computerized management system and an on-board review of the overhaul highlights of the aircraft carrier USS F.D. Roosevelt.

The paper given at the meeting covered "Reliability and Maintainability Analysis of Shipboard Systems" and was written by **Roy L. Harrington, John W. Coats** and **Fred E. Farley** of the Assurance Engineering Group, Newport News Shipbuilding and Dry Dock Company. The paper emphasizes the reliability and maintainability of shipboard systems and equipment and presents a definition of the terms and specifications for a uniform understanding by the manufacturers of marine equipment.

Numerous manufacturers' representatives commented on the paper and indicated that it was very informative and indeed presented the needed definition.

The paper was very timely in that it was brought on the scene at a time when the aircraft carrier Nimitz, CVA(N)68, is building and the R & M specifications pertain thereto. Many items of equipment for the ship are in the production stage and some only in the design stage and the guide lines set forth in this paper should allow equipment to be produced which more nearly meets the specifications. Rejection of design and the necessity for modifications should be minimized.

The next meeting of the Section will be held on April 23, 1969 at the Mariners Museum in Newport News, Va. This will be the final meeting of the year and will present a program featuring a talk and movie by **John Biddle** covering the sailing races and regattas of recent years.



THE OCEAN COVERS A LOT OF GROUND
AND O.S.E. COVERS THE OCEAN

Ocean Science and Engineering, Inc. owns and operates the Gulfrex shown in this illustration. The Gulfrex is on a long-range, world-wide research cruise. This project calls for research in marine exploration and data gathering techniques. This special purpose vessel is just one of our scientific and engineering projects in the oceans.

At OSE we know that the design of efficient special-purpose research vessels and work ships requires close cooperation between the naval architects who draw the plans and the men who will use the ships. At OSE there is a constant exchange of ideas between designers and users. In fact, these may be the same people, for unlike most design groups OSE builds ships for its own use, and is acutely aware of ways to keep costs down and performance up. In the past five years OSE's technical staff has designed, supervised construction, and operated a number of special purpose ships. Our ships are work ships, built to make work in a seaway as convenient as possible—and to make shipboard living as comfortable as possible.

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Todd Shipyards Corporation Listed On N.Y. Stock Exchange

Todd Shipyards' President **John T. Gilbride** (center), being welcomed by New York Stock Exchange President **Robert W. Haack** (left) and **Jules R. Huber,** of Ling & Company, Inc., specialist in the Todd stock.

Todd Shipyards Corporation was listed on March 25 on the New York Stock Exchange. The stock was assigned ticker symbol TOD.

Todd's president, **John T. Gilbride,** in observing a tradition of the Big Board, opened trading with the purchase of the first 100 shares of his company's stock for his wife.

Todd will list 1,593,418 shares of common stock previously listed on the American Stock Exchange.

Founded in 1916, but with a history through predecessor companies reaching back to the Civil War, Todd operates seven shipyards in major U.S. ports on the East, Gulf and West Coasts. It is one of the world's prime builders, repairers and converters of oceangoing vessels and its Nuclear Division services atomic-powered vessels and other nuclear installations. Additionally, the company specializes in both marine and industrial heavy fabrication, and through a subsidiary firm, Lester Engineering Company, Cleveland, Ohio, has diversified into the production of metal die-casting and plastic injection molding machines.

Todd has over 10,000 employees and its stockholders number slightly over 3,000, having increased 10 percent since the 2-for-1 stock split in June, 1968.

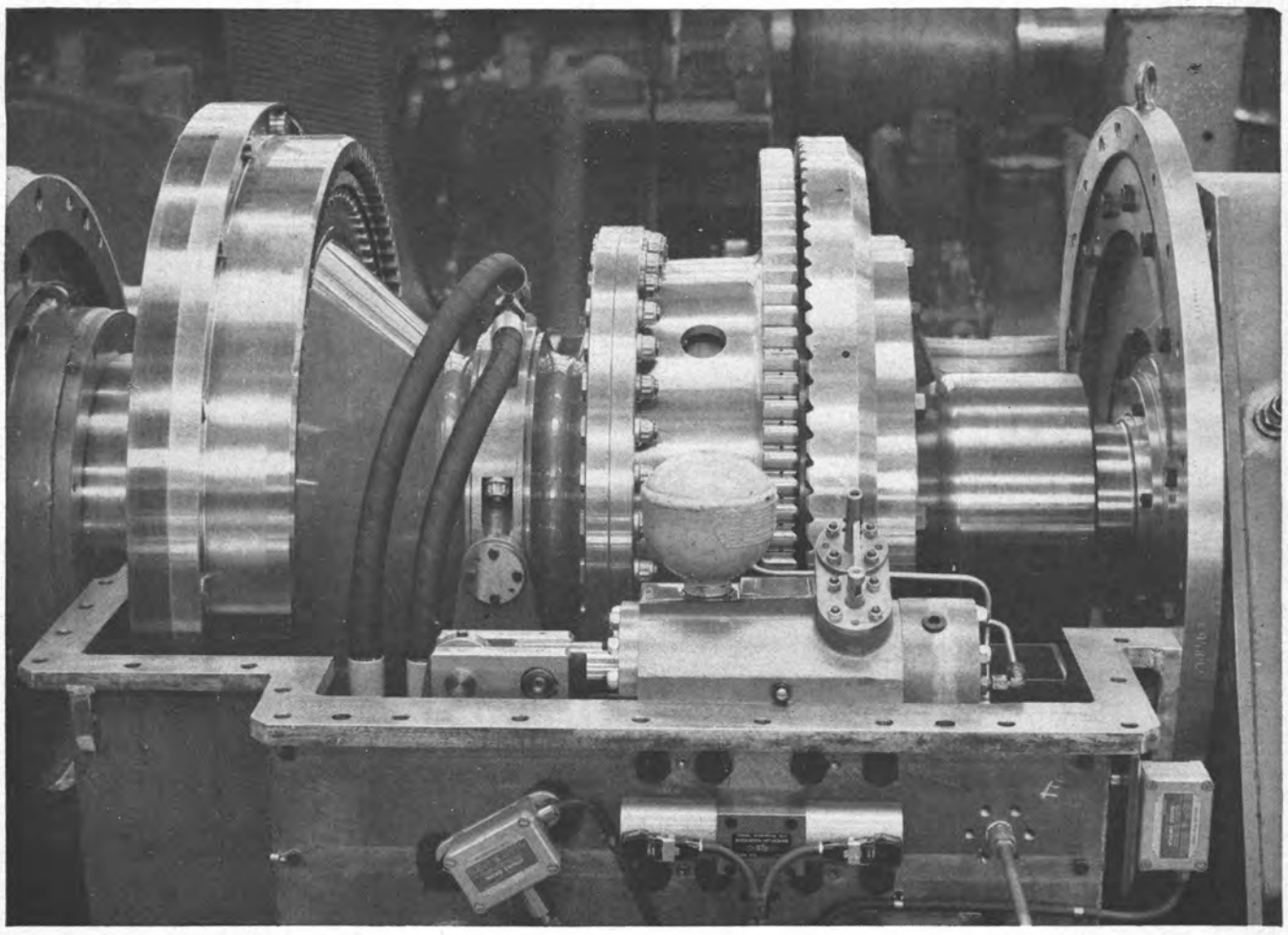
Sales for the fiscal year ending March 31, 1968 totaled $194,124,444, compared with $159,008,655 for the previous year. Earnings were $4,930,955 or $3.38 per share against the $4,556,760 or $3.12 per share registered in fiscal 1967. For the six months ended September 30, 1968, sales totaled $101,370,483 and net income $2,290,919 or $1.57 per share, compared with $91,970,608 sales, $2,198,201 net income or $1.51 per share for the previous year.

Martinolich To Build Largest Tuna Seiners

The Martinolich Shipbuilding Corporation of Tacoma, Wash., recently was awarded a contract for the construction of two 212-foot long super tuna seiners, which will have a carrying capacity of 1,300-tons of tuna. These will be the largest vessels that have ever been designed and built for the tuna fishing fleet. The seiners will have a beam of 42 feet and a depth of 21 feet.

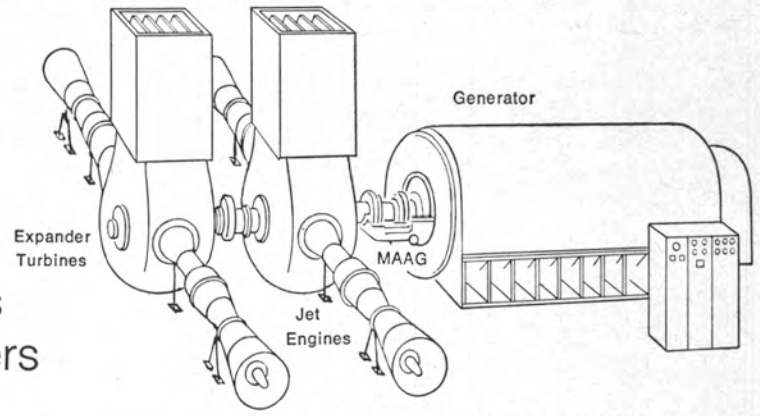
The vessels are of "V" bottom, double chine construction and will be powered with a 3,600-hp, 20-cylinder General Motors, Electro-Motive diesel, swinging a 125-inch, 5-bladed stainless steel propeller.

The vessels are being built for Joe Rogers and Associates. The first one is to be delivered 16 months from the signing of the contract. The auxiliary equipment includes Caterpillar diesels and generating sets.



COMMAND PERFORMANCE

...by the Maag Synchronous Clutch Coupling from Koppers



The Maag Synchronous Clutch Coupling engages or disengages only at your command, from 0 to 3600 r.p.m. or more. Utilizing the double engagement gear coupling principle for torque transmission, the Maag unit features an automatic synchronizing mechanism over which you exercise push-button control.

The Maag (shown above with upper part of housing removed for illustrative purposes) stays where you put it; it will not engage or disengage because of torque fluctuations, and it will not create axial vibrations.

Ideal for industrial peaking power plants and marine propulsion, the Maag is offered by Koppers under an exclusive licensing arrangement.

Thus, Koppers is now of even greater service in helping you transmit power efficiently and profitably. For more information, write Koppers Company, Inc., Power Transmission Department, 3604 Scott Street, Baltimore, Maryland 21203.

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The 17th Annual Port Engineers Forum Discusses

Advanced Concepts In Marine Engineering

Principals attending the Society of Marine Port Engineers and the N.Y. State Maritime College's Department of Engineering forum were, left to right: Standing, **P. Farr,** secretary-treasurer of the Society of Marine Port Engineers New York; **G. J. Timmer,** Consolidated Edison; **A. Simins,** author; **W.S. McPhee,** author; **K. Kasschau,** author, and **Louis V. Minett,** principal surveyor, American Bureau of Shipping. Seated, **John C. Fox Jr.,** Esso International; Rear Adm. **Edward J. O'Donnell,** USN (ret.), president of the college; Dr. **J. J. Foody,** author, and **M. E. Carroll,** Port of New York Authority.

The 17th Annual Port Engineers Forum, held on the Fort Schuyler, Bronx campus of the State University of New York Maritime College, had as its theme "Advanced Concepts In Marine Engineering." These annual one-day forums are jointly sponsored by the Society of Marine Port Engineers and the Maritime College's Department of Engineering.

Four technical papers — two in the morning and two in the afternoon—were presented in sessions held in the Lecture Hall of the College's new Science & Engineering Building. A luncheon, in the College's Vander Clute Hall; a tour of the 50-acre campus of the Maritime College, and a social hour in the College Club were included in the meeting.

The four technical papers presented at the Forum were: "Transshipment Terminals," by **William S. McPhee,** assistant vice-president, Frederick R. Harris, Inc.; "Ocean Engineering: Its Scope and an Educational Program," by Dr. **John J. Foody,** chairman of the Department of Engineering, Maritime College; "The Westinghouse 30,000 Horsepower Marine Propulsion System," by **Andrew Simins,** principal engineer, Engineering Services Department, and **Kenneth Kasschau,** manager, Production Engineering, Marine Division, both of Westinghouse Electric Corp., and "Tektite—Man at Work in the Sea," by **William Danesi,** manager, Aquanaut Equipment Division, Advance Development Operation, General Electric Co., Philadelphia, Pa.

Mr. **McPhee** described in detail the various worldwide transshipment terminals for the distribution of crude oil and some of the plans for future terminals. This description included the Bantry Bay terminal in Ireland and those presently planned for Okinawa and Point Tupper, Nova Scotia, as well as other transshipment terminal locations in Europe.

The author stated that "because of the lower proportion of imported crude oil, it is obvious that in North America the need for deepwater terminals has not been so urgent as in Europe. There is now, however, a strong trend for the use of larger tankers for the transport of the crude from outside the United States in ever-increasing numbers. The confirmation of large crude deposits in Alaska reemphasizes the need to consider large tanker terminals. It would be wrong to conclude that transshipment terminals of the 300,000-500,000-dwt class are necessarily the most economic solution for the North American needs and could instead include maximum-sized tankers of, say, the 200,000-dwt class."

Speaking of the economics, Mr. **McPhee** listed various sizes of tankers on different routes together with the cost per barrel for shipment, including distribution from the transshipment terminal.

As an example of the costs, the author explained that "the comparative cost of using a tanker direct from the source to the port of delivery, as compared to transshipment, can usually be made by comparing the cost using the transshipment tanker together with the cost using a distribution tanker. This assumes that the distance from the point of source to delivery to be approximately the same in both cases. For instance, using direct shipments from Kuwait to North America in 100,000-dwt lots direct to the port of use, the cost would be $0.40 per barrel as compared to transshipment using 300,000-dwt tankers to the transshipment terminal and a 100,000-dwt tanker for distribution, where the total cost would be $0.259 (for 300,000-dwt tanker) plus $0.064 (for 100,000-dwt tanker) or $0.323 per barrel."

The speaker further described in his presentation various mooring systems and what must be considered in selecting the sites for transshipment terminals.

Mr. **Kosschau** presented the paper prepared by Westinghouse on the 30,000-hp marine propulsion plant. In the introduction the author stated: "Within the last 2-3 years a clear trend to higher horsepower plants has emerged in the merchant marine. Whereas two or three years ago the interest centred around 20,000-25,000 hp, today the active interest is in the 25,000-30,000-hp class. Some activity is developing in the 30,000-35,000-hp range, and there is even some interest in a twin 60,000-hp installation.

"To participate in this growing program, Westinghouse initiated design of a 30,000-35,000-hp propulsion system over a year ago. The objective was to have the basic design work done in sufficient depth to be able to deliver equipment on a 14-to-16-month schedule. In the fall of 1968, agreement was reached with Ingalls Shipbuilding Corporation to provide the 28,500-hp equipment to be used in the seven ships they are building for American President Lines and Farrell Lines.

"In undertaking this design, Westinghouse adhered to a basic policy of using proven concepts from earlier designs in order to provide for maximum reliability of the equipment in service and to expedite manufacture. The resulting equipment has a strong family resemblance to a successful series of marine turbines going back some ten years to the 10,000-hp unit used in the Mississippi Shipping Company's Del Rio class. The overall propulsion unit consists of a cross-compound turbine driving the propeller shaft through an articulated reduction gear. By means of a newly adopted arrangement this unit achieves a remarkably low headroom at little expense in width and length."

The author then described in detail the design features, materials and intended operation of this plant.

Mr. **Danesi** introduced his paper by giving the following background and object for the Tektite-I program: "On February 15, 1969, four U.S. scientists began two full months of living and working on the ocean floor 50 feet below the surface of Great Lameshur Bay, Virgin Islands National Park, offshore from St. John Island. At this site, they are conducting extensive studies of marine life as well as oceanography, marine geology and underwater equipment testing. They have become thoroughly 'at home' in their undersea world and their base of operations is a dry habitat from which they go out and perform their daily research tasks using saturation diving techniques.

"This program, and the ocean floor habitat which functions as the vital living quarters and in situ laboratory, have been named Tektite-I. The primary mission of the Tektite-I program is to evaluate the ability of a small group of men to conduct underwater scientific research under saturated diving conditions for long periods of time.

"The Tektite program is a multi-agency program. The Navy, as the lead agency, is responsible for the overall management of the program. In addition, it is responsible for the management of the biomedical and behavioral experiments as well as the preparation of the site and its operation during the test phase.

"NASA is participating extensively in the planning and execution of the behavioral and biomedical experiments, especially with regard to their application to manned space missions.

"The Department of Interior is responsible for defining and executing the marine science program, as well as supplying the aquanaut-scientist crew.

"The General Electric Company has provided the basic habitat system. Under the Tektite-I contract with the Office of Naval Research, General Electric is also assisting ONR in mission and operational planning and in the field operations. In addition, General Electric has modified the habitat by installing certain items of specialized equipment for this particular mission.

"The primary goals of the Tektite Program are closely related to the objectives of the participating agencies. In general, the Navy and the Department of the Interior are interested in evaluating the utility of saturation diving in performing their normal missions. Both NASA and the Navy have a deep interest in developing a better understanding of the capabilities and limitations of small crews on extended, isolated missions. Finally, the Navy is interested in providing operational experience for those units of the fleet which are participating in and supporting the program."

The speaker then described in detail the hardware entering into this program.

Largest Tanker To Be Lifted In New York Drydocked By Bethlehem's Hoboken Yard

The largest tanker ever drydocked in the Port of New York, the 57,700-dwt Swedish motor vessel Dan Brostrom, sits high and dry at Bethlehem Steel's Hoboken, N.J., ship repair yard. Docked stern inboard, she overhangs outboard end of the dock about 100 feet. The tanker has an overall length of 773 feet 11 inches.

The largest tanker ever drydocked in the Port of New York was lifted recently in Bethlehem Steel Corporation's Hoboken, N.J., ship repair yard.

The tanker, the 57,700-dwt Swedish motor vessel Dan Brostrom, has an overall length of 773 feet 11 inches, beam of 105 feet 8 inches, and depth of 56 feet 6 inches.

Until recently, there has been no commercial dry dock in New York Harbor with a breadth of more than 100 feet. As the result of a multi-million-dollar modernization program of the big dock at Hoboken, however, tankers ranging up to around 60,000-dwt can now be lifted in this facility because its breadth has been extended to 110 feet.

Transferred to the Hoboken yard from the corporation's former Brooklyn 56th Street yard, the big dock was a six-sectioned wooden pontoon unit with a breadth of 100 feet, length of 685 feet and lifting capacity of 25,000 tons. Soon after its arrival at Hoboken, the modernization program got underway.

To make the dock available as needed, the modernization job proceeded on a sectional basis. One section at a time was removed and rehabilitated. The wooden walls were replaced by steel walls fabricated by the yard, the pontoon was widened and the rebuilt unit reinstalled and welded to adjoining sections. Now in the final stages of completion, this dock will have continuous steel wingwalls and a lifting capacity of 27,000 tons.

Although no change had been made in the length of the dock, there is a possibility that this, too, may be extended, increasing the lifting capacity even further.

The Dan Brostrom was maneuvering off Port Newark early in March, after discharge of her cargo to a nearby refinery, when her stern struck an obstacle. The accident disabled her steering engine. She was towed to the Bethlehem Hoboken yard where the decision to drydock her for survey was made by her owner, **Dan-Axel Brostrom**, after a plane flight from Gothenburg.

The yard, in the meantime, had gone ahead with preparations to handle the big tanker in the largest of its four floating dry docks. To protect the tanker's hull, one-foot wooden fenders were placed against the inner walls of the dock. This reduced the effective width of the dock to 108 feet, or only 2 feet 4 inches more than the extreme breadth of the tanker.

Further, since she was considerably longer than the dock, it was decided to bring the Dan Brostrom in stern first so that her overhang would be on the outboard end. This overhang, exceeding 100 feet, was not regarded as critical by the dockmaster and engineering consultants because the vessel was unloaded and had been deballasted. The dockmaster estimated her displacement weight at 20,450 tons, well within the dock's capacity.

It took only two hours and 15 minutes from the time the yard's dockmaster first got a line on the tanker, until she was high and dry.

Inspection of the stern showed that a number of oxter plates (the shell plates forming the curve at her stern) had been torn and would have to be replaced. Her rudder and propeller, however, required no repairs.

The steering engine had been wrecked beyond repair and her owner decided to replace it with a new unit to be flown in from Great Britain.

Although the nature of the repairs was such that they could be made at a wet slip, her owner decided to hold the tanker on dock until her underwater hull could be painted. This task required some 1,100 gallons of paint.

Douglas Mansell, general manager of the yard, stated that it required about five days to install the new steering engine, after receipt, and to restore the Dan Brostrom to service again.

Paceco Appoints Five Representatives For Dredge Line

The dredge division of Paceco has named five additional U.S. firms to represent the company's line of dredges and dredge accessories.

The new representatives are:

F. H. Bathkee Co., 529 No. Cleveland Ave., St. Paul, Minn., for the state of Minnesota; Little Rock Road Machinery Co., P.O. Box 3140, Little Rock, Ark., for Arkansas; Supply Inc., P.O. Box 51185, Tulsa, Okla., exclusive for Oklahoma; Blue Water Marine Supply Inc., 1000 Broadway at Channelside St., Houston, Texas, for Texas, and Alaska Expeditors Inc., 3508 Minnesota Dr., Anchorage, Alaska, for Alaska.

Paceco, headquartered in Alameda, Calif., has designed and built dredges and dredge accessories since 1923. The company offers the Pacer line of dredges, dredge accessories, Jet Stream System—a booster pump system to increase dredge production—and Hurricane Ball Joints.

Port Of Mobile Propeller Club Honors Houston H. Feaster For Outstanding Service

Houston H. Feaster displays certificate of appreciation presented to him by the Mobile Propeller Club. Shown, left to right, are: **Jack Campbell,** Club president; Mr. **Feaster;** Capt. **Harry Hargrove** ,and Col. **Robert E. Snetzer,** Army district engineer at Mobile.

Special honor has been paid to Alabama State Docks Director **Houston H. Feaster** for "outstanding service" in developing the maritime industry and the Port of Mobile by the Mobile Propeller Club. At a recent meeting, the Club presented Mr. **Feaster** a certificate of appreciation, and its president, **Jack Campbell,** pointed to "a record of unparalleled growth and progress" of Mobile's port in the six years that Mr. **Feaster** has served as State Docks director.

The presentation was made by Capt. **Harry Hargrove,** retired bar pilot, often called "the grand old man of the Port of Mobile." Captain **Hargrove,** himself, was the last recipient of such an honor from the Propeller Club, and was asked by the board of governors to present the new certificate to Mr. **Feaster.**

The certificate noted that Mr. **Feaster's** contributions to the maritime industry "reflect the aims and purposes of the Propeller Club of the United States, which is to promote and further the American merchant marine."

In connection with the presentation, Mr. **Hargrove** said the Propeller Club had undertaken a comprehensive review of major improvements to the state-owned docks facilities since Mr. **Feaster** became director in January, 1963, and said this record "demonstrates high professional ability."

The summary showed total capital improvements at the State Docks under Mr. **Feaster,** have amounted to $16.3-million — $5.3-million of which came from record-breaking net earnings from operations and $11-million from bond issues serviced from docks revenues and issued at very favorable interest rates.

The summary also noted that earnings of the State Docks in the six years since 1963 totaled $9.1-million, described as "almost unbelievable" when compared to the record of previous years. Total State Docks tonnage went up from 5.5 million in 1963 to 8.1 million in 1968, while total Port of Mobile tonnage increased from 16.3 million to 22.4 million.

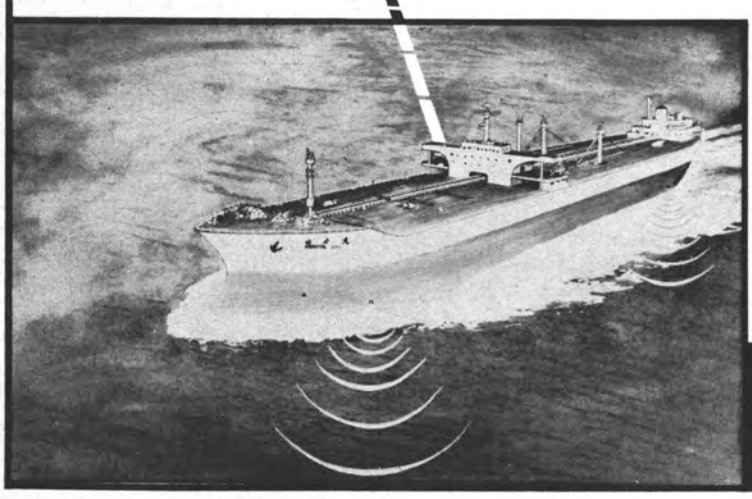
Edo Western's "NAVTRAK"®

Model 482 DOPPLER DOCKING SONAR

A precision docking sonar system which utilizes the Doppler principle to provide absolute "over-the-bottom" velocity information for berthing of super vessels.

- Velocity in 1 ft./min. increments (approx. 1/100 Knot)
- Fore/aft and port/starboard velocity at bow and stern
- Compensation for water temperature and salinity
- Portable displays
- Single transducer assembly installation — fore and aft
- Built to meet MIL-E-16400, IEEE 45, and ABS standards
- Minimal installation cost
- Two-year maintenance
- World wide maintenance available

With the advent of the super tanker and the deep keel, berthing and mooring of super vessels have become critical operations,. Edo Western's "Navtrak" can assist the pilot or captain in maintaining precise control of his vessel by means of accurate "over-the-bottom" velocity information. This information is completely independent of atmospheric conditions, ship dynamics, water currents, ship's engines, etc.



During the critical operations of berthing or docking, it is absolutely necessary to have instantaneous velocity information (fore-aft, and port-starboard at the bow and stern) available to the captain or pilot. Relatively large kinetic energy levels such as encountered in super vessels require the most detailed information for the safety and protection of ship and berth.

Edo Western's "Navtrak" Docking System is completely independent of land based stations, and is contained entirely aboard the ship. The "Navtrak" was developed specifically to meet the docking requirements of the large super vessel or tanker.

Send for additional technical data and prices.

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Knappton Towboat Adds Twin-Screw Tug To Fleet

The Betsy L operates on Columbia and Willamette Rivers.

The tug Betsy L, newest and most powerful in the fleet, was recently placed in operation by the Knappton Towboat Co. of Portland, Ore. The tug was designed by Phillip F. Spaulding & Associates of Seattle, and was built by the Martinolich Shipbuilding Corp. at Tacoma, Wash.

This new tug represents the continuing effort of Knappton Towboat Co. to provide the most efficient equipment with which to serve its customers.

Due to the trend toward larger ships, this powerful and efficient tug was built to assure vessels calling in the area of having the safest and best possible tug assistance in docking and undocking. Also, her size, maneuverability and power will enable her to handle the larger 'super barges' which are calling on the Columbia and Willamette Rivers with increasing frequency.

The Betsy L is an all-steel, twin-screw tug, 76 feet in length, 26½ feet in beam, with an operating draft of 8½ feet. Power is furnished by two D-398B Caterpillar diesel engines, with a total of 1,700 rated hp through Twin-Disc Model MG 540 reverse reduction gears, supplied by Halton Tractor Company of Portland, Ore. The engines drive 82-inch by 55-inch four-bladed propellers through a 7½-inch propeller shaft to provide a free running speed of 12 knots. Auxiliary power is supplied by a pair of Caterpillar Model D-330C, 50-kw, 125/216-volt generating sets.

The Betsy L is automated and fully pilothouse controlled for fingertip maneuverability. The main engines are operated through Morse engine controls, and can be started and stopped from the pilothouse through a Mathers air-control system. A Mathers air-control system is also used to activate the Fawick Model 20 VC 600 shaft brakes automatically in conjunction with the main engine controls. In addition, the main and standby steering systems can be started, switched and activated from the pilothouse.

A comprehensive alarm system is provided which monitors all vital functions of the vessel through a dual set of audible and visual alarms to provide a fail-safe system. The main alarm console is located in the engine room and contains the gauges, lights, relays, horns and test switches necessary for the system and a remote panel with alarm lights and horn is located in the pilothouse to indicate the type and location of any trouble. This system monitors water temperature, oil temperature, oil pressure, fuel pressure, lube-oil level and expansion-tank water level of the main engines, reduction gears, and auxiliary engines. The level of fluid in all hydraulic reservoirs and a high bilge-water level alarm are also included. In addition, a complete fire-alarm system has been installed with temperature sensing units located in all principal areas of the tug.

The hydraulic steering systems and the hydraulic winch control package were supplied by Mathews Hydraulics of Portland, Ore. Three steering stations are used, one port and one starboard in the pilothouse and one station located on the stern.

The living and messing areas of the boat were designed with the comfort of the crew in mind, as well as ease of maintenance. Four single-berth staterooms are provided. The pilothouse and passageways are all paneled in walnut wood grain plastic laminate, trimmed with solid walnut mouldings and searails. Floor coverings in the staterooms and pilothouse are a heavy tweed-textured indoor-outdoor type of carpeting. The galley, washroom and passageways have a hard surface polyurethane poured floor.

Heating and air conditioning are provided by a centrally located General Electric Weathertron heat pump to maintain a comfortable climate throughout the vessel.

A number of innovations have been provided on this vessel for both safety and ease of operation. Roller chocks and sheaves, which are built into the structure of the tug, are provided wherever possible to alleviate the need for using large, heavy blocks and shackles when making up tows. Four small overhead windows have been provided in the outboard corners of the pilothouse roof to allow vision upwards while docking large ships. These windows, along with the rest of the pilothouse windows, have tinted glass and are sloped to prevent glare.

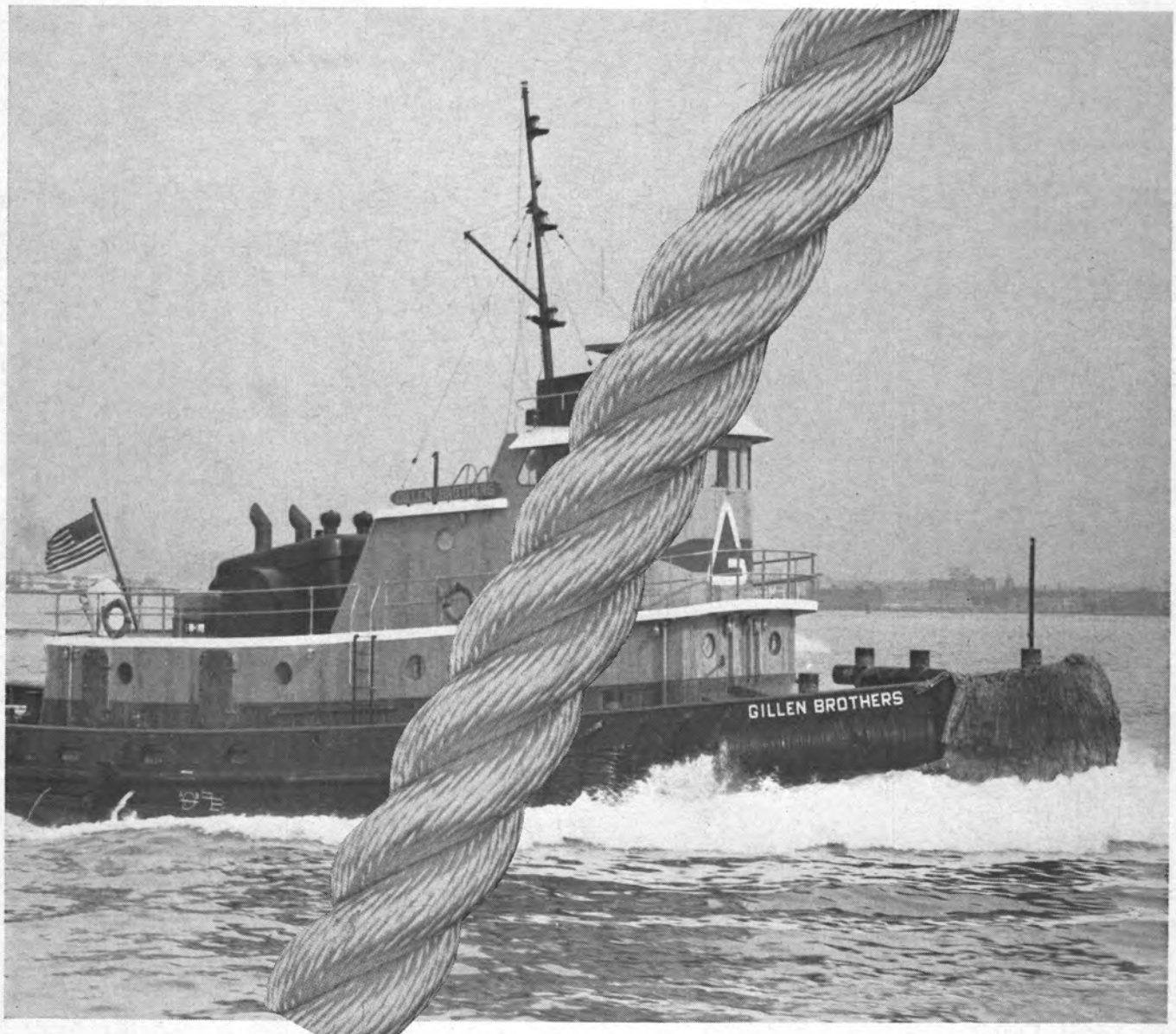
Pilothouse features overhead windows for view of ships when performing docking operations.

Navigational equipment aboard the tug includes a Decca Model RM-314 Radar, Konel Model KR 53VB, 10 channel VHF radio with a Konel Model KRV-5B 5 channel monitor, a Konel Model KR-71 2MG radio, Konel Model KS 100 depthfinder, and a Danforth White Model C-428 compass.

The main towing winch of the Betsy L is a hydraulic-powered Jaeger towing machine with 1,500 feet of 1-inch cable. Four 65-ton Beebe Bros. barge winches are located on the main deck. These winches can be activated locally at each winch, and in addition, they can be remotely controlled from the pilothouse.

The steering system incorporates two main steering rudders and two monkey rudders which are operated at a total of 120 degrees through followup and non-followup hydraulic systems. The main steering system is supplied by either one of the variable volume hydraulic pumps driven by each auxiliary engine, which in turn actuate a large double-ended hydraulic cylinder attached to the main rudders. The standby steering system is an entirely separate unit for use if the main system fails, and consists of its own pump, reservoir, valving, electric motor drive, and controls mounted together as a unit with a single hydraulic cylinder attached to the rudder linkage in the lazarett.

The addition of the Betsy L to the Knappton fleet brings the total to over 20 tugs available for service on the Columbia and Willamette Rivers for ship assisting, barging and log towing.



New York career launched with K-ting

The new tug *Gillen Brothers* has a lot going for it as it reports for duty in New York and other East Coast harbors. All the rope aboard was produced by K-ting . . . a fast start for any marine career.

Selected for heavy duty on the tug are K-ting 3-strand nylon and Docrylene® line, the toughest synthetics going. K-ting nylon rope minimizes wet shrinkage, prevents unraveling, makes splicing easy.

Docrylene rope by K-ting encases polypropylene cores in individual spun polyester jackets for insulation against heat and friction. Fights abrasion, too.

Rugged K-ting ropes are also available in polypropylene, polyethylene, natural fibers and special blends. Successful marine careers begin with K-ting.

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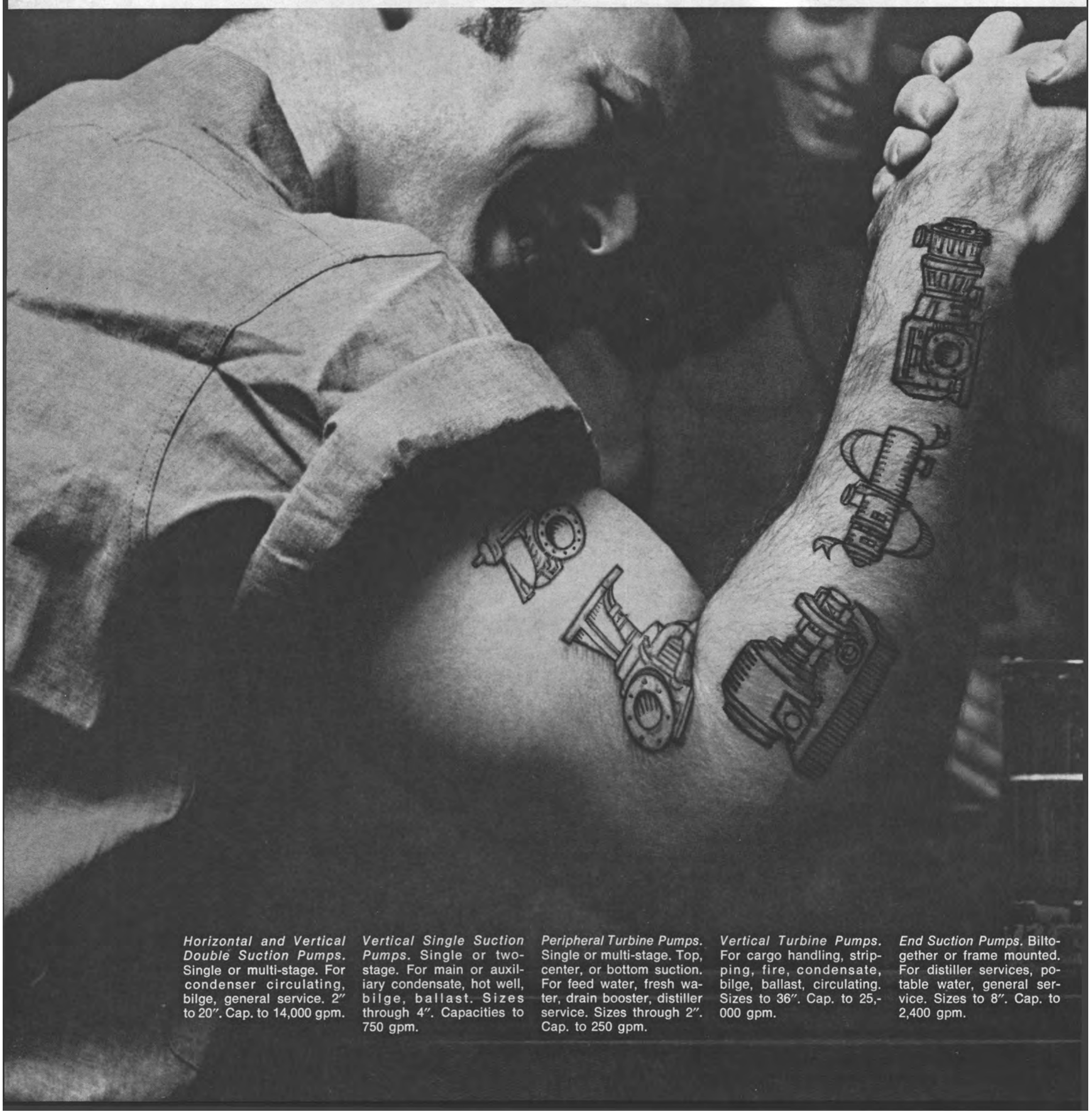

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Vertical Single Suction Pumps. Single or two-stage. For main or auxiliary condensate, hot well, bilge, ballast. Sizes through 4″. Capacities to 750 gpm.

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Motors from 125 to 20,000 hp, in weatherproof, dripproof and totally enclosed designs. High and low speed.

Western Gear To Acquire Rados & Son Engineering

Western Gear Corporation, Lynwood, Calif., has agreed in principle to acquire Rados & Son Engineering Company, naval architects and engineers.

Terms of the proposed transaction were not disclosed in a joint announcement made by Western Gear President **Bernard J. Bannan,** and **Robert Rados,** president of Rados Engineering. Mr. **Bannan** stated that the Rados staff of marine and marine-electronic engineers, based in San Pedro, Calif., will expand and strengthen Western's involvement in the marine and oceanography fields, which accounted for about 24 percent of Western's 1968 volume of $108-million.

Mr. **Rados** will continue as president of the acquired company, which will be operated as a wholly owned subsidiary within Western Gear's marine and oceanography group of operating units. **Richard L. Bauer** will also continue in his post as Rados vice-president, and the firm's entire staff of marine architects and engineers will be retained.

In recent months, Rados Engineering completed preliminary engineering studies for modification and conversion of the RMS Queen Mary, now moored in Long Beach Harbor. Final engineering drawings are underway for the 450-room hotel, convention center, shopping area, and restaurant complex for the Queen Mary, which is under the jurisdiction of the Diners Queen Mary Corporation.

Also, preliminary studies for the conversion of the RMS Queen Elizabeth have been submitted to the Elizabeth's owners for their review and approval.

Studies are underway at Rados for a new hydrofoil vessel to be used for passenger service in Pacific waters. A new generation of tuna vessels, ranging in size up to 2,000 tons, is currently being designed for Star Kist Foods, and several private corporations.

In the electronic field, Rados has engineered all types of shipboard and shore-based electronic systems for communications, navigation, telemetry, instrumentation, counter-measures, degaussing, and fire control. These have included teletype, cryptograph, automatic telephone, closed-circuit television, microwave equipment, and audio-visual control systems. The firm has just completed design and engineering for a new solid-state, air-transportable control tower to be used for aircraft control in the Vietnam area.

For years, Rados Engineering has provided engineering services for the Long Beach and San Diego Naval Shipyards. These efforts have included modification and conversion work on aircraft carriers, cruisers, destroyers, tankers, cargo and auxiliary vessels.

Western Gear, which has ten divisions and four wholly owned subsidiaries in four states, designs and manufactures complex mechanical systems for aerospace, marine, oceanography, industrial, medical, specialized equipment, and engineered construction applications.

Pearlson Engineering Announces Expansion

In response to worldwide acceptance of the Syncrolift Drydocking and Transfer System, Pearlson Engineering has expanded their Florida operations to a new location in Miami and has opened a branch office in London, England. The new Miami office is located at 8970 S.W. 87th Court, (P.O. Box 8, Kendall Branch), Miami, Fla. 33156. The London office, Syncrolift Ltd., is located at 25 Victoria Street, London S.W.1, England. The manager of this office is **Keith Edmonds,** B.Sc. (Eng.), F.I.C.E., M.A.S.C.E. Syncrolift sales outside the Western Hemisphere will normally be handled through the London office.

Coinciding with this new move, **Ray Pearlson,** president of Pearlson Engineering has announced the contract signing of the 50th Syncrolift Drydock, and that American Bureau of Shipping certification is now available in addition to the present Lloyd's Register of Shipping certification.

Syncrolifts are now in operation or under construction in the following areas: U.S.A., Canada, Bahamas, Grenada, Trinidad, Venezuela, Chile, Peru, Argentina, Brazil, Iceland, Ireland, France, Canary Islands, Israel, Iran, Nigeria, South Africa, Thailand, Republic of China, Japan, and Eniwetok.

A free brochure describing the Syncrolift Drydocking and Transfer System is now available by writing to either Miami or London.

Non-Reversing Turbo-Gear Powerplants Discussed By Northern California Section

Attending Northern California Section Meeting were, left to right: **Lester Rosenblatt,** national meetings chairman, M. Rosenblatt & Sons, and **W. B. Hill,** Northern California Section meetings chairman, Babcock & Wilcox.

The design economies and operation of modern 130,000-dwt ore/oil ships, as being built by the Marcona Corporation, was the subject of the March meeting of the Northern California Section of The Society of Naval Architects and Marine Engineers, which was held at the Engineers Club in San Francisco. The meeting was conducted by **Hugh Downer,** Section chairman and vice-president of the Marcona Corp.

Nominations for Section officers for the coming year were announced as follows: **Graham Fraser,** Paceco-chairman; **Wm. B. Hickman,** Ocean Machinery-vice-chairman, and **Arthur J. Haskell,** Matson Navigation Co.-secretary-treasurer. Nominated for the executive committee were: **David Seymour,** naval architect, and **Ben Andrews,** Stanford Research Institute.

Prior to the technical portion of the meeting, the 'T. Douglas MacMullen Award,' an engraved pewter set, was presented to the immediate past chairman, **Thomas T. Lunde.**

Arthur J. Haskell, papers committee chairman, introduced the authors of the paper "Vanguard Class of 130,000-DWT Ore/Oil Carriers," **N.J. Thompson** and **T.B. Thomas** of the Marcona Corporation. This paper deals with all facets of bulk carrier economic analysis, design and construction. These vessels contain several "firsts" among which is a non-reversing turbo-gear set with a controllable-pitch propeller. The authors estimated that the additional cost for this type of powerplant including interest, will be recovered in four years.

The authors gave the following factors as influencing the selection of steam turbine/c-p propellers. "At present, the Marcona fleet consists of seven steam turbine and two large-bore, slow-speed direct diesel ships. During the preliminary design stages of the Vanguard-class ships, the main aim was to have the best equipment, which represented the maximum in efficiency, and to only incorporate tried and tested developments, thus the steam turbine/controllable-pitch propeller. This choice was made based on the following conclusions:

"1. With a c-p propeller maneuverability of the ship is outstanding.

Authors at the Northern California Section meeting were, left to right: **N. J. Thompson,** staff naval architect and **T. B. Thomas,** staff marine engineer, Marcona Corporation.

"2. Full power can be obtained astern as well as ahead with a c-p propeller, a condition which is impossible to obtain with a fixed-pitch propeller regardless of the type of powerplant. On a steam turbine, the astern element is eliminated. Controllable-pitch propelled ships can come to a crash stop from full ahead in considerably less time than can similar ships equipped with fixed-pitch propellers, and a maneuver is carried out with considerably less strain on the overall ship.

"3. Should one blade be damaged, that blade can be replaced without drydocking the vessel simply by ballasting the ship down by the head and raising the stern sufficiently to uncover the wheel hub. Conversely, damage of one blade on a fixed-pitch propeller usually requires drydocking of the ship and removal of the entire propeller.

"4. It is not necessary to purchase and carry on board a spare propeller, as in the case with a fixed-pitched propeller. Because each blade is independently attached to the hub, it is necessary only to carry one blade as a spare.

"5. Turbines with c-p propellers operating at almost constant rpm enable installation of a generator and feed pump driven through a clutch from the main turbine. This reduces the amount of auxiliary machinery required and adds to fuel economy.

"6. Since these are ore/oil ships, a large boiler is needed in any respect for tank cleaning and cargo heating.

"7. A turbine plant requires considerably less maintenance than a diesel. In Marcona's type of operation, long voyages with a limited time in loading and discharging ports, it is practically impossible to carry out the preventative maintenance necessary on large diesel plants without costly offhire time. This has been conservatively estimated as 5-6 more days offhire than the comparable turbine plant.

"8. Replacement parts and maintenance costs are much higher on a diesel than on a steam turbine. Maintenance costs for a diesel ship, the same size as the Vanguard-class, would run $20,000 more per year.

"9. The use of the steam turbine with gear allows a decrease in the propeller speed to 85 rpm—resulting in a larger propeller with greater efficiency.

"A reheat cycle was studied but the consensus was that there had not been enough experience with these types of installations to justify their incorporation into these ships. However, a c-p installation is ideal for a reheat cycle, and Marcona hopes that perhaps such an installation on one of our future buildings can be justified."

Marshall Silverthorne (left) accepting "Certificate of Appreciation" for **T. T. Lunde** from **Hugh Downer,** Section chairman.

Hilder To Represent French Manufacturer Of Deck Machinery

J. P. **Tanquerey,** of the Marine Department, Brissonneau et Lotz, Nantes, France, has announced the appointment of **Jack R. Hilder Jr.,** as U.S.A. Gulf Coast agent for the firm's line of deck machinery.

Brissonneau et Lotz has over 100 years of experience in the design and manufacture of equipment for the marine industry.

Products include windlasses and winches with a a-c motor drive or ac/dc with electronic control, electro-hydraulic deck cranes, electric and electro-hydraulic self-tensioning automatic mooring winches, chainstoppers, universal fairleads, auxiliary rollers and other deck machinery.

According to Mr. **Hilder,** there is a great interest among the drilling contractors and other oil country users in the automatic mooring systems developed by the firm. The Neptune Pentagone 81, semi-submersible drilling rig, is equipped with Brissonneau et Lotz deck equipment including its 125-ton anchoring winches.

Inquiries in the Gulf Coast area should be directed to **Jack R. Hilder Jr.,** Special Offshore Services, P.O. Box 7576, Metairie, La. 70002.

Litton Appoints Preisser President Of Great Lakes Corp.

Victor L. Preisser

Victor L. Preisser has been appointed president of Litton Great Lakes Corporation, a division of Litton Industries, **Ellis B. Gardner,** Litton senior vice-president in charge of the Marine Group, announced.

In his new position, Mr. **Preisser** will direct the transportation systems activities of Litton's Marine Group on the Great Lakes. He will be located in Cleveland.

Previously, Mr. **Preisser** was assistant vice-president of the Chicago & Northwestern Railroad Company, where he was in charge of developing transportation systems programs. He also organized and directed the Chicago & Northwestern's accident and loss prevention department.

Mr. **Preisser** received a bachelor of science degree in physical sciences from Stanford University and an MBA degree in transportation and operations research, also from Stanford. He spent four years in consulting and research work with Stanford Research Institute prior to joining the Chicago & Northwestern.

Maryland Names Ferrari Ass't Sales Manager

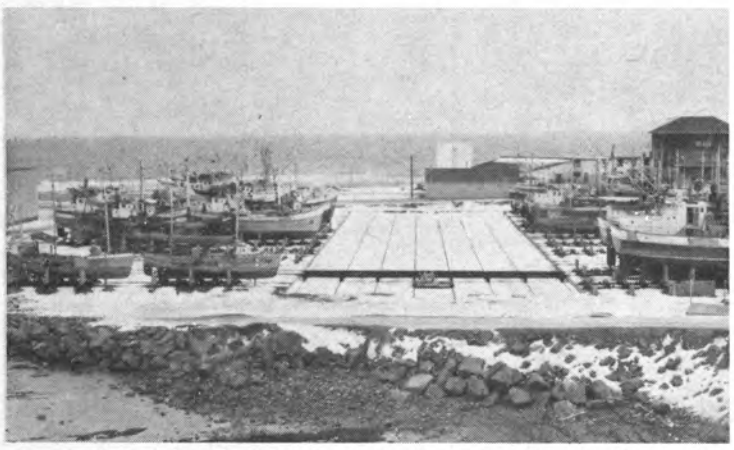
Gino Ferrari

Gino Ferrari has been promoted to assistant manager of sales for Maryland Shipbuilding & Drydock Company, according to an announcement by **Harry A. Berke,** manager of sales for the company.

Mr. **Ferrari** came to the company five years ago, from Todd Shipyards Corporation, where he was employed in ship repair sales since 1953.

He is a native of Italy and a graduate of St. John's University, Brooklyn, N.Y. He is a member of The Society of Naval Architects and Marine Engineers, Propeller Club and Sportsmen Club.

SPECIFY CRANDALL SHIP TRANSFER SYSTEMS



Twenty longitudinal storage berths serviced by a self-propelled cross transfer table.

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Up to 6000 Ton Capacity from Railway Dry Dock

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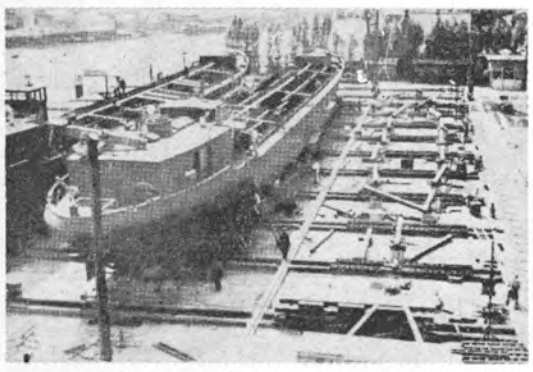
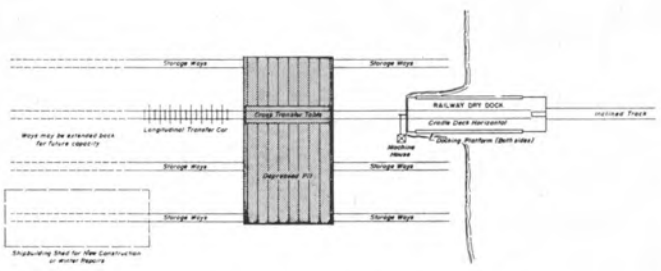
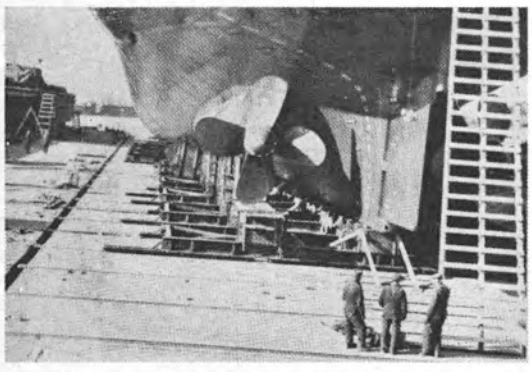


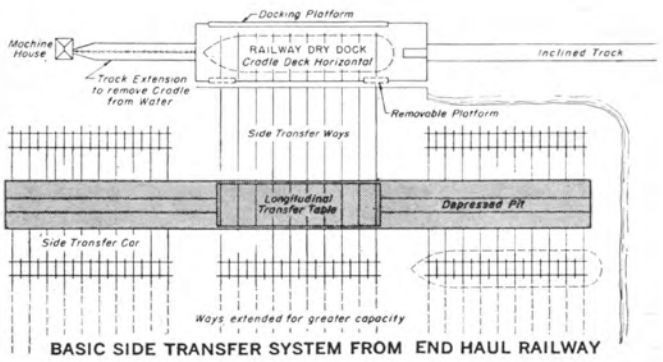
300 ton side transfer system used for barge construction with launching by means of side-haul railway, Dordrecht, Netherlands



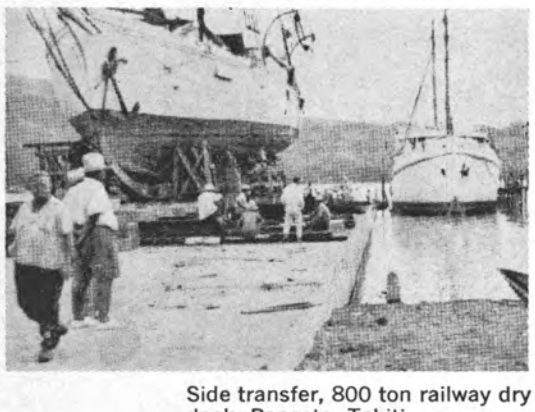
BASIC LONGITUDINAL TRANSFER SYSTEM
FROM END HAUL RAILWAY OR FLOATING DOCK



4000 Ton Ship on Side Transfer



BASIC SIDE TRANSFER SYSTEM FROM END HAUL RAILWAY



Side transfer, 800 ton railway dry dock, Papeete, Tahiti

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Inquiries are invited for transfer systems, new dry dock designs or enlargement of dry docks.

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since 1854 — "Progress — the result of never being satisfied"

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AIMS Directors Elect James J. Reynolds Association President

James J. Reynolds, until recently Under Secretary of Labor, has been elected president of the Washington-based American Institute of Merchant Shipping by the board of directors of the new national shipowners' association.

AIMS' Board Chairman **Everett S. Checket,** general manager, Marine Transportation and Marine Sales, Mobil Oil Corporation, New York, in making the announcement said: "We are indeed fortunate to have as president a man with such broad experience in both private industry and public service. The board is confident Mr. **Reynolds** will provide the leadership needed to unify our industry, to assist us in developing policies and programs essential to rebuilding all segments of the fleet and to assure government-industry cooperation in restoring our nation's lost maritime prestige."

James J. Reynolds

Mr. **Reynolds,** a key leader in labor-management relations in the last two administrations, was appointed in 1961 as Assistant Secretary of Labor by the late President **John F. Kennedy.** He was appointed Under Secretary of Labor by former President **Lyndon B. Johnson** in January, 1967, a position he filled with distinction until January 20, 1969.

Mr. **Reynolds,** a Brooklyn native and a Columbia University graduate, worked in Wall Street during the 1930's and became a member of the New York Stock Exchange. In 1939, he joined the United States Pipe and Foundry Company in Bessemer, Ala., as industrial relations director and then served as a naval officer in World War II.

President **Truman** appointed Mr. **Reynolds** in 1946 to a five-year term on the National Labor Relations Board. Shortly after reappointment to a second term, he resigned to rejoin the United States Pipe and Foundry Co. as vice-president in charge of employee relations and subsequently became vice-president of operations with ALCO Products in Schenectady before returning to government on his Labor Department appointment in 1961.

He has served on the New York State Governor's Business Advisory Council and as an employer representative on the New York State Advisory Council on Employment and Unemployment Insurance.

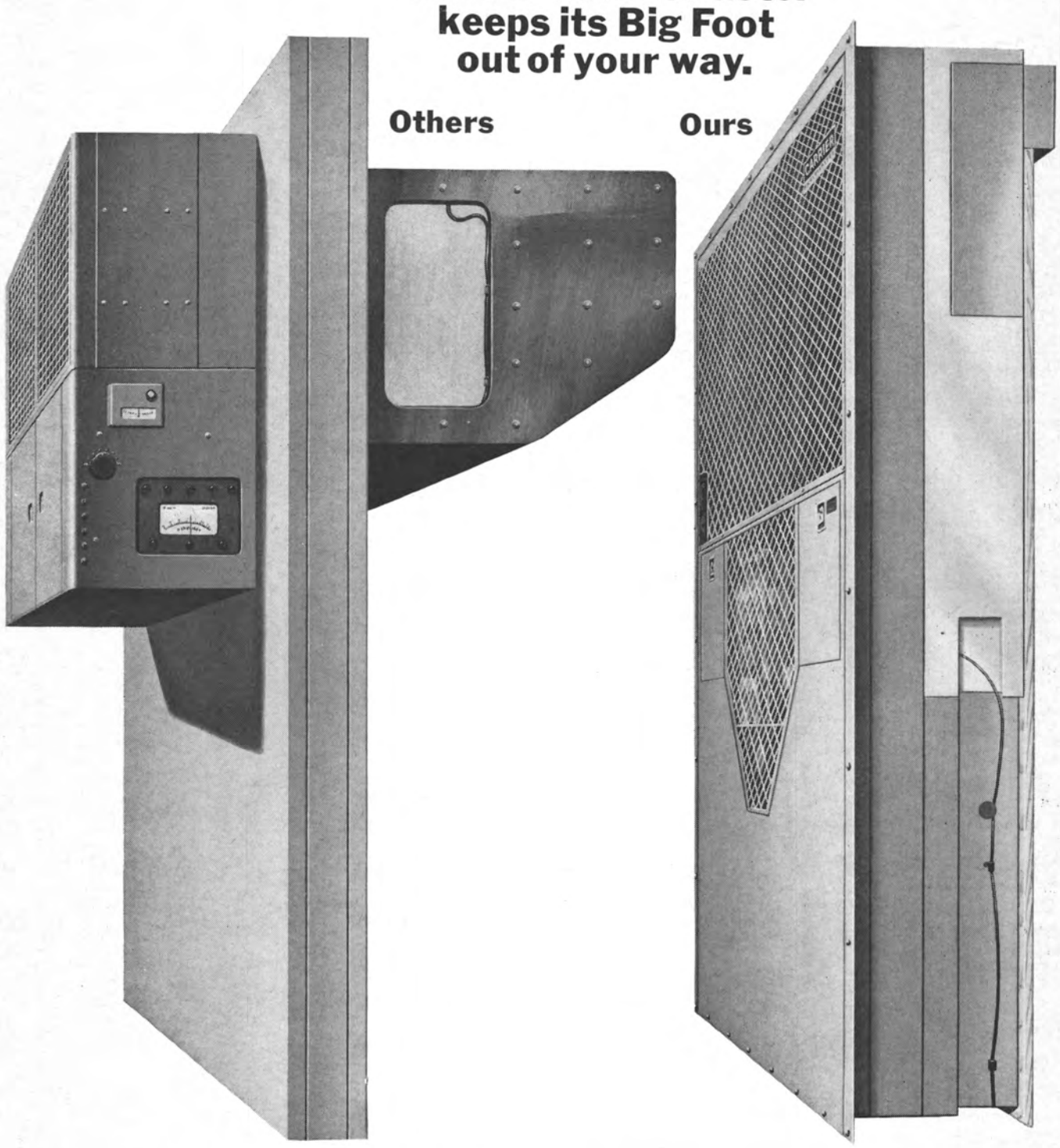
Mr. **Reynolds** said it was a "great opportunity" to be elected president of AIMS. He said he sees his job not only as a challenge but as a chance to play a key role in the preservation and growth of the U.S. merchant marine. "I am not a stranger to this industry," he said. "It has been my privilege to work with many of the leaders of the U.S. maritime industry not only in labor situations but in many other maritime related matters. The critical role which a strong merchant marine plays in the well being of the nation both in times of peace and international strife cannot be over-emphasized. I wholeheartedly support the objectives of the American Institute of Merchant Shipping, and I trust that I can make a significant contribution to the attainment of those objectives."

AIMS' members represent the strongest unification of American shipowners ever joined together. It is comprised of nearly 40 tanker and dry-cargo companies, owning and operating over half (500) of the oceangoing vessels in the active merchant marine. Most of the AIMS' companies formerly comprised three of America's leading maritime trade associations — the American Merchant Marine Institute, the Committee of American Steamship Lines and the Pacific American Steamship Association.

The AIMS' staff has moved into new headquarters in the Bender Building, 1130 Connecticut Avenue, N.W., Washington, D.C. In addition to Mr. **Reynolds,** other AIMS officers are **Ralph E. Casey,** executive vice-president; **Albert E. May** and **Ralph B. Dewey,** both vice-presidents, and **Parker S. Wise,** secretary-treasurer.

Former Senator **George A. Smathers** of Florida, who worked closely with Presidents **Kennedy** and **Johnson** on proposed maritime programs, was recently retained as general counsel for AIMS.

Carrier's Frostmaster® keeps its Big Foot out of your way.



We went out of our way to stay out of your way when we designed the 12 5/16 inch deep Big Foot cargo container refrigeration unit.

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Because Frostmaster doesn't bulge into the box, it doesn't put a dent in profits. It's flat as a wall so it loads flush. In fact you can use Frostmaster as a wall . . . which not only lets you get a high end-load but rack-loading strength as well.

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Our Special Products Division will tell you all about the Big Foot. Write them at Syracuse, N. Y. 13201. It'll be a step in the right direction.

Carrier Air Conditioning Company

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LAD – A New Family Of Devices To Assist In Ship Conning

Robert F. Riggs*

Sperry Marine Systems Division has carried out extensive studies of ship conning functions for the Maritime Administration. Among other things, these studies included an analysis of the lookout's function in the conning of a vessel and a study of the feasibility of improving lookout efficiency with electro-mechanical aids.

Hardware devices, called the lookout-assist-device (LAD) were developed under this program to demonstrate the practical feasibility of automatically detecting vessels within set navigational ranges.

Originally, the LAD concept was restricted to the function literally described by its name, but extensive studies have shown that there are many problems associated with the conning of a ship that can be more easily solved by proper sensors and displays. The word LAD has now come to connote a whole family of potential devices, sensors, and displays, of which the original lookout assist device is only a part.

The studies demonstrated that a radar lookout-assist-device was theoretically feasible. This part of the LAD gear is called R-LAD. A feasibility demonstration of the equipment occurred at sea aboard the Humble Oil Company ship Esso Bangor during late 1965 and early 1966, with the result that feasibility of the R-LAD was proven to the satisfaction of both MarAd and ship operating personnel.

Further theoretical studies to consider feasibility of a hearing lookout-assist-device (H-LAD) in the acoustic portion of LAD, were begun soon thereafter with the ultimate result that a feasibility model of H-LAD has been constructed and is now undergoing trials aboard the Great Lakes bulk carrier Edward B. Greene of the Cleveland Cliffs Iron Company fleet. Results of the trials thus far have been largely satisfactory. The installation aboard the Edward B. Greene combines both the radar and acoustic detection systems in a single system.

Since detections with LAD use two sensing methods, radar and acoustic, the probability of detection will be greater than either one acting singly. Actually, a good deal of study went into the choice of these two sensing techniques. Before the choice, all known eligible sensing techniques, including radar, microwave radiometry, passive and active underwater sonar, laser radar, infrared, passive sound-in-air, and passive foghorn listening were compared. The comparison involved sensor capabilities to search and detect an intruding merchant vessel within a reasonable time during unfavorable weather conditions. The sensor performance per dollar-of-cost became the sensor's figure-of-merit. The study showed that only passive foghorn listening and radar have acceptable figures-of-merit. Here we mean, of course, robot systems that automatically detect other ships without the necessity for a human observer.

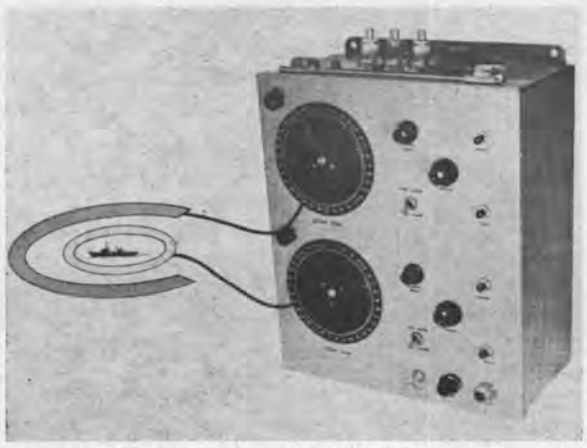


Figure 1—Experimental model of R-LAD showing how the guard-ring concept is incorporated in the bridge unit.

The concept of detection at a limited number of discrete ranges, as used with R-LAD, is called guard-ring detection. Figure 1 shows how the guard-ring concept has been incorporated into the experimental model of the R-LAD system. On the right of the figure is shown the display panel developed for the feasibility demonstration. Two dials rotate in synchronism with the R-LAD antenna. Each dial corresponds to a guard-ring. In this case there are two, an inner and an outer, which are usually set at approximately 1½ and 5 miles range, respectively. When a target crosses either guard ring, an alarm is sounded and the proper dial indicates bearing in relation to the intruder. In one mode, the dial can be made to stop altogether and the alarm made to continue until the conning officer resets the device. In another mode, the dial keeps rotating and an intermittent 'beep' and flashing light indicates that the intruder is still in the guard ring each time the R-LAD antenna scans past the target.

In the combined H- and R-LAD system now undergoing trials aboard the Edward B. Greene, the R-LAD detections also initiate a recorded voice callout alarm which tells the conning officer in words that an object has been detected and indicates its bearing sector.

A question often asked about R-LAD is, "What makes it so special—why can't any marine radar be modified to incorporate the guard-ring concept?" The answer is that R-LAD is required to fulfill several special requirements not normally adaptable to the usual marine radar design. In addition, the lookout can be considered as a sensor redundant to the ship's regular radar.

In H-LAD, the acoustic signals are picked up by a remote microphone array. The particular array being tested contains only three microphones—port, starboard, and aft. The array is about four feet in diameter and is enclosed in a teflon fabric windscreen. The windscreen has proven very effective; very little wind or rain noise has actually been experienced in the system. The electronic equipment is contained in the standard relay rack. The equipment consists of amplifiers, a recording system, audio-visual displays, controls, an automatic alarm system, and a logic system for controlling the recorder. A simple block diagram of the entire H-Lad system is shown in Figure 2.

Although at present only three receiving and amplifying channels are being used, the special amplifier system is capable of amplifying up to eight signals with equal gains and phase match over the band 100 to 4,000 Hz, the band of most interest to conning. Phase and gain balance allows faithful binaural reproduction of the signals to the observer's ears. This feature has been used in one series of experiments to determine the bearing of sounds to within about 5 degrees accuracy. The amplified signals are also recorded with binaural fidelity and can be played back on command. Besides being recorded, the sounds picked up by the remote microphone array are continuously reproduced through a high fidelity speaker and stereo headset. Also, a visual display of the signals is available on a cathode ray oscilloscope that continuously indicates the bearings of all sound sources to about 45 degrees accuracy.

Automatic alarms are given when a sound of sufficient amplitude and duration occurs in any one of the receiving channels. When this happens, appropriate alarms sound, warning lights are lit, and the recorded voice channel calls out the bearing to about 45 degrees accuracy. Coincidentally, the recorder system is made to store the sound that triggered the alarm. The storage time is adjustable for a period of from zero to two minutes. If the recording is not played back within that time, the system automatically reverts to record mode.

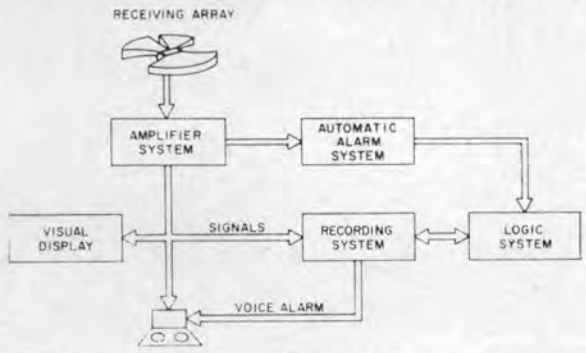


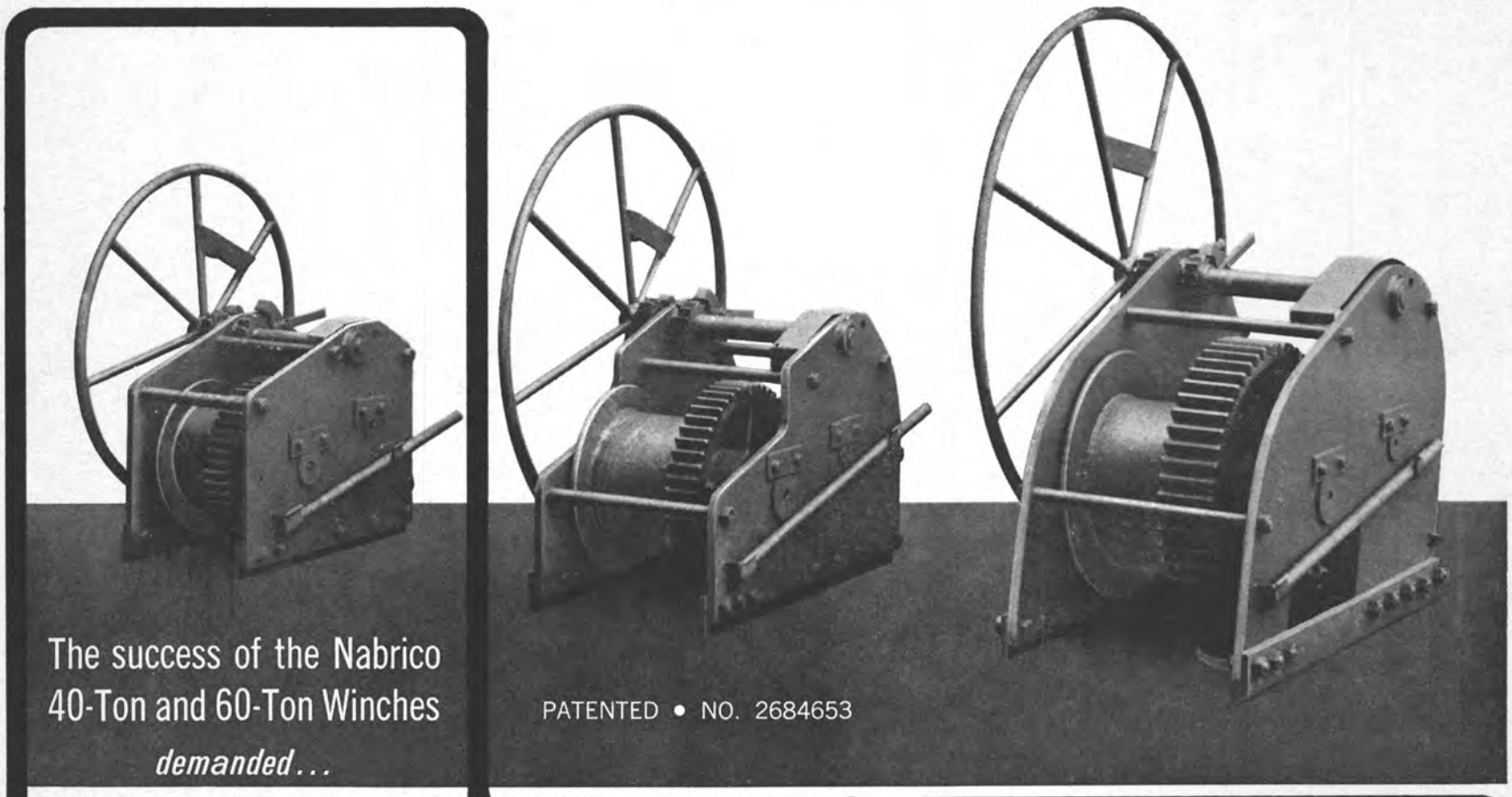
Figure 2—Block diagram of H-LAD system as currently being tested on the Edward B. Greene on the Great Lakes.

Results with this experimental version of LAD equipment have been encouraging. Detection probabilities of R-LAD have been about 97 percent against steel-hulled vessels at six miles range. Compared to actual lookout performance, this is a considerable improvement and R-LAD works as well in bad as in good visibility.

Acoustic reception by H-LAD has demonstrated about a one-mile increased detection range over the unaided lookout. The R-LAD and H-LAD sea trials have given Sperry Marine Systems Division engineers valuable data necessary to design a prototype version of LAD.

Besides the new system, various other displays have been or are being considered that would permit the conning officer to formulate a safe and effective maneuver plan in a densely populated sea, without plotting or using a computer. The overall objectives are to improve safety, finesse in maneuvering, reliability, and to lower costs without compromising the conning officer's traditional role as the maker of decisions.

*Mr. **Riggs,** Sperry Marine Systems Division, Sperry Rand Corporation, presented the paper condensed here before the winter meeting of the Great Lakes and Great Rivers Section of The Society of Naval Architects and Marine Engineers. **John L. Horton,** assistant manager, Marine Department, The Cleveland Cliffs Iron Company, presented a supplemental paper reporting on the actual use of the LAD system.



The success of the Nabrico 40-Ton and 60-Ton Winches *demanded...*

A Little Brother!

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THE NABRICO 20-TON WINCH

Success often runs in families . . . and if the performance records of the Nabrico 40-Ton and 60-Ton Winches are any criteria . . . a successful career awaits their new baby brother, the Nabrico 20-Ton Winch!

Like its big brothers, the Nabrico 20-Ton Winch has a sturdy, massive, all-steel construction that gives you more pounds per dollar to assure more strength, longer wear and trouble-free operation. All gears and ratchets have machine-cut teeth. All bearings are bronze-bushed and Alemite fittings permit proper lubrication of every bearing.

These and the many other features, listed right, are convincing proof that the Nabrico 20-Ton Winch is indeed worthy to stand beside its big brothers. So, if you need winches for river equipment, remember Nabrico has a size for every requirement. Available from stock . . . no waiting!

CHECK THESE FEATURES

- Positive no-slip tension
- Fast cranking with handle
- Quick release action
- Foot brake run-out control
- Lever ratchet for extra high tension
- Easy installation
- Simple, fast rope attachment

Air, electric and hydraulic power options. Can be galvanized on request. (Made in true left hand and right hand arrangement so they can be used in pairs)

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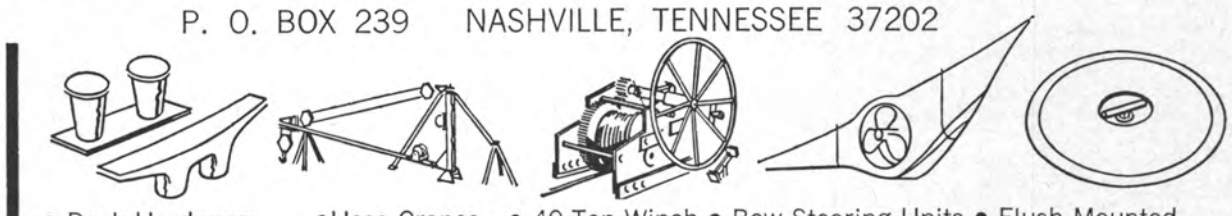

• Deck Hardware •Hose Cranes • 40-Ton Winch • Bow Steering Units • Flush Mounted-Watertight Hatches

Todd Shipyards Offers To Use NS Savannah As Training Facility

Todd Shipyards Corp., one of three companies which submitted bids to the Maritime Administration to operate the nuclear ship Savannah after July 1, proposed to use it in conjunction with its nuclear division at Galveston as "a completely integrated marine training and test facility."

Todd would prefer to see the Savannah continue in service as a merchant ship, as it has been operated in the past by First Atomic Ship Transport, Inc., a subsidiary of American Export Isbrandtsen Lines. But, if the Maritime Administration decides that is not feasible, Todd would like to see the ship kept in berth at its Galveston facility for training purposes.

Todd maintains the Savannah, and completed its refueling only last year. For this reason it considers itself "uniquely qualified" to maintain the training facility.

If keeping the Savannah in service, at an annual cost to the government of $1.8-million is out of the question, making it a part of the Galveston training project would preserve the symbolism of the vessel as the only U.S.-flag nuclear-powered merchant ship, and at the same time would accomplish the Maritime Administration's objective of "economic and effective utilization," Todd said in support of its proposal.

The other companies which have submitted proposals for the Savannah to the Maritime Administration are, American Export Isbrandtsen Lines and Transoceanic Navigation Co.

Thermo King Awards N.Y. Area Franchise To Trans-World Int.

Harold Hansen

Trans-World International, Inc., 56 Oak Street, Bayonne, N.J., has been designated Thermo King Corporation's first container service marine franchise in the New York City area.

Thermo King, which is based in Minneapolis, is the world's largest manufacturer of transport cooling/heating units for trucks, trailers, railroad cars and containers. It is a subsidiary of Westinghouse Electric Corporation and has more than 200 factory-authorized franchise dealerships from coast to coast.

Trans-World International services Thermo King units for major shipping lines commuting to all corners of the world. It employs mechanics with specialized training in marine container repair, and has a complete service and distribution department and a new modern stockroom warehouse.

Principal owners of the company are **Frederick Rogers** and **Ronald Lefcourt. Harold Hansen** is general manager.

Trans-World International is situated in a central location on three acres of land in close proximity to ports in New York, Brooklyn, Port Newark, Port Elizabeth and the new free port of entry dock.

With location, a highly-skilled staff, and the increasing popularity of containerization on its side, Trans-World International believes that it has all the makings of an extremely valuable Thermo King franchise.

Manual Remote Control For Valves Described In New Stow Bulletin

Stow Manufacturing Co. has published a four-page bulletin on the selection and types of remote control systems for valves. This bulletin describes the different types of equipment available for remotely controlling valves and how to use the equipment, as well as typical installations for industrial plants, atomic plants and aboard ships.

For a free copy of this bulletin on Remote Control of Valves write Stow Manufacturing Co., 86 Shear Street, Binghamton, N.Y. 13902.

An idle SS Delta Argentina gathers no green.

The SS Delta Argentina exists for one purpose only: to make money transporting cargo.

An all-hatch cargo liner, she's automated to load and unload at record-setting speeds.

That's why her owners, Delta Steamship Lines, Inc., specify Texaco lubricants for her machinery including high-speed revolving cranes.

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The kind of service that guarantees the best marine lubricants and fuels money can buy.

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WORLD WIDE

MARINE FUELS AND LUBRICANTS

Pratt & Whitney Gas Turbines Ordered For Two Cargo Ships Under Contract In Germany

A West German shipyard will build two fully-automated ocean-going cargo vessels to be powered by Pratt & Whitney Aircraft gas-turbine engines.

The two vessels will be the first general cargo ships to use the quick-response, high-energy aviation-type gas turbines for primary power, according to the announcement made by Pratt & Whitney Aircraft. Each P&WA FT4 Marine Power Pac will develop 30,000 shp and give the cargo vessels a 25-knot capability.

The two vessels will be built at the Rheinsthahl Nordseewerke yards at Emden, Germany. The vessels will be in commission by late 1970.

Each vessel will be more than 750 feet long and displace more than 32,000 tons. The two P&WA FT4 gas turbines will drive the ship's controllable-pitch propellers through a geared transmission.

Pratt & Whitney Aircraft will also supply, in addition to the Marine Power Pacs, modules containing the gas turbines, enclosures, other engine room equipment and the ship's control system including bridge controls.

The automated equipment will enable the captain to run the vessels entirely from the bridge, if need be.

While the cargo ships will be the first gas-turbine vessels of this type on the high seas, there are currently seven high endurance U.S. Coast Guard cutters of the Hamilton class in commission and two more on the ways and a military chartered cargo vessel—all using Pratt & Whitney Aircraft marine gas turbines.

In addition, two Royal Danish Navy frigates use P&WA engines to drive Swedish turbines for high-speed operation and four Royal Canadian Navy destroyers and a Canadian hydrofoil, all under construction, will use P&WA FT4 gas turbines.

Adapted for marine service, the engine's tremendous power is harnessed by adding a power turbine to convert the hot gas energy from thrust to shaft horsepower. The power turbine is spun by the exhaust gases. Special materials and protective coatings are used to resist corrosion from salt water. The FT4 engines will burn jet fuel, diesel and other marine fuels.

The FT4 is the largest of a series of marine and industrial powerplants developed by Pratt & Whitney Aircraft's Turbo Power & Marine Department. Other units range down in size to 480 hp. More than 400 industrial engines have been sold since 1960 for use in gas compression on long-distance natural gas lines, electrical power generation, chemical processing, and for marine propulsion.

The FT4 engines have undergone exhaustive testing by both the U.S. Navy and the U.S. Coast Guard and are certified by the Coast Guard and the American Bureau of Shipping.

SNAME N.Y. Section Discusses Protection And Securing Of Deck-Stowed Containers

The state-of-the-art of securing containers on the deck of a ship was reviewed and evaluated in detail by **Charles R. Cushing,** president of Cushing and Nordstrom, Inc., New York Naval architectural and marine engineering firm, at the March meeting of the Metropolitan Section of The Society of Naval Architects and Marine Engineers.

Mr. **Cushing** showed by means of slides what damage has occurred to containers on deck and then proceeded to explain the proper methods for securing containers to prevent a repeat of these experiences. The paper includes calculations for lashings. Also described in the paper are other systems, such as the buttress system, for securing containers.

Mr. **Cushing** expressed concern over the publicity given to some of the difficulties encountered in the transport of deck containers. "This publicity," stated the author, "has ranged from accurate accounts and constructive suggestions, to hysterical and inaccurate accounts accompanied by unrealistic and uneconomical solutions."

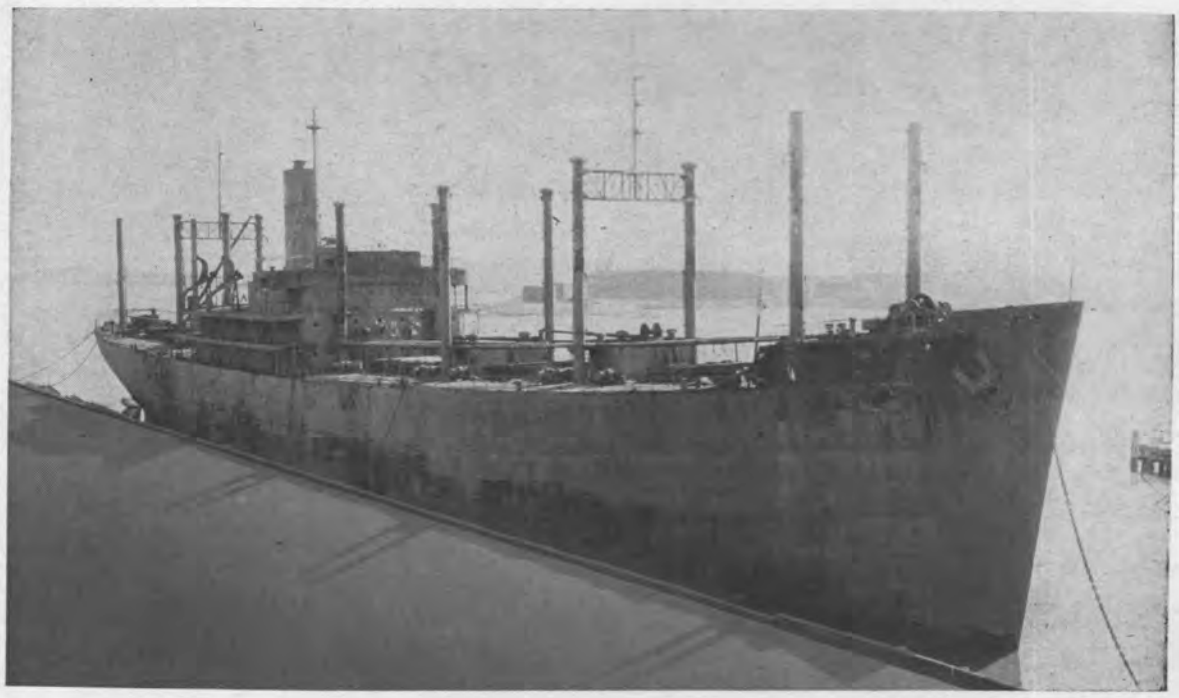
The author further stated "The regulatory bodies have shown admirable restraint in permitting the industry to evolve rational solutions to the problems, as the factors affecting the problems occur. However, it behooves the industry and profession to quickly recognize and solve these problems. The alternative is to have solutions dictated in the form of regulations which may restrict progress."

Considerable discussion was devloped by this paper since the marine industry is fully aware of problems involved. The discussors included naval architects, regulatory bodies, insurance groups and ship operators.

Sewart Building Twin-Screw Launch

Sewart Seacraft Div., Teledyne, Inc., of Berwick, La., has received an order from Panama Canal Co., New Orleans, La., for the construction of a twin-screw launch. Designated Hull No. 1672 and to be powered with 680-bhp diesel machinery, the launch will be 45 feet 11½ inches in length, 13 feet 8 inches in beam and 6 feet 1½ inches in depth.

AP2/AP3 VICTORY C2/C3 NEW, US RECONDI



EQUIPMENT FROM MOORE DRYDOCK C-3 EX-MORMACSEA — HULL 197

350 KW TURBO GENERATORS: **Turbine**—De Laval 503 HP—10,000 RPM—6-stage—440#—282° superheat—28½" exhaust. **Gear**—De Laval—10,000/1200 RPM. **Generator**—Crocker-Wheeler 350 KW—120/240 DC—1458 amps—1200 RPM—compound wound—#230194 & 230195. Also fits Federal Hull 198. BOILERS: Foster-Wheeler type D—2-pass design—525# pressure. FORCED DRAFT FAN MOTORS: Westinghouse SK—46.5/13.81—2400/1660/960 RPM—230 VDC. PROPELLERS: 21'8" diameter—21.669 pitch. REDUCTION GEAR: De Laval 5015/3461/729/85—serial 228972. SHAFTING: 24'x19" diam. STEADY BEARINGS: 19¼" o.d. EVAPORATOR: Paracoil 36-17/48-23/28-11. MAIN FEED TRIPLEX: Worthington—4½"x8"—160 GPM @ 510#—72 HP—230 VDC—975/1750. MAIN CIRCULATOR: Worthington 20" LAS—12,000 GPM—19' head—100 HP Westinghouse motor—frame 184.5—230 VDC—485/645—365 RPM. ALSO TAILSHAFT & RUDDER, KINGPOSTS, 16" PORTLIGHTS, BOOMS, DOORS, WINCHES, WINDLASSES, STEERING GEAR.

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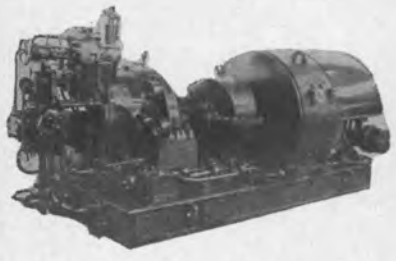
INQUIRE ABOUT OTHER ITEMS YOU NEED

MATERIAL FROM MOORE-BUILT C-2 MORMACWREN — HULL 271

Specification class C2-S-B1—Maritime Commission Hull #1184. **Main Turbine Rotors:** HP & LP—HP serial 75382—LP serial 75363. ALSO, ALL MOTORS FOR FEED PUMPS, BILGE, CIRCULATORS, ETC.

TURBO-GENERATORS



300 KW — From AP2 Ex-Medina Victory

TURBINE: Worthington-Moore—serial 7547 & 7548—440 lbs.—740°TT—28½" vacuum—type S4—5-stage—6097 RPM. GEAR: Type 14x7—6097/1200 RPM. GENERATOR: Crocker-Wheeler 102-HD—120/240 VDC—125 amps—40° rise—serial No. 973643 & 999795—compound wound. Armature flange 8¼"—B.C. 7"—12 holes. NEW ARMATURE AVAILABLE FOR THIS GENERATOR. SEE 3RD PAGE FOLLOWING.

300 KW — From AP3 Ex-Ridgefield Victory

TURBINE: Worthington-Moore type S4—5-stage—6097 RPM—740°TT—440#—serial No. 7108 & 7106. GEAR: 6097/1200—type 14x7—serial No. 7108—5.081:1 ratio. GENERATOR: Crocker-Wheeler 102-HD—300 KW—120/240 DC—6-pole—3-wire—stab. shunt—1200 RPM—type CCD—serial 973583. Suitable for units 7541 & 7543 and 7089 & 7188. WILL SELL ARMATURE SEPARATELY: 12-Hole flange—⅝" bolt holes—8.247" diam.—7" B.C.—flange & shaft 5".

300 KW Murray

TURBINE: G.E.—DORV—325M—440#—740°TT—5645 RPM. GEAR: S-192—5645/1200. GENERATOR: Ideal—120/240 VDC—1250 amps—stab. shunt.

300 KW GENERAL ELECTRIC

TURBINE: G.E.—DORV—325M—440#—740°TT—reduction gear S-192. GENERATOR: G.E. 120/240 VDC—1250 amps—stab. shunt.

TURN TO 3RD PAGE FOLLOWING FOR 300 KW SPARE ARMATURES

BOILER SOOT BLOWER ELEMENTS

12 Units—Diamond Power Specialty Corp.—type FM-1220—for blower units S-3, S-4—84¼" overall—2" tubes—22 jets—calorized metal.

11 Units—Diamond Power Specialty Corp.—used with type FM-1220 coupling—2" tubes—Dialoy element—S1&S2—26 jets—12'6" OA—2x2 steel coupling.

3 Units—2" ID tubes—15 jet—8'10½" OA—with 2" steel coupling—with FM-1220 unit blower.

ENTIRE LOT $450.00

SHIPS SERVICE AIR COMPRESSOR

VEE-type—Sullivan—7x4½x4½—60 CFM—15 HP—230 volts—1850 RPM—light compound—with starter. **INGERSOLL-RAND ALSO IN STOCK**—model 15—type 40—5x4x4.

AP2 Victory Main Condenser Water Boxes

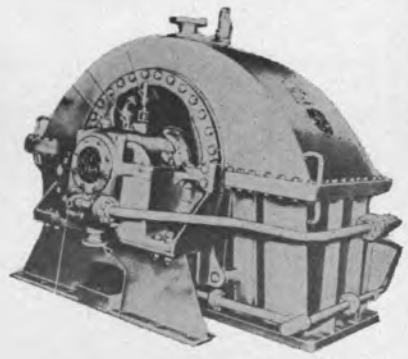
Mfg. by Graham—unused ABS and reconditioned ABS. Main condenser water boxes—AP3—Allis-Chalmers.

Aux. Condenser Water Box & Return Cover

Reconditioned ABS—Graham design—mfg. by Ross.

NEW AP2 VICTORY ENGI

6600 HP Main Propulsi



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Low Pressure Turbine $18,500
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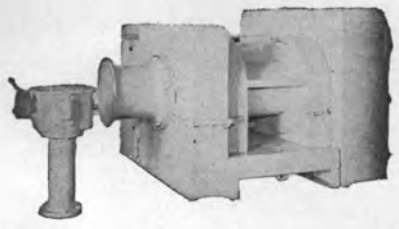
VICTORY SHIP UNIT WINCHES



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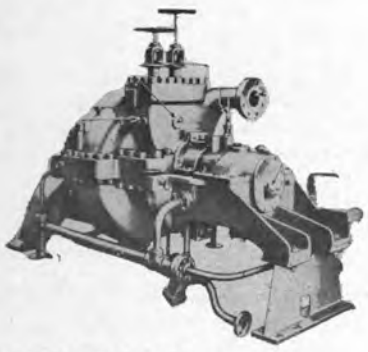

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FORCED DRAFT BLOWERS–22-TD-18

Westinghouse—230 PSI—430° TT—back pressure 15 lbs.—normal capacity 8900 CFM—4.8" of water pressure. RPM 2875—9.6 HP—total steam 697—overload capacity—13,-700 CFM at 10.7.

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DE LAVAL VERTICAL ROTARY MAIN LUBE OIL PUMP

10/15 HP—230 VDC—250 GPM @ 43 lbs.—980/1750 RPM. MOTORS: G.E. or Reliance.

MAIN CIRCULATOR & MOTOR FOR AP2 VICTORY

Ingersoll-Rand 18VCM bronze pump—20" suction—18" discharge—vertical. Flanges opposite each other. Distance flange-to-flange 4'5". Suction bolt circle 25"—discharge bolt circle 22¾". Suction (20) ¼" holes—discharge (16) ¼" holes. PUMP WEIGHT: 5100 lbs. MOTOR: 5700 lbs.—Allis-Chalmers 75 HP—230 VDC—500/670 RPM—frame E-Bu-162—drawing No. 31099.

SPARE ARMATURE AVAILABLE FOR ALLIS-CHALMER MOTOR — WILL SELL PUMP MOTOR SEPARATELY.

INGERSOLL-RAND 2VHM MAIN CONDENSATE PUMP

120 GPM—85 PSI—Pump only

Motors for Above

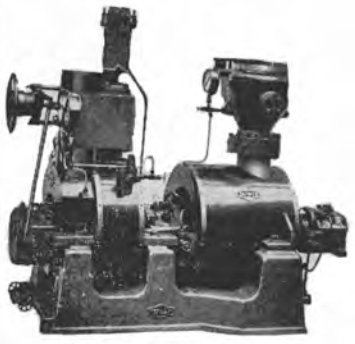
15 HP Motors and Terry or Coppus turbine drive.

INQUIRE ABOUT ANY UNLISTED ITEMS THAT YOU NEED

3000 G.P.M. AP2 – AP3 BRONZE AUXILIARY CIRCULATOR

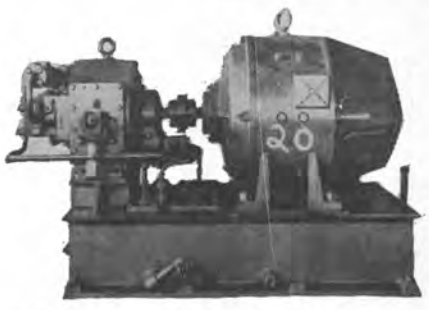
Manufactured by Allis-Chalmers. 10.9 lb. head—36" flange to flange—12" suction and discharge—17" bolt circle—19½" O.D. flange. This pump was substituted for a Worthington LAS on a Victory Ship and was easily fitted into the existing piping. The flange to flange dimensions were only slightly larger. MOTOR: 25 H.P.—230 volts DC—stabalized shunt—92 amperes—type EBU-100 — 18812MK — 1150 RPM.

COMPLETE WITH MOTOR STARTER



WEIR TURBINE-DRIVEN FEED PUMPS TMFP7

PUMP: 7000 GPH—585 PSI—1380 ft. head—5600 RPM. TURBINE: 480 PSIG—750°TT—exhaust 5 PSIG.



AP3 Steering Gear Pumps **$1750**

Northern Hydraulic (variable stroke) and Hele-Shaw Hydraulic.

Motors For Above Pumps **$1750**

Reliance: 40 HP—230 VDC—147 amps—type T—900 RPM.

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AUX. COND. PUMPS
Ingersoll-Rand 1-VHM—with 5 HP 230 VDC motor.
Will Sell Pump separately.

LUBE OIL STANDBY
Vertical Duplex—Worthington—7½x9x12.

FEED PUMPS
Worthington—vertical simplex—11x7x24.

HORIZONTAL DUPLEX PUMPS
Size 6x6x6 pumps.

AUX. CIRCULATOR MOTORS: 25 HP—230 VDC—96 amps—658/875 RPM—G.E. and Reliance

AP3 LARGE VICTORY MATERIAL

PROPELLER: DORAN—Seattle—4-blade—20'6" diam.—6' pitch—heal #4931—ABS (59) 645R.
ALSO TAILSHAFT—RUDDER—RUDDER CARRIER—UPPER STOCK

FORCED DRAFT FANS & TURBINES: Westinghouse type 25-TD-18—231.6 lbs. steam—exhaust 15.6 lbs.—superheat 31°F—max. capacity 19,000 CFM—static pressure 10.7—3950 RPM—45.8—serial nos. 5A2167-11 & 5A2167-12.

SPECIAL FROM RIDGEFIELD VICTORY

G.E. HP & LP TURBINES & REDUCTION GEAR—8500 HP—9350 HP Oregon Shipbuilding Hull #1224—Instruction Book 16263

TURBINES: G.E.: L.P.—8-stage—3509 RPM—#62043 H.P.—8-stage—6159 RPM—#62042 REDUCTION GEAR: #75143—type MD-48-A—8500 HP—9350 max.—6159/3509/763/85 RPM. Maneuvering valve, operating cylinder, etc.

PACIFIC FEED PUMPS – TYPE JB

Horizontally split—diffuser type centrifugal. CAPACITY: 150 GPM @ 542# or 1242' normal—185 GPM @ 600# or 1418' max. Steam inlet 440 @ 507°TT—RPM 3740—water rate 35 lbs/HP—pumping temp. 240°. Total weight 1 unit 3100 lbs. OAL turbine & pump on base 8' 9⅜"—OAW about 2'.

A 300 KW VICTORY SHIP & C-2 GENERATOR ARMATURES

CROCKER-WHEELER

New—as pictured above—with ABS certificate. From VC2-S-AP2 Ex-Medina Victory. For Crocker-Wheeler generator 102-HD-DP—type CCD—compound—serial 973-643; 999-795 and others in this group. Bearing shaft size commutator end—3½"; Flange size 8¼" OD; Bolt Circle 7", with 12 holes ½" diameter.

ALLIS-CHALMERS

120/240 volts DC—type MCW 21-11—1200 RPM—stab. shunt—148171 & 148173—from ex Stamford Victory—completely re-wound anuary 10, 1968—ABS—(1).

WESTINGHOUSE

120/240 volts DC—1250 amps—1200 RPM—stab. shunt—frame CB 208.4—Instruction Book 8301—51-S-20P-923 and 18-83H-313.

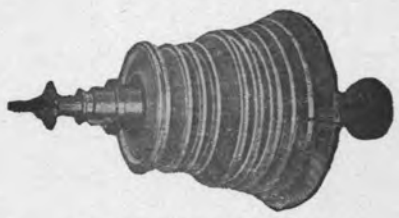
GENERAL ELECTRIC

120/240 volts DC—1250 amps—1200 RPM—stab. shunt—serial No. 2222725-2222807—In G.E. Instruction Book G.E.I. 16584.

C-2 ARMATURES

North Carolina C2-S-AJ-I—General Electric—120/240 volts DC—type MPC—stab. shunt.

T2-SEA-1 TANKER MAIN STEAM & AUXILIARY EQUIPMENT



B MAIN TURBINE ROTORS

Large Turbine Rotors—Lynn
Large Turbine Rotors—Schenectady
Elliott Turbine Rotors—Fit G.E. small Schenectady turbine

C G.E. MAIN PROPULSION GENERATOR REVOLVING FIELD

G.E. reconditioned—June 1967

D G.E. MAIN GENERATOR STATORS

E

REWOUND WESTINGHOUSE MAIN PROPULSION GENERATOR REVOLVING FIELD

Was rewound for Gulf when removed from "Gulf Moon". Since that time, it has been re-checked in the Westinghouse Service Shop and balanced. ABS and ready to go. —December 18, 1968—certificate number 68-BA4831 — A-67B-JW — 12/18/68 Baltimore.

WRITE FOR COMPLETE INFORMATION

F WESTINGHOUSE MAIN GENERATOR STATOR WITH OR WITHOUT COOLER

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WESTINGHOUSE MAIN MOTOR FIELD COILS

COMPLETE SET

Westinghouse — universal type — newest design—80 pieces—one set.

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T2 RUDDER

Reconditioned—ready to go.

T2 TAILSHAFTS

Reconditioned

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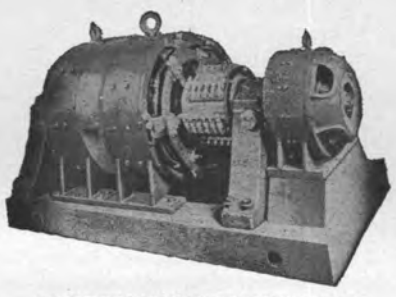

I WESTINGHOUSE EXCITER SETS

110 KW—28 KW—5 KW available
110 KW—32.5 KW—5 KW available

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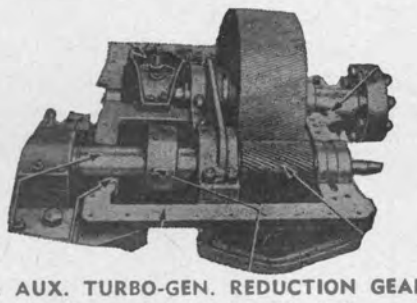
LORIMER

Emergency Generator Engine and Generator Parts

K MAIN CIRCULATING PUMP MOTOR

125 HP—Westinghouse—Frame 876C—type CS—squirrel cage — 440/3/60 — 585 RPM. Reconditioned to ABS. Ready to go immediately.

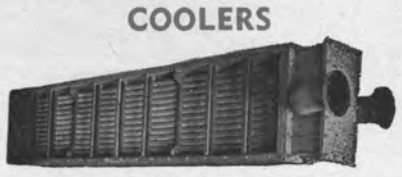


L G.E. AUX. TURBO-GEN. REDUCTION GEARS

Bull gear & pinion. With ABS.

M WESTINGHOUSE AUXILIARY GENERATOR REDUCTION GEARS AND BEARINGS

COOLERS



N MAIN MOTOR AIR COOLER

Westinghouse—ABS—ready to ship

O MAIN GENERATOR AIR COOLER

Westinghouse — reconditioned with ABS—ready to ship

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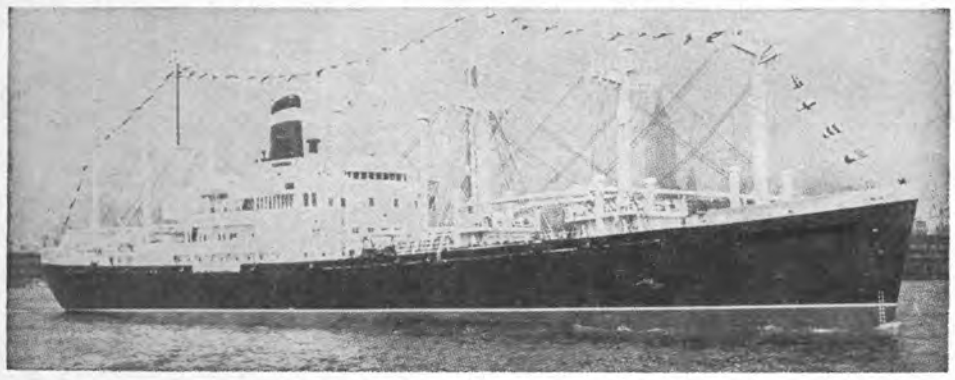
G.E. MAIN GENERATOR COOLER
type G4—bronze heads—AL brass tubes

ALL MACHINERY FROM U.S.M.C. NORTH CAROLINA C2-S-AJ1



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CENTRIFUGAL PUMPS

– ALLIS-CHALMERS –

MAIN CIRC. PUMP

9500 GPM @ 27'—800/600 RPM—type S.B. 20x20 — horizontal. MOTOR: Allis-Chalmers 100 HP—230 volts—600 RPM—Frame EB-162.

TURBINE DRIVEN MAIN FEED PUMP

Allis-Chalmers type BK-4—150 GPM @ 1465' head—180 GPM @ 1342' head. TURBINE DRIVE: Type ZS-1—94 HP normal—440 PSI —740°TT—4400 RPM.

AUXILIARY CIRCULATOR

Allis-Chalmers 8x6 — SE — 1500 GPM — 27' head—1200/1600—15 HP motor—horizontal.

MAIN CONDENSATE

6x3 CF2V — Allis-Chalmers — vertical — 120 GPM—185' head—1310/1750 RPM—15 HP.

AUXILIARY CONDENSATE

3x1½ SSL — 20 GPM — 185' head—1310/1750 RPM—7½ HP—vertical.

FIRE PUMP

4x3 B-2 — Allis-Chalmers — 400 GPM—280' head—1425/1900 RPM—50 H.P.

CIRCULATING PUMPS

Hot water & auxiliary sea water circulating pumps—1½x1½ SSH—20 GPM—10' head —1750 RPM—½ HP—and 80 GPM—70' head—2620/3500 RPM—3 HP.

– WORTHINGTON –

MAIN FEED PUMP

2 UQS-2—150 GPM @ 1465 T.D.H.—4000 RPM—115 HP. Turbine. Form S2RM—Moore steam turbine—1½" steam inlet—440 lbs WP —750°F @ 10 lbs gauge. Water rate 26.8 lbs BHP/HR.

MAIN CIRCULATOR

20-LAL-18 — 20" suction — 20" discharge — horizontal—9500 GPM—27' TDH—800 RPM — 100 HP. MOTOR: 100 HP — 360 amps — 800/600 RPM—horizontal—Frame 183 SK—light compound.

6-L-1 AUXILIARY CIRCULATING

1500 GPM—27' head—1450 RPM—horizontal —8" suction—6" discharge—15 HP—230 DC —56 amps—1450/1090—frame 83SK.

2½UZS-1 MAIN CONDENSATE

Vertical—6" suction—3" discharge—120 GPM —185' T.D.H. — 1750 RPM — 15 HP — 230 VDC—56 amps—1750/1310—ambient 50°C —frame 83SK.

3-UB1—FIRE SERVICE

Horizontal — 4x3 — 400 GPM — 281' head—1750—50 HP Motor—230 VDC—178 amps —1310/1750 RPM—frame 133SK.

AUX. SALT & HOT WATER CIRCULATING

1½ D—20 GPM—10' TDH—1750 RPM—3 HP salt water circ.—1 HP hot water circ.

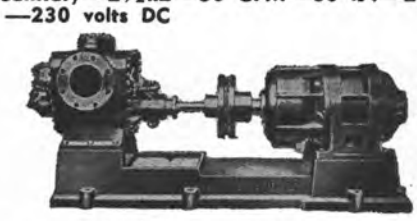
RECIPROCATING STEAM PUMPS

– WORTHINGTON –

- Port Feed — 8½x5¼x15 — 50 GPM—600 lbs.—VS
- Fire Service & Standby — 12x11x18 — 400 GPM—125 PSI—VS
- Dirty Ballast—Clean Bilge 10x11x18—400 GPM—50 PSI—VS
- Fuel Oil Standby—7x4x10—11 GPM—400 lbs—VS
- Lube Oil Standby—7½x9x12—250 GPM—47' head—VD
- Make-up Evaporator Feed—3x2 3/4x3—20 GPM—50 lbs.—HD
- Contaminated Evaporator Feed—20 GPM—75 lbs—HD
- Salt Water Evaporator Feed—3x2 3/4x3—20 GPM—35 lbs.—HD

– POWER RECIPROCATORS –

- Drinking water—2½x2—10 GPM—70 lbs—¾ HP—230 volts DC
- Sanitary—2½x2—30 GPM—80 lbs—2 HP —230 volts DC



KINNEY MOLASSES PUMP

430/215 GPM—size 8x8—pressure 60 lbs.—142/280 RPM—Motor RPM 875/1750—Reducer Falk 6.25:1. GE Motor—30/15 HP.

STEERING GEAR

McKiernan-Terry — size 10½ RAM Electre-Hydraulic. MOTOR: 40 HP. Westinghouse—frame 143S—690 RPM—230 volts.

– REFRIGERATION EQUIPMENT –

• CARGO REFRIGERATION PLANT

Compressor 7G8-EF—size 240—897 cu. inches —minimum displacement 39.2 tons—Carrier. Has 365 sq. ft. 3-pass Freon 12 condenser. MOTOR: 35 HP — 230 VDC — 1310/1750 Westinghouse—type 113-SK.

• SHIP SERVICE REFRIGERATOR

York 4x4—type Y-38—model 44-Fe—50 sq. ft. condenser. MOTOR: 10 HP—230 VDC—type SK—frame 43—1750 RPM—37.3 amps.

• COLD DIFFUSER

York type 4—Fan-Fin unit 1155 CFM—82 sq. ft. York type 2—543 CFM—36.8 sq. ft.

• CARGO WINCHES

North Carolina built type 73-S — mfg. by AH&D—50 HP—230 volts DC.

• BAILEY BOARD COMPONENTS

G.E. 300 KW TURBO GENERATORS

GENERATOR: Type DORV-325M — 5645 R.P.M. — 440 Lbs.—740° TT—18" exhaust. GEAR: Type S-192—right hand—5645/1200 —G.E. GENERATOR: G.E. 300 KW—120/240 —1200 RPM—type MPC—stab. shunt. WILL SELL ROTORS — GEARS — ARMATURES SEPARATELY.

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54000 lbs. water/hour. Elliott Co.

FEED WATER HEATERS

- FIRST STAGE—Shell & tube—45000 lbs/hr —100°—172°F—305 sq. ft.—Heat Transfer Products.
- THIRD STAGE—5400 lbs/hr—240° to 318° 200 sq. ft. effective surface. Heat Transfer Products Co.

EVAPORATORS

Contaminated water — 36-14 Paracoil-Davis Eng.—Distiller 2F72D Davis.

EMERGENCY DIESEL GENERATOR SET

Heavy duty—75KW—120/240 DC—720 RPM Ideal. ENGINE: Lorimer 115 HP—7½x9½—720 RPM—4-cycle—radiator cooled. With all switchgear. OAL 12'4"—OAW 49"—OAH 79" Weight 10,500 lbs.

M.G. SET

D.C. final AC—Bus—MG set—5.5 HP—230 Volt 1800 RPM input—Diehl's—3 KW 120/1/60 output.

AIR EJECTORS

Ingersoll-Rand main air ejector and auxiliary air ejector.

AIR COMPRESSOR

Ship service — type PB-2 — 7x4x4 — Chicago Pneumatic—15 HP—230 volts—1750 RPM.

COMBUSTION CONTROL

Worthington—4¼x2½x2¾—2-stage — 17.9 CFM at 100 lbs.—5 HP—230 volts DC.

FORCED DRAFT BLOWER

Type 6-SL — 12000 CFM — 8.1 S.P. — 1830 RPM— Buffalo Forge. MOTOR: Allis-Chalmers type EB-100—20 HP—1190/1830 RPM—230 volts—75 amps.

FUEL OIL BURNER

Todd HexPress—3 per boiler.

FUEL OIL HEATERS

ALCO—4400# fuel oil—from 100° to 230° —shell & tube type—unit in four sections.

FUEL OIL METER

2"—DVHP—30 GPM—Buffalo.

SEPARATOR

Oil and water—50-ton—McNab Victor.

DeLAVAL OIL PURIFIERS

Unimatic model designation 55-N-13—for turbine or light oils—200 GPH. Powered by 2 HP 230 volt DC Allis-Chalmers motor—frame 224.

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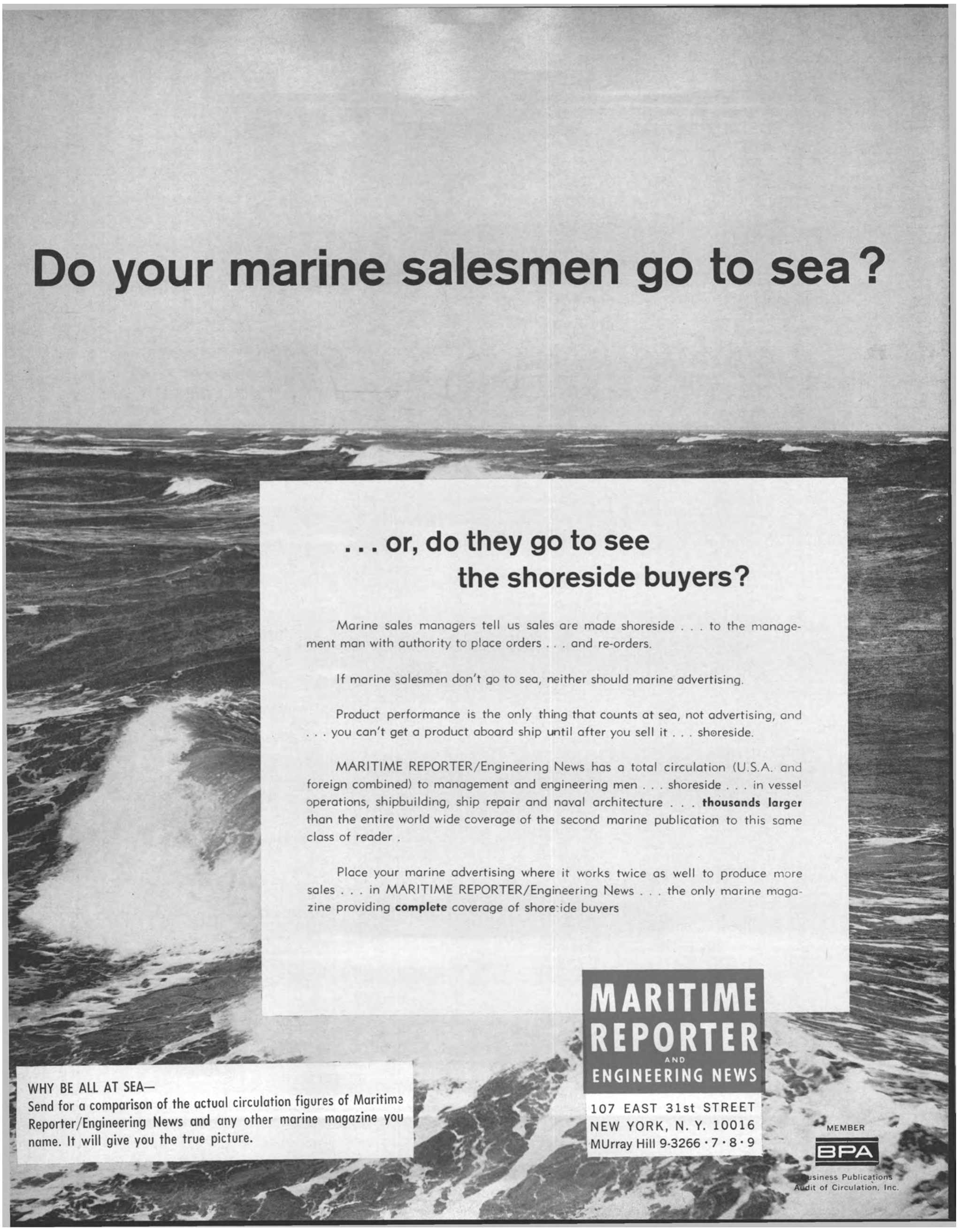

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Crandall Engineers Design Railway Dry-Dock System Installed At Caraquet, N.B.

The trawler Jean Cabot was the first vessel to be dry-docked and transferred for winter storage on the new railway dry dock and transfer system at Caraquet.

Fishing vessels of wood or steel must be removed from the water two or three times per year so that barnacles and fouling can be removed and the hull painted to protect against wood eating borers or corrosion of the steel by the seawater. To lift the vessel out of water, a dry dock is needed; and if this dock is located in the home port of the fishing fleet, it is much better than if the vessels must travel to more distant ports to be drydocked.

For many years, busy fishing fleets of northern New Brunswick have had to depend on docking facilities at Pictou or Gaspe when haulout was needed. Now with a new facility at Lower Caraquet, complete with transfer system for winter storage and multiple docking, the New Brunswick fleet can maintain itself at home. This is particularly valuable during winter when fishermen can clean, paint and overhaul their vessels when ice conditions prevent fishing operations.

For ships which displace up to 8,000 tons, the marine railway dry dock has proven to be a most economical and reliable method of docking, especially since it can be fitted with transfer systems to enable many vessels to be out of water at the same time. In the regions of Canada, where the harbors are frozen in the winter, the fishermen prefer to store their boats on land to avoid the damage that can be caused by ice pressure on the hull. This also gives the fishermen the whole winter to overhaul their boats so that they can start fishing very early in the spring.

The New Brunswick Department of Fisheries recognized the need to provide the fishermen at Caraquet with modern drydocking and storage facilities and therefore engaged Crandall Dry Dock Engineers of Cambridge, Mass., to plan a new facility at Lower Caraquet.

A railway dry dock operates on the principle of the inclined plane where a carriage or cradle supporting a vessel is moved up or down the inclined track which is for the most part, underwater. This results in the cradle being deep enough in the water to receive a floating vessel and then to remove the craft completely out of water as it moves up the incline to its inshore position.

The railway dry dock at Caraquet has a steel cradle, 144 feet long and 40 feet wide, traveling on a track 740 feet long. The track is built on the arc of a circle so as to achieve drafts of water over the keel blocks of 10 feet forward and 15 feet aft when the cradle is submerged and have the cradle horizontal in the up position for transfer purposes.

The cradle travels over a system of free rollers and is hauled by a 1¾ inch welded steel chain which is operated by a Crandall-type hauling machine. The 75-hp motor can haul a capacity vessel in 30 minutes.

The cradle is fitted with uprights and docking platforms on each side from which the docking crew can secure the vessel and operate the sliding bilge blocks. It has a tight, flush timber deck to permit easy access and prevent sandblast shot from penetrating to the ways below.

Two longitudinal crane rails on this cradle permit transfer cars to move vessels from cradle to shore and vice versa. A cross transfer table enables any vessel to be moved to or from any storage berth. One of the transfer ways connects to the building of the Chantier Naval where it will serve to move newly constructed boats to the main cradle for launching.

The 20 storage ways of the transfer system can accommodate 20 large vessels or 40 small vessels. The self-propelled cross transfer permits any vessel in storage to be moved to the main cradle for launching, or into the large shed of the Chantier Naval for repairs.

It permits the shipyard to undertake ship repair in the shelter of the shed during the whole winter period and thereby makes the winter work competitive with shipyards in milder climates.

The site conditions at Caraquet are difficult in that ledge rock is close to the surface, making it necessary to excavate rock underwater to achieve adequate depth of water. Also, the exposure to wind and waves makes the protection of the site very important and this problem was aggravated by the lack of good natural stone in the area to use as rip rap.

The new 600-ton railway dry dock with the government wharf on the west side, forms the nucleus for a new man-made harbor which can be used for ship repair and unloading of fish.

The project was managed by **Clarence Duguay** of the New Brunswick Department of Fisheries. Construction was done by Nordbec Construction Inc. of Rimouski, Quebec, and supervision of construction was by **William Koutrouba** of Crandall Dry Dock Engineers, Inc.

Delta Line Wants To Build Three Large Containerships And New Container Terminal

Delta Steamship Lines recently marked the 50th anniversary of its founding as an American-flag shipping firm with the announcement of plans to construct three huge new containerships and a container terminal in New Orleans.

Delta President Capt. **John W. Clark** took the occasion to report that the ship line has submitted its preliminary design plans for the three containerships—each capable of carrying up to 1,200 cargo boxes—to the Maritime Administration. All three vessels would be in service by 1972, he said.

In the meantime, he added, the company would use its five new ships, built under a contract just completed, as part containerships until the new vessels are ready.

The company is also planning construction of a container terminal in New Orleans on the assumption that this type of cargo will play a big part in the company's future.

Captain **Clark** said the containerships would be used in Delta's Brazil and Argentine service, where considerable progress has been made in the construction of container handling facilities.

The steamship line, Captain **Clark** said, will be able to proceed on construction plans because of availability of new financing by its new owners. Delta is now operated by the parent company, TCO Industries, which in turn is owned by Holiday Inns of America.

"Rio de Janeiro and Santos, Brazil plus Buenos Aires are already building container facilities for us," Captain **Clark** said.

N.Y. Harbor Carriers To Hold 35th Annual Banquet At Waldorf

William T. Tracy, president of M. & J. Tracy, Inc., and Tracy Towing Line, Inc., has been appointed chairman of the committee for the 35th Annual Banquet of the Harbor Carriers of the Port of New York, to be held on April 25 in the Grand Ballroom of the Waldorf-Astoria Hotel.

The Dinner Committee, in addition to Mr. **Tracy,** consists of **Francis B. Bushey,** president of Spentonbush Transport Service, Inc.; **Gerard M. McAllister,** vice-president, McAllister Brothers, Inc., and **Bart J. Turecamo,** president of Turecamo Coastal and Harbor Towing Corporation. The committee will receive staff assistance from **Michael G. Lorenzo,** administrative assistant of the Harbor Carriers.

Special tribute is being paid at the dinner to honorary chairman **Eugene F. Moran Jr.,** retired vice-president of Moran Towing Corporation, who has been a member of the Banquet Committee since its inception 35 years ago.

One of the oldest and most influential marine trade associations in the New York area, the Harbor Carriers organization represents owners of barges, lighters, scows and motortankers on the waters of New York Harbor, the Hudson River and Long Island Sound.

William E. Cleary, president of the Harbor Carriers, noted that more than 1,000 leaders in the New York shipping industry are expected to attend, with federal, state and municipal officials as guests of honor.

E. B. Koelliker Joins De Laval As V-P Turbine Division

Ernest B. Koelliker

Ivan Monk

Ernest B. Koelliker has joined De Laval Turbine Inc. as vice-president and general manager of their Turbine Division located in Trenton, N.J.

The announcement was made by **Ivan Monk,** formerly vice-president and general manager of the Turbine Division, who has advanced to vice-president and assistant group manager of the De Laval Heavy Equipment Group under **A. R. Weckel,** vice-president and group manager.

Mr. **Koelliker** has spent most of his business life with the General Electric Company in various engineering, sales, marketing and general management functions; most recently as manager of their marine and industrial gas-turbine operation at Evandale, Ohio.

Since 1967, Mr. **Koelliker** has held the position of vice-president and general manager of the medium engine operation of the Power Systems Division of Colt Industries.

He earned his degree in electrical engineering at the Georgia Institute of Technology.

De Laval's Heavy Equipment Group manufactures steam turbines; centrifugal compressors and pumps; steam condensers; gears; marine propulsion machinery, and reciprocating engines and compressors.

Falcon Appoints Schwarz Vice President And General Manager

Falcon Seaboard Drilling Company, Houston, Texas, has announced the appointment of **Carl J. Schwarz** as vice-president and general manager, with direct responsibilities relating to the drilling, production and exploration departments. He will also serve as a part of the overall corporate management staff of Falcon and its subsidiary companies.

Mr. **Schwarz** is a native of Houston. He received a bachelor of arts degree from Rice University in 1950. He was an All-Southwestern Conference performer on the 1949 Rice championship football team.

Prior to becoming associated with Falcon, Mr. **Schwarz** was manager of exploration and development for J. M. Huber Corporation, in New Orleans, and directed all of Huber's activities in Louisiana, Mississippi, Alabama, East Texas, Texas Gulf Coast and offshore Louisiana and Texas.

Elisha Webb & Son Directors Appoint A.P. Lodise President

Aurelio P. Lodise

The board of directors of the Elisha Webb & Son Company is pleased to announce the appointment of **Aurelio P. Lodise** as president of the firm.

The Elisha Webb & Son Company, at 136 South Front Street, Philadelphia, Pa., manufactures oil-burning galley ranges and distributes marine and industrial supplies to the trade and shipyards throughout the country.

Mr. **Lodise** is a native of Philadelphia, and upon discharge from the Navy in 1952, he was employed by the company in the accounting department. He was then appointed secretary of the company in 1958, and secretary-treasurer in 1962. He has served in a management capacity for the past ten years.

Mr. **Lodise** is a graduate of La-Salle College, from which he received a bachelor's degree in business administartion. He was also granted a master's degree in business administration from the Drexel Institute of Technology.

Mr. **Lodise** succeeds **J. Hampton Webb,** former president, who announced his complete retirement from the firm.

Holubowicz Heads Litton's Marine Group New York Office

R. P. Holubowicz

The Marine Group of Litton Industries has announced that its Eastern offices will be relocated at 850 Third Avenue, New York City.

The Group is comprised of the Ingalls Shipbuilding Division, Erie Marine, Advanced Marine Technology Division, Marine Consultants and Designers, and Wilson Marine.

The Eastern office of Litton's Marine Group is headed by **R. P. Holubowicz,** Ingalls vice-president. It is responsible for Ingalls Shipbuilding customer relations and sales, and other Marine Group business opportunities.

Mrs. Chung Sells Mobil Marine Fuels

Mrs. Dora Chung

Mrs. Dora Chung, of Mobil Oil Hong Kong Limited, is the only female marine sales representative in Mobil's worldwide organization. Born in Canton, China, she moved to Hong Kong in 1948 with her parents. A graduate of Belilios Public School, **Mrs. Chung** joined the Standard-Vacuum Oil Company in the Hong Kong Branch in 1961 as a clerk/typist.

Last fall she was made international sales representative for marine fuels. She has full responsibility for marine fuel sales to Hong Kong and Taiwan shipowners, which necessitates frequent flights to Taiwan to visit shipowners who are based there but whose ships fuel at Hong Kong.

The mother of two children, **Mrs. Chung** is married to a branch manager of the Hong Kong and Shanghai Banking Corporation.

Worldwide Impact Of Containerization Highlights Port And Harbor Conference

The sixth biennial conference of the International Association of Ports and Harbors, held recently in Melbourne, Australia, while discussing all phases of port operations, focused a large part of the conference on containers. It was clearly indicated by those present that the impact of containers has been worldwide.

Interest in the implications of containerization for all shipping nations was a factor in the decision of representatives from the Soviet Union and Yugoslavia to recommend full membership in the association for maritime bodies in those countries.

"With our merchant ships operating all over the world, we must know the developments in ports of other countries," **Boris P. Trunov,** general manager of the Port of Leningrad, said in an interview. "We feel that Soviet membership will be very useful to us and to the world," he added.

Toru Akiyama of Japan, secretary general of the association, said that approaches would be made to Poland, Rumania and Czechoslovakia to join the worldwide port organization. There has been "no indication of interest" to support an invitation to Communist China to join, he said in answer to a question.

The conference established a fund for technical assistance by member organizations to port and harbor development in the less advanced countries. The project will be administered by the organization's Committee on International Port Development, headed by **Austin J. Tobin,** executive director of the Port of New York Authority.

"The fund will enable us to make direct, informal contact with the ports to be assisted, avoiding the complications and delays involved in working through governments," Mr. **Tobin** said in an interview.

Advanced countries will be asked to contribute to the fund, when called upon, under a schedule of "special dues" ranging from $250 to $1,000 in accordance with a classification system.

"The advent of the containership is going to create several problems for developing countries," **David Owen,** co-administrator of the United Nations Development Program, told the conference.

Delegates adopted a resolution recommending that any new system "should be as simple as possible, in order to insure uniformity of interpretation and thus avoid anomalies."

The resolution referred to proposals for revising the present system of tonnage measurement to be considered by the Inter-Governmental Maritime Consultative Organization in London at a conference next May and June.

The changes adopted "should lead to only one set of tonnages, irrespective of the ship's draft or amount or disposition of cargo carried, thus eliminating the difficulties that at present arise under the 'tonnage mark' system," the resolution declared.

The organization asked also that the new system, when adopted, apply to all ships, old and new, "thereby permitting similar charges to be levied on similar ships regardless of age."

Pointing out that the effect of the change on port revenue "may be substantial," the resolution urged the inter-governmental organization to allow time for adjustment of charges before enforcing the new system.

The next biennial conference was set for Montreal, June 6 to 12, 1971. **V. G. Swanson,** chairman of the Melbourne Harbor Trust Commissioners, was elected president for the next two years, succeeding Dr. **Chujiro Haraguchi,** Mayor of Kobe, Japan.

Mr. **Trunov** and **Edward V. Adamovsky,** chief specialist on ports and harbors of the Soviet Ministry of Merchant Marine, stated that they would recommend that the Soviet Union apply for full membership in the association. The Soviet Union has up to now only had observer status.

Dr. **Josko Vukov,** vice-president of the Port Authority of Rijeka, Yugoslavia, said he would recommend that his country, represented as a "supporting member," upgrade its participation to full membership. "The conferences of the association have been excellently organized," he commented in an interview.

Mr. **Adamovsky** said that the Soviet Union would expand facilities for handling containers at Soviet ports. "It will be most useful for us to establish terminals on the Baltic, in the Soviet Far East and on the Black Sea," he stated.

Containers used in Soviet vessels will be altered in size to conform with the standard specifications in use by Western countries, he said in the interview.

The next step in the movement of oil in huge carriers, like the 750,000-ton vessel now on the drawing board, may be trans-shipment of oil to smaller vessels at sea for distribution to refineries, **Stanley Johnson,** managing director of the British Transport Docks Board, declared in a paper entitled, "The Seaports of the Future."

NSSC Issues RFQ To Booz Allen For Studies On DX/DXG Program

RFQ N00024-69-Q-0603-(S) has been issued by Naval Ship Systems Command to Booz Allen Applied Research, Inc., of Bethesda, Md., for the purpose of conducting studies on the revision of integrated logistic support documentation for the DX/DXG program. This company has done preliminary work and therefore has the experience and knowledge required.

Darien Queen, Designed For Gold Mining, Commissioned At Equitable Equipment

Attending the commissioning of the Darien Queen were, left to right: **W. P. Oster,** Equitable vice-president; Capt. **Neville Levy,** Equitable president; **Herbert Larsen,** vice-president of Sandia Metals; **Marion Brown,** president of Sandia Metals; **S. H. Glassmire,** geologist of S. H. Glassmire & Associates which will conduct scientific studies from the boat, and **Miss Mary Anderson,** stand-in at christening for **Senora Garrido.**

Gold mining from a boat? In wild, unexplored jungles and rivers? That's the way it's being done in Panama by Sandia Metals Corporation, builder of extensive placer gold concessions in the Republic.

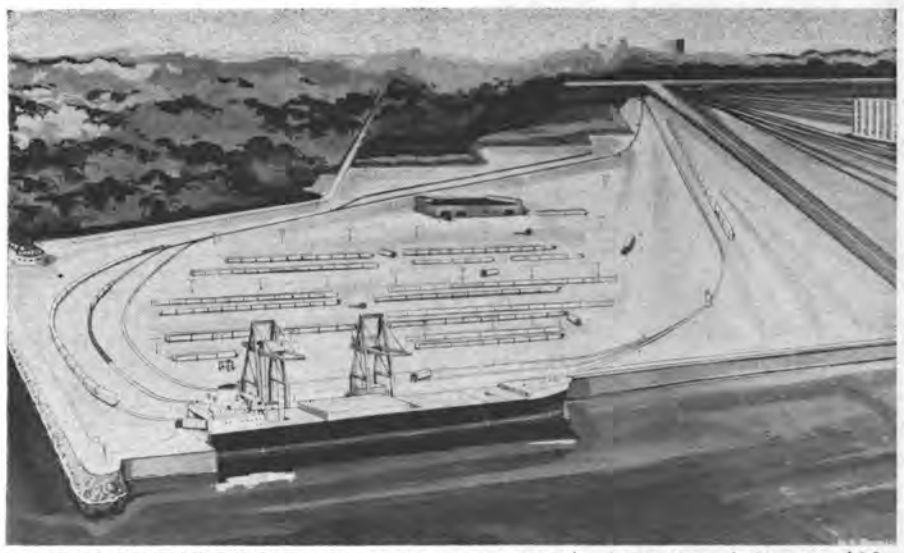
Sandia Metals recently took delivery of a new 38-foot steel mining yacht from Equitable Equipment Company, Inc., New Orleans, shipbuilder and manufacturer of marine equipment. The vessel, named Darien Queen, in honor of the Darien Jungles of Panama, was custom designed to fine yacht specifications and equipped with sophisticated drilling and electronic gear. Ruggedly built, the boat is powered by twin General Motors 671 diesel engines, an auxiliary generator providing electric service, and removable spud wells, booms and masts on the stern, racks for the onboard installation of a placer drilling rig, laboratory and a small suction portable dredge.

The pilothouse is equipped with radar, depth recorders, two-way radios and an automatic direction finder. The boat carries over 1,000 gallons of fuel in a custom-built tank.

The Darien Queen is fully documented and will fly the United States flag. Her home port is New Orleans.

The Darien Queen was sponsored in New Orleans by **Senora G. Garrido,** wife of the vice-consul of the Republic of Panama, who also attended the commissioning ceremonies.

David P. Levy, manager of Equitable Equipment Company's Small Boat Division, designed the vessel.



HALIFAX CONTAINERPORT—Shown here is an artist's conception of the new $10,000,000 Halifax containerport which is now under construction in Halifax, Nova Scotia. When completed in July, 1970, the new facility will be Canada's most modern container handling unit which is expected to make the port of Halifax a principal gateway for the growing Atlantic container shipping trade. The containerport's first major customer will be an international shipping consortium comprising Bristol City Lines of Bristol, England, Clarke Traffic Services, Montreal, and Compagnie Maritime Belge of Antwerp. To operate their service the consortium has ordered three large containerships, priced at $17-million each, scheduled for delivery at about the same time the Halifax containerport is ready for operation. The consortium will provide weekly container sailings to serve shippers in Europe, eastern and central Canada and the U.S. midwest and also call at an eastern port, probably New York.

The Design And Operation Of Priam-Class Cargoliners

M. Meek and R. Adams*

The newest ships in the Ocean Group of companies are the eight Priam-Class cargoliners. These new ships were designed by the owner's technical staffs, with orders for construction placed in 1964.

The Priams sail from Liverpool, via Rotterdam, then normally via Suez or the Cape of Good Hope to Singapore, Hong Kong and four ports in Japan. The outstanding feature of that service is the absolute regularity of the monthly sailing schedule. It is, of course, regularity that is the essence of true cargo liner operation and this was the first requirement laid down when the 'Priam' design was begun.

The starting point of the 'Priam' design was a critique based on the earlier Glenlyon Class, but to this was added the result of more research and thought. Much of this was based on the need to keep down cargo-working and manning costs. This thinking and designing period, combined with the building period, covered no less than 4½ years and is an indication of the difficulty of gauging and anticipating both technical and commercial developments and then procuring ships quickly enough for the owners to get the full advantage.

Six of the eight new ships were built in two separate U.K. shipyards—five being from one single yard—and the two remaining were built in Japan.

Design Criteria

The basic design criteria for these ships can be listed as:

(a) Speed to be a minimum of 20 knots. This was to be to the owner's usual interpretation of service speed viz., that for full draft in all but the worst weather and over the normal life span of the ship. In practice this means that the ships can maintain a 21-knot schedule at almost all times.

(b) The disposition of the cargo spaces was to be such that all other requirements would take second place to those of economic stevedoring and strict care of the cargo.

(c) Deadweight to be approximately 8,500 tons of cargo on winter marks with sufficient fuel for Port Said/U.K./Aden plus the owner's usual reserve.

(d) The design was to include facilities for the introduction of containers into the service in due course. This was to be possible in the main cargo spaces viz., Nos. 3, 4 and 5 holds and 'tween decks. Likewise there was to be special attention to features suited to the carriage of unitized cargoes.

(e) There was to be a liquid-cargo capacity of some 1,800 tons in 13 tanks and all tanks were to have a capacity of multiples of 50 tons.

(f) A limited amount of refrigerated cargo space (20,000 cubic feet) providing temperatures of minus 20°F.; and some compartments suited to the carriage of dangerous or inflammable goods.

(g) The stability was to be enough to keep the ship upright in port through all the conditions of cargo loading or discharging including pumping of deep tanks. This control is much facilitated by having wing ballast and oil fuel tanks in Nos. 3, 4 and 5 lower holds.

h) The engine room was to be of a size that made maintenance of machinery easy and was to be adapted for a degree of remote control and data logging which seemed economically justifiable.

(i) The accommodation was to be of a standard that made it more than comparable with that in any other dry cargo ship, in the belief that if the interior designers' efforts are merited in passenger accommodation then, equally, they are merited in the crew living spaces.

(j) In the belief that repair and maintenance costs would continue to rise over the years, an appropriate degree of first cost was to be allowed which would counter this escalating expenditure in the long term.

Design Features

The deep tank capacity largely governed the design. The principle was suggested that liquid cargo spaces, being occupied for at least half the time with easily handled liquids, should be sited towards the ends of the ship so that the clear square midship area might be free for general cargo. This has been done on the Priams as all the deep tanks are at the very ends of the ship and the engine room is located as far aft as possible. With the refrigerated cargo lockers relegated to the No. 6 hatch, Nos. 3, 4 and 5 holds are the main general cargo spaces. Figure 1 and Table 1.

Some attempt was also made to balance the work load involved in loading/discharging the various

(Continued on page 48)

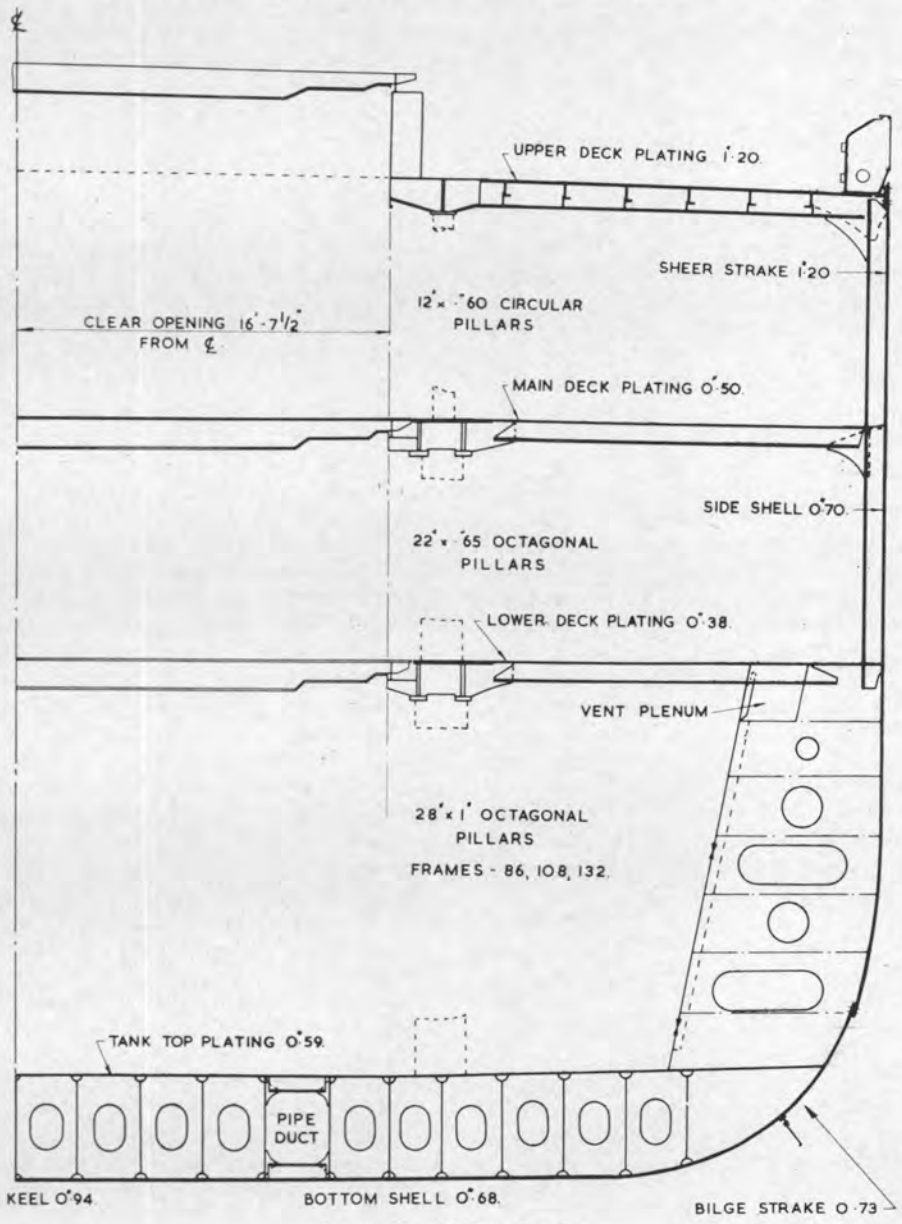


Figure 2—Midship Section

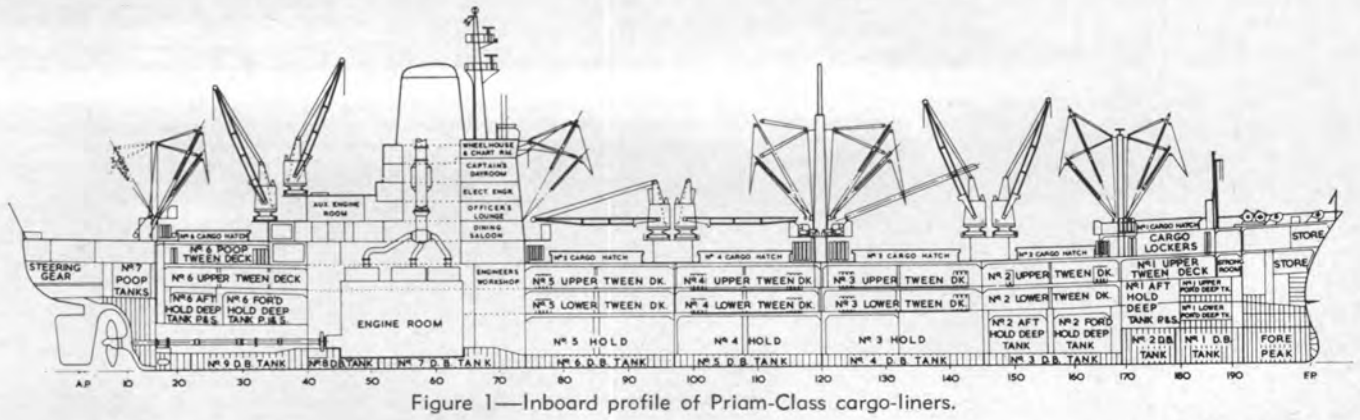


Figure 1—Inboard profile of Priam-Class cargo-liners.

*Mr. **Meek,** director and chief naval architect, and Mr. **Adams,** deputy naval architect, Ocean Fleets Limited, presented the paper condensed before a joint meeting of the Royal Institution of Naval Architects and the Institution of Engineers and Shipbuilders in Scotland.

Priam-Class Cargoliners

(Continued from page 46)

holds along the length of the ship. This took into account the size and shape of hold and type of cargo gear, the aim being to load or discharge each hold in the same period of time. The concept has been expressed by others, but it is not easy to achieve a perfect balance in a ship where the overall shape changes as rapidly along the length as it does in a fast cargo liner.

Table 1—Principal Characteristics

Length bet. perps.	521 ft. 0 in.
Breadth mld.	77 ft. 6 in.
Depth to upper deck	44 ft. 0 in.
Summer load draft	30 ft. 0 in.
Block coefficient	0.59
Displacement (tons)	20,400
Deadweight (tons)	11,140
Service speed (knots)	21
$V/\sqrt{L}$	0.92
Shaft horsepower	18,900
Shaft rpm	110
Cubic capacity (cu. ft.)	737,000
Gross tonnage	12,094
Net tonnage	6,471

Cargo Working

Speed in handling and stowing cargo was a prerequisite. In the holds there are therefore as few obstructions as possible. The frames, frame brackets, beam knees and ventilation trunking in the main holds have been buried in the wing tanks. These tanks (water ballast in Nos. 4 and 5 holds and fuel oil in No. 3) also have the effect of squaring-off the curvature of the ship sides. Admittedly, there is a loss of cubic space in doing this but the overall advantages justify it. Additionally, these wing tanks provide a facility for rapidly correcting heel while the liquid cargo tanks are pumped, or when the deck cranes are moved to one side. They also provide a means of alleviating the stresses in the hogging conditions.

The cargo hatches were made as long as possible. Hatch width was a compromise between the 'open' ship on the one hand and the need for sufficient 'shelf space' in the 'tween decks on the other hand, because of the number of ports of call. All hatches are fully power-operated. In addition, the sections of each 'tween deck hatch can be subdivided in several ways to give greater choice in the way the holds can be served, i.e., the ends of the hatch can be left in place and the center opened or vice versa.

There are cofferdams around all the deep tanks. This undoubtedly casts away cargo cubic capacity but was considered to be worthwhile in reducing the cleaning costs which are an unavoidable part of deep-tank operation, as well as giving better separation between liquid cargoes. All the associated services such as bilge and ballast lines and sound and air pipes can also be led within the cofferdams which again makes for easier cleaning and maintenance.

In ships with flush 'tween decks, the support or 'tomming' of part cargoes in the wings can be a problem as there is nothing at the deck to get a grip on. At the same time, there is the continual quest for quick stowing which means that less effort is called for in chocking-off the cargo. 'Priams' therefore have a series of vertical tomming stanchions, hinged at the top and for easy removal, slotting into a low shoe on deck, and made of aluminum for easy portability. Fore and aft timbers can be laid between these as necessary.

Cargo Gear

The traditional derrick and winch system has been partly superseded. Each main hatch is served by a 5-ton crane at one end and some kind of derrick system at the other end. The cranes can traverse across the ship as required. As a 20 foot outreach beyond the ship side was required, this arrangement was considered preferable to having a fixed crane on the center line with a 59 foot outreach. All derricks have powered topping and those on the bridge front have powered slewing as well. With the cranes and the Stulcken 60-ton derrick, the A.E.G. or Hallen derrick system at the bridge front and the remaining derricks conventional in type, there are four different types of cargo gear on each ship. These undoubtedly involve a higher first cost and also greater maintenance but are more efficient in handling cargo.

The exact benefit of installing and maintaining more expensive cargo handling gear and hatches is difficult to cost. Some indication of their value is gained from considering the reduced time taken to prepare the ship for the stevedores each day. A ship with conventional hatches and cargo gear might involve a gang of 18/20 men in one hour of unproductive work in uncovering hatches and getting cargo gear into action. On the 'Priams' the corresponding unproductive time is about 10 minutes.

Generally, the faster turn-around in port of these ships coupled with the higher sea speed has meant that even though the voyage is now around the Cape instead of by the Suez route, the intended monthly schedule is being maintained. The 'Priams' are spending an average of 193 days at sea per year, as compared with 201 days for the Glenlyon Class. However, all the ships are now sailing around the Cape and so tend, with the larger sea mileage, to have higher time at sea.

Main Structure

The rather unusual distribution along the ship's length of the main cargo compartments involved a close examination of the longitudinal strength.

The structure on the 'Priam' class is a combination of transverse and longitudinal framing and is shown in Figure 2.

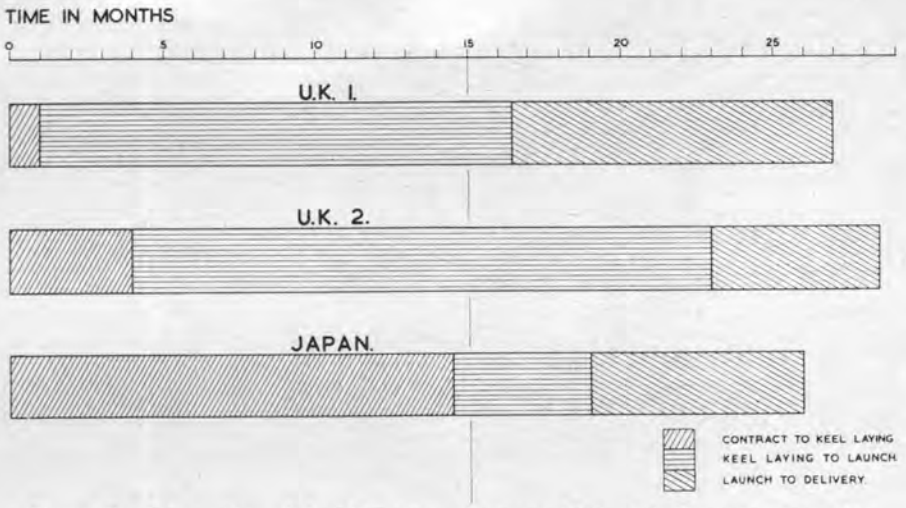


Figure 3—Comparison of building times between U.K. and Japanese shipyards.

Heating Coils

In this class of ship the deep tankage capable of taking heated oils represents a very sizeable proportion of the cargo space. Every effort was therefore made to reduce the capital cost, maintenance cost and operational costs of the cargo heating system. The heating in all tanks is by steam coils but three different types of coils were used. For the small 50-ton tanks in No. 1 and 7 hold, the heating coils are in the form of hollow D sections and are permanently welded to the outside of the tank, i.e., in the cofferdams.

At first it was proposed that all deep tank heating coils should be permanently welded to the outside of the tanks, but difficulties regarding the required heating surface areas, and overheating in the cofferdams made this undesirable for all spaces. The next step was to weld the permanent coils inside the other tanks but the use of fork lift trucks in No. 1 and 2 holds meant that the internally welded type of coil was only fitted in the No. 6 tanks.

In the No. 1 aft and No. 2 deep tanks, the heating coils are of the normal circular piping within the hold but are constructed in grid sections and are capable of being hinged against the tank sides or, alternatively, of being lifted out altogether when the tank is used for general cargo or unheated oils.

Construction Methods

It is generally recognized that Japanese shipyards have introduced new techniques into the management and production aspects of building and the authors were favored with an early insight into these during the building of the two Japanese-built 'Priams.' Figure 3 shows the comparison of the building times required by each of the three shipbuilders. The building period is shown divided into the time elapsed between placing the order and laying the keel; between keel laying and launch, and for the outfitting period.

As far as the owners are concerned, the effects of the Japanese performance are:

1. All major plans must be approved, the major decisions must be taken, and subcontractors agreed during the pre-planning period, with little time to alter opinions subsequently.

2. There is a shorter but much more concentrated load on the owner's superintendents supervising the steel construction, and a heavier load on the owner's plan approval staff at an earlier stage in the building period.

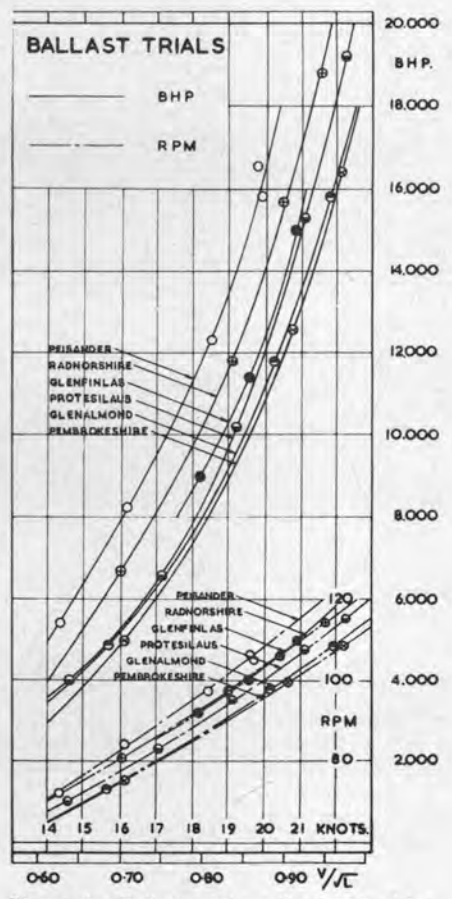
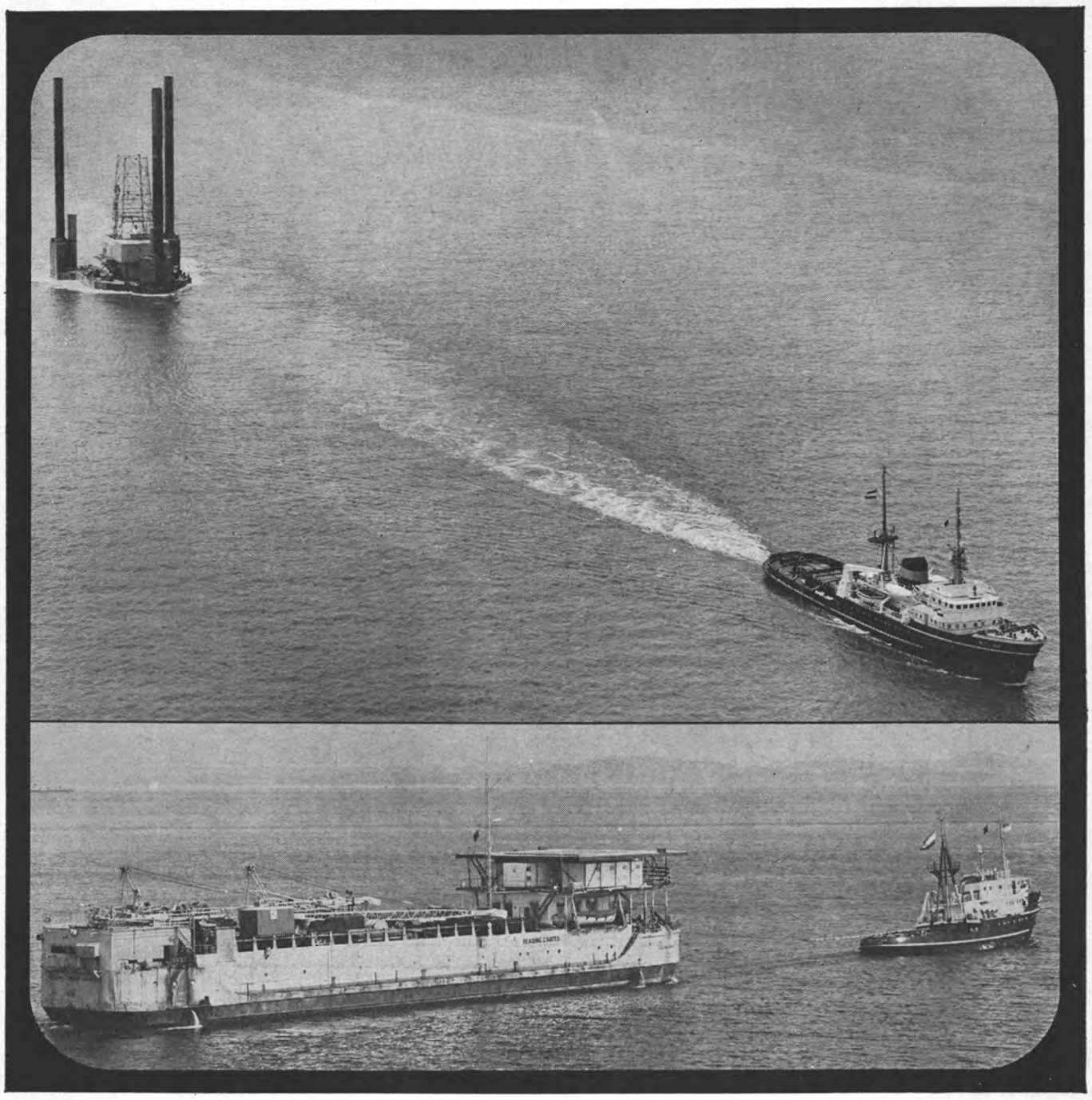


Figure 4—Ballast trial results for six ships.

Both the Japanese and the British shipyards built the ships in about 300 sections, the heaviest of which was 75 tons, the rest being nearer 30 tons. For the typical large tanker, the Japanese would certainly adopt heavier units, or blocks as they call them, but for this type of fine-lined cargo liner with almost double-skinned hull construction they were obliged to resort to smaller units.

Trial Results

Speed trials in ballast condition were conducted for six of the ships; bad weather ruled these out on the remaining two. The power—speed and rpm—speed curves for these ballast trials are shown in Figure 4.



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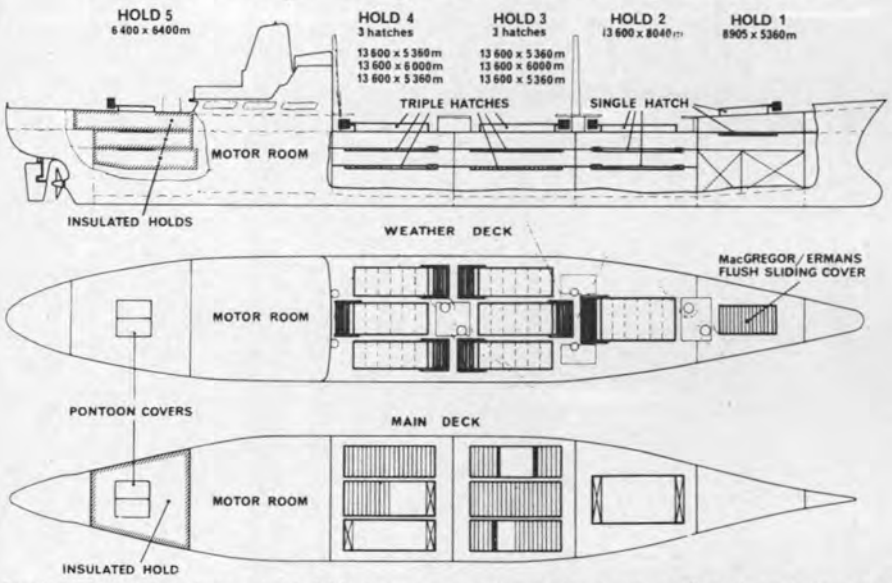
MacGregor To Supply All The Hatch Covers For 35 Cargo Ships To Be Built In Brazil



Profile and deck plans of 12,000-dwt cargo ships to be built in Brazil and equipped with MacGregor hatch covers. A total of 24 of these ships are to be built.

MacGregor-Comarain, Inc. of New York City has announced that the MacGregor International Organization has been awarded a $10-million order for hatch cover equipment for the 35-ship Brazilian national shipbuilding program. The main part of this program, authorized by the Brazilian government in September, 1967, is for twenty-four 12,000-dwt fast cargo liners and will provide the three major shipyards with a full workload for a period of about four years. Another part of the program consists of eleven 7,400-dwt cargo vessels.

All these ships will be equipped with MacGregor 'single-pull' hatch covers on the weather decks and MacGregor/Ermans flush-sliding covers in the 'tween decks. For the 12,000-tonners this will involve some 355,000 square feet of hatch cover surface and for the smaller ships about 70,000 square feet.

The fine hull form of the 12,000-dwt ships incorporates a modern bulbous bow and 'clear water' type stern configuration. Deep tanks will be fitted forward in No. 1 hold and are to be suitable for the carriage of vegetable oils, general cargo or water ballast. The aftermost hold, No. 5, will be refrigerated. The other holds and 'tween deck spaces will be fitted for general cargo with Nos. 2, 3 and 4 holds additionally fitted for standard 20-foot containers. Access will be via triple hatches abreast in Nos. 3 and 4 holds with centerline hatches elsewhere. All holds will be fitted with Cargocaire equipment and their total grain cubic will be 700,-000 cubic feet. Cargo handling gear will consist of a combination of deck cranes and derricks.

These highly automated cargo liners will have an operational range of some 12,000 nautical miles and their construction is being financed by the Brazilian Merchant Marine Commission. The operating managers will be Lloyd Brasileiro (12 ships), Navegacao Mercantil S.A. (4 ships), C. de N. Maritima Netumar (4 ships), and C. N. Alianca (4 ships). The shipbuilding allocation is between Comp. Comercio E Navegacao Estaleiro Maua (8 ships), Verolme Estaleiros Reunidos Do Brasil S.A. (8 ships) and Ishikawajima Do Brasil Estaleiros S.A. (8 ships). The first vessel is scheduled to be launched by the end of 1969. Maua and Verolme will build to Lloyd's Register Classification and the Ishikawajima shipyard will build in accordance with the requirements of the American Bureau of Shipping.

The other 11 cargo vessels of 7,400 dwt will be operated by Linhas Brasileiras de Navegacao S.A. and will be suitable for the carriage of containers. They will be built by three smaller Brazilian shipyards, Industrias Reunidas Caneco S.A. (4 ships), Estaleiro So S.A. (2 ships), and Engenharia E Maquinas S.A. (5 ships) and delivery is scheduled to begin in 1969-70. The three holds of each vessel will have MacGregor 'single-pull' hatch covers on the weather decks.

The MacGregor/Ermans flush-sliding 'tween deck covers will be designed to withstand a layer of 20-foot standard containers.

Hustler Names Delrich Vice-President Sales

Raymond Delrich

Raymond Delrich has been appointed vice-president of sales by Hustler Products Corporation of Camarillo, Calif. and Sydney, Nova Scotia, it was announced by **Wylie A. Mason Jr.,** president of the firm.

Mr. **Delrich** will head marketing activities for all of the products of the firm, including a complete line of intermodal shipping containers, trailers, water purification systems and modular housing units. Hustler's main manufacturing facility is located at 333 Lewis Road in Camarillo, Calif. A new plant is under construction in Sydney, Nova Scotia. Mr. **Delrich** will make his headquarters in the firm's home office at 373 Dawson Drive, Camarillo, Calif. 93010.

Before joining Hustler, Mr. **Delrich** was vice-president of container sales for Standard Railway Equipment Division of Stanray Corporation of Chicago and executive vice-president of Litewate Transport Equipment Corporation of Milwaukee. Previously, he was manager of research and planning at American President Lines, Ltd., in San Francisco, where he was responsible for the development of that company's container program.

A graduate of the U.S. Merchant Marine Academy and Georgetown University, Mr. **Delrich** was a ships' officer in World War II and served with the Navy's Military Sea Transportation Service during the Korean War.

He is a director of the Containerization Institute and a member of The Society of Naval Architects and Marine Engineers, Operation Research Society of America, National Defense Transportation Association and the Propeller Club.

Matson's container ship, the S.S. Pacific Trader

British Firm To Charter Gas-Turbine Ships To Seatrain Lines, Inc.

A joint British-American containership operation for North Atlantic service is under negotiation between Seatrain Lines, Inc., of New York, and an unnamed British firm. Two ships for the operation have been ordered from Rheinstahl Nordseewerke, in Germany. These ships will be propelled by Pratt & Whitney gas turbines which will give the ships a 25-knot sea speed.

The 750-foot ships are scheduled for delivery in 1970 and will be registered in Great Britain. The British firm will in turn charter the ships to Seatrain Lines.

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Raytheon Introduces Transistorized Radar

Braille knobs, whose distinctive shapes give the user an immediate indication of their function in a darkened wheelhouse, are featured on a new high-power, solid-state X-band radar introduced by Raytheon Company.

J. Leonard Lovett, general manager of Raytheon's Marine Products Operation, said the new Model 2840 radar employs fewer tubes and more transistorized circuits than any radar available for commercial use. He said the solid-state circuits contribute to the new radar's high reliability which surpasses all published standards in Europe and the United States.

Mr. **Lovett** said the new radar had been developed particularly for high-performance operation aboard smaller coastal and ocean-going vessels, tugs, commercial fishermen and yachts. The new Model 2840 radar is manufactured at Raytheon's South San Francisco, Calif. plant and qualifies for outfitting public and subsidized vessels and those subject to "Buy America" stipulations.

The new radar has a peak power of 20 kilowatts and an average power of 20 watts for effective target acquisition at ranges up to 48 miles. Six-range scales provide coverage up to ½, 1½, 3, 6, 12, 24, and 48 nautical miles.

The new Raytheon radar system has four units: antenna, indicator, modulator-transmitter-receiver, and power converter.

The radar is available for 24, 34, or 110-volt d-c or 115-volt a-c operation. Anticipating the extreme power fluctuations encountered aboard smaller vessels, the radar operates at designed performance despite line voltage variations of 20 percent in d-c lines and 10 percent in a-c lines.

Complete specifications are available from Raytheon Marine Products Operation, 213 East Grand Avenue, South San Francisco, Calif. 94080.

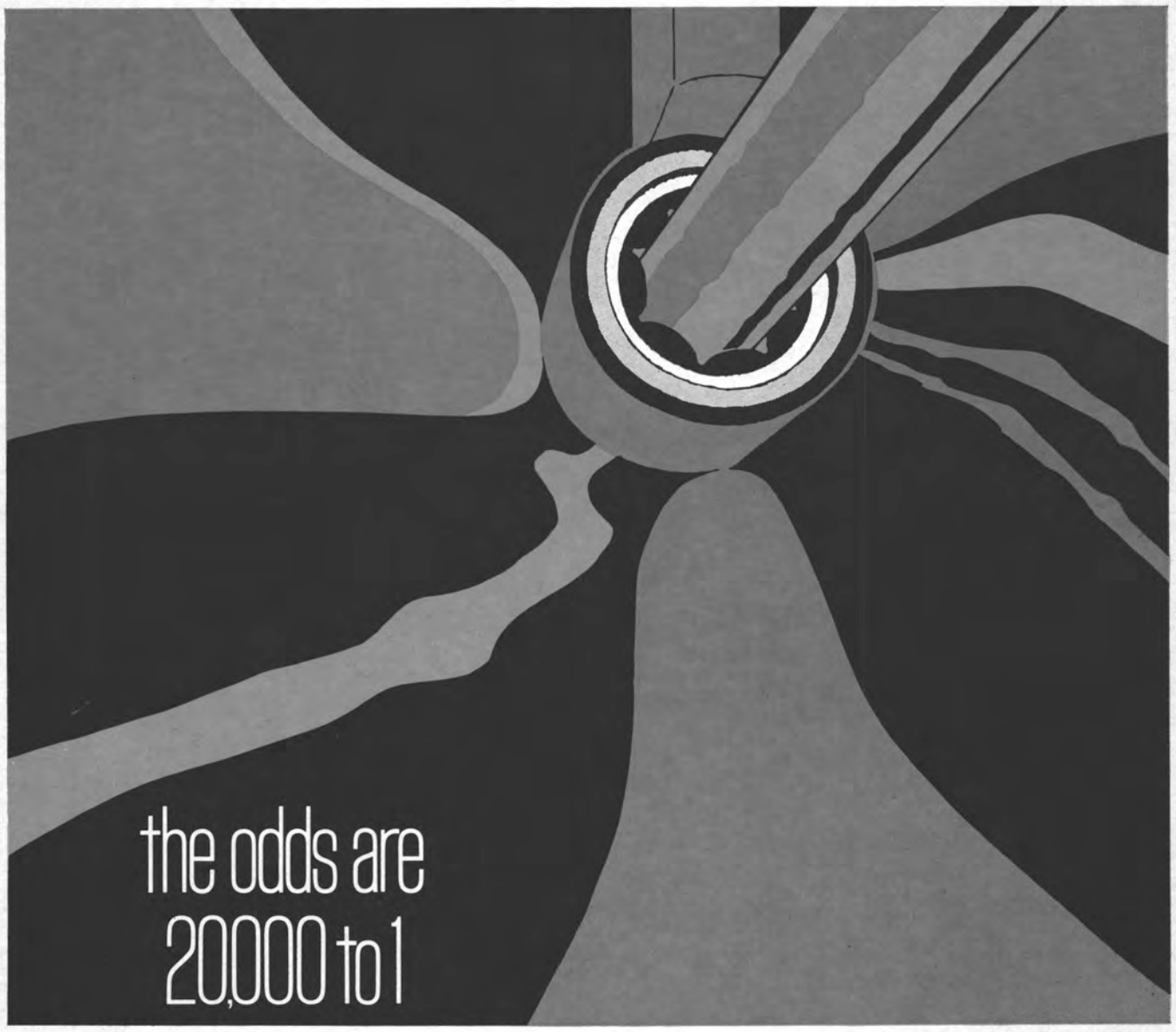
Capt. Merrill Joins Caddell Drydock

Capt. Ralph P. Merrill Jr.

Capt. **Ralph P. Merrill Jr.** has been appointed vice-president and general manager of the Caddell Drydock and Repair Company, Staten Island, N.Y., according to an announcement made by **John B. Caddell III,** president of the firm.

Capt. **Merrill,** for the past two years, was director of ferry operations for the New York City Department of Marine and Aviation. He retired from this position after 20 years of service with New York City. Upon his retirement, various City officials praised Capt. **Merrill** for his outstanding service in both the Department of Marine and Aviation and the Department of Sanitation, where he was marine superintendent.

PORT EXECUTIVE HONORED—Gen. **A. F. Clark Jr.** (ret.) left, executive vice-president of the Philadelphia Port Corporation, receives "Man of the Month" Award of the Greater Philadelphia Chamber of Commerce from Chamber President **J. P. Bracken,** at the Chamber's March membership luncheon. Mr. **Bracken,** managing partner, Morgan, Lewis & Bockius, hailed General **Clark** for an outstanding job as head of the Port Corporation since its establishment in 1965. He credited the General's leadership with "rapid implementation of the program to modernize Philadelphia's commercial waterfront upon whose activity the livelihoods of thousands are directly or indirectly dependent."



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Marconi Names Bowker And Hughes To New Posts

David Bowker

Peter Hughes

The Marconi International Marine Co., Ltd., has announced the appointment of **David Bowker** as its North American representative. He succeeds **Peter Hughes** who has been appointed managing director of Marconi Marine (South Africa) (Pty.) Ltd. Mr. **Hughes** succeeds **R. C. Van de Velde,** who is returning to the United Kingdom to take up a new appointment within the parent company.

Like many other executives of Marconi Marine, Mr. **Bowker,** who was born in Milford Haven, Pembrokeshire, began his career with the company as a seagoing radio officer. He served at sea on a variety of vessels from 1960 until 1964, when he was appointed to the company's shore staff as a technical sales assistant in the export sales department, and later became assistant to the export sales manager.

Mr. **Bowker** will be based in the offices of Kaar Electronics Corporation, Rahway, N.J.

Mr. **Hughes,** who was educated at the Nautical College, Pangbourne, joined Marconi Marine in 1957 as a seagoing radio officer, and served at sea on a variety of vessels until 1960, when he was appointed to the company's shore staff, at the head office as personal assistant to the service manager. In 1963 he moved to the sales side of the company's business, joining the contracts division at Marconi Marine's London office, which was then situated in the Strand. In the following year he was appointed as the company's sales representative for the northeast area, based on Newcastle depot, and in January, 1967 went to the United States to become the company's representative in North America. He recently returned to the United Kingdom for consultations prior to taking up his new appointment.

Oceanic Requests Subsidy To Build Two Containerships

Oceanic Steamship Co. has applied to the Maritime Administration for construction subsidy for two new containerships for its Pacific Coast-Australia-New Zealand service. This request replaces a three-year-old application for subsidy to help defray the cost of the reconstruction of two C-3's.

Oceanic asked that its new application be acted upon so that bids could be solicited by November of this year. Oceanic, an affiliate of Matson Navigation Co., now has five ships in subsidized service. It would replace three of those with its two new containerships, if they are approved, the company said.

Bender Ship To Build Twin-Screw Towboat

Warrior & Gulf Navigation Co., subsidiary of U.S. Steel Corp., Chicasaw, Ala., has contracted Bender Ship Repairs, Inc., of Mobile, Ala., for the construction of a twin-screw river towboat. To be equipped with 1,700-total-bhp Caterpillar diesels, the vessel will have the following dimensions: 85 feet in length, 26 feet in beam and 10 feet in depth.

Martinac Bid Wins Purse Seiner Contracts

With a price of $1,748,403 each, J. M. Martinac Shipbuilding Corp., of Tacoma, Wash., is the successful bidder for the construction of three steel purse seiner fishing boats. To be propelled by a 2,800-bhp single diesel, each boat will have the following dimensions: an overall length of 165 feet 5 inches, a beam of 34 feet, and a depth of 17 feet.

Designated Hull Nos. 179, 180 and 181, one fishing vessel each is being built for Pacific King, Inc., of San Diego, Calif.; Star Kist Foods, Inc., Terminal Island, Calif., and Southern Seas, Inc., San Diego, Calif., respectively. A government subsidy of about 50 percent will be paid on the vessels.

The Maritime Administration received bids for these boats on November 21, 1968.

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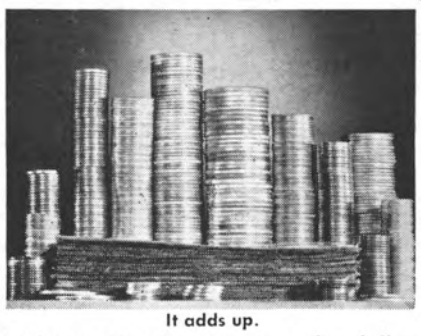

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Navy To Switch To All Distillate Fuel For Ship Propulsion

The Department of Defense has authorized the Navy to shift to a new fuel for ship propulsion.

An all-distillate marine diesel type of fuel will replace, on a gradual time-phased basis, the Navy Special Fuel Oil now in use. The shift was approved on the condition that the new fuel be introduced in such a manner as to allow industry to adjust to the new requirement. A three-year phase-in period was considered minimum, with no large procurements in the first year.

Under these guidelines, procurement of the new fuel could start as early as March, 1970 and reach a peak, now estimated at 46 million barrels a year, by February, 1972.

The shift was based on extensive research by the Navy. The present Navy Special Fuel Oil is high in sulphur and metallic mineral ash-forming compounds which create excessive deposits of soot and slag requiring frequent boiler cleaning and other shipboard maintenance.

Use of the all-distillate fuel will greatly reduce shipboard boiler repairs and maintenance with resultant improvements in ship readiness. It will practically eliminate the exhausting job of routine fireside cleaning by boiler tenders.

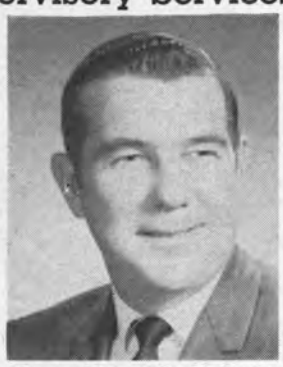
Adoption of the all-distillate fuel will also reduce the number of varieties of main propulsion fuels now being used in the fleet.

Even though the new fuel will be more expensive (about $48-million more per year) operating costs will be reduced by decreased maintenance, fewer repairs, etc. Total benefits are estimated to be in the millions of dollars per year when the new system is fully implemented.

Certain preparatory steps must be accomplished before ships of the fleet can burn this fuel. For example, shipboard fuel pumps must be modified or replaced in many instances. Piping will be tested and repaired as necessary to handle the less dense fuel. Ashore, stocks of Navy Special Fuel Oil must be drawn down and the tankage prepared for the new fuel. The oil industry will require sufficient advance notice of the phase-in plan in order to provide the required quantities. The actual shift will be so timed as to permit an orderly changeover during the recommended three-year period until the entire fleet is converted.

The interim specification for the new fuel, MIL-F24374 (Ships), has been published and may be obtained by writing to the Navy Publication and Forms Center, NPSC-103, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

Capt. Halboth Offers Supervisory Services



Capt. Henry C. Halboth

Capt. **Henry C. Halboth,** formerly surveyor to the United States Salvage Association, Inc., and salvage master for Merritt, Chapman and Scott Corp., has opened private offices at 50 Broad Street, New York, N.Y.

Captain **Halboth** will offer a complete range of marine survey and supervisory services applicable to hull and machinery, small craft, cargo, and marine structures generally, on a worldwide basis.

Specialized consultation in the areas of ocean engineering, towing, navigational problems, and ship salvage, including salvages involving catastrophic oil pollution potential, is available.

A graduate of the New York State Maritime Academy, Captain **Halboth** is a veteran of 15 years at sea in the naval service and merchant marine, as well as shore-based repair and survey experience in Atlantic and Pacific ports.

He is a member of the Council of American Master Mariners and the American Society of Naval Engineers. A veteran of World War II and the Korean Conflict, he is a commander in the U.S. Naval Reserve.

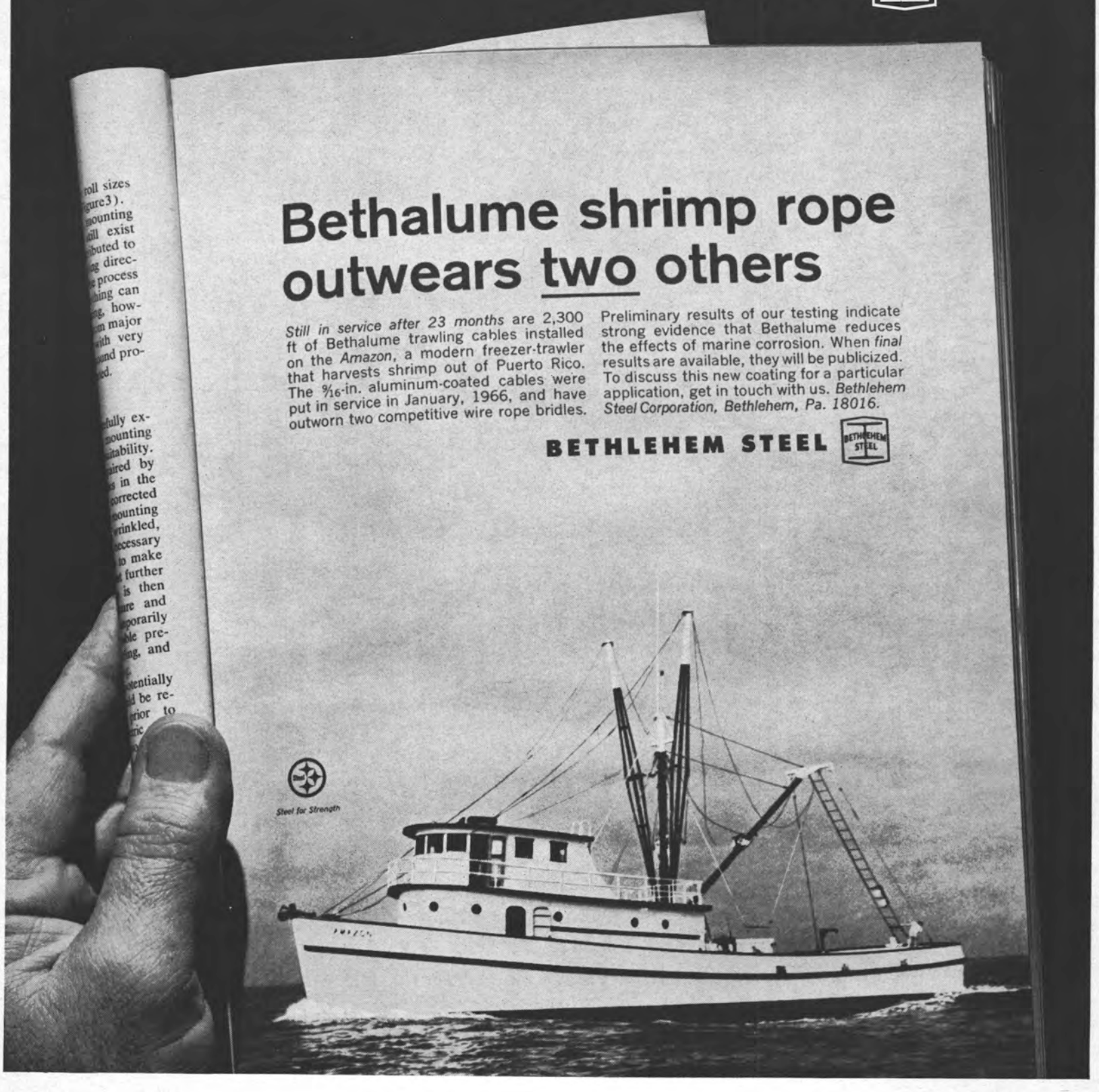
The Amazon reports: one year later

The performance of our Bethalume ropes on the *Amazon* was told briefly in the advertisement below. We wanted to know more about the total service life of these aluminum-coated cables. So again we got in touch with the owner of the trawler.

He reports that most of the 9/16 in. ropes lasted until February 1968, almost 25 months after the original installation. What's more, they outwore one additional set of bridles coated with a competitive material. That's a total of *three* sets of bridles.

We would like to tell you more about the money-saving advantages of Bethalume. *Bethlehem Steel Corporation, Bethlehem, PA 18016*

BETHLEHEM STEEL



AWO Elects Jacobson Region 5 Director

The American Waterways Operators, Inc., has elected **George P. Jacobson** as a director of AWO in Region 5 (north Atlantic area). Mr. **Jacobson,** who is general manager-transportation of Allied Chemical Corp., of New York City, succeeds **George H. Blohm,** who has moved up to chairman of the board of AWO. Mr. **Blohm,** besides being chairman, is also vice-president and general manager of Cities Service Tankers Corp., of New York City.

Halter Marine Building Offshore Oil-Well Boat

Sedco, Inc., (Southeastern Drilling, Inc.), of Dallas, Texas, has placed an order with Halter Marine Fabricators, Inc., Moss Point, Miss., for the construction of an offshore oil-well supply boat. Designated Hull No. 227, and to be powered with 1,700-total-bhp diesels, the vessel will have the following dimensions: 166 feet by 40 feet by 15 feet.

Manning Electric Appointed Distributors By Edison Ind. For Voltage Control Equipment

Donald Manning, president of Manning Electric Inc., 52 Warren Street, New York, N.Y. 10007, has announced the appointment of his firm as marine distributors for the Thomas A. Edison Industries for general systems voltage control equipment.

General Systems manufactures voltage regulators, current limit controls, and reverse current rectifiers for the marine trade.

Edo Western Introduces Doppler Current Meter

Edo Western Corporation, Salt Lake City, Utah, has announced the development of a completely new concept for the measurement of flowing currents. The Model 429 Doppler Current Meter is designed to meet the increasing need for valid, precise measurement of flowing currents ranging from 0-0.5 feet/second to 0-15 feet/second in water depths to 500 feet.

This new measuring system consists of an underwater section and a surface unit which contains instrument readout and controls, and operates on the principle of volume reverberation and reflection signal frequency shift. This method provides high accuracy at very low current rates and allows fast current acceleration measurement. The underwater package is faired to minimize flow disturbance, and to act as a vane to keep the meter pointed in the direction of current flow. It is connected to the surface package by an underwater interconnecting cable. Error-causing current disturbances are minimized by measuring the current flow at an acoustical beam intersection, approximately one foot in front of the transducers. Transmitting and receiving transducers are mounted at an angle of 20 degrees with respect to the face of the meter. Very small particles of water reflect energy and act as point energy sources for the beam pattern of the receiving transducer. The received signal has a Doppler frequency shift expressed in a difference frequency for signal processing by the surface package.

The Model 429 Doppler Current Meter is easily maintained and serviced because of its modular, all solid-state construction. Interchangeable printed circuits are used throughout the system, facilitating ease in field troubleshooting and repair. For more information contact Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115.

Barge Construction

Dravo Corp., Pittsburgh, Pa., will build four covered hopper barges for C. G. Willis, Inc., Paulsboro, N.J. The 221-foot by 35-foot by 12-foot vessels will be of 2,000-dwt.

Dravo is also building ten covered hopper barges for stock purposes only. These barges will have dimensions of 195 feet by 35 feet by 12 feet.

Gunderson Bros. Engineering Corp., Portland, Ore., was awarded a contract by Crowley Launch & Tugboat Co., San Francisco, Calif. for the construction of two 4,500-dwt cargo barges. Designated Hull Nos. 16546—3 and 4, each will have dimensions of 250 feet by 76 feet by 18 feet 6 inches.

Ingalls Iron Works Co., Birmingham, Ala., was awarded a contract by Canal Barge Co., Inc., New Orleans, La., to build an oil barge. The 3,000-dwt barge will have the following dimensions: length—250 feet; width—50 feet; depth—14 feet 6 inches.

Jeffboat, Inc., Jeffersonville, Ind., was contracted by Ellis Towing & Transportation Co., Galveston, Texas for the construction of three 1,500-dwt tank barges. Each barge will have the following dimensions: 195 feet by 35 feet by 12 feet 6 inches.

Levingston Shipbuilding Company, Orange, Texas, was awarded a contract for the construction of a marine pipe laying barge, by J. Ray McDermott & Co., Inc. The announcement was made by **Roger W. Wilson,** president of the company. To be named McDermott Lay Barge No. 23, it is designed to lay pipe in deepwater. The unit will be 420 feet long and 120 feet in width and will have two 100 ton gantry cranes and a constant tensioning device to facilitate pipelaying.

Zigler Shipyards, Inc., Jennings, La., will build an independent tank barge designed for the movement of chemicals, for Durow Corp., New Orleans, La. It has been designated Hull No. 195, and will be named D.C. 110. The 1,500-dwt barge will have the following dimensions: 193 feet 9 inches by 35 feet by 11 feet.

Fairbanks-Morse Diesels To Propel Nine MSTS Tankers

The largest order since World War II for diesel engines to propel commercial U.S.-flag ships has been placed with the Fairbanks-Morse Power Systems Division of Colt Industries, Beloit, Wis. The order is reported to be valued at $12-million dollars.

This diesel engine order results from the award of a build-and-charter contract by the Military Sea Transportation Service to Central Gulf Steamship Company for nine 25,000-dwt tankers. Central Gulf has ordered the tankers from Bethlehem Steel Corporation's Sparrows Point, Md., shipyard.

The proposals received by MSTS for these tankers covered both steam and diesel propulsion, with the selection of the type of powerplant left up to the Navy.

Each ship will be propelled by two six-cylinder engines. The engines are rated at 1,250 hp per cylinder, thus giving a total output of 15,000 hp. The propeller shafts will drive attached electric generators.

Carstone To Represent Julius Mock & Sons

Carson Stone, president of Carstone Corporation of 321 Carondelet Building, New Orleans, La., has announced the firm's appointment as Gulf area representative for Julius Mock & Sons, Inc. of Brooklyn, N.Y.

The Mock organization specializes in Navy and commercial hinged closures such as doors, hatches and scuttles.

American Legion To Present Distinguished Service Awards To Two Steamship Executives

On May 3, 1969, at the Statler Hilton Hotel, New York City, the American Merchant Marine Post No. 945, American Legion, with headquarters at One Broadway, New York, will present the Legion's Distinguished Service Award to **James A. Farrell Jr.**, chairman of the board, Farrell Lines, Inc., and Gen. **John M. Franklin**, chairman of the board, United States Lines.

These awards are in recognition of their long dedicated service to the American Merchant Marine over a period of many years.

The American Merchant Marine Post No. 945, American Legion, was chartered under the name United States Lines Post No. 945 in 1920 and later changed to the present name. Composed entirely of shipping men ashore and afloat, this post has always been in the forefront in the activities relative to keeping our merchant marine strong, modern and efficient.

This year's awards is the beginning of an annual event to choose the most outstanding men in American shipping to receive the highest award the American Legion can offer for outstanding service in all fields of endeavor.

Whitehall Brokerage Acquires Charles M. Schmitt & Co., Inc.

Nicholas J. Crisa, president of Whitehall Brokerage, Inc., 17 Battery Place, New York, N.Y. 10004, has announced the acquisition of Charles M. Schmitt & Co., Inc., effective May 1, 1969.

James Walsh, former president of Charles M. Schmitt & Co., Inc., with whom he has been associated for the past 31 years, will act in the capacity of vice-president.

Charles Schmitt has been in the insurance brokerage business for the past 60 years and will act in the capacity of insurance consultant.

These gentlemen, along with **Roy J. Ross**, executive vice-president; **Joseph Martuscello**, vice-president, and **Richard J. Laba**, secretary and manager of the Claims Department, are experienced in all commercial lines, both marine and otherwise of insurance.

BUILDS THEIR LARGEST—A final check of the outside diameter is given to the longest and heaviest full-molded bearing ever manufactured by Byron Jackson. This bearing is designed for the 14½-inch propeller shaft of a seagoing tug and has an overall length of 56 inches. Weight of this special flanged brass bearing is approximately 1,200 pounds. Byron Jackson builds a complete line of marine bearings for all types of boats and vessels, from the smallest inboard runabouts up to battleships. For further information on stock sizes and special-order bearings, contact: BJ Marine Bearings, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054.

Seatrain Planning 3-For-1 Stock Split

Joseph Kahn, chairman of the board of Seatrain Lines, Inc., has announced that the board of directors had approved a three-for-one stock split subject to approval of the shareholders. It is anticipated that a special meeting of shareholders will be held on May 7, 1969 to authorize the necessary amendment to increase authorized shares to 30 million. If approved, the new shares will be distributed on or about May 23 to shareholders of record on May 9.

Mr. **Kahn** also said that the company had applied to the New York Stock Exchange for the listing of its capital shares.

NSSC Issues RFP For Six Harbor Tugs

RFP N00024-69-R-0605-(Q) has been issued by Naval Ship Systems Command for the construction of three medium harbor tugs (YTM) and three small harbor tugs (YTL), to the following nine shipyards: Bender Welding & Machine Co., Inc., Mobile, Ala.; Blount Marine Corp., Warren, R.I.; Equitable Equipment Co., Inc., New Orleans, La.; General Ship & Engine Works, Inc., East Boston, Mass.; Halter Marine Services, Inc., New Orleans, La.; J. M. Martinac Shipbuilding Corp., Tacoma, Wash.; San Diego Marine Construction Co., San Diego, Calif.; Tacoma Boatbuilding Co., Inc., Tacoma, Wash., and Zigler Shipyards, Inc., Jennings, La.

Moore-McCormack Promotes Lavelle

Moore-McCormack Lines, Incorporated, has announced the appointment of **Walter A. Lavelle** to the position of advertising and public relations manager.

Mr. **Lavelle** joined Mooremack in November 1947 and was chief photographer for the line from 1954 to 1961. In 1961, he was assigned to the Public Relations and Advertising Department.

Mobil Assigns New Name To Marine Trade Department

The marine trade department of Mobil Sales and Supply Corporation has been renamed the marine sales department, according to **Richard G. Coffin**, general manager.

The new department will continue to sell Mobil's marine fuels and marine lubricants worldwide and provide technical service and assistance to ship owners, operators and personnel.

King Tonnage Rotor Improved For Night Use

B. W. King, Inc. of New York, has announced the issuance of a recent patent which greatly improves the use of the water-level indicator or rotor (the King Displacement Rotor) for displacement measurement. The recently issued patent has a lighted dial which makes possible accurate use of the rotor at night.

The rotor gives accurate freeboard measurements even in rough weather and, thus, can be used day or night, even in rough water, to measure ships and barges. B. W. King, Inc. recently reported that over a million tons of cargoes had been measured in a two-year period by the firm using the original rotor instrument. Now, with the lighted dial, the use of the rotor will expedite tonnage measurements.

B. W. King, Inc., is located at 17 Battery Place, New York, N.Y. 10004.

Kelvin Hughes America Appoints Taylor And Read To New Management Positions

Presley Taylor

Frank D. Read

Kelvin Hughes America Corporation, a leading manufacturer of marine electronic equipment for pleasure, fishing, and commercial vessels, recently announced the appointment of two staff members to new management positions. **Presley Taylor** has been appointed general manager, and **Frank D. Read** has been named service manager of the Annapolis, Md., headquartered concern.

Prior to the appointment as general manager, Mr. **Taylor** had been marine division manager of KHAC since August, 1959. Mr. **Read**, KHAC's new service manager, joined the organization in November, having been previously associated with RCA Radiomarine.

The new positions were announced recently by Mr. **Benton Hall Schaub**, president of Kelvin Hughes America Corporation. The new changes are in line with an overall strengthening of Kelvin Hughes North American service and marketing operations for their broad line of marine radar, loran, depth sounders and other electronic equipment.

IFBs Issued By MarAd For Steel Seiner

The Maritime Administration, 441 G Street, N.W., Washington, D.C. 20235, is receiving bids for the construction of a 70-foot 1½-inch steel seiner for Sardine Carriers, Inc. Anyone interested in submitting a bid should request an IFB from Sardine Carriers, Inc., c/o John Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. Bids are to be received by the Maritime Administration on April 23.

Greenville To Build Twin-Screw Towboat

Greenville Shipbuilding Corp., Greenville, Miss., has been contracted by Campbell Barge Line, Inc., Pittsburgh, Pa., for the construction of a twin-screw towboat. Powered with 1,700-total-bhp diesel machinery, the towboat will have the following dimensions: 90 feet by 24 feet by 10 feet.

New Data Sheet Describes M&T Harbormaster Units

A new catalog sheet featuring condensed information about Murray & Tregurtha Harbormaster propulsion units, has been released by the firm. Photographs with accompanying descriptions show various unit installations. Ranging from 50 to 2,500 hp, M&T Harbormaster has a model to answer any need involving marine propulsion, dynamic positioning or maneuvering. The sheet includes a comprehensive chart giving specifications on all models.

A copy of this date sheet can be obtained from: Murray & Tregurtha, 80 Hancock Street, Quincy, Mass. 02171.

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(2) N3-M-A1 VESSELS, ex Navy
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DIMENSIONS: 255' x 42'-6" x 25'-3" (approx.) TONNAGES (approx.): Gross 2483, Net 1577, Dwt. 2226, Light Ship Tons 1130 (excludes permanent ballast and is the reported tonnage applicable to standard ship of N3-M-A1 type, prior to conversion to port repair ship, which will have increased tonnage to each ship).

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Built: 1952 Bethlehem Steel Corporation Sparrows Point Yard
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Beam — 64'
Deadweight: 7600
Draft (Summer-Freeboard): 20' 7⅛"
Engines: Lentz - Double Compound 3500 H.P.
Service Speed (Loaded): 12½ Knots
Consumption: 235 Bbls./Day — Bunker C
Special Survey Completed October, 1967
Last Annual Survey Completed March, 1968
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10 Ton Cap. 400 Ton Cargo Cap. $12,500.00

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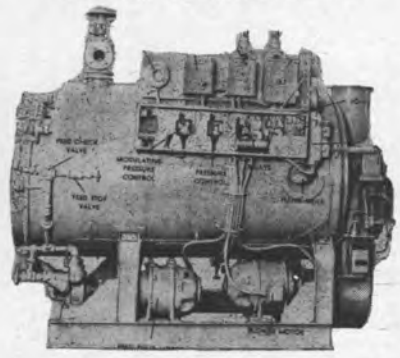

OUTPUT 2600 lbs/hour—design pressure 125 PSI—working pressure 100 PSI—2-pass—1-burner—pressure atomizing. Burner capacity 26 gallons per hour—fuel pressure at nozzle 200 PSI—fuel pump capacity 75 gallons per hour against 200 PSI. BLOWER MOTOR 5 HP—440/3/60—3400 RPM. FEED PUMP MOTOR 3 HP—440/3/60—1725 RPM. FUEL PUMP MOTOR ½ HP—220 volts single phase—1725 RPM. FEED PUMP CAPACITY 10 GPM @ 300′ head. IGNITION electric—transformer primary 200 volts—secondary 10,000 volts. BURNER pressure atomizing type. Shell plate 5/16" thick—heads ½" thick—furnace 16" OD x ⅜" thick. Return tubes: 22 @ 2½" x 0.110 wall and 22 @ 2" x 0.095 wall. Boiler shell hydro-tested 188 lbs/inch. Hand holes 3½" x 4½". Fusible plug—one in rear.

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The boiler is mounted on a rugged structural base—easily bolted down. Boiler heating surface so arranged to provide rapid circulation of surrounding water. DIMENSIONS: 8′ OAL—8′ OAH over safety valves—43" OAW. Dry weight 5035 lbs. Flue outlet 10" ID. Control cabinet mounted on top of boiler. Boilers carefully removed from Naval vessels. You have to see them to appreciate them.

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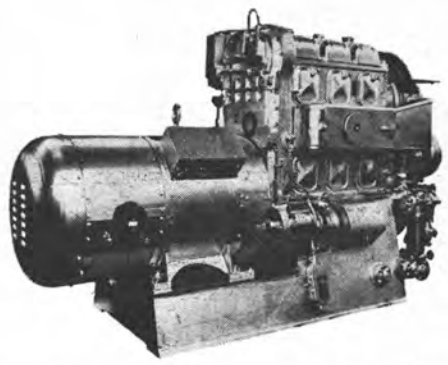
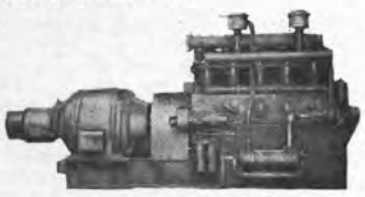
SUPERIOR, 10 KW, 120 Volts DC.
HERCULES, D0OC, 10 KW, 120 DC, Radiator cooled.
BUDA, radiator cooled, 15 KW, 120/240 Volts DC.
FAIRBANKS-MORSE, radiator cooled, 25 KW Continental Generator, 120/208/3/60.
Hercules DJXC, 25 KW, 120 DC.
GM 3-71, 30 KW, 120 DC.
Cummins A1, 30 KW, 120 DC.
MURPHY, Model ME 66, radiator cooled, 75 KW, 120/240 Volts DC.
CATERPILLAR DIESEL ENGINE, Model D17000, 167 HP, 900 RPM, Heat Exchanger cooled, with Louis-Allis Generator, 85 KW, 220/3/60.
LORIMER, F5SS, 75 KW, 120/240 DC, radiator cooled.
COOPER-BESSEMER, JS-5, 250 KW, 240 DC.



LORIMER 100 KW
450/3/60 Volts DC.



BUDA 6DHG691, 60 KW, 120 Volts DC.

GM-3-268A, 100 KW, 240/120 Volts DC.

SUPERIOR GBD-8, 100 KW, 240/120 Volts DC.

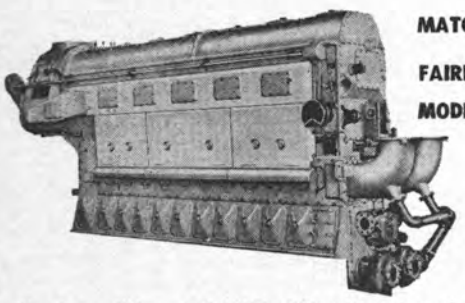
SUPERIOR, Model IDB-8, 100 KW, 450/3/60.

GENERAL MOTORS Diesel Generator Sets Model 3-268A, 152 BHP, 1200 RPM, heat exchanger cooled, with 100 KW Generators, 450 volts AC, 3 phase, 60 cycles.

GM 8-268A, radiator cooled, air start with Westinghouse Generator, 250 KW, 440/3/60, complete with switchboard.

GENERAL MOTORS DIESEL ENGINES, Model 8-278, with 500 KW Generators, 115/230 DC.

MARINE DIESEL ENGINES



MATCHED PAIR . . .

FAIRBANKS-MORSE

MODEL 38D8-⅛

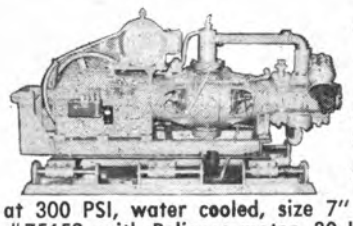
1 Port;
1 Starboard

Used condition, 1800 HP, 800 RPM, 2 cycle, 8½" bore, 10" stroke, Air Start. Complete with Westinghouse Reduction Gears, 2.216:1 ratio—with hydraulic coupling.

4—COOPER-BESSEMER, MODEL LS-8-DR
1300 HP, 277 RPM, direct reversing, turbo charged.

HYDRAULIC PUMPS (STEERING)
Hele Shaw, Type JLP 12, 1000 PSI, 850 RPM. Northern radial piston. Size 5430, 44 GPM, 1500 PSI, 850 RPM.

AIR COMPRESSORS



JOY
CLASS WG82
JOY Air Compressors Class WG82, 2-stage rated 100 CFM at 300 PSI, water cooled, size 7" x 3⅜" x 7", Typical Shop #75652, with Reliance motor, 30 HP, 220/440 AC/3/60.

SULLIVAN, 60 CFM, 110 PSI, with 15 HP Motor, 440/3/60.

INGERSOLL-RAND, 150 CFM, 600 PSI, Model 75, with Westinghouse Motors, 75 HP, 230 DC.

INGERSOLL-RAND, 50 CFM, 600 PSI, Model 30, with Westinghouse Motors, 15 HP, 230 DC.

WESTINGHOUSE Air Brake, 246 CFM, 140 PSI, with 50 HP Motors, 440/3/60.

WORTHINGTON, 175 CFM, 125 PSI, with 50 HP Motors, 440/3/60.

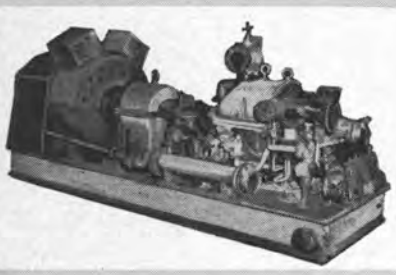
STEAM AIR COMPRESSORS
Westinghouse Air Brake Company, Size 11 x 11 x 12, Vertical, rated 66 CFM at 100 PSI (2 available).

REDUCTION GEARS . . .

FARREL-BIRMINGHAM, as orig. used on two 1375 HP electric motors, in submarine, 2 pinions, single output gear, Pinion RPM 1302, Gear RPM 280; ratio 4.65:1.

WESTINGHOUSE, 2.216:1 ratio, with hydraulic coupling; as used with 1800 HP, 800 RPM Fairbanks-Morse engine—Starboard.

FALK REDUCTION GEARS . . . Port and Starboard, interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on A051 Class Tankers (14 ships). Also on A097 to A0100 Tankers. Gears are available as complete assemblies and/or rotating elements in sets. Gears offered with a current inspection report of condition by a representative of Falk Corporation.



WESTINGHOUSE Turbines, 440 PSI, 740° F, with Westinghouse Generators, 250 KW, 120/240 DC.

DE-LAVAL Turbines, 450 PSI, 750° F, with Crocker-Wheeler Generators, 300 KW, 120/240 DC.

TURBINE GENERATORS

JOSHUA HENDY Turbines, 300 PSI, temperature 550° F with Westinghouse Generators, 300 KW, 120/240 Volts, DC.

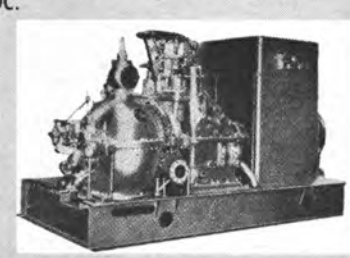
WORTHINGTON Turbines, Form S-4, 440 PSI, 740° F, driving on same comman shaft a 250 KW Generator, 440/3/60, and a 90 KW Generator, 125 Volts DC.

WORTHINGTON Turbines, Form S-4, 440 PSI, 740° F, with Crocker-Wheeler Generators, 300 KW, 120/240 Volts DC.

GENERAL ELECTRIC Turbine, Type FN3-FN24, Steam 265#G., Serial 54110, with G.E. Generator, 750 KW, 440/3/60, Frame 985 Y, Serial 580447.

JOSHUA HENDY Turbines, with Westinghouse Generators, 150 KW, 120 volts DC.

TERRY TURBINES, type TM5, 440 PSI, 750° F, with Crocker-Wheeler Generators, 300 KW, 120/240 DC.



WATERTIGHT DOORS

As removed from reserve "mothballed" vessels. Huge inventory of practically all sizes and types ready for immediate delivery . . . and more on the way. These doors have the frame trimmed and are suitable for re-use. Doors are available in 4, 6, 8 and 10 dog types; many are "Quick-acting-wheel controlled."

Save over new replacement costs as shown in the **"Typical Price"** listing below . . .
26" x 48"—4 dog type $ 60.00 ea.
26" x 66"—6 dog type $ 85.00 ea.
26" x 66"—Quick Acting $150.00 ea.

USED, GOOD STEEL
"QUICK-ACTING WHEEL TYPE"
and DOG TYPE

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Phone: (503) 228-8691
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TURN PAGE . . . more buys!

BEST BUYS!

AC & DC *Marine* PUMPS

ZIDELL EXPLORATIONS, INC.

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Portland, Oregon 97201
Phone: (503) 228-8691
Telex: 036-701

Contact
Ralph E. Ingram
(503) 228-8691

Hundreds of other pumps in our stock
Phone or mail required specifications.

AC PUMPS—Horizontal Centrifugal

2—Goulds, 2000 GPM, 470' head, Size 8x10, with Westinghouse Motors, 350 HP, 2300/3/60.

1—Ingersoll-Rand, 3000 GPM, 250' head, Size 8ALV, with Westinghouse Motor, 250 HP, 2200/3/60, 1775 RPM.

1—Worthington, 400 GPM, 150 PSI, 5½" suction, 3½" discharge, with G.E. Motor, 75 HP, 440/3/60, 3550 RPM.

2—Goulds, 300 GPM, 336' head, 3" suction, 2" discharge, with G.E. Motors, 50 HP, 440/3/60, 3550 RPM.

7—J.C. Carter, 365 GPM, 250' head, stainless steel, 3" suction, 3" discharge, with 220/440/3/60 Motors.

6—326 GPM, 138' head, C.I. pump housing, 3" suction, 3" discharge, with Westinghouse Motors, 20 HP, 220/440/3/60, 1755 RPM.

6—682 GPM, 60' TDH, C.I. pump housing, 5" suction, 5" discharge, with Westinghouse Motors, 15 HP, 220/440/3/60, 1700 RPM.

2—Worthington, 80 GPM, 60 PSI, 2½" suction, 2" discharge, with G.E. Motors, 8 HP, 440/3/60, 3450 RPM.

3—Worthington, 650 GPM, 9 PSI, 6" suction, 6" discharge, with Star Motors, 6 HP, 440/3/60.

1—Worthington, 175 GPM, 20 PSI, 3½" suction, 3" discharge, with G.E. Motor, 3.74 HP, 440/3/60, 3450 RPM.

4—Worthington, 60 GPM, 22 PSI, 3½" suction, 2" discharge, with G.E. Motors, 3 HP, 440/3/60, 3450 RPM.

3—Allis-Chalmers, 35 GPM, 100' head, 2" suction, 1½" discharge, with Allis-Chalmers Motors, 3 HP, 440/3/60, 3500 RPM.

1—Allis-Chalmers, 65 GPM, 80' head, 1½" suction, 1½" discharge, with Allis-Chalmers Motor, 3 HP, 220/440/3/60, 3500 RPM.

2—Worthington, 13 GPM, 51 PSI, 1½" suction, 1½" discharge, with G.E. Motors, 2.64 HP, 440/3/60, 3490 RPM.

1—Worthington, 75 GPM, 22', 3" suction, 2½" discharge, with G.E. motor, 1.9 HP, 440/3/60, 3450 RPM.

5—Worthington, 30 GPM, 30 PSI, 1½" suction, 1½" discharge, with G.E. Motors, 1.75 HP, 440/3/60.

14—Warren, 6 GPM, 36 PSI, 1¼" suction, 1" discharge, with G.E. Motors, 1.25 HP, 440/3/60, 3450 RPM.

AC PUMPS—Vertical Centrifugal

6—Worthington, 275 GPM, 56.6 PSI, 8½" suction, 3½" discharge, with G.E. Motors, 22.9 HP, 440/3/60, 1180 RPM.

4—Worthington, 490 GPM, 35 PSI, 7" suction, 4½" discharge, with G.E. Motors, 19.6 HP, 440/3/60, 1175 RPM.

6—Chicago Pump Co., submersible, 400 GPM, 6 # suction, 30 # discharge pressure, with Wagner Motors, 15 HP, 440/3/60, 1740 RPM.

6—Dayton-Dowd, 1160 RPM, 15 PSI, 10" suction, 8" discharge, with Wagner Motors, 10 HP, 440/3/60.

4—Worthington, 100 GPM, 40 PSI, 5" suction, 3" discharge, with G.E. Motors, 7.37 HP, 440/3/60, 1750 RPM.

4—Warren, 135 GPM, 35 PSI, 6" suction, 3" discharge, with G.E. Motors, 6 HP, 440/3/60.

1—Worthington, 35 GPM, 62.4 PSI, 3" suction, 2" discharge, with G.E. Motors, 5.83 HP, 440/3/60, 1150 RPM.

7—Allis-Chalmers, 68 GPM, 114' head, Type SSV-C, 3" suction, 1½" discharge, with Wagner Motors, 7½ HP, 440/3/60, 1750 RPM.

3—Worthington, 350 GPM, 11.1 PSI, 10" suction, 3½" discharge, with G.E. Motors, 5 HP, 440/3/60, 1150 RPM.

12—Allis-Chalmers, 10 GPM, Size 2"x2½", with Wagner Motors, 3 HP, 440/3/60, 3600 RPM.

AC PUMPS—Horizontal Rotary

4—Warren, 197 GPM, 175 PSI, with Electro Dynamics Motors, 30 HP, 440/3/60, 1750 RPM.

2—Northern, 10 GPM, 350 PSI, 3" suction, 2" discharge, 200 RPM, with G.E. geared Motors, 5 HP, 440/3/60.

3—DeLaval, 25 GPM, 50 PSI, with G.E. Motors, 1.8 HP, 440/3/60.

AC PUMPS—Vertical Rotary

2—DeLaval, 550 GPM, 50 PSI, with G.E. Motors, 27.4 HP, 440/3/60, 1180 RPM.

7—Quimby, Size 2½, 10/6 GPM, 350 PSI, 2½" suction, 1½" discharge, with Wagner Motors, 6/3 HP, 440/3/60, 1160/865 RPM.

8—Blackmer, 50 GPM, 35 PSI, 420 RPM, with G.E. geared Motors, 2 HP, 440/3/60, 1750 RPM.

DC PUMPS—Horizontal Centrifugal

6—Worthington, Size 8L1, 2100 GPM, 138.5 TDM, with Westinghouse Motors, 100 HP, 230 DC, 1310/1750 RPM.

6—Worthington, Size 12 LA1, 4000 GPM, 67.3 TDM, with Westinghouse Motors, 100 HP, 230 DC, 1310/1750 RPM.

6—Worthington, Size 3UB1, 400 GPM, 280' head, with Westinghouse Motor, 50 HP, 230 DC, 1310/1750 RPM.

2—Weil, 400 GPM, 100 PSI, with 40 HP Motors, 230 DC.

1—Goulds, Figure 3380, 4" suction, 3" discharge, 250 GPM, 100 PSI, with 30 HP Motor, 230 DC, 2200 RPM.

6—Worthington, Size 4L1, 400 GPM, 83' head, with Westinghouse Motors, 15 HP, 230 DC, 1225/1750 RPM.

1—Aldrich, 8" suction, 6" discharge, with G.E. Motor, 12/25 HP, 115 DC.

3—Warren, 1175 GPM, 11.2 PSI, with Reliance Motors, 10 HP, 230 DC.

4—Gardner-Denver, 900 GPM, 30' head, with Crocker-Wheeler Motors, 10 HP, 230 DC.

1—Westco, 100 GPM, 100 PSI, 2" suction, 2" discharge, with 10 HP Imperial Motor, 115 DC.

DC PUMPS—Horizontal Centrifugal

2—Yeomans, 135 GPM, 3" suction, 115' head, 3" discharge, with Kimble Motor, 10 HP, 230 Volts DC.

2—Warren, size 5, 600 GPM, with Electro-Dynamics Motors, 8/4.5 HP, 230 Volts DC.

1—Warren, 5" suction, 4" discharge, with Reliance Motor, 7½ HP, 115 Volts DC.

1—Dayton-Dowd, 3" suction, 2½" discharge, with Crocker-Wheeler Motor, 5 HP, 120 DC.

1—Ingersoll-Rand, Model A, 45 GPM, 125' head, with G.E. Motor, 5 HP, 115 Volts DC.

3—Ingersoll-Rand, Size 1MVR, 50 GPM, with Electro-Dynamics Motors, 3.9 HP, 230 DC.

1—Fairbanks-Morse, 250 GPM, 13' head, with Fairbanks-Morse Motor, 3.72 HP, 230 Volts DC.

2—Worthington, 150 GPM, 22 PSI, 3½" suction, 3" discharge, with Diehl Motors, 3.47 HP, 230 Volts DC.

DC PUMPS—Horizontal Centrifugal

1—Yeomans, 40 GPM, 75' head, 1½" suction, 1" discharge, with Master Motor, 2 HP, 230 Volts DC.

2—Westco, 20 GPM, 50 PSI, with Century Motors, 1½ HP, 120 Volts DC.

2—Worthington, 60 GPM, 23.7 PSI, 2½" suction, 2" discharge, with Diehl Motors, 1.43 HP, 230 Volts DC.

7—Warren, 4 GPM, 38 PSI, 1½" suction, 1" discharge, with Century Motor (4-230 DC, 3-115 DC), 1.25 HP.

DC PUMPS—Vertical Centrifugal

2—Buffalo, Size 3 SAV, 400 GPM, 125 TDH, with Electro-Dynamic Motors, 50 HP, 230 Volts DC, 1350/1800 RPM.

1—Gardner-Denver, 1500 GPM, 56' head, 8" suction, 6" discharge, with Century Motor, 30 HP, 230 Volts DC, 1750 RPM.

1—Ingersoll-Rand, Size 18VCM, 8500 GPM, with Electro-Dynamic Motor, 20/40 HP, 230 Volts DC, 410/545 RPM.

2—Worthington, 16" LAS-2, 5600 GPM, 10 PSI, with G.E. Motor, 20/40 HP, 230 Volts DC, 540/720 RPM.

1—Ingersoll-Rand, 10" suction, 10" discharge, 1050/2000 GPM, with G.E. Motor, 20 HP, 230 Volts DC, 805/1150 RPM.

1—Worthington, 340 GPM, 33.6' 6" suction, 3" discharge, with G.E. Motor, 15 HP, 230 Volts DC.

1—Ingersoll-Rand, 1050 GPM, ... 5" suction, 5" discharge, with Crocker-Wheeler Motor, 15 HP, 230 Volts DC. 1150 RPM.

2—Ingersoll-Rand, 450 GPM, 15' head, 4" suction, 3" discharge, with G.E. Motors, 10/15 HP, 230 Volts DC, 1300/1750 RPM.

1—Allis-Chalmers, 750 GPM, 30.3' head, 5" suction, 5" discharge, with Star Motor, 10 HP, 230 Volts DC, 1750 RPM.

2—Buffalo, Size 3SLV, 425 GPM, 35 TDH, with Electro Dynamic Motors, 7½/15 HP, 230 Volts DC, 1310/1750 RPM.

3—Ingersoll-Rand, Size 1VHM, 18 GPM, 75 PSI, 3¼" suction, 1½" discharge, with G.E. Motors, 7½ HP, 230 Volts DC.

1—Worthington, 175 GPM, 50 PSI, 4" suction, with G.E. Motor, 7½ HP, 230 Volts DC.

2—Ingersoll-Rand, Size ..... 8 VCM, 1400 GPM, with Electro Dynamic Motors, 5/10 HP, 230 Volts DC, 950 RPM.

2—Ingersoll-Rand, Size 1½ VBM, 70 GPM, with Electro Dynamic Motors, 5/10 HP, 230 Volts DC, 1500/2000 RPM.

2—Ingersoll-Rand, Size 1MVR, 20 GPM, with Electro Dynamic Motors, 3/1.5 HP, 230 Volts DC, 1950/2600 RPM.

2—Worthington, 8" LS-1, 1400 GPM, 10 PSI, with G.E. Motors, 5/10 HP, 230 Volts DC, 875/1200 RPM.

2—Worthington, Type 1½ UZS-3, 20 GPM, 75 PSI, with G.E. Motors, 5 HP, 230 Volts DC, 1800 RPM.

2—Weil, 20 GPM, 40 PSI, 1½" suction, 1¼" discharge, with G.E. Motors, 3 HP, 230 Volts DC.

DC PUMPS—Horizontal Rotary

3—Worthington, Size 5GES, 400 GPM, 50 PSI, with Westinghouse Motors, 20 HP, 230 Volts DC, 1750 RPM.

1—DeLaval, 15 GPM, 350 PSI, 2½" suction, 2½" discharge, with Diehl Motor, 10 HP, 230 Volts DC.

2—Viking, Type EKK, 60 GPM, 70 PSI, 2" suction, 2" discharge, with Diehl Motors, 5 HP, 230 Volts DC.

3—National Transit, 50 GPM, 50 PSI, 3" suction, 2½" discharge, 3 HP, 230 Volts

DC PUMPS—Vertical Rotary

6—Quimby, Size 5, 400 GPM, 60 PSI, 6" suction, 5" discharge, with Westinghouse Motors, 30 HP, 230 Volts DC.

1—DeLaval, IMO, 250 GPM, 40 PSI, with G.E. Motor, 15/20 HP, 230 Volts DC, 1310/1750 RPM.

3—Worthington, Model 4GRVS, 225 GPM, 35 PSI, with G.E. Motors, 15/20 HP, 230 Volts DC.

4—Worthington, Model 4GRVS, 175 GPM, 50 PSI, with G.E. Motors, 7½/10 HP, 230 Volts DC.

1—Quimby, Size 4, 175 GPM, with Electro Dynamic Motor, 7.5/10 HP, 230 Volts DC, 865/1150 RPM.

2—Worthington, Type 3GRVS, 90 GPM, 75 PSI, 2¾" suction, 2½" discharge, with Diehl Motors, 7½ HP, 230 Volts DC.

1—Quimby, Size 2, 8 GPM, with Electro Dynamic Motor, 2/5 HP, 230 Volts DC, 575/1150 RPM.

2—Worthington, Type 2GRVS, 7 GPM, 400 PSI, with G.E. Motors, 2½/5 HP, 230 Volts DC, 900/1800 RPM.

BOILER FEED PUMPS — TURBINE & ELECTRIC

4—Worthington, Vertical type, single acting, triplex, constant speed, size 2¼ x 4, 47 GPM, 525 PSI, with G.E. Motors, 20 HP, 230 Volts DC.

2—Worthington, 5" UFD, 460 GPM, 750 PSI, 5" suction, 5" discharge, driven by Sturtevant Steam Turbine, Size CC-22', Type 21, 2½" steam inlet, 5½" exhaust.

2—Aldrich Pump Co. Triplex, Vertical, Size 2½ x 4, 65 GPM, 575 PSI, with G.E. Motors, 25 HP, 230 Volts DC.

2—Ingersoll-Rand, 165 GPM, 575 PSI, with turbine drives.

TURBINE DRIVEN PUMPS — Various

2—Worthington, Size 20-LAL-18, Main Condenser, Centrifugal, 10500, 27' head, Vertical, with Whiton Turbines, 95 HP.

1—Ingersoll-Rand, Size 5UV, Centrifugal, Horizontal, 1200 GPM, 225' head, 6" suction, 5" discharge, with Elliot Turbine, 84.3 HP.

1—Worthington, Fire, Flushing & Emergency Bilge, Centrifugal, Horizontal, Rating—Fire: 500 GPM, 150 PSI, Flushing: 1000 GPM, 60 PSI, Bilge: 750 GPM, 25 PSI, 5½" suction, 4½" discharge, with Whiton Turbines, 72.9 HP.

1—DeLaval, Fuel Oil Transfer, Vertical, Rotary, 250 GPM, 150 PSI, 7" suction, 6" discharge, with DeLaval Turbine, 35 BHP.

8—Goulds Main Circulating, Vertical, Centrifugal, 3700 GPM, 13 PSI, Size 12", with Elliot Turbines, 30 HP.

2—DeLaval Fuel Oil Service, Vertical, Rotary, 50 GPM, 350 PSI, 3½" suction, 3½" discharge, with DeLaval Turbines, 14.4 HP.

4—DeLaval—IMO, L.O. Service, Vertical, Rotary, 300 GPM, 45 PSI, 6" suction, 6" discharge, with DeLaval Turbines, 14.1 HP.

8—Allis-Chalmers, Type SSC-V, 68 GPM, 114' head, 3" suction, 1½" discharge, with Carling Turbines, 7½ HP, 1750 RPM.

2—Warren, 85 GPM, 60 PSI, For Lube Oil Service, Turbine Driven.

2 — Warren, Main Circulating, 3500 GPM, 13.5 PSI, Turbine Driven.

STOCKLESS ANCHORS

USED, GOOD QUALITY . . . SAVE!

3,000 pound size
8,000 pound size
10,000 pound size

ANCHORS... Unused, surplus 3000 # size Danforth

ANCHOR CHAIN . . . Used, good, with or without test certificate . . .
1 1/2" size
1 3/8" size
2 1/16" size
2 1/4" size

ANCHOR WINDLASS

1—LIDGERWOOD horizontal Anchor Windlass, double wildcat—for 2 1/16" Chain, double gypsy, with 50 motors, 230 volts DC, complete with controls.

1—Horizontal, of German Mfg., double wildcat—for use with 3" anchor chain, double gypsy with 230 VDC motor, complete with electrical control equipment.

American Engineering, horizontal, double 2⅛" Chain, 65 HP, 230 DC, complete.

7—American Hoist and Derrick Company, horizontal, double wildcat—for 2¼" chain double gypsy, 70 HP, 230 Volts DC, with electric controls.

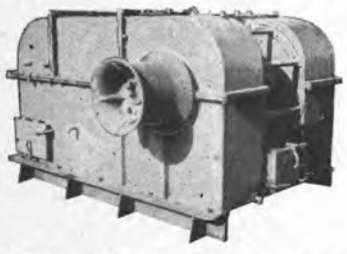
3—Hesse-Ersted, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

1—Hyde Horizontal Anchor Windlass double wildcat—for use with 2⅛" Anchor Chain, and with General Motors Electric Motor, 60 HP, 230 volts DC, 560/1700 RPM, Type CDM 18831 AE. Complete with Contractor Panel, Resistors, and Master Switch.

ANCHOR WINCHES

2—Jaeger, single drum—capacity approximately 900' of 1½" wire rope, double gypsy, with 35 HP Motors, 230 Volts DC, complete with electricals.

UNIWINCHES



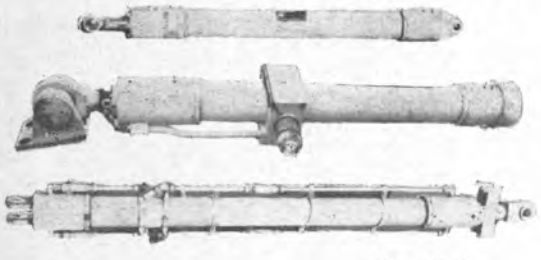
LAKESHORE UNWINCHES, with Allis-Chalmers Motors, 50 HP, 230 Volts DC, complete with Control Equipment.

Single speed, double drum, 7450 # at 220 FPM.

Single speed, single drum, 7450 # at 220 FPM.

Two speed, single drum, 7450 # at 220 FPM, 14400 # at 105 FPM.

HYDRAULIC CYLINDERS



3000 PSI

Bore	Stroke	Rod Diameter	Overall retracted length	Action
10"	12"	3.75"	45½"	double
10"	26"	3.75"	58½"	single
2"	8"	1½"	20"	double
2.5"	15"	1.12"	25½"	double
3"	8"	1.37"	15½"	double
6"	8'	4"	144"	double
13"	9'7"	5½"	14'	double

STEERING STANDS

Brass Steering Stands. Complete with angle indicator on top, used, 11" base diameter by 35½" high, and with 42" overall, 8-spoke brass steering wheel.

$149.50 each

CAPSTAN WINDLASSES

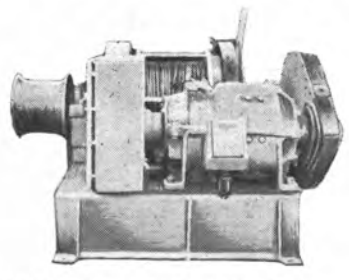
Model CWP-3, Vertical 24" Planetary Capstan Windlasses, Single Wildcat — using 1¼" Anchor Chain, Single Gypsy with 20 HP motor, 230 volts DC, complete with Contactor Panel, Master Switch, and Resistors.

3—Hesse-Ersted Vertical, Single Wildcat—for 1⅜" Anchor Chain, single gypsy, with HP General Electric Motor, 230 Volts DC, complete with Controller equipment.

Hyde, Vertical, Single Wildcat, for 1⅛" Anchor Chain, single gypsy, with 20/5 HP Motor, 440/3/60.

McKiernan — Terry, Single Wildcat — for ¾" chain, Single Gypsy, with underdeck drive with Star Motor, 7½ HP, 115 DC, with Electrical control equipment.

CARGO WINCHES



American Hoist and Derrick Company Winches with Westinghouse Motors, 50 HP, 230 Volts DC, complete with Contactor Panels, Master Switches, and Resistors.

Type 66—single speed, single drum.

Type 67—two speed, single drum.

CENTRIFUGES

Sharples Purifiers—For Diesel Service or for Lube Oil Service.

150 GPH—440 AC, 230 DC

350 GPH—230 DC

600 GPH—230 DC

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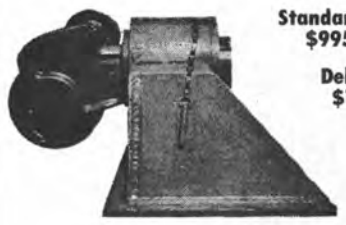
Designed and Manufactured by ZIDELL EXPLORATIONS, INC.

To Give You These Features:

One size fairlead with universal type sheave to accommodate wire rope sizes 1" up to and including 2".

Self Aligning, Swivel Type Head.

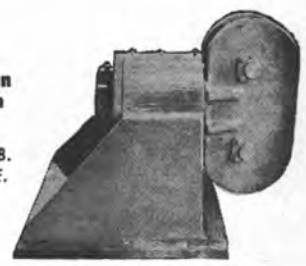
Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.



Standard Design $995 each

Deluxe Design $1250 each

Model Design $1350 each



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(Flexible Couplings between Turbines and Reducing Gear)

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1—Set from C2 Vessel (Moore built)

1—Set from AP2 Victory Ship

PROPELLERS

From C2-SU Vessel

From C2 Vessel (Moore built)

From AP2 Victory Ship

From Liberty Ships and LST Vessels

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From C3-S1-A3 Vessel

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From C2-SU Vessel

From Liberty Ships and LST Vessels

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In 440 AC, in 115 DC, and in 230 DC, and in sizes 1 HP through 20 HP. Completely reconditioned.

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5 ton rated, steel, as removed from surplus Liberty Ships. Manufactured by Young, Draper, etc. 12" or 14" sizes, your choice

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$35.00 each with pull test certificates.

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LP TURBINE, Allis-Chalmers, Straight Reaction, Type, 4289 RPM, 740° F, 440 PSI, Serial #1738.

2 — TURBINE GENERATORS, Allis-Chalmers, Turbines: Impulse Condensing Type, 740° F, 440 PSI, 8000 RPM, Generators: 300 KW, 240 Volts DC, 2 wire, 1200 RPM.

CARGO WINCHES
2—Jaeger, 2 drum, 2 speed, 50 HP, 230 DC.
2—Parkersburg, 2 drum, 1 speed, 50 HP, 230 DC.
2—O.C.S., 2 drum, 1 speed 50 HP, 230 DC.
2—Vulcan, 1 drum, 2 speed, 50 HP, 230 DC.
2—American Hoist & Derrick, 1 speed, 1 drum, 50 HP, 230 DC.

SALT WATER EVAPORATOR, Davis, Size 36-17, rated 2500 lbs. per hour.

MAKE UP FEED EVAPORATOR, Davis, Size 26-8, rated 1500 lbs. per hour.

LAKESHORE TOPPING WINCHES, single speed, capacity 10,000 # at 67 FPM, 5 HP, 230 DC.

ANCHOR WINDLASS, Markey, Type CWA-4, horizontal, double wildcat—for 2 5/16" anchor chain, 70 HP, 230 DC.

MAIN CONDENSER, Allis- Chalmers, 7800 sq. ft. cooling service, 2 pass, horizontal.

LUBE OIL PURIFIER, Sharples, Type M-34-W-22U43, 350 GPH, 230 Volts DC Motors.

FUEL OIL STANDBY PUMP, Worthington, horizontal duplex, Size 5½" x 3" x 6", 13 GPM, 410 PSI.

GENERAL SERVICE PUMP, Worthington, vertical simplex, Size 12 x 14 x 18, 600 GPM, 50 PSI.

FIRE & STANDBY PUMP, Worthington, vertical duplex, Size 12 x 8½ x 12, 400 GPM, 150 PSI.

BOILER FEED PUMP, Worthington Auxiliary, vertical simplex, Size 11 x 7 x 24, 120 GPM, 550 PSI.

FRESH WATER PUMPS, 2—Worthington, Size 4x6, horizontal duplex, 100 GPM, 80 PSI, 7½ HP, 230 DC.

BALLAST PUMP, Allis-Chalmers, Type SGV, Size 5 x 5, double suction, vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

SUBMERSIBLE BILGE PUMPS, 2—Worthington, 5", vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

BILGE PUMP, Allis-Chalmers, Size 5 x 5, Type SGV, double suction, vertical centrifugal, 600 GPM, 30 PSI, 20 HP, 230 DC.

EVAPORATOR TUBE NEST DRAIN PUMPS, 2—Allis-Chalmers, Type SS-LH, horizontal, Size 2½ x 2, 17 GPM, 127' head, 5 HP, 230 DC.

MAIN CONDENSATE PUMPS, 2—Allis-Chalmers, Type CF-2V, vertical volute, Size 6 x 3½, 170 GPM, 208' head, 20 HP, 230 DC.

DISTILLER CONDENSATE PUMPS, 2 — Allis-Chalmers, Type SS-L, horizontal centrifugal, Size 4 x 2, 45 GPM, 2 HP, 230 DC.

AUXILIARY CONDENSATE PUMPS, 2—Allis-Chalmers, Type CF-2V, vertical volute, Size 2½ x 1½, 30 GPM, 208' head, 7½ HP, 230 DC.

DIESEL OIL PUMP, Viking, Type ZKK, gear type, Size 3 x 2½, 40 GPM, 30 PSI, 2 HP, 230 DC.

DISTILLER FRESH WATER DISTRIBUTION PUMPS, 2—Allis-Chalmers, Type SS-DH, horizontal centrifugal, Size 2½ x 2, 55 GPM, 51' head, 2 HP, 230 DC.

FIRE PUMPS, 2—Allis-Chalmers, Type B2-V, vertical centrifugal, Size 4 x 3, 400 GPM, 280' head, 50 HP, 230 DC.

MAIN FEED PUMP, Terry Turbine, Type ZS-1, 124 HP, with Ingersoll-Rand horizontal pump, Size 4 x 3½, 4 stage, 250 GPM, 1340' head.

STEERING GEAR PUMP, Waterbury, Size 5, Type K, with Westinghouse Motor, 55 HP, 230 Volts DC.

LUBE OIL SERVICE PUMPS, 2—Quimby, vertical screw, Size 5, 400 GPM, 48 PSI, 6 x 5, 25 HP, 230 DC.

FUEL OIL TRANSFER PUMP, Quimby, vertical screw, Size 4D, 225 GPM, 50 PSI, 15 HP, 230 DC.

FUEL OIL SERVICE PUMP, Quimby, vertical screw, Size 2½, 20 GPM, 400 PSI, 2½ x 1½, 10 HP, 230 DC.

ICE WATER CIRCULATING PUMP, Allis-Chalmers, Type SS-RH, 10 GPM, 81' head, 1" x ¾", vertical volute, 1 HP, 230 DC.

HOT WATER CIRCULATING PUMP, Allis-Chalmers, Type SS-HH, 35 GPM, 70' head, 1¼ x 1¼, vertical volute, 2 HP, 230 DC.

REFRIGERATION CONDENSER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SJK, 180 GPM, 81' head, 2½ x 2, horizontal volute, 7½ HP, 230 DC.

MAIN CONDENSER CIRCULATING PUMP, Allis-Chalmers, Type LS-V, 12,550 GPM, 20' head, 20 x 20, vertical volute, 100 HP, 230 DC.

AUXILIARY DISTILLER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SG, 650 GPM, 29' head, 5 x 5, horizontal volute, 7½ HP, 230 DC.

AUXILIARY CONDENSER CIRCULATING PUMPS, 2—Allis-Chalmers, Type SE-V, 2820 GPM, 29.2' head, 12 x 12, vertical volute, 40 HP, 230 DC.

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AUTOMATIC PILOT, Sperry, Mark 642840.

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BOOM: 80' to headblock (with 10' whip)—WHIP: 10 tons at 125 FPM—2 part line—TRACK CENTERS: 20' — ENGINE: Cummins HBIS 601, 180 HP supercharged, elec. start —MOTORS: each leg (4 tot.) 7½ HP, 230 DC—POWER: Diesel Electric (DC).

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1—Westinghouse, 304 HP, 115 V, DC, 900 RPM, Sh. Wd., 2 pedestal bearings.

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6—Westinghouse, 50 HP, 230 V, DC, 600 RPM, Comp'd Wd., Type CK, Fr. 9.

4—Westinghouse, 9.3 HP, 230 V, DC, 640/852 RPM, Type SK, Fr. 93.

20—Westinghouse, 7½ HP, 120 V, DC, 1750 RPM, Stab. Sh. Wd., Type SK, Fr. 43.

Others in stock: 5 HP & up . . . 115 & 230 V.

230 VOLT D.C. MOTORS

1—250 HP, G.E., Type CY, Form HJ, Model 24G, 1200 RPM Horizontal, 2 B.B., Shunt Wd.

2—220 HP, G.E., Type CDM—1348S, Form HA, Model 25G 339, 1800 RPM, Stab. Sh. Wd. Horizontal, 2 B.B.

6—100 HP, Westinghouse, Type SK, FR. 163, Style 1B4631, 1150 RPM, Shunt Wd. Horizontal, 2 B.B.

2—55 HP, Electro-Dynamic, FR 25-SL, 550 RPM, Compound Wound, Single Ball Bearing. Originally for high pressure Air Compressor.

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1—40 HP, Allis-Chalmers, 1750 RPM, Compound Wound, Horizontal, 2 B.B.

1—40 HP, G.E., Type CDM, FR 95, Model 35A1663, 1800 RPM, Compound Wound, Horizontal, 2 B.B.

1—18/25 HP, Electro-Dynamic, 1225/1750 RPM, Compd. Wd., FR. 7½ S, Horizontal, 2 B.B.

6—15 HP, Allis-Chalmers, 1225/1750 RPM, Stab. Sh. Wd., Type EB90, Horizontal, 2 B.B.

2—10 HP, Allis-Chalmers, 1225/1750 RPM, Compd. Wd., Type EB80, Horizontal, 2 B.B.

4—9.3 HP, Westinghouse, 640/852 RPM, Type SK, FR. 93.

120 VOLT D.C. MOTORS

1—304 HP, Westinghouse, 900 R.P.M., Shunt Wound, Horizontal, Pedestal Bearing.

3—25 HP, G.E., Type CDM, 1200 R.P.M., Horizontal, 2 B.B., unused. Removed from M.G. Sets.

20—7½ HP, Westinghouse Type SR, FR 43, Stab. Sh. Wd., 1750 RPM,.

STEERING GEAR MOTORS

2—General Electric, 30 HP, 230 V, DC, 600 RPM, Stab. Sh. Wd., Type CDM, Fields Continuous Duty, Armature 1 Hr.

1—Westinghouse, 35 HP, 230 V, DC, 850 RPM, Stab. Sh. Wd., Type SK, Fr. 123, Fields Continuous Duty, Armature 1 Hr.

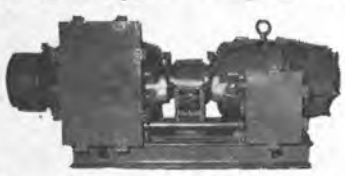
SHIP'S LIGHTING M-G SETS

230 V, DC/115 V, DC. Ship's Lighting M.G. Sets for C3-S1-A-3 150 K.W. and Moore built C2 100 K.W.

SPECIAL D.C. GENERATORS

3—Unused, G.E., 15 KW, 100 A, 15 V, Type CDM, 1200 RPM, 2 B.B., D.P. Generators.

MOTOR-GENERATOR SETS
Unused Surplus in Original Boxes



Janette M-G Sets. Input: 1.75 HP, 230 V, DC, 7.2 Amperes, 1800 RPM. Output: 1-KVA (.85 KW), 115/1/60, 4 ball bearing, with speed regulator, and with noise filters. Navy Type CJM-21151, continuous duty. Net weight 435 #, Dimensions 44" L, 19½ W, 18⅝" H. Instruction book and parts list included.

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1—Cutler-Hammer, 250 HP, 230 V, DC, No. 232 793A14.

2—General Electric, 225 HP, 230 V, DC, CR 5430-B32D.

6—Westinghouse, 100 HP, 230 V, DC, Type 8585A SO-1B4636.

1—Cutler-Hammer, Unused, 50 HP, 230 V, DC, No. C280981A290, Contactor Panel for Stern Anchor Haulage Winch. Many others from ¼ HP & up—115 and 230 V.

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15—Westinghouse Rotorols, driven by 5 HP, 440 V, 3 phase, 60 cycle, 1700 RPM, AC Motors.

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Westinghouse Propulsion Control Switchboards as used on S-4 Vessels. AC and DC Switchboards. Let us know of your requirements.

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2 and 3 Pole Air Breakers, 2 and 3 Pole Molded Case Navy Type Breakers. 2 and 3 Pole Trip Elements for Molded Case Breakers.

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D.C. GENERATORS

2—500 KW, 120/240 V, Westinghouse FR. CB813.7, 750 RPM, 2 Pedestal Bearing, with Balance Coils. Removed from GM 8-278 Engines.

2—250 KW, 120/240 V, Westinghouse, 1200 RPM, Single Pedestal Bearings. Balance Coils not available, Type 12S18P107PH, removed from Turbines.

2—150 KW, 120 V, G.E., Type CDM-1348-S, Form HA, Model 25G 340, 1800 RPM, Compound Wound, Horizontal 2 B.B.

1—150, 120 V, GE, Type CDM, Form AA, Model 24G, 1200 RPM, Compound Wound, Horizontal, 2 B.B.

6—100 KW, 120/240 V, Westinghouse, Type SK, FR. 143.8, 1800 RPM, Single Ball Bearings. Balance Coils available.

3—100 KW, 120/240 V, Delco, 1200 RPM, Single Bushed Bearings, with Balance Coils. Removed from Superior GDB-8 Engines.

1—100 KW, 120/240 V, Allis-Chalmers, 1200 RPM, Single Sleeve Bearing, Shunt Wound, Type 4-14-45-13, removed from GM 3-268A Engine.

10—90/165 KW, Westinghouse, 125/400 Volt, Type SK, FR. 185, Shunt Wound, separately excited (120 V), 1200 RPM, Horizontal, 2 B.B.

4—75 KW, 120 V, G.E., Type CDM-1234, Mod. 24GA71, 1200 RPM, 2 Ball Bearing, Tapered Shaft. Removed from Motor-Generator Sets.

6—60 KW, 120 V, Westinghouse, Type SK, FR 143, Style 3B2855-PH, 1800 RPM, 1 B.B. Removed from Turbines.

6—60 KW, 120 V, Westinghouse, Type SK, FR. 153-L, Style 1B4632, 1200 RPM, Compound Wound, Horizontal, 2 B.B.

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From 250 Watts to 500 KW in 115 Volt, 230 Volt and 120/240 Volt, 3 Wire DC. Any drive including Synchronous Motor. Let us have your inquiries.

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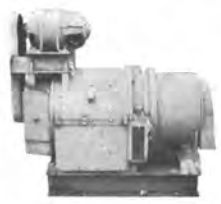

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230 VOLTS D.C. TO A.C.

Hertner. Input: 230 V, DC, 24A. Output: 3.5 KVA, 440 V, 60 cy., 3Ø.

Hertner. Input: 230 V, DC, 28A. Output: 5 KVA, PF .85, 115 V, 60 cy., Ø1.

Continental. Input: 230 V, DC, 28A. Output: 7.5 KVA, 3.5 KW, 120 V, 1Ø, 60 cy., 62.5A.

Century. Input: 10 HP, 230 V, DC. Output: 7.5 KVA, 3.75 KW, 120/1/60.

Bogue. Input: 230 V, DC, 57A, 15 HP. Output: 10 KVA, PF .8, 120 V, 60 cy., 1Ø.

Fidelity. Input: 15 HP, 230 V, DC. Output: 12.5 KVA, 10 KW, 120/1/60.

Bogue Electric. Input: 15 HP, 230 V, DC. Output: 12.5 KVA, 10 KW, 120/1/60.

Burke Electric. Input: 20 HP, 230 V, DC. Output: 25 KVA, 12.5 KW, 120/1/60.

General Elec. Input: 25 HP, 230 V, DC. Output: 18.75 KVA, 15 KW, 120/1/60.

Star Kimble. Input: 30 HP, 230 V, DC. Output: 25 KVA, 20 KW, 120/1/60.

Ideal. Input: 40 HP, 230 V, DC. Output: 31.3 KVA, 25 KW, 450/3/60.

Star Elec. Input: 40 HP, 230 V, DC. Output: 33.4 KVA, 25 KW, 450/3/60.

General Elec. Input: 230 V, DC, 40 HP. Output: 25 KW, 480 V, 60 cy, 3Ø, 24A, 1800 RPM.

Star Elec. Input: 125 HP, 240 V, DC. Output: 93.75 KVA, 75 KW, 450/3/60.

115 VOLTS D.C. TO A.C.

Marathon. Input: 1 HP, 115 V, DC. Output: .500 KVA, .425 KW, 115/1/60.

Bludworth. Input: .75 HP, 115 V, DC. Output: .500 KVA, .450 KW, 115/1/60.

Elec. Spec. Input: 1 HP, 90/130 V, DC. Output: .500 KVA, .500 KW, 115/1/60.

Century. Input: 1.5 HP, 115 V, DC. Output: .750 KVA, .600 KW, 102/1/60.

Janette. Input: 13 Amp, 115 V, DC. Output: 1 KVA, 110/1/60.

Elect. Prod. Input: 1.5 HP, 115 V, DC. Output: 1 KVA, 115/1/60.

Allis-Chalmers. Input: 14 Amp, 115 V, DC. Output: 1.250 KVA, 1 KW, 115/1/60.

Cont. Elect. Input: 6 HP, 115 V, DC. Output: 2.9 KW, 440/3/60.

Louis Allis. Input: 10 HP, 105/130 V, DC. Output: 7.5 KVA, 440/3/60.

Cont. Elect. Input: 12 HP, 120 V, DC. Output: 7.5 KVA, 440/3/60.

Star Elect. Input: 12½ HP, 115 V, DC, 1800 RPM. Output: 7½ KW, 120 V, 60 Cy.

Ideal. Input: 40 HP, 115 V, DC. Output: 31.3 KVA, 25 KW, 450/3/60.

Continental. Input: 50 HP, 115 V, DC. Output: 50 KVA, 25 KW, 120/3/60.

Burke. Input: 20 HP, 115 V, DC. Output: 25 KVA, 12½ KW, 120/1/60.

RCA. Input: 4 HP, 105/130 V, DC. Output: 2.22 KVA, 2 KW, 120/1/60.

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For Charter

Hopper Barges	*Spud Barges*
175′ x 26′ Open	110′ x 30′
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120′ x 32′ — 120′ x 45′ — 190′ x 42′
120′ x 40′ — 160′ x 50′

Oil Barges 7,000 to 10,000 bbl.

Also Available: Various Deck Barges

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195′ x 35′ x 9½′ Inland Deck Barge

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15 KVA—3 per bank—450 V primary—117 volt secondary.

$190.00 PER BANK

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BATTERIES
NEW SURPLUS BARGAIN

Heavy Duty, 8 volts, 500 amps, 13¾" Wide, 27¼" long, 18" high. Weight in case, 488 lbs.

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Most Anything in Marine Supplies
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New Watertight Doors

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6 Dog right and left hand hinged steel doors—with frames. Built and tested to A.B.S. specifications.

SIZES:
26" x 48"
26" x 57"
26" x 60"
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30" x 60"

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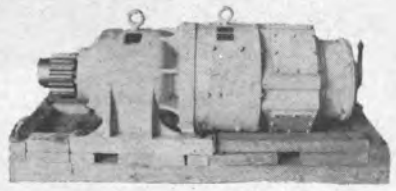
DREDGES — CONTRACTORS
OLD FAITHFUL IS BACK!!!
NEW 20 HP 230 VOLT D.C.

GEARHEAD MOTORS

30 R.P.M. OUTPUT



Star Electric Co.—20 HP—230 VDC—73 amps—1200 R.P.M.—compound wound—1 hr. duty—55° rise—with reduction gear 41.2:1—type 5R3165.

$1450.00 EACH

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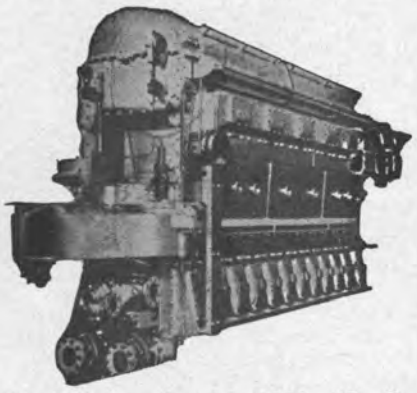
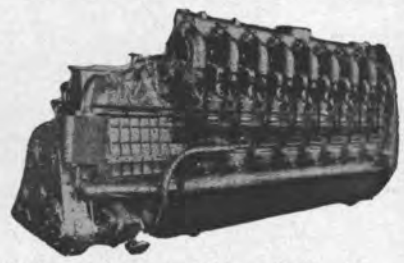
539-1900 (301) 355-5050

FAIRBANKS-MORSE 38D8 1/8 DIESEL



(4)—10 Cylinder—2-cycle—1800 HP @ 800 RPM. 8⅛x10—air starting—reversible. Complete with Harrison coolers, sylphon valves, strainers, filters, etc. For immediate delivery.

G.M. 16-278A 1700 BHP MAIN PROPULSION DIESEL ENGINES



16-Cylinder Vee type—8¾ x 10½. Air starting—never run commercially. All taken from Navy D.E. vessels. You'll be surprised by the good condition of these engines. Buy now and save.

USE AS PROPULSION ENGINES OR BUY FOR PARTS

You'll be surprised at the condition.
Only 6 engines remaining for sale.

$9750.00

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Shipyard Machinery for Sale or Rent

29′ FARREL BETTS Fixed Rail Vertical Boring Mill; with 15′ table; 2 rail heads ram type–1 with 36″ travel, 1 with 48″ travel; 75 HP main drive motor; 1952.

26′ SCHIESS-DEFRIES Vertical Boring & Turning Mill; 2 saddles on cross slide, side head on R.H. upright; 120 HP main motor; 1944.

12′-16′ CINCINNATI "HYPRO" High Column Extension Type Vertical Boring & Turning Mill; 2 swivel ram heads on cross rail; 60 HP main motor; 1949.

HILL Horizontal Type Deep Hole Drilling Machine, with G.E. Mark II tape control & chip conveyor; max. drill size 1½″; 1960.

26′ CRAVEN Gear Hobber; spur & helical cap. 10′5″ to 26′ dia. x 4′ face; max. pitch of hob gears 1¼ D.P.; 15 HP main motor; 1952.

ARCHDALE 9′ arm 23″ column Heavy Duty Hydraulic Control Preselect Speed and feeds Radial Drill; 22 spdle speeds 11 to 1450 RPM; 1954.

54″ x 54″ x 7′ INGERSOLL Planer Type Milling Machine; adjustable cross rail; tubular ways; 1 plain milling head on cross rail with power feed to quill.

96″ x 72″ x 20′ CINCINNATI "HYPRO" Openside Planer; 2 swiveling toolheads in adjustable rail 40/60°; 1 R.H. side toolhead swivels 30/30°; pendant control; pneumatic tool lifters; 1951.

24″ x 24″ x 18′ GRAY High Speed Openside Planer, for carbide tipped tools; 2 swivel toolheads on adjustable rail; with tool lifters mechanically driven; Gray non-metallic table ways; bed in 2 sections; push button pendant control; rapid traverse control; oil from forced lubrication system; 1950.

NEW HERCULES/SASS 7′ x 22″ Model TRM-2200 Radial Drill; rapid traverse on arm; centralized controls.

PLUS MANY OTHERS–WRITE FOR CATALOG.

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VERTICAL BOILER

Suitable for

Pile Drivers
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Hoists, etc.

$1450.00

100 HP @ 100 PSI. Water heating surface 747 sq. ft. — total heating surface 1144 sq. ft. A.S.M.E. Built by International Boiler Works—East Stroudsburg, Pa. Height to top of cylinder 12' 0"—diameter 66"—4" main steam line—2 1½" safety valves —practically new—very little if any use. Oil burning. Boiler stamped Mass.—Standard—100#—5290—National Board No. 6395.

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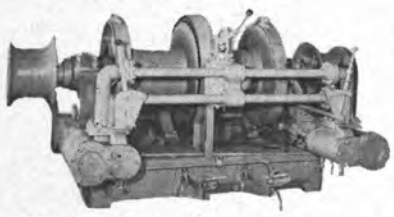
7 x 10 CLYDE DOUBLE DRUM

WINCHES



Drum 8500 lbs @ not less than 120 FPM; 13,000 lbs at no specified speed. Gypsy head 22,500 lbs. static pull. Foot brake to hold 17,000 lb. pull. Steam cylinders with standard 250 PSI.
DIMENSIONS:
9' 5¾" wide over winch heads
5' 10½" wide on bedplate
4' 1" deep over bedplate
6' 5" overall—brake pedal, etc.
2" steam—2½" exhaust.
Drums 16" diameter—20" wide—33 13/16" over flanges. Rebuilt by U.S.N. equal to new.

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FACTORY NEW BERGER

Self - Aligning

MARINE FAIRLEADS

$1175

Model 623—for 1¾" wire. 23" Sheave—shank opening 9½"—4500 lbs.—BASE: 37" long—50" wide—throat 11".

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BARGE MOUNTED REVOLVING CRANE 50-Ton capacity, Barge dimensions: 57' wide x 190' long.
CRANES-WHIRLEYS: One American 1956 model R20 HHE heavy duty 50 Ton. One practically new American model 254 capacity 90 Tons at 50', 25 Tons at 140'. One Clyde model 24E 50 Tons at 45'.
CONTINUOUS LIBERTY SHIP DISMANTLING—Marine parts always available.
STEEL BARGES AVAILABLE IMMEDIATELY—180'x42'x 12' and 150'x42'x12'—A.B.S. Newly Constructed. OTHER SIZES ALSO AVAILABLE.

SCHNITZER INDUSTRIES

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3300 N.W. Yeon Avenue, Portland, Oregon 97210
Phone: (503) 224-4321 Cable: Schnitzerbro Telex: 503-224-1002
Ft. of Adeline St., Oakland, Calif. Phone: 415-444-3919

FOR SALE OR CHARTER

One deck barge, steel construction, 220' x 45' x 11', 8" wood protective decking, removable 4½' bin sides, excellent condition.

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FOR SALE

Dredge "Admiral" 150' x 40' x 11'6, 705 tons complete with all machinery on board, located in Texas City, Texas. For use as barge or for scrapping purposes only for sale to the highest bidder. Send bids to:

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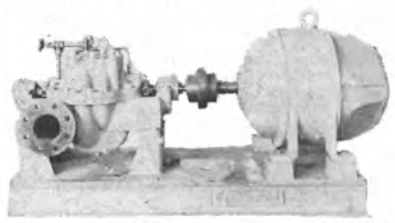
Or Contact 212-422-3967

MARINE PUMPS - FIRE - BILGE - GENERAL SERVICE



GENERAL SERVICE BUTTERWORTH & FIRE

2-Stage 300 GPM @ 339 ft. Mfg. by Gould & Ingersoll-Rand. Bronze—5 x 4—50 HP 230 VDC —2500 RPM—with magnetic starters—reconditioned.

NEW ALL-BRONZE BUFFALO PUMP

Fire & General service—550 GPM @ 30 lbs.—14.5 440/3/60 motor—built for USN.

AUXILIARY CONDENSATE

Worthington—1½ UZ-3—20 GPM @ 208'—5 HP—230 VDC—1577/2250 RPM—2½" suction —1½" discharge.

INGERSOLL-RAND FIRE & BILGE PUMP

Self-Priming

200 GPM—bronze—224' head—90/100 lbs fire service—suction lift 23'—3500 RPM. MOTOR: 20 HP—440/3/60/3500 RPM—28 amps—G.E. type KF—frame 326—class B—totally enclosed—Navy Service A — 3½" suction — 3" discharge. PRIMER MOTOR: 1½ HP — 440/3/60/3600 RPM—fan cooled—totally enclosed—2.2 amps. Nash priming pump complete with priming valve. Reconditioned.

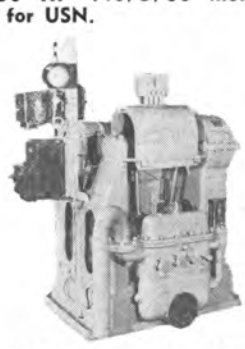
$497.50

BRONZE FEED-WATER BOOSTER PUMPS

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

INGERSOLL-RAND FIRE & FLUSHING PUMP

200 GPM—total head 224'—discharge pressure 100 PSI — 3½" suction — 3" discharge — 3500 RPM—bronze construction—flanged. MOTOR: 20 HP — 440/3/60/3600 RPM — G.E. type K.F.—frame 326 — full load amps 28 — fan cooled — ambient 50°C—class B insulation—totally enclosed — Navy Service A. DIMENSIONS: OAL 37¼"—OAW 18 31/32"—OAH 18½"—total weight 1225 lbs. Reconditioned.



RECIPROCATING PUMP

80 GPM @ 60 lbs.—self-priming motor-driven, with air dome. 2-Cylinder—5" bore—8" stroke—4" suction—3" discharge Variable speed 6 HP motor—230 VDC—reduction gear ratio 22:1. German-built—long a favorite on foreign ships for reliability.

$1250.00

$397.50

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SULZER DIESEL ENGINE

Type 6Ts-29 With Perkins—75HP. Gen. Oil Cooler and Spare Parts. Good Running Condition. Very attractive price.

SPOONER'S SALVAGE

Box 343, Newport News, Va. Tel. 703-245-0097

DUMP SCOW

1000 cu. yd. 115 x 40 x 13, 6 pocket dumper, excellent condition $25,000.

area code 617-242-2512

NEW - UNUSED

1-5/16 ANCHOR WINDLASS

Made by Ideal Electric Co.—with spares. Double wildcat—1-5/16"—15 HP—115 volts DC—1750 RPM—all controls—two outboard gypsies. Wildcats 36" between centers—6000 lb line pull @ 50 FPM. DIMENSIONS: O.A. width over gypsies—84"; OA length 81". Will sell windlass without power if desired.

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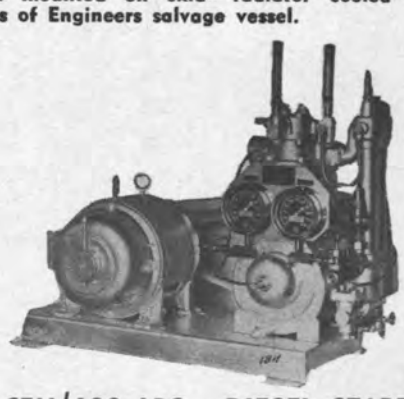
SHIPBOARD AIR COMPRESSORS

DIESEL-DRIVEN INGERSOLL RAND

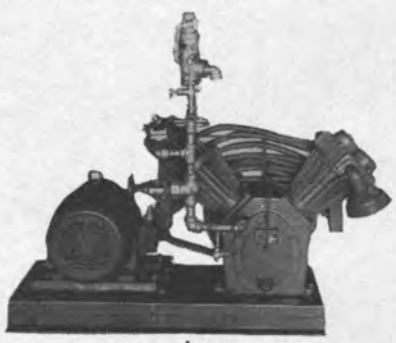
Ingersoll-Rand compressor—315 cu. ft. at 125 lbs.—driven by International Harvester UD-18 diesel. Tank mounted on skid—radiator cooled—from Corps of Engineers salvage vessel.



10 CFM/600 LBS - DIESEL STARTING

Ingersoll-Rand type 30—class T—4 x1½x3½—10 CFM at 600 lbs.—7.5 HP—motor is 440/3/60—1750 RPM—class A—50°C—weight 700 lbs. Complete with inter- and after cooler. OAL 3'6"—OAH 4'1½"—OAW 2'2¾".

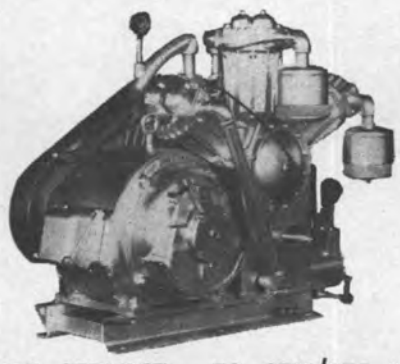
$1750



20 CFM/100 LBS

Ingersoll-Rand type 30—model 253x5—5x3x3½—20 CFM @ 100 lbs—self unloader. Westinghouse 5 HP 440/3/60 motor. T2 ships service.

$695



SHIPS SERVICE - 50 CFM/150 LBS

Ingersoll-Rand—type 30—class R—5x5x4x4—50 CFM @ 150 lbs. 20 HP 440/3/60 motor & controls—1750 RPM—50°C—class A. Complete with centrifugal unloader. OAL 4' 1⅛"—OAH 3' 2½"—OAW 2' 6½"—total weight 1505 lbs.

$1250

20 CFM/100 LBS

Worthington—5½x3⅛x3½—VA2—20 CFM @ 100 lbs. Motor 5 HP—440/3/60—1750 RPM—marine type ball-bearing drip-proof—fan cooled—with magnetic starter & self-unloader. OAL 4' 8½"—OAH 28"—OAW 25' 5". T2 ships service.

$695

54 CFM/100 LBS

Ingersoll-Rand type 30—5x5 & 4x4—54.4 CFM @ 100 lbs. Motor 15 HP—440/3/60—1750 RPM—with magnetic control, self-unloader, etc. Weight complete 1122 lbs. OAL 4' 11¼"—OAH 2' 10"—OAW 2' 7¾". T2 combustion control.

$995

52 CFM/100 LBS

Worthington 6½x3½x4—VA2—52 CFM @ 100 lbs. Motor is 15 HP—440/3/60—1750 RPM. Complete with magnetic starter, self-unloader, etc.

$995

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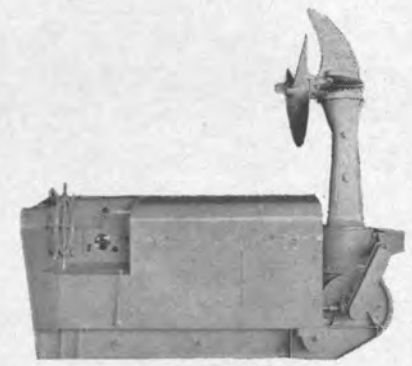
539-1900 **(Area Code 301)** **355-5050**

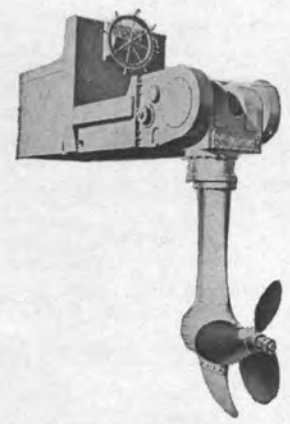
MURRAY & TREGURTHA

DIESEL PROPULSION UNITS

JUST ARRIVED — 7 UNITS



Model 02-D—powered by 6-cylinder G.M. 6-71 diesel—driven through Oliver gear—8708—forward ration 1:1.27—reverse 1:1—3 blade propeller—48" diameter—24" pitch—left hand—manual steering—electric starting. RECONDITIONED—READY TO GO!



1 Model 0-7 unit in stock. Powered by twin GM 6-71 diesels with hydraulic clutch & electric steering. Propeller diam. 64" pitch 48". Tailfin raised & lowered mechanically. 7' from bottom of unit to propeller hub center. Weight about 20,000 lbs. Propeller speed 308 RPM. Unit can develop up to 500 HP. Formerly used on Cargill Grain Co. barge "Carpolis". Actual photo on request. Can be demonstrated running in shop.

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NEW – UNUSED
10 H. P.
REVERSING CAPSTANS

Shipboard Use

Duty 10,000 lbs @ 60 FPM

MOTOR: 10 HP—totally enclosed—fan cooled—continuous duty — horizontal flange mounted — special shaft & oil seal fitted—440/3/60—1760 RPM. CONTROL: Marine type water-tight push-button—forward/reverse/stop—watertight starter box—rated for 40 starts per hour—triple pole contactor with silver contacts, thermal overload relay and trip adjustment. DIMENSIONS: Barrel 10" diameter — Flange 10" diameter — approx. 26" wide and 36" long.

6 IN STOCK FOR IMMEDIATE DELIVERY

$1675

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NEW — UNUSED

ROSS COOLERS

FOR LUBE OIL SERVICE

Screw connections — copper jacket — cupro-nickle tubes. 8" diameter x 6'3" length—84 sq. ft. surface. Water inlet 3"—outlet 3". Oil inlet 2½". Two Pass. Complete with zinc plugs.

$695

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LESLIE PUMP GOVERNOR VALVE

New—in original crates. For U.S. Naval Vessels—type CT-HNS-3. For merchant vessels—type CTHS. Size 2". Typical serial 241-423. For immediate delivery.

$495

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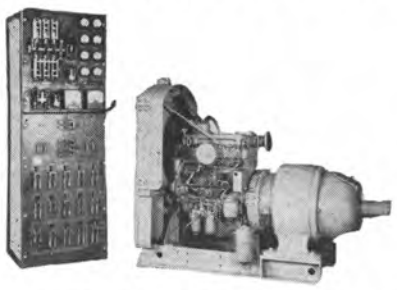
15 KW DIESEL

GENERATOR SET



Hercules DOCC 4" X 4½" diesel engine. Generator: Fidelity Electric — LCD3 — 15 KW — 120/240 Volts DC—62.5 amps. With switchboard and automatic transfer switch. From C2-S-AJ2—North Carolina built. Good operating condition.

$1450

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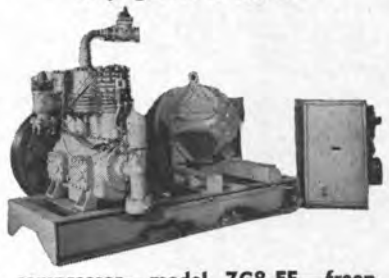
CARRIER REFRIGERATION UNITS

40-Ton Air Conditioning & Cargo Refrigeration Units



Carrier compressor—model 7G8-EF—freon compressor with manual cylinder cut-out—426 RPM—39.4 tons—suction temp. 45°F—cond. temp.—105°F—35 HP—230 volt DC motor. Complete with motor control—refrigeration condenser—receiver — fittings. 8 Complete units. Dimensions: Compressor 6'8½" long—4' 10½" OAW—approx. 6' high over suction connection. Condenser about 14' long—approx. 12" diameter. Just removed from Grace Line vessels. Excellent for fishing industry, banana boats, air-conditioning quarters, etc.

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M.G. SETS

NEW JANETTE 1 KVA SETS

2-Bearing Sets—type D.E.—3L. MOTOR INPUT: 2 HP—115 volts DC—3.5 amps—1800 RPM. OUTPUT: type C.E.I.—120 volts 60 cycle single phase. 8.3 amps—40°C Temp rise—0.8 P.F.

$179.50

1.24 KW G.E. MG SETS

G.E. Motor—3 HP—115 volts DC—1800 RPM. OUTPUT: G.E. generator—1.24 KW—1.56 KVA—120/60/1—0.8 PF—14.2 amps—1800 RPM. With spare armature. Overspeed trip on motor side.

$339.50

25 KW IDEAL M.G. SETS

INPUT: 40 HP—115 volts DC—290 amps—1800 RPM—frame 445. OUTPUT: Generator 31.5 KVA—25KW—440/3/60—1800 RPM. Control cabinet includes motor starter & generator control.

UNUSED SURPLUS 1 KVA SETS

INPUT: 1.75 HP—115 Volts DC—17 amps—1800 RPM. OUTPUT: 1 KVA—115 volts—8.7 amps—60 cycle single phase—0.9 PF. Unit is self-excited and will carry load immediately on starting. Regulation ±5%. Complete with magnetic starter & spare parts. Units designed and built to rigid Navy specs. SIZE: 19.5" long—26.5" wide—16" high. Weight 285 lbs. SPARES: 85 lbs. CONTROL: 20"X15"X10"—75 lbs.

$189.50

NEW 0.5 KVA HERTNER SETS

Type CHT-211761. INPUT: Motor 115 volts DC—9.0 amps—1800 RPM—1 HP. OUTPUT: 0.5 KVA—115 volts single phase 60 cycle—4.3 amps—.85 PF.

$127.50

CONTINENTAL: 3.7 KW—Input: 7½ HP 230 volts DC/28 amps/1800 RPM. Type D-324X—continuous. Output: Generator type DS-324XB 3.7 KW/7.5 KVA/120/1/60—62.5 amps—0.5 PF compound wound.

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RPC Corp., Marine Sales, 200 Park Ave., New York, N.Y. 10017
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Lake Shore Electric Corp., 205 Willis St., Bedford, Ohio 44014
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231

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Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 7 Dey Street, N.Y., N.Y. 10007
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Pacific Coast Eng. Co., P.O. Drawer E, Alameda, Calif. 94506
Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98401
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Western Gear Corp., Heavy Machinery Div., Everett, Wash. 98201

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Alco-Worthington Corp., 401 Worthington Ave., Harrison, N.J. 07029
Bruce GM Diesel, Inc., U.S. Route 46 at Savoy St., Lodi, N.J. 07644
Burmeister & Wain, 2 Torvegade, Copenhagen K, Denmark
Electro-Motive Division General Motors, La Grange, Illinois 60525
Fiat, Turin, Italy, U.S.A. 375 Park Ave., New York, N.Y. 10022
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
M.A.N. Maschinefabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
H. O. Penn Machinery Co., Inc., Caterpillar dir., 140th St. & East River, New York, N.Y. 10454
Stewart & Stevenson Services, Inc., 4516 Harrisburg Blvd., Houston, Texas 77011
Stork Dieselmotoren, Kromhout Motoren, P.O. Box 4196, Amsterdam, Holland.

DIESEL ENGINE MUFFLERS
Marine Products & Engineering Co, 20 Vesey St., New York, N.Y. 10007

DOORS—Watertight—Bulkhead
Blue Water Marine Supply, Inc., 2102 69 St., P.O. Box 9156, Houston, Texas 77006
Overbeke-Kain Co., 209 Aurora Rd., Bedford, Ohio 44014
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
Arnessen Marine Systems, Inc., 335 Bond St., Brooklyn, N.Y.
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150
Oceanic Electrical Mfg. Co., Inc., 148 Perry Street, N.Y. 10004
Owesen & Co., Inc., 315 Notre Dame, New Orleans, La. 70130
Pauluhn Electric Mfg. Co., Inc., 422 Broome St., New York 10013
Worthington Corp., 401 Worthington Ave., Harrison, N.J. 07029

EVAPORATORS
Aqua-Chem, Inc., 225 N. Grand Ave., Waukesha, Wis. 53186
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Mechanical Equipment Co., Inc., 861 Carondelet St., New Orleans, La. 70130

FITTINGS & HARDWARE
Kerotest Mfg., Corp., 2516 Liberty Ave., Pittsburgh, Pa. 15222
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

FUEL RECOVERY
Tretolite Div., Petrolite Corp., 369 Marshall Ave., St. Louis, Mo. 63119

GALLEY RANGES
Elisha Webb & Son Co., 136 So. Front St., Philadelphia, Pa. 19106

HEAT EXCHANGES
Aqua-Chem. Inc., 225 N. Grand Ave., Waukesha, Wis. 53186

HEATERS—Ship
Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231

HYDRAULICS
Bond Hydraulics Equipment Service Inc., 9264 Kennedy Blvd., North Bergen, N.J. 07047
Vickers, Marine & Ordnance Division, P.O. Box 302, Troy, Mich. 48084

INSULATION—Marine
Bailey Carpenter & Insulation Co.,Inc.,74SullivanSt.,Brklyn,N.Y.11231
Johns-Manville, Box 290-T, New York, N.Y. 10016
Reef Industries, Inc., P.O. Box 23221, New Orleans, La. 70123

MACHINE SHOP—TROUBLE SERVICE
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Metal Finishers, Inc., (Mecrome Division), 3125 Brinkerhoff Road, Kansas City, Kansas 66115

MARINE DRIVES—GEARS
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406
Western Gear Corp., Industrial Products Div., P.O. Box 126, Belmont, Calif. 94003

MARINE ELECTRONIC NAVIGATION EQUIPMENT
Decca Radar, Inc., 386 Park Ave. So., New York, N.Y. 10016
Electronics Concepts Inc., (Div. of Automatic Sprinkler Corp. of America) P. O. Box 813, Charlottesville, Va. 22902
Fisher Research Laboratory, 1890 Embaracadero Road, Palo Alto, California 94303
Griffith Marine Electronics, Inc., 79 Fourth Street, New Rochelle, N. Y. 10801
Kaar Electronics Corp., 2250 Charleston Road, Mountain View, Calif. 94041
Marquardt Corp., 16555 Saticoy St., Van Nuys, Calif. 91406
National Marine Service, 1750 So. Brentwood Blvd., St. Louis, Mo.
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
RCA Service Co., A Division of RCA, Marine Communications and Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

MARINE EQUIPMENT
Beaver Tool & Machine Co., P.O. Box 94717, 525 S.E. 29th St., Oklahoma City, Okla. 73109
Brazos Engineering, a div. of Metallic Bldg. Co., 4625 Holmes Road, Box 14240, Houston, Texas 77021
Gadelius, K. K., P.O. Box 802, Kobe Port, 651-01 Japan
Gulf Coast Marine, Inc., P.O. Box 52987, Houston, Texas 77052
H & H Engineering Co., 430 So. Navajo, Denver, Colo. 80223
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Kearfott Marine (Div. of The Singer Co.) 21 West St., New York, N.Y. 10006
Pacific Coast Eng. Co., P.O. Drawer E, Alameda, Calif. 94506
Vokes Filter Div. (Cardwell Machine Co.), Cardwell and Castlewood Rd., Richmond, Va. 23221
Worthington Corp., 401 Worthington Ave., Harrison, N.J. 07029

MARINE FURNITURE
Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231
Rex Cabinet & Linoleum Co., 531 23rd St., Union City, N.J. 07087

MARINE INSURANCE
Adams & Porter, Cotton Exchange Bldg., Houston, Texas

MARINE PROPULSION
The Buehler Corp., 9000 Precision Drive, Indianapolis, Ind. 46236
Combustion Engineering, Inc., Windsor, Connecticut 06095
De Laval Turbine, Inc., 853 Nottingham Way, Trenton, N.J. 08602
Foster Wheeler Corp., 666 Fifth Ave., New York, N.Y. 10019
General Electric Co., Schenectady, N.Y. 12305
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York 10014
Stal-Laval, Inc., 147 E. 50th St., New York, N.Y. 10022
Western Gear Corp., Precision Products Div., P.O. Box 190, Lynwood, Calif. 90262

MARINE RADIO COMMUNICATIONS EQUIPMENT
Collins Radio Co., M/S 416-118, Dallas, Texas 75207
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Kaar Electronics Corp., 2250 Charleston Road, Mountain View, Calif. 94041
Motorola Communications & Electronics, Inc., 4935 W. LeMoyne Ave., Chicago, Ill. 60651
RF Communications, Inc., 1680 University Ave., Rochester, N.Y. 14610
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Marine Products Operation, 213 East Grand Avenue, South San Francisco, California 94080
RCA Service Co., A Division of RCA, Marine Communications and Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101

NAVAL ARCHITECTS AND MARINE ENGINEERS
BG Marine Services, Div. of Genge Industries, Inc., 4419 Van Nuys Blvd., Sherman Oaks, Calif. 91403
Coast Engineering Co., 711 West 21 St., Norfolk, Va. 23517
Commercial Radio Sound Corp., 652 First Avenue, N.Y., N.Y. 10016
Crandall Dry Dock Engineers, Inc., 238 Main St., Cambridge 42, Mass.
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Christopher J. Foster, 17 Battery Place, New York, N.Y. 10004 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 21 West St., New York, N.Y. 10006
Morris Guralnick, Associates, Inc., 74 New Montgomery St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, N.Y. 10006
L. K. Homyer, Box 408, Corona Del Mar, California 92625
James S. Krogen, 1460 Brickell Ave., Miami, Fla. 33131
Littleton Research and Engineering Corp., 95 Russell Street, Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Applications Co., Inc., P.O. Box 167, Mineola, N.Y. 11502
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Rudolph F. Matzer & Associates, Route 1 - Box 314 D, Jacksonville, Fla. 32211
John J. McMullen Associates, Inc., 17 Battery Pl., New York, N.Y.
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Gunnar Nelson, 2185 Lemoine Ave., Ft. Lee, N.J. 07024
Pearlson Engineering Co., Inc., 2825 Oak Ave., Miami, Florida 33133
Research & Design Corp., 17 Battery Place, Suite 1227 New York, N.Y. 10004
Philip L. Rhodes, 369 Lexington Ave., New York, N.Y. 10017
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 45 Second St., San Francisco, Calif.
Sanders & Thomas, Inc., 1st-Federal Bldg., Pottstown, Pa. 19464
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
George Slifer, 1422 Lakewood Rd., Jacksonville, Fla. 32207
Philip F. Spaulding & Associates, 65 Marion St., Seattle, Wash. 98104
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 44 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Transcaribbean Shipping & Trading Corp., Panam Docks, Isle Grande, P.O. Box 564, San Juan, P.R. 00902
H. Newton Whittelsey, Inc., 17 Battery Pl., New York, N.Y. 10004

OIL PURIFIERS—Repair
Norse Electric Mfg. Co., Inc., 57-59 Commerce St., Bklyn, N.Y. 11230
OILS—Marine—Additives
Esso International Inc., Esso Bldg., 15 West 51 St., New York, N.Y.
Gulf Oil Trading Co., 1290 Ave. of the Americas, New York, N.Y.
Mobil Oil Co., Inc., 26 Broadway, New York, N.Y. 10004
Refineria Panama, S. A., 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., 50 W. 50 St., New York 10020
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
PAINT—Marine—Protective Coatings
Amercoat Corp., 201 N. Berry St., Brea, Calif. 92621
Devoe & Raynolds Co., Inc., Marine Division, Newark, N.J. 07105
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
International Paint Co., 21 West St., New York, N.Y. 10006
Mobil Chemical Company, Metuchen, N.J. 08840
PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 277 Park Ave., New York 10017
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., W. 50 St., New York 10020
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
The West Indies Oil Co., Ltd. St. John's, Antigua, W. I.
PLASTICS—Marine Applications
Atlas Minerals & Chemical Div., ESB, Inc., Mertztown, Pa. 19539
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936
POLLUTION CONTROL
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
PROPELLERS—New and Reconditioned
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Baldwin-Lima-Hamilton Corp., Phila., Pa. 19142
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bird-Johnson Co., 883 Main Street, Walpole, Mass. 02081
Escher Wyss, G.M.B.H., 798 Ravensburg, Germany
PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City. Kansas 66110
De Laval Turbine, Inc., 853 Nottingham Way, Trenton, N.J. 08602
RATCHETS
American Forge & Mfg. Co., McKees Rocks, Pa. 15136
W. W. Patterson Co., 830 Broket St., Pittsburgh, Pa. 15233
REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Frigitemp Corp., 329 Herzl St., Brooklyn, N.Y. 11212
York Corp., Grantley Road, York, Pa. 17405
ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Cating Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Columbian Rope Co., Auburn, N.Y. 13022
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Plymouth Cordage Company, Plymouth, Mass. 02364
Tubbs Cordage Company, 200 Bush St., San Francisco, Calif.
Wall Rope Works, Inc., Beverly, N. J. 08010
RUBBER PRODUCTS—Dock Fenders, Hose, Life Preservers
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
RUDDER ANGLE INDICATORS
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
SEALS
Golten Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Syntron, a division of FMC Corp., 398 Lexington Ave., Homer City, Pa. 15748
SEARCHLIGHTS
Portable Light Co., Inc., 67 Passaic Ave., Kearny, N.J. 07032
Snelson Oilfield Lighting Co., 1201 E. Daggett St., Forth Worth, Texas 76104
SEWAGE DISPOSAL
Youngstown Welding & Engineering Co., 3708 Oakwood Ave., Youngstown, Ohio 44509
SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore, Md. 21202
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Northern Metal Co., Minor & Bleigh Sts., Philadelphia, Pa. 19136
Peck Equipment Co., 3500 Elm Ave., Portsmouth, Va. 23704
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201
SHIP BROKERS
Gulf Coast Marine, Inc., P.O. Box 52987, Houston, Texas 77052
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
Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119
SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Ore. 97227
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Astilleros de Cadiz, S.A., Zurhono 72, Madrid 10, Spain
Atlantic Gulf & Pacific Co. of Manila Inc., 45 Muelle De La Industria, Manila
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Barbour Boat Works, Inc., P.O. Box 1069, New Bern, N.C. 28560
Bender Ship Repair, Inc., 265 So. Water St., Mobile, Ala. 36602
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
Brewer Dry Dock Co., Mariners Harbor, Staten Island, N.Y.
Ira S. Bushey & Sons, Inc., 764 Court St., Brooklyn, N.Y. 11231
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Equitable Equipment Co., Inc., 410 Camp St., New Orleans, La. 70130
Furness-Smiths Dock (Trinidad) Ltd., P.O. Box 893, Chaguaramas Dockyard, Port Chaguaramas, Trinidad, West Indies.
Gotaverken American Corp., 39 Broadway, New York 6, N.Y.
Groignard Shipyards, P.O. Box 829 Colbert, Marseilles, France.
Halifax Shipyards, Ltd., P.O. Box 640, Halifax, Nova Scotia, Canada
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hitachi Shipbuilding Co.,25 Nakanoshima2-chomeKitaku,Osaka-Japan
Ishikawajima-Harima Heavy Industries Co., Ltd., 50 Broad Street New York, N.Y. 10004
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla.
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan
LISNAVE, P.O. Box 2138, Lisbon, Portugual
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Lone Star Marine Salvage Co., 7200 S. Harbor Drive, Houston, Texas 77001
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mitsui Shipbuilding & Eng. Co., Ltd., Nihonbashi-Muromachi, Chuo-ku, Tokyo, Japan
Nashville Bridge Co., P.O. Box 239, Nashville 1, Tenn.
National Steel & Shipbuilding Corp., San Diego 12, Cal.
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Nippon Kokan Kabushiki Kaisha, 2, 1-chome, Otemachi, Chivoda-ku, Tokyo, Japan
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy
Pacific Coast Engineering Co., P.O. Drawer 6, Alameda, Calif. 94506
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J.
Puerto Rico Drydock and Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
Rodermond Industries, Foot of Henderson St., Jersey City, N.J. 07302
L. Rodriquez Shipyard, 24 Molo Norimberga, Messina, Italy.
St. Louis Shipbuilding—Federal Barge, Inc.
611 East Marceau, St. Louis 11, Mo.
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Southern Shipbuilding Corp., P.O. Box 1089, Slidell, La. 70458
Tampa Ship Repair & Dry Dock Co., Inc., P.O. Box 1277, Tampa, Florida 33601
Terrin Agency, Inc., 17 Battery Place, New York, N.Y. 10004
Todd Shipyards Corp., 1 Broadway, New York City
Vare Corp., Equipment Systems Div., 516 Sylvan Ave., Englewood Cliffs, N.J. 07632
Vickers Ltd., 222 London Rd., St. Albans, Herts, England
Wiley Mfg. Co., Port Deposit, Md.
Wyatt Industries Inc., Port Houston Shipyard Div., P.O. Box 3052, Houston, Texas 77001
SHIP MODELS
Boucher-Lewis Precision Models, Inc., 36 E. 12 St., N.Y., N.Y. 10003
SHIP STABILIZERS
Lidgerwood Mfg. Co., (Superior Lidgerwood Mundy Corp.), 7 Dey Street, New York, N.Y. 10007
John J. McMullen Associates, Inc., 17 Battery Pl., N.Y., N.Y. 10004
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
STEAM GENERATING EQUIPMENT
Combustion Engineering, Inc., Windsor, Connecticut 06095
STEVEDORING
M. P. Howlett, Inc., 415 32nd St., Union City, N.J.
Luckenbach Steamship Co., 120 Wall St., New York 5, N.Y.
SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 23rd St., N.Y. 10011
SYNTHETICS
E. I. Dupont De Nemours & Co., Inc., Textile Fibers Dept., Wilmington, Delaware
TANK CONTAINERS
Fruehauf Trailer Div., Fruehauf Corp., 10940 Harper Ave., Detroit, Mich. 48232
TOWING—Lighterage, Transportations, Barge Chartering
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore 2, Md.
G & H Towing Company, 509 Texas Building, Galveston, Texas 77550
Henry Gillen's Sons Lighterage, 140 Cedar St., New York, N.Y. 10006
James Hughes, Inc., 17 Battery Pl., New York, N.Y.
Jackson Marine Corp., P.O. Box 1087, Aransas Pass, Texas 78336
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y.
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
P. F. Martin, Inc., Mall Bldg., 325 Chestnut St., Philadelphia, Pa.
Moran Towing & Transportation Co., Inc., 17 Battery Place, N.Y.
Nickerson Marine Towing Co., 1670 Southeast 17th Street, Ft. Lauderdale, Fla. 33316
Red Star Towing & Transportation Co., 500 Fifth Ave., N.Y. 10036
L. Smit & Co., 11 Broadway, New York 4, N.Y.
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
M. & J. Tracy, Inc., 1 Broadway, New York, N.Y.
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y.
Vancouver Tug Boat Co., Ltd., 10 Pemberton Ave., No. Vancouver, B.C., Canada
VALVES AND FITTINGS—Hydraulic—Safety Flanges
Hooper Valve & Engineering Corp., 24th St. & Virginia Ave., Newport News, Va.
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn 31, N.Y.
Hydrasearch Co., Inc., Riva Rd., Annapolis, Md. 21401
Marine Moisture Control Co., 39 Redfern Ave., Inwood 96, L.I., N.Y.
Mechanical Marine Company, 45-15 37th St., Long Island City, N.Y.
Todd Products, Div. of Todd Shipyards Corp., Halleck St., Brooklyn, N.Y. 11231
VAN CONTAINERS—Insulated, Refrigerated, General Commodity
Fruehauf Trailer Div., Fruehauf Corp., 10940 Harper Ave., Detroit 32, Mich.
WEATHER ROUTING
Weather Routing, Inc., 90 Broad St., New York 4, N.Y.
WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18018
DiMattina Supply Co., 59-61 Seabring St., Brooklyn, N.Y. 11231
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230
ZINC
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