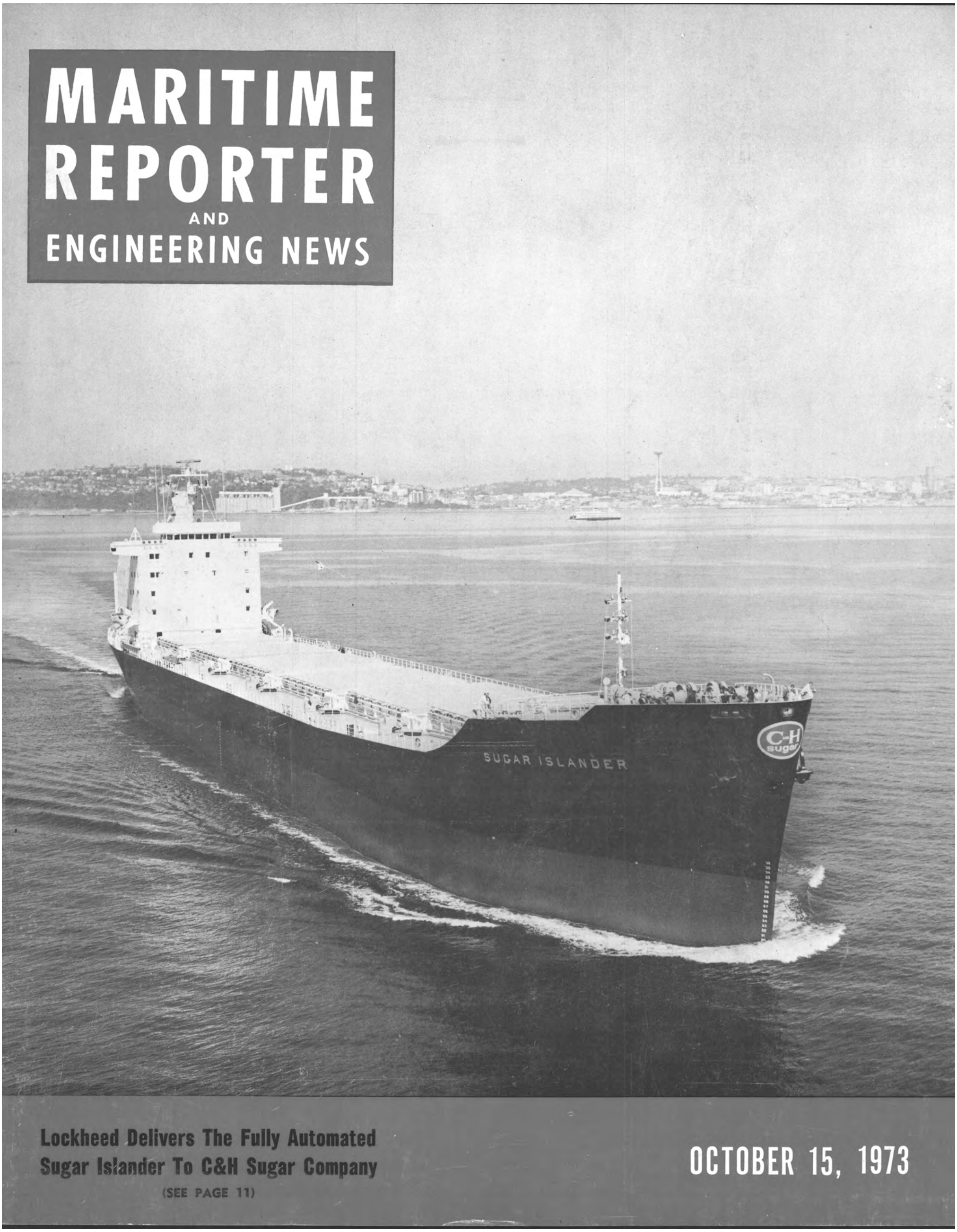
MARITIME
REPORTER
AND
ENGINEERING NEWS



Lockheed Delivers The Fully Automated Sugar Islander To C&H Sugar Company

(SEE PAGE 11)

OCTOBER 15, 1973

Benjamin Franklin did more than fly a kite

He was a candle and soap maker, book printer, cabbage grower, a successful publisher, diplomat and deputy postmaster general of all the colonies. He invented bifocal eyeglasses, an efficient heating stove and proved that lightning is electricity. He was truly a jack-of-all-trades and master of many.

Franklin founded an academy which eventually became the University of Pennsylvania. He was the only man who signed all four of the key documents in early American history: the Declaration of Independence, the Treaty of Alliance with France, the Treaty of Peace with Great Britain, and the Constitution of the United States.

BAILEY does more than service air conditioners. Their engineers design refrigeration and air conditioning systems for new ships or alterations for existing vessels... and their skilled craftsmen handle the installation.

If you call them, even on the hottest day of the year, they're not apt to tell you to "go fly a kite" because service is a major part of their business.

Their affiliated companies serve the marine industry in many other ways. Get to know the BAILEY group and what they can do for you.

BAILEY REFRIGERATION CO., INC.
74 SULLIVAN STREET • BROOKLYN, N.Y. 11231 • 212/855-3958 • CABLE: BAILREFCO

Affiliated Companies
BAILEY DISTRIBUTORS, INC.
BAILEY CARPENTER & INSULATION CO., INC.
BAILEY JOINER CO., INC.

Offices and Warehouses
WASHINGTON, D.C. 20006 • 1629 K Street, N.W. • 202/296-8217
NEW ORLEANS, LA. 70117 • 632 Alvar Street • 504/943-2461

Skilled hands

Kenneth Piegari, tug Jane McAllister

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

McAllister

Offshore Seminar To Be Held Oct. 22-26

With a record of five previous successful seminars presented in Houston, Texas, and London, England, with participants attending from many countries, ETA Offshore Seminars, Inc. is now presenting its sixth seminar session. It will be held in Houston on October 22-26, 1973.

In four and one-half days, the seminar covers everything from theory, selection, and operation of offshore drilling, completion, and production equipment to the newest techniques for drilling in deeper and more hostile waters. Through the seminars, participants gain, in a short period, a knowledge of the industry which could otherwise take months or years of exposure to obtain.

The aim of the seminar is to update experienced personnel and train new men to combat the shortage of qualified personnel on drilling rigs today. Seminar instructors use practical approaches, case histories, scale models, slide presentations, and new design research to quickly and efficiently train participants in the latest offshore drilling technology. Each instructor is highly experienced, and represents a vital segment of the offshore industry.

The seminar focuses on offshore safety, drilling unit stability, certification, insurance, well testing, and blowouts. For equipment and techniques, the instructors cover mooring systems and positioning, marine risers, drilling motion compensation, offshore drill string, and subsea wellhead and production equipment.

Along with the instruction, participants receive a personal manual containing all of the seminar presentations, charts, and illustrations to use as future reference.

Interactive dialogue between instructors and participants is also a unique aspect of the ETA Offshore Seminar. The seminar attendance is limited to 30 qualified applicants to allow for questions, discussion, and exchange of new ideas.

ETA Offshore Seminars, Inc. will also sponsor seminars for the offshore industry in Stavanger, Norway, and in London, England, in late November or early December.

For further information, contact **Ralph G. McTaggart,** president, ETA Offshore Seminars, Inc., 4140 Southwest Freeway, Houston, Texas 77027, or call (713) 621-0072.

MARITIME REPORTER AND ENGINEERING NEWS
No. 20 Volume 35

107 EAST 31st STREET
NEW YORK, N. Y. 10016
MUrray Hill 9-3266, 3267, 3268, 3269
ESTABLISHED 1939

Maritime Reporter/Engineering News is published the 1st and 15th of each month by Maritime Activity Reports, Inc. Controlled Circulation postage paid at Hoboken, N.J. 07030.

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

Member
BPA
Business Publications Audit of Circulation, Inc.

SHIPBUILDING

PRODUCTION CAPACITY

1,000,000 GRT/Yearly

ENGINE MANUFACTURE

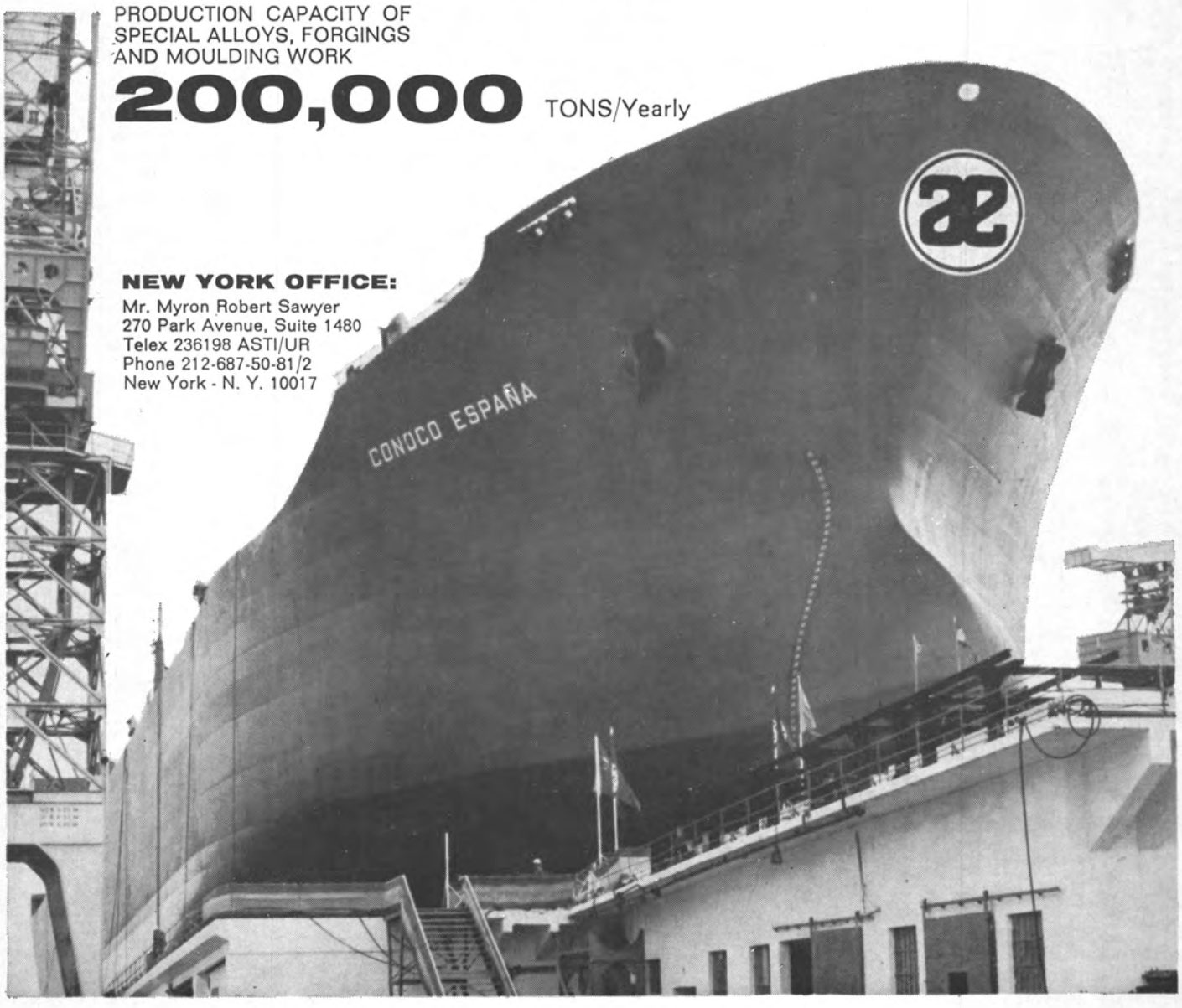
PRODUCTION CAPACITY

500,000 BHP/Yearly

STEEL MANUFACTURE

PRODUCTION CAPACITY OF
SPECIAL ALLOYS, FORGINGS
AND MOULDING WORK

200,000 TONS/Yearly



NEW YORK OFFICE:
Mr. Myron Robert Sawyer
270 Park Avenue, Suite 1480
Telex 236198 ASTI/UR
Phone 212-687-50-81/2
New York - N. Y. 10017

ASTILLEROS ESPAÑOLES, S.A.

HEADOFFICE
17, PADILLA - MADRID-6 SPAIN - **P. O. Box** n.º 815
Phones 225 21 00/01
Telex: 27690 - Astil-E and 27648 - Astil-E.
Cable address: ASTILLEROS - MADRID

Tanker Construction Costing $18.2 Billion Predicted By Banker

World tanker demand through 1975 will increase by about 130 million deadweight tons, requiring some $18.2 billion in new ships, according to **Eric A. Fris Jr.**, vice president, Manufacturers Hanover Trust Co., New York, N.Y.

Mr. **Fris's** comments appear in the latest issue of "Byline," an MHT publication featuring interviews with senior bank officers in question-and-answer format.

A specialist in maritime financing, Mr. **Fris** sees the longer-term picture even more demanding. From mid-1975 to 1980, he says about 30 million deadweight tons per year will be required, or a total cost of $29 billion and financing of $23 billion. He also expects a need for up to 80 new liquid natural gas vessels by 1985, costing well over $10 billion, if the current gas deals presently under discussion to carry LNG to Western Europe, Japan and the United States materialize.

Emphasizing that "the money is going to have to be found, or the world is not going to get the energy it needs," Mr. **Fris** observed that the energy crisis isn't only confined to the United States. Japan and Europe currently import more crude oil than the United States, Mr. **Fris** says, and banks and other institutions will be forming vehicles for taking equity participations in the construction of some of the LNG vessels.

Mr. **Fris** also looks for demand for other vessels, such as "many more very large and specialized grain carriers and the new type roll-on/roll-off car carriers that can transport upward of 4,000 vehicles at a time.

But he notes that the cost of these ships doesn't approach that of the tankers, pointing out that the building price of a 200,000-dwt very large crude carrier (VLCC) has almost tripled in five years from $70 per ton to $190.

Mr. **Fris** attributes the increased shipbuilding costs in part to the devaluation of the dollar and upward revaluation of other currencies. "But the big factor," he says, "is the increased cost of labor and steel."

He also believes that "under-utilization" of shipbuilding yards in the late 1960s forced the yards to bid low for new building contracts. Thus, Mr. **Fris** says, they now have to bid higher to recover the losses they suffered in previous years.

Asserting that American yards haven't been too successful until now in building the new tankers, Mr. **Fris** reports that Japan, as of June 30, has back orders and vessels under construction totaling 55.6 million gross tons, while the United States ranks 10th with an aggregate volume of 4.6 million gross tons. Of the approximate 125 ULCCs (ultra large crude carriers) on order, two-thirds of these will be built in European yards and most of the others in Japanese yards, he says.

But he speculates that the United States might get more future orders for four reasons: (1) our yards are developing a more efficient building operation; (2) labor is better utilized; (3) the U.S. has attractive long-term financing, and (4) the dollar devaluation has made some U.S. prices more attractive.

Sohio Elects Cazalet To Board

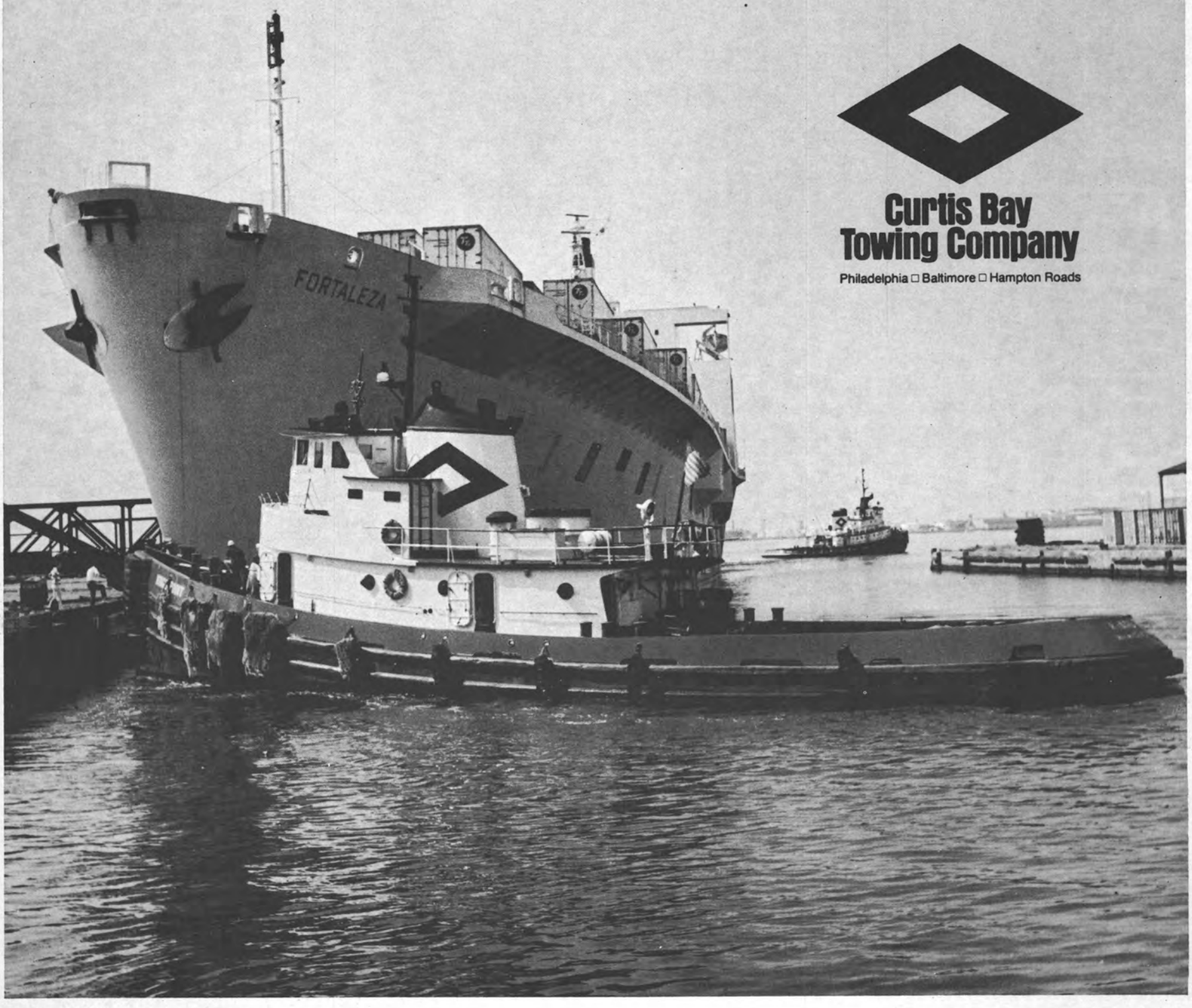
Peter G. Cazalet, president of BP North America, Inc., New York, N.Y., has been elected to the board of directors of The Standard Oil Co. (Ohio) to serve a term that expires in 1975.

Mr. **Cazalet** succeeds Lord **Strathalmond**, a director of The British Petroleum Company Limited, who resigned. Lord **Strathalmond** has been a Sohio director since 1970, when British Petroleum's U.S. subsidiary, BP Oil Corp., was merged with Sohio.

Mr. **Cazalet** has been president of BP North America, another British Petroleum subsidiary, since December 1972. He joined British Petroleum in London in 1959 and later served as assistant manager of BP's shipping department, general manager of the BP Tanker Co., and in regional coordination work involving Australasia and the Far East.

THERE IS A DIFFERENCE IN TUGBOAT COMPANIES.

Equipment and personnel make that difference. The best of both are required by the FORTALEZA, shown sailing from Baltimore. Both are provided by Curtis Bay. In the photograph, the new tug CAPE HENLOPEN exerts her 3300 horsepower on the stern of the ship. The 2400 horsepower tug KINGS POINT controls the bow. Curtis Bay Towing Company, 63 years of superior service.



Curtis Bay Towing Company

Philadelphia □ Baltimore □ Hampton Roads

Aerojet Builds Four Test Facilities For Waterjet Propulsion

Test data from the first of the Navy's 100-ton SES vessels, one of which utilizes waterjet propulsion, has led the Navy to begin preliminary design of multithousand-ton ships with speeds in excess of 80 knots.

The Navy has contracted with Boeing to build a Patrol Hydrofoil ship carrying Missiles (PHM) designed to serve as a high-speed modern PT boat. The PHM will have a foilborne and hullborne propulsion system produced by Aerojet.

In its high-speed foilborne mode, the PHM uses a 16,000-hp Aerojet waterjet driven by a gas turbine modified for marine service. The lower speed hull-borne propulsion uses two 800-hp Aerojet waterjets driven by diesel engines.

Aerojet is supporting three other Navy contractors on the 2,000-ton SES program.

A technology development program for the Navy for an SES steering and reversing system has recently been completed.

The Aerojet Liquid Rocket Company believes the extension of aerospace technology to marine systems is a logical means of diversification. To this end it has invested considerable sums of money in research and facilities.

The Aerojet waterjet test facilities under construction are evidence of the confidence the Aerojet Liquid Rocket Company has in the future of waterjet propulsion. These facilities were built entirely with capital funds. They include four separate test positions and two independent control units.

Since 1955, when Aerojet began operations in Sacramento, the company has conducted 7,500 pump tests. This experience has been incorporated into the development of these facilities.

Test Stand C-1 has been utilized for model studies on PHM foilborne pumps. This facility can be operated in either an open or closed loop mode from a 1.2-million-gallon water source. It has a flow rate capacity of 20,000 gpm.

Test Stand C-2 was designed to accommodate steering and reversing studies. C-2 measures thrust in three planes. A special feature is the closed loop system that provides water from the pool to the pump up to 4,500 gpm.

Test Stand C-3 is the foilborne test facility. This includes a water tank with a 1.2-million-gallon capacity; a flow loop capable of 150,000 gpm at 65 feet NPSH; a system capable of measuring up to 200,000 pounds of thrust; a self-contained gas turbine mechanical drive package rated at 21,300 hp that can operate at 27,000 hp for periods up to eight hours.

Test Stand B-1, the hullborne facility, has a steering and reversing capability. A reservoir containing three million gallons of water was created, whose level can be varied by six feet to meet various suction head test conditions.

The B-C test complex has a three-million gallon per day water replenishment capability.

These facilities give ALRC a unique capability to accurately test a broad range of waterjet propulsion systems.

Success of the PHM is expected to lead to use of this hydrofoil by NATO allies.

Work on the Navy 2,000-ton Surface Effect Ship indicates that it will be the forerunner of high-speed transocean craft.

Waterjet propulsion is also being applied to a wide range of smaller vehicles, such as barges, offshore crewboats and tugboats.

Ferries and other commercial craft are employing waterjet propulsion.

The Aerojet Liquid Rocket Company is located in Sacramento, Calif. 95813.

John Rybka Joins Crane Consultants

John Rybka Jr. has joined Crane Consultants, Inc., 3642 Albion Place North, Seattle, Wash. 98103. Mr. **Rybka** will be involved in design projects for Crane Consultants' clients. In addition, he will conduct crane load tests, periodic inspections and annual certifications as an accredited inspector for the firm.

Mr. **Rybka** is formerly a design and project engineer with Star Iron & Steel Co. of Tacoma, Wash., and has worked with Washington Iron Works and Colby Crane & Manufacturing Co.

Donald Frisby Named Manager Armco Steel's Houston Markets

Donald L. Frisby

Robert E. Portik

Armco Steel Corporation has announced the appointment of **Donald L. Frisby** as manager of Houston markets. He will direct and coordinate activities for markets served by products produced at Armco's Houston Works. He will be responsible for marketing to the marine and liquefied natural gas industries.

Mr. **Frisby** joined the company in 1948 and has held assignments in public relations and in the International Division. He served as a market specialist for industrial markets in 1965, and was promoted to supervisor of those markets in 1971.

Completing the Houston steel marketing staff will be **Robert E. Portik,** supervisor, with responsibility for the construction and offshore markets in the South, Southwest and Gulf Coast areas. Mr. **Portik** joined Armco's Metal Products Division in 1958. **Michael L. McClelland,** market specialist, will have the hydrocarbon processing industries markets. He moves to Houston, Texas, from Armco's office in Jackson, Miss.

Howaldtswerke-Deutsche To Expand Shipyard Facilities

Roland Marine, Inc., 50 Broadway, New York, N.Y. 10004, U.S. general agents of HDW, has announced that the Board of Directors of Howaldtswerke-Deutsche Werft A.G., at its September meeting in Kiel, decided to expand its shipbuilding facilities in Kiel-Gaarden to allow for construction of vessels up to 700,000 dwt.

The Kiel-Gaarden Shipyard was the first German yard capable of building vessels up to 236,000 dwt. Construction of the new graving dock represents another step in the shipyard's plan, announced in early 1972, to concentrate its main shipbuilding activities in Kiel.

The new graving dock constitutes an expansion of the present dock No. 8, making the new dock about 1,312 feet long, about 262 feet wide and about 33 feet deep. The expansion plan also provides for the installation of a new crane with an outreach of 535 feet and a capacity of about 900 tons. Construction will begin early in 1974 with completion of the dock scheduled for mid-1976.

HDW will continue the construction of specialized vessels and the Board of Directors have also decided to allocate additional funds for investment in their Hamburg facilities.

Tilston Roberts Opens Offices In Philadelphia & Baltimore

Tilston Roberts Corp. of New York, N.Y., has opened offices in Philadelphia, Pa., and Baltimore, Md. The company represents Lloyd Brasileiro, National Shipping Corp. of Pakistan, Portuguese Line, Forest Lines and Atlan Line.

Donald Marks, formerly general manager for the South Atlantic Steamship Agency and Philadelphia manager for States Marine Isthmian Line, manages the Philadelphia office. The manager in Baltimore will be **George G. Everett.**

Numero Uno in San Juan

□ Harbor Docking □ Ocean Towing □ Steamship Agents □ Stevedoring □ Salvage Capabilities

BERWIND

Puerto Rico Lighterage Co.

P.O. Box 1072, San Juan, Puerto Rico 00902 809/723-6164 Cable: "PORILITE", San Juan. Telex: RCA 325-2660 or ITT 345-0056

Lockheed Shipbuilding Delivers

The Fully Automated SUGAR ISLANDER

This J.J. Henry Co. Designed Bulk Carrier Is Propelled By Two Colt-Pielstick Diesel Engines. Automation Cut The Crew To 22 Men.

The Sugar Islander on her return to Lockheed Shipbuilding plant in Seattle after successful trials. This fully automated ship will forge another link in the trade that joins the Hawaiian Islands to the mainland of the United States. The ship carried grain from Portland to Hawaii on her maiden voyage and raw sugar cane on return trip.

Principals at the delivery ceremonies, left to right: **Greg de Montreve,** C and H Sugar Co.; Capt. **W. McAuliffe, Jr.,** master of the vessel; **Don Hare,** C and H sugar Co.; Capt. **Pete Johnson,** Pyramid Ventures Group, ship's operators; **Ron Sanders,** chief engineer, and **M.L. Ingwerson,** president of Lockheed Shipbuilding and Construction Company.

The completion of the M.V. Sugar Islander at a Seattle shipyard forges another link in the 67-year-old trade chain between the Pacific Northwest and Hawaii, president **James H. Marshall** of California and Hawaiian Sugar Company, declared during the recent ship-acceptance ceremonies.

The new ship was built at the Lockheed Shipbuilding and Construction Company's Harbor Island yards for C and H Sugar to Transport Hawaiian raw sugar to the mainland for refining and distribution to consumers in the U.S.

The new U.S.-flag bulk carrier was designed by the J.J. Henry Co., Inc. of New York City. This firm also served as the owner's representative during construction.

"We have been privileged to serve the Pacific Northwest since our company began operations in 1906," Mr. **Marshall** said, adding, "and the people of Hawaii have depended on the northwest for food, machinery, and a multitude of products and services to keep life going in the Islands."

The head of the West Coast's only cane-sugar refining company said the flow of cane sugar from Hawaii has been the foundation for substantial interstate trade between Hawaii and the northwest. Sugar dollars earned in Hawaii flow steadily back, he said, to buy goods from the northwest.

"Because of the long history of our ties with the northwest, we at C and H were doubly pleased that it was possible to have the Sugar Islander built there," Mr. **Marshall** stated. "Completion of this most modern ship in the American merchant marine fleet is a proud achievement for all involved, especially the men and women employed by Lockheed in Seattle."

The 641-foot long, highly automated Sugar Islander departed after the ceremonies for Portland, Ore., for delivery to her owner. Following Lockheed's transfer to Banker's Trust Company, the vessel was bareboat chartered to Pyramid Sugar Transport of New Orleans and time chartered to California and Hawaiian Sugar Company for the transport of raw sugar.

Although built to haul raw sugar, the vessel can carry many other types of cargo in her six holds which have a capacity of 1.2 million cubic feet. On her maiden voyage, the ship carried grain from Portland to Honolulu.

PRINCIPAL CHARACTERISTICS

Length overall	641 ft.
Length bet. perpendiculars	620 ft.
Breadth (mld)	77 ft. 10 in.
Scantling draft (keel)	33 ft. 6 in.
Design draft	32 ft. 6 in.
Depth (mld)	45 ft. 3 in.
Displacement	35,910 tons
Deadweight	28,478 tons
Horsepower	12,000 bhp
Cargo cubic	1,185,444 cu. ft.
Speed (trial)	15.75 knots
Complement	22

THE SHIP

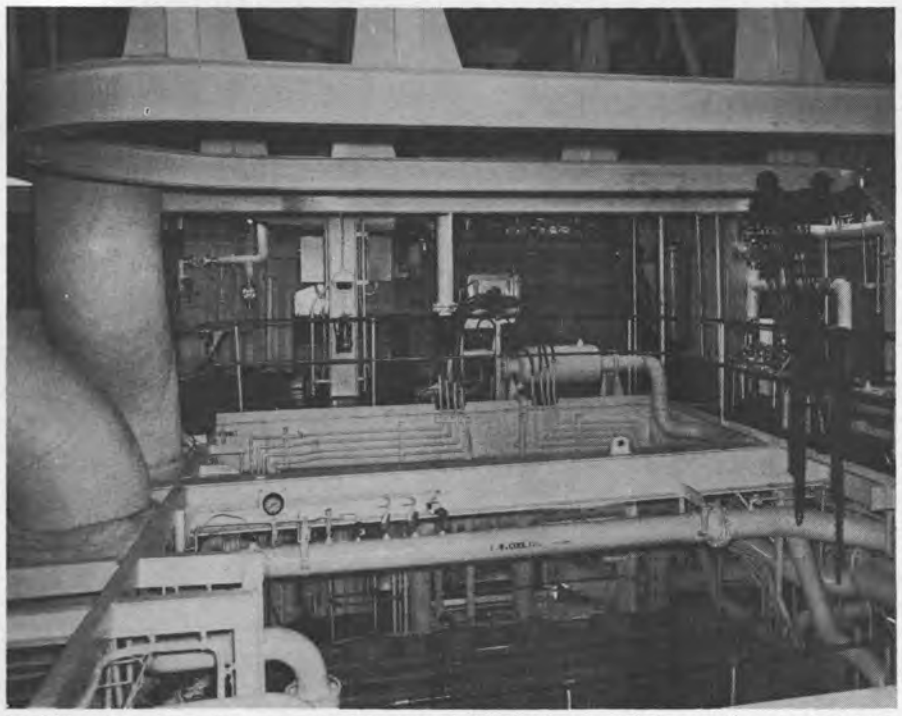
The longitudinally framed ship has a raked stem and a transom stern. The bow section contains the forepeak, chain locker, bow-thruster compartment and deep tanks. The cargo section is subdivided into six 75-foot-

(Continued on next page)

Main engine console is located in a sound-proof room. View was taken looking forward and toward starboard.

Looking to the port side of the bridge shows the propulsion control console, navigating units and the radar.

This view of the lower engine room is taken looking aft between the two Colt Diesels.



Looking to port on the upper engine room level shows one of the auxiliary generators.

The Fully Automated Sugar Islander—

(Continued from page 11)

long cargo holds located along the center of the ship with wing tanks port and starboard for ballast. The cargo holds are smooth sided and have corrugated bulkheads. Each hold is served by mechanically operated folding hatch covers. The hatch for No. 1 hold measures 46 feet 10½ inches long by 42 feet wide. All the other hatch covers are 56 feet 3 inches long by 42 feet wide. The stern section contains the engine room, after peak tank and the steering-gear room.

All accommodations and the bridge are located in the after house. On the Main Deck are all storerooms, refrigerated spaces, galley, crew's mess, officers' mess, crew and officers' laundry, ship office, slop chest, CO-2 room and linen lockers. On the "A" Deck are staterooms for the able-bodied seamen, messmen and the crew recreation room.

Located on the "B" Deck are staterooms for the boatswain, chief steward, deck/engine mechanics, wiper, and electrician, plus the emergency-generator room and treatment room. On the "C" Deck are staterooms for the relief mate, third assistant engineer, second assistant engineer, first assistant engineer, relief engineer, and the chief engineer together with an office for the first assistant engineer, the chief engineer's day room and the officer lounge. The "D" Deck contains staterooms for the radio officer, the third, second and first mates and the captain, plus the captain's day room and the radio room.

The entire crew of 22 officers and men have individual, air-conditioned staterooms with the officers having individual bath rooms and the crew having adjoining bath rooms.

The total capacity of the six cargo holds, including the hatch coamings, is 1,185,444 cubic feet or 28,045 tons. The total ballast capacity including the forepeak and after peak tanks, the wing tanks and the double bottom tanks is 409,793 cubic feet or 11,699 tons. The total fresh water capacity of the ship is 142 tons. Fuel oil and diesel oil are carried in deep tanks, wing tanks, service tanks, settling tanks and the double bottom, having a total capacity of 144 tons.

The ship is classed by the American Bureau of Shipping.

MACHINERY PLANT

The two unidirectional, 6,000-bhp Colt-Pielstick diesel engines drive the single controllable-pitch propeller through a twin-pinion marine reduction gear and flexible couplings. The reduction gear has two output quill shafts, each fitted with a clutch for engagement with pinion shafts. The starboard pinion shaft connects through a speed increaser to a 450-kw electrical generator. The port pinion shaft connects to the propeller drive shaft.

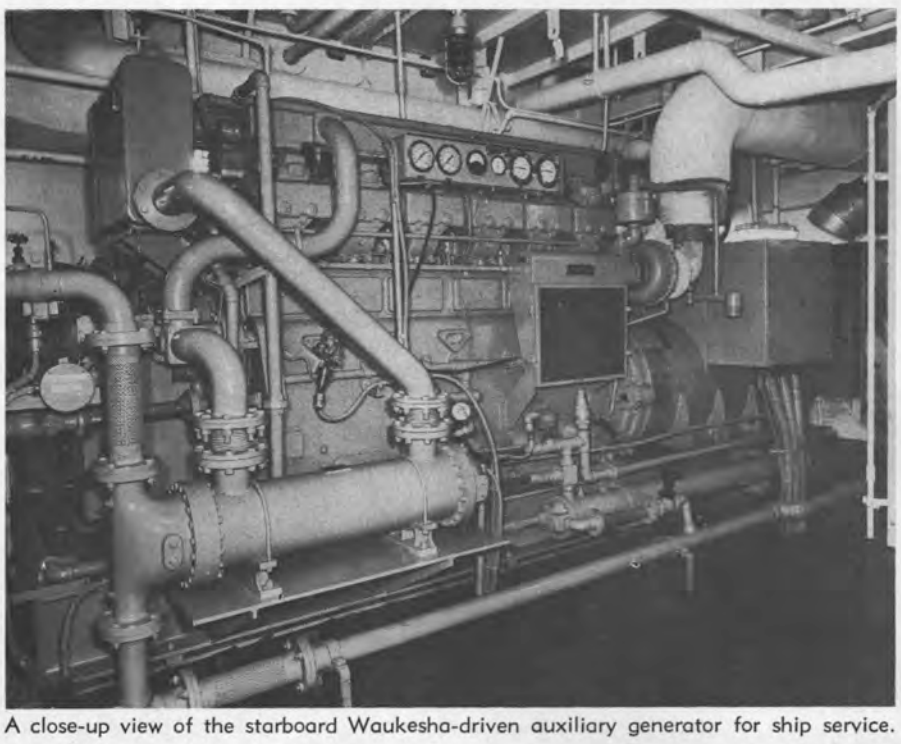
The engines are Colt S.E.M.T. Pielstick, Model 12PC2V, uni-directional marine diesels. Each engine is a 12-cylinder, 45°-V configuration, with a 6,000-bhp rating at 520 rpm. The engines are turbocharged and operate on a four-stroke principle. Either diesel or heavy oil may be used as fuel. Three attached engine-driven pumps supply lubricating oil to the engine, lubricating oil to the rocker-arm assembly, and cooling water to the engine jacket.

Each engine output shaft is equipped with a Geislinger, Model B90/20/3/2, flexible-drive coupling for connection to the reduction-gear input quill shafts. The flexible coupling has a radial leaf-spring design and is oil-filled via the engine crankshaft.

A Lufkin, Model CSQ 16222S, dual-input, single-reduction (ratio 5.192:1), double-helical unit is used as the reduction gear. An integral pressurized lube-oil system includes filters, motor-driven lube-oil pump, one gear-driven lube-oil pump, a lube-oil cooler and a salt-water cooling regulator valve.

The reduction gear may be driven by one or both engines.

(continued on next page)



A close-up view of the starboard Waukesha-driven auxiliary generator for ship service.

The bow-thruster diesel engine with Lufkin reduction gear and Philadelphia drive gears.

The main-engine electrical switchboard looking aft to port.

The radio room looking aft to port, showing the console.

Captain's day room provides for work and entertaining.

A clutch is fitted on the aft end of each of the two reduction-gear quill shafts for engagement with the pinion shafts. The clutches are each air-actuated Fawick, Model 42 VC 1200 units.

To drive the generator, a Lufkin, Model S148C, speed increaser is connected to the starboard reduction-gear output shaft by a Fast, No. 4-½, output coupling. The speed increaser is a single-input/single-output unit with a ratio of 1:2.458.

The shaft-driven generator is a Fairbanks-Morse, Model TBGZBK, rated at 450 kw and 1,200 rpm. The output is three-phase, 60-Hz, 450-volt alternating current.

The two diesel auxiliary generators are Waukesha Model F2895D SIM units. They are rated at 702 hp at 1,200 rpm. Each generator is capable of developing 500-kw, 450-volt alternating current.

The Sugar Islander also is equipped with one 100-kw, 450-volt, alternating-current emergency diesel generator. The diesel engine is a Waukesha Model H-1077-D, eight-cylinder, four-stroke-cycle unit that develops 147 hp at 1,200 rpm.

The 22-foot diameter, four-blade propeller was manufactured by Allis-Chalmers (Escher Wyss design). The pitch may be set for ahead or astern propulsion. Three propeller-pitch control modes may be selected at the bridge control console or at the engine-room control-station console:

(a) Maneuvering Mode (direct pitch setting). Between the command-lever handle settings of Position 5-astern and Position 7-ahead, the engine speed and propeller pitch are changed according to a pre-planned program.

(b) Load-Control Mode. Between the command-lever handle settings of Position 7 to 10-ahead and Position 5 to 10-astern, the propeller pitch is automatically adjusted to accommodate variations in ship influences and sea conditions. The engine speed remains constant.

(c) Cruise Mode. Between the command-lever handle settings of Position 7 to 10-ahead and Position 5 to 10-astern, the propeller pitch may be set manually while the engine speed remains constant.

The control system is capable of controlling the ship's direction and speed from a stand-by condition to a sea condition through all modes of maneuvering safely and efficiently. The control system also is capable of controlling and monitoring all vital and non-vital auxiliary machinery through all modes of operation. The Barber Colman Company provided the centralized engine control console and systems.

OTHER MACHINERY

A bow-thruster system supplied by Propulsion Systems Incorporated provides the ship with increased close-in maneuvering capability. The bow-thruster motor was manufactured by Waukesha Motor Company and is a V-12, 1,000-hp at 1,200 rpm diesel. The propeller is a Liaaen Model BF 20-10 with four blades. Philadelphia Gear Corporation supplied the reduction gears.

The steering gear, supplied by Propulsion Systems Incorporated, consists of a Frydenbo rotary-vane hydraulic-motor powered by two PE-3″ pump units, which are controlled by electrical means from the wheelhouse. The Model H.S. 450 steering motor is mounted directly on the rudder stock. It is capable of handling the full torque and weight of the rudder. The motor contains a built-in rudder carrier, radial bearings and relief and by-pass valves. The maximum torque is 6.5 million inch-pounds.

The anchor windlass is a horizontal type with two cable lifters suitable for 2¾-inch stud-link cable, and two 28-inch diameter warping heads independently clutched. The unit was manufactured in England by Clarke Chapman-John Thompson, Ltd. It is electrically driven by a 125-hp direct-current motor via a power supply located below the forecastle deck. The motor and controls were supplied by the General Electric Company. The two 14,200-pound stockless anchors (Baldt), each with 165 fathoms of 2¾-inch forged-steel, stud-link chain can be raised at a speed of 30 feet-per-minute.

The hatch covers were supplied by MacGregor Comarain, Inc. and were manufactured in Japan. They are steel, self-powered electro-hydraulic with chain drive. Wheel jacking is automatic, while dogging to rubber gasketing is manual around the perimeter and automatic between the seven panels forming each cover.

A Seattle Boiler Works, Inc., Model HDT-550 boiler was installed to provide steam for the ship systems. The boiler has a working pressure of 125 psi and is equipped with an automatic combustion-control system.

The Sugar Islander is equipped with a Pall Trinity Micro Corporation Model M sewage treatment plant capable of handling a flow of 1,250 gallons-per-day.

JOINER WORK

All furniture and joiner work was supplied and installed by Eastern Cold Storage Insulation Company.

The accommodations provide individual staterooms with private or semi-private toilet facilities for all personnel.

Each accommodation space is outfitted with all-metal furniture to the latest marine standards, and all bulkheads and deckheads are lined with decorative prefinished materials to minimize maintenance work.

The main galley is finished entirely in stainless steel and is outfitted with the most modern equipment to provide high quality, efficient food service on a cafeteria-style basis.

LIST OF SUPPLIERS

Main Propulsion System	Colt	Aux. Diesel S/W Pump	Warren
C. P. Propeller	Allis Chalmers	Bow Thruster S/W Pump	Warren
Bow Thruster	Propulsion Systems	Ballast Pump	Warren
Bow-Thruster Motor	Waukesha Motors	Sludge Trans. Pump	Blackmer
Steering Gear	Propulsion Systems	Bilge/Ballast Pump	Warren
Aux. Boilers	Seattle Boiler	F/W Pumps	Pacific
Boiler Feed Unit	Roth	Sewage Treat. Plant	Pall
Centralized Engine Control Console	Barber-Colman	Mod. Salinity Ind. Sys.	McNab
100 KW Diesel Gen.	Waukesha Motors	Rudder Angle Ind.	Hose-McCann
500 KW Diesel Gen.	Waukesha Motors	Docking Announc. Sys.	Dynalec
Switchboards—Mn/Emerg.	Federal Pacific	Oily Water Detector	Galbraith-Pilot Marine
Distilling Plant	Meco	Tank Level Ind. Sys.	King
Air Cond. Plant	York	Atmospheric Condenser	Thermxchanger
Air Cond. Unit	Bailey	Watch Call Sys.	Henschel
Air Cond. Control	Johnson	Oily Water Detec. Sys.	Bull & Roberts
S/S Refrigeration	York	Marine Smoke Detector	Kidde
Mooring Winch	Lake Shore	CO_2 Fire Ext. Sys.	Kidde
Boats/Davits/Winches	Marine Safety	Draft Indicate Sys.	King
Diesel Eng./Boat	Westerbeke	Shaft H.P. Meter	McNab
Anchor Windlass	Clark-Chapman	Vacuum Prime Sys.	Hyde
Drive/Windlass	General Electric	Bilge-Ballast Sys.	United Power
Gyro Compass	Sperry	Fire Detection Sys.	Pyrotronics
Dial Telephone	Hose-McCann	Steering Cont. Sys.	Sperry
S/P Telephone	Hose-McCann	Auto Direct. Finder	Ben-Mar
Controllers	General Electric	Depth Sounder	Raytheon
Hatch Covers	MacGregor	VHF Radio Tele.	ITT
Electric Whistle	Kahlenberg	Pathfinder Radar	Raytheon
Fans—Centrif.	Buffalo Forge	Depth Alarm Asses.	Raytheon
Stern Tube—Bearing Seal	Waukesha Bearings	Marine Auto-Alarm	ITT
Line Shaft Bearing	Waukesha Bearings	Marine Radio	ITT
Searchlight	Carlisle-Finch	Reefer-Freezer	Foster

FMC Receives $35-Million Contract To Build Two Tankers —Bringing Total To Six

The first of six tankers being built at FMC Corporation's Marine and Rail Equipment Division, Portland, Ore. They will be chartered to Standard Oil Company of California and operated by Chevron Shipping Company.

FMC Corporation's Marine and Rail Equipment Division, Portland, Ore., has signed a contract to build two additional 35,000-deadweight-ton gas-turbine-powered oil tankers, bringing the total contract to six vessels, the first of which is nearing two-thirds completion. The ships will be chartered to Chevron Shipping Company, a wholly owned subsidiary of Standard Oil Company of California. Now totaling over $102 million, the project has brought the first shipbuilding to the Portland area since World War II.

According to **C. Bruce Ward,** president of the FMC Division, construction of the six tankers will provide an uninterrupted production schedule, providing steady employment into 1977.

The FMC Division, formerly Gunderson, Inc., has incorporated new design concepts developed by the Chevron Shipping Company and FMC Corporation. The hull design and gas turbine electric power units combine to produce a safe, economical, environmentally sound tanker.

Utilizing modern construction methods, FMC fabricates steel modules weighing up to 200 tons each and sets them in place with a giant crane. To facilitate construction, modular living quarters, complete with carpets and bedspreads, will be installed in the steel deckhouse. The pilothouse will be equipped with the most sophisticated navigational equipment available today.

The hull on each tanker is 650 feet in length, with a molded breadth of 96 feet and a molded depth at the side of 50 feet. The operational draft is 34 feet. Ship cargo will be divided into a tank layout in accordance with latest requirements of IMCO, the International Maritime Agency of the United Nations.

FMC developed both hull and propulsion system details in consultation with Chevron Shipping Company, Nickum & Spaulding Associates, Inc.—the naval architects, and General Electric—the propulsion system manufacturers. The innovative design concepts, which are embodied in these vessels, are creating considerable interest in maritime circles around the world.

To handle expanded shipbuilding work, FMC acquired an additional 23 acres adjacent to its existing facility in Northwest Portland, according to Mr. **Ward,** and also invested in a $1-million 200-ton capacity whirley crane and new types of welding equipment, including a computer-operated burning machine for cutting metal plates. "We see the increased world demand for more efficient water transportation providing a fine opportunity for continued growth in Oregon," Mr. **Ward** stated, "and our recent expansion and future plans are an expression of our intention to participate in this market."

Iraq Awards $117 Million Contract To Brown & Root

Iraq has awarded a $117-million contract for construction of crude oil exporting facilities in the Persian Gulf to Brown & Root, Inc., Houston, Texas-subsidiary of the Halliburton Company.

The project is for offshore terminals, with loading facilities for four tankers fed by 41-inch-diameter pipelines capable of pumping a million barrels of crude oil a day from the southern Iraq oil fields at Rumeila and Basra.

The awarding of the contract to a United States concern is noteworthy because Iraq, an Arab socialist country, has not had diplomatic relations with the United States since the Middle East war of 1967, and officials frequently refer to the use of Arab oil as a political weapon against countries that support Israel.

But Iraq is embarked on a major expansion program to increase oil production from the present less than 2 million barrels a day to close to 5 million barrels a day in five years.

The new offshore facility, to be built near Foa, at the northern end of the Persian Gulf, is part of this program.

Oil Dispersant Company Opens East Coast Office

ECO/+ East, specializing in non-toxic oil dispersant and cleaning agents for marine use, recently announced the opening of offices in New York.

Joseph Cerrato, president, stated ECO/+ was developed as an oil spill dispersant and has been tested in accordance with procedures outlined in California State Water Resources Control Board Publications No. 43.

Mr. **Cerrato** also announced that the company had received approval from the Commission of Environmental Control, State of Massachusetts.

Mr. **Cerrato** stated that ECO/+ will effectively clean grease and oil from bilges, is nonflammable and may be used in a variety of applications, including vessel engine rooms and as a tank cleaning agent.

Further information may be obtained by contacting ECO/+ East, 139 East 35th Street, Suite 8F, New York, N.Y. 10016.

JACKUP BARGE CONVERSION: Curacao Drydock Company recently completed an interesting conversion of the Jackup Barge Gem 111. A 21-foot section was inserted into the existing pontoon and two additional caisson wells for jackup legs were added. To accommodate a new American Hoist revolving crane, a crane tub was installed carried on two crane rails running the full length of the pontoon with hydraulic sliding mechanism to position the crane in longitudinal direction. Picture above shows the crane tub being lowered to the rails with the lengthened barge refloated in the drydock.

Zapata To Acquire Three Rigs From Texas Gas Transmission

Zapata Corporation and Texas Gas Transmission Corporation announced that they have reached an agreement in principle for Zapata to acquire Crestwave Offshore Services, Inc. Crestwave, a wholly owned subsidiary of Texas Gas, owns and operates a fleet of three offshore drilling rigs.

The companies said that under terms of the agreement, Zapata Off-Shore Company, a Zapata subsidiary, will acquire all of the outstanding capital stock of Crestwave for a total consideration of approximately $20 million. The acquisition is expected to be completed this month, subject to the satisfaction of certain conditions.

FROM HILLMAN TO NATIONAL: Hillman Barge & Construction Company, Pittsburgh, Pa., recently delivered a second chemical barge (shown above) to National Marine Service, Inc. of St. Louis, Mo. These barges are built as "Type 1" hulls in line with the U.S. Coast Guard Subchapter "O", classed by the American Bureau of Shipping, and are modified from Hillman's standard 10,000-barrel 195-foot by 35-foot by 12-foot design. Features include an all stainless steel cargo piping system, stainless steel heat coils, and Amercoat #75 tank lining.

Ralph J. Bradford Jr. Joins NASSCO As Chief Marine Engineer

Ralph J. Bradford Jr.

Ralph J. Bradford Jr. recently joined National Steel and Shipbuilding Co., San Diego, Calif., as chief marine engineer. He will be responsible for the efficient and economical operation of the Marine Engineering Division, and will report to **Larry French,** director of engineering.

Mr. **Bradford** brings to NASSCO 25 years of experience in marine engineering and significant experience in management. He is a 20-year veteran of General Dynamics, having started with the Electric Boat Division in Groton, Conn., in 1952.

He has held various responsible positions in engineering, starting with the USS Nautilus SSN571, through the Polaris SSBN program at Groton, LHA program manager, DD963 design manager, manager of marine engineering and most recently, manager, advanced engineering department for Quincy Shipbuilding Division.

Mr. **Bradford** is a veteran of five years of active duty as an engineering officer, U.S. Navy, holds an active U.S. Coast Guard license as chief engineer of steam vessels, any horsepower, and is a registered professional engineer in Connecticut and Massachusetts.

He is a native of Philadelphia, Pa., and a graduate of the U.S. Merchant Marine Academy, Kings Point, N.Y.

Mr. **Bradford** is a member of The Society of Naval Architects and Marine Engineers, and a member of Panel M24, "Marine Fuels" for SNAME.

Metro Machine Corp. Organizes Boatbuilding/ Steel Fabrication Firm

The owners of Metro Machine Corporation have organized a new corporation which will be named Mid-Atlantic Steel & Boat Works, Inc., P.O. Box 1527, Norfolk, Va. 23501.

Carl Bock Jr. has been appointed vice president and general manager of the new operation. The new corporation will specialize in boatbuilding of vessels up to approximately 150 feet in length and will include tugboats, various types of boats involved in the fishing industry, and other specialty type vessels. The corporation will also expand the industrial fabrication of steel and aluminum products.

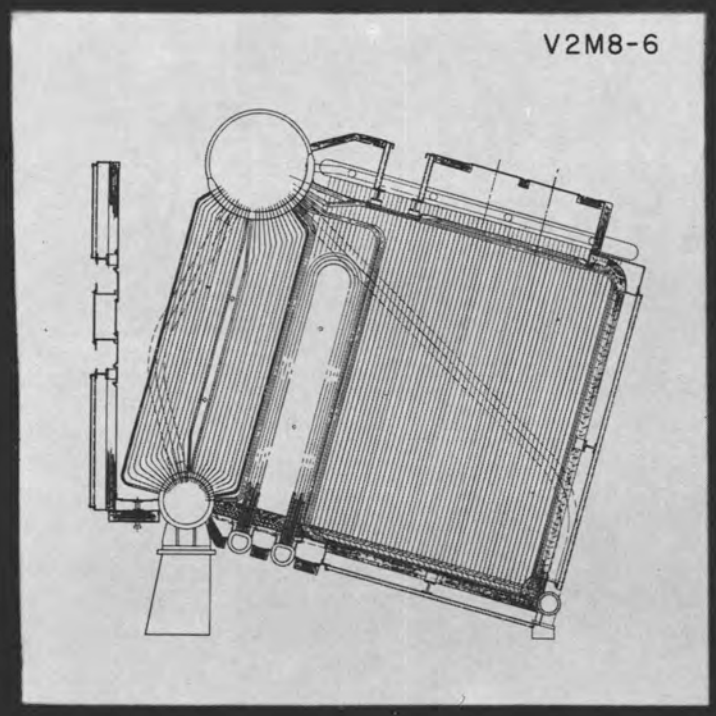
The corporation will begin its operation with a continuation of an existing contract to build a 103-foot offshore clam dredger, which is in the early stages of construction.

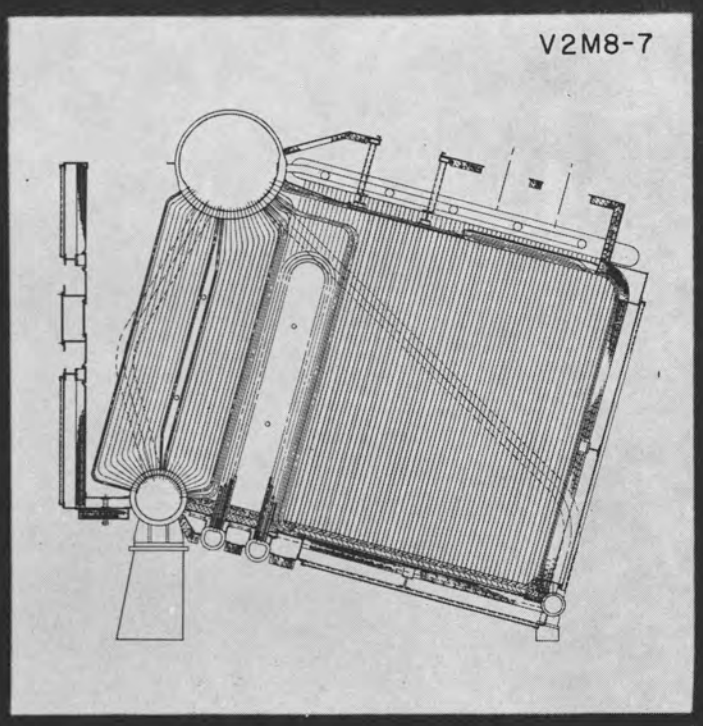
Mid-Atlantic Steel & Boat Works, Inc. is located near the downtown area of Norfolk on the Elizabeth River, adjacent to the Midtown Tunnel and the Norfolk & Western General Cargo Piers.

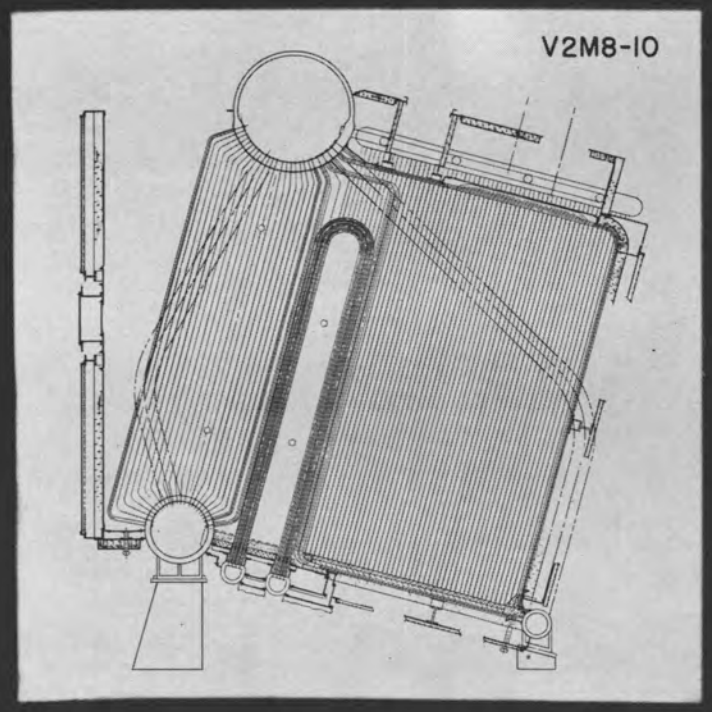
Appollo Applies For Subsidy To Construct Fleet Of Eight Tankers

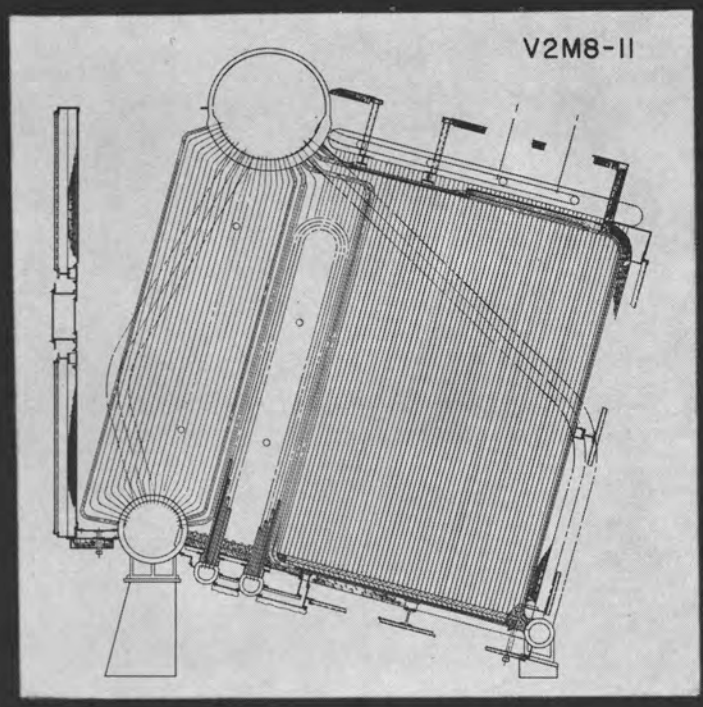
Appollo Marine Shipping Co., Lake Success, N.Y., has applied for construction subsidy to build a fleet of eight tankers, ranging in size from three of 38,300 deadweight tons, one of 89,700 dwt, and four of 380,000 dwt, the Maritime Administration disclosed. No price was given, but in other recent subsidy bids, the 38,-300-dwt types were estimated at $21.3 million each, the 89,700 tonner at about $30 million, and the very large crude carriers (VLCCs) in the 380,-000-ton class were put at $105.4 million each.

The application said no building contracts had been worked out yet, but that National Steel and Shipbuilding, San Diego, Calif., would build the small tankers. The ships, when completed, would be put into worldwide trading. Operating subsidy will also be sought, the application said.

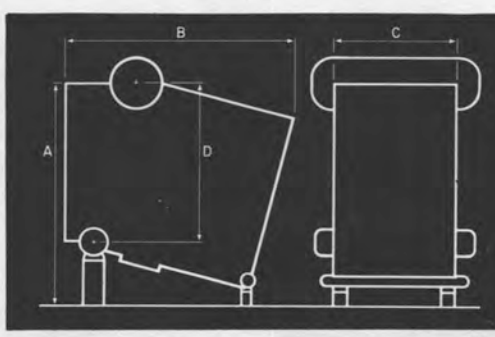






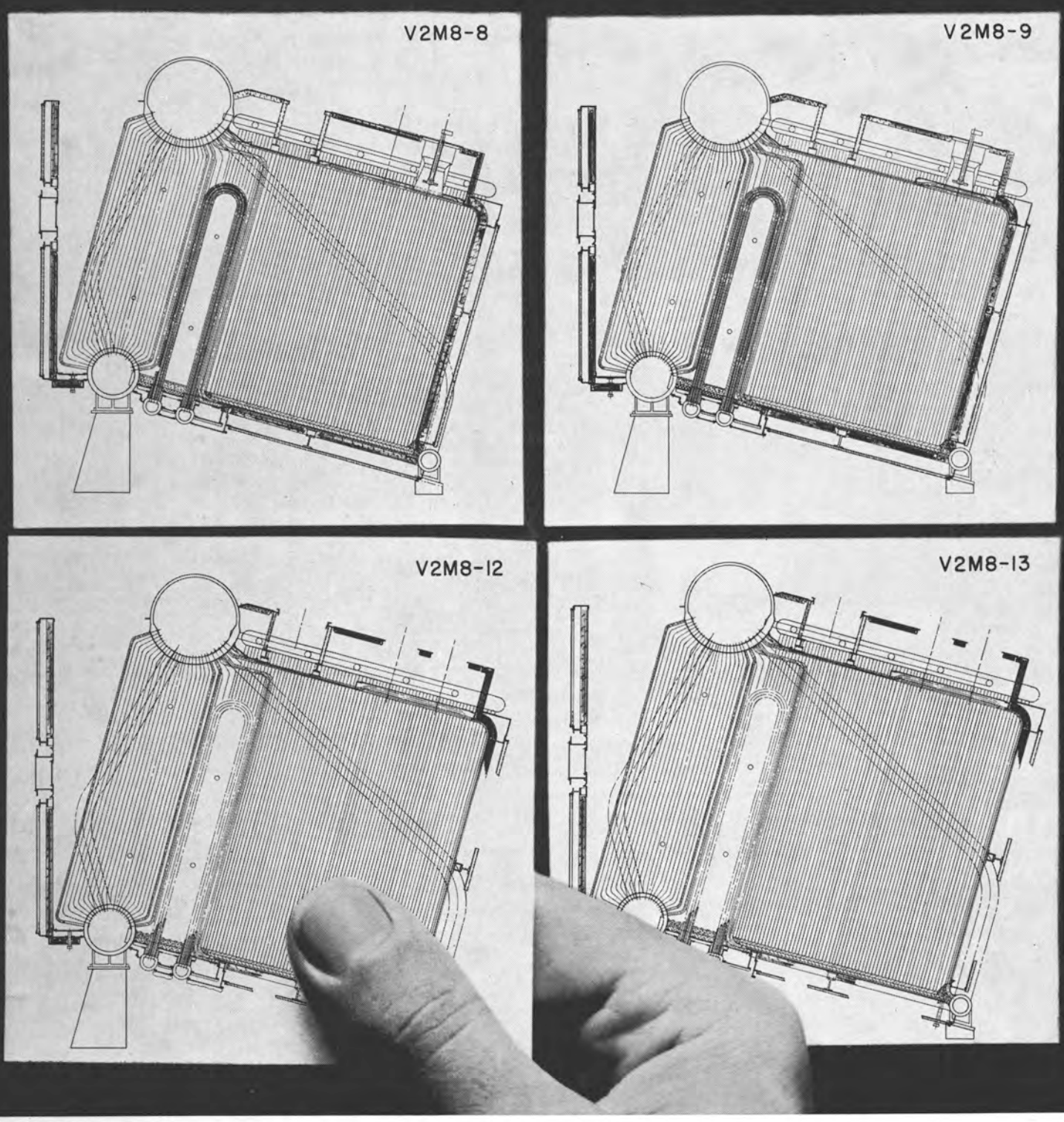


C-E makes a full line of standard V2M8



BOILER DESIGN	CAPACITY METRIC TONS/HR*	A		B		C		D	
		MM	FT	MM	FT	MM	FT	MM	FT
V2M8-6	60	6400	21	7600	24.9	3870	12.7	4572	15
V2M8-7	70	6400	21	7500	24.6	4978	16.3	4572	15
V2M8-8	80	7195	23.6	8450	27.7	4408	14.5	5030	16.5
V2M8-9	90	7160	23.5	8330	27.3	4856	15.9	5030	16.5
V2M8-10	100	8001	26.2	7700	25.2	5614	18.4	5791	19
V2M8-11	110	8099	26.5	8100	26.5	5805	19	5791	19
V2M8-12	120	8268	27.1	8670	28.4	6056	19.8	5791	19
V2M8-13	130	8002	26.2	7700	25.2	7015	23	5791	19

*Varies with cycle conditions



boilers...including the one you want.

More than 500 C-E V2M8 marine boilers are in operation throughout the world. Relying on this wide experience we have assembled a series of standard designs for the full range of steaming rates. The choice is yours. And when you choose you have the advantage of design features proven superior in service. Features like:

- Welded Wall—proven stronger than tangent tube
- Vertical Superheater—with proven ability to remain cleaner longer
- Continuous Circuitry—for positive circulation

Choose the V2M8 boiler that's right for you. For more information contact us: C-E Marine Division, Combustion Engineering, Inc., Windsor, Connecticut 06095.

MARINE DIVISION
COMBUSTION ENGINEERING, INC.

sweet performing Waukesha diesels for "Sugar Islander"

C & H Sugar's new 38,000 ton Sugar Islander relies on Waukesha diesels for all auxiliary requirements — ship's service, emergency power, and bow thruster power.

The highly automated queen of the Hawaiian sugar trade is the largest U.S. built ocean-going dry bulk cargo carrier ever put into service. More than two football fields long (641 feet) it was built by Lockheed Shipbuilding and Construction Co. and is operated by Pyramid Sugar Transport, Inc. of New Orleans.

Auxiliary ship's service includes two 500 KW gen sets powered by two F-2895 DSIM Waukesha diesels, and a third 100 KW emergency set powered by a H-1077 DM V-8 diesel. The bow thruster is powered by a L5792 DSIM V-12 diesel. This engine is capable of delivering 1400 continuous horsepower at 1200 rpm.

For complete information on Waukesha marine diesels, write for bulletin M-008 or see your Waukesha distributor.

Designer: J.J. Henry Co., Inc.

One of two 500 KW Waukesha generating sets on Sugar Islander.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN 53186
A BANGOR PUNTA COMPANY

John J. McMullen Associates And Island Government To Build Shipbuilding Facility On Island Of Curacao

Governor **A.E. Kibbelaar,** Governor of the Island of Curacao, has announced the formalization of an agreement between the Island Government of Curacao and John J. McMullen Associates, Inc. of New York to establish, build and operate a shipbuilding facility on the Island of Curacao. To this end, Santa Ana Shipyards Corporation N.V., a Netherlands Antilles corporation, has been formed, and the Island Government of Curacao will have the majority interest.

Management agreements for the planning and construction and for the operation of the shipyard will be signed between Santa Ana Shipyards Corporation N.V. and McMullen Antilles N.V., a newly formed Netherlands Antilles company.

The establishment of this shipbuilding facility, which is a fabrication industry, would stimulate the growth of satellite manufacturers and suppliers, which will increase employment. Since most of the ships built in this yard will be exported, this will contribute to the positive balance of payments of the Netherlands Antilles.

In 1972, the Island Government of Curacao commissioned John J. McMullen Associates, Inc. to conduct a study to investigate the economic viability of establishing a shipbuilding facility in Curacao. The conclusions reached in that study were that the concept of developing a shipbuilding facility in Curacao were valid and economically feasible. The conclusion of the viability study has been further strengthened by subsequent events in the international monetary and shipbuilding markets. A firm decision to proceed, with the concurrence of the Island Government and the Island Council of Curacao, was made as indicated by the formalization of the before-mentioned agreement.

The principal factors which insure the success of the shipbuilding facility in Curacao are the determination and enthusiasm of all concerned.

The statements in favor of Curacao as a shipyard location are very telling:

— Curacao is geographically well located, close to the USA and to the busy trade routes between South and North America, and through the Panama Canal, and in an area where there is no existing competition.

— The island is easily accessible from all directions, with deep water, no significant tides, warm weather and no exposure to unusual wind or wave actions.

— The Government of the Netherlands Antilles is a stable, forward-looking body that has fostered an excellent growth record, with inflation at reasonable levels, low taxes, and a generous program of industrial development incentives.

— There is a readily trainable pool of labor available, with a reliable record of productivity and industrial relations.

— The population is literate and healthy, and the standard of living is relatively high.

— Curacao itself has one of the finest ports in the world, including an extremely successful ship repair yard.

— The Netherlands Antilles, as an integral part of the Kingdom of the Netherlands, receives all the benefits of membership in the European Economic Community.

The availability of a highly skilled intelligent and trainable workforce and excellent climatic conditions are especially important. In addition, the success of the Curacao Dry Dock Company (CDM), the largest repair facility in the Caribbean area, is also ample evidence of the technical skill and ability of the professionals and workers in Curacao.

The Total Business Plan for the development of the project is scheduled to be completed within the next six months. This Total Business Plan will consist of:

I. **BUSINESS PLAN**

Preparation of detailed studies for documenting economic viability of the project for financial institutions. Studies to include — Survey of International Shipbuilding Market, Detailed Analysis of Infrastructure for Shipbuilding in Curacao, Development of Material Costs, Development of Prices of Ships of Various Types, Determination of Most Profitable Ship Types, Development of Profitability of Shipyard and Return on Investment and cash flows.

II. **SITE SELECTION**

Location of possible sites, investigation of extent of required site preparation, layout investigations, planning and equipment specification, preparation performance specification, preparation of construction cost estimates and preparation of documents for receiving bids.

III. **FINANCING**

Contact investment bankers and government agencies, commercial banks, and evaluate their proposals, development of financial plan and arrangement of most suitable financing.

IV. **LETTERS OF INTENT**

Contact shipowners and ascertain required ship types—Prepare preliminary designs for ships—Estimate construction cost—Prepare outline specification for ships — Prepare appropriate letters of commitment suitable and acceptable to financial institutions.

When the result of the Total Business Plan is positive, as expected, construction of a shipbuilding facility will commence. It is envisioned that the shipyard will have the capability of building up to 80,000 dwt, with expansion possibility to build larger sizes in the future.

However, the initial objective will be to concentrate on series constructions of ships of 80,000-dwt size and less. The shipyard will incorporate a highly mechanized modern steel fabrication facility, machine shops, pipe shops, outfitting shops and all of the ancillary facilities normal to a modern, highly productive shipyard. The shipyard is scheduled for completion in 1976. However, planning, purchasing the materials, engineering and prefabrication of sections on the actual ships themselves will commence during the latter part of 1975.

The shipbuilding facility in Curacao will be strictly for new construction and will be complementary to the repair facilities of the Curacao Dry Dock, which has long been recognized as an outstanding repair facility in the Caribbean area. Although there is no corporative connection between the Curacao Dry Dock and the new shipbuilding facility, it is envisioned that both organizations will work side by side for mutual benefit and the benefit of Netherlands Antilles.

Report Published On Shipyard Capability To Produce LNG Ships

Since 1964, when the first commercial shipment was effected, LNG has provided one of the most interesting and complex facets of the shipbuilding and shipping industry. In view of the energy crisis in the USA and its repercussions for every other country, the stage is set for a rapid increase in the seaborne trade of LNG in the future. "However, some of the most important problems to large-scale development of this trade have become particularly relevant in the past year or so. Growing world currency instability, hardening OPEC country attitudes, the uncertain role of natural gas in world energy requirements and unbalanced price structures for natural gas have all led to some projects now being classed as only probable, which were considered firm only a year ago." These words of caution are expressed by H.P. Drewry (Shipping Consultants) Limited in their latest study.

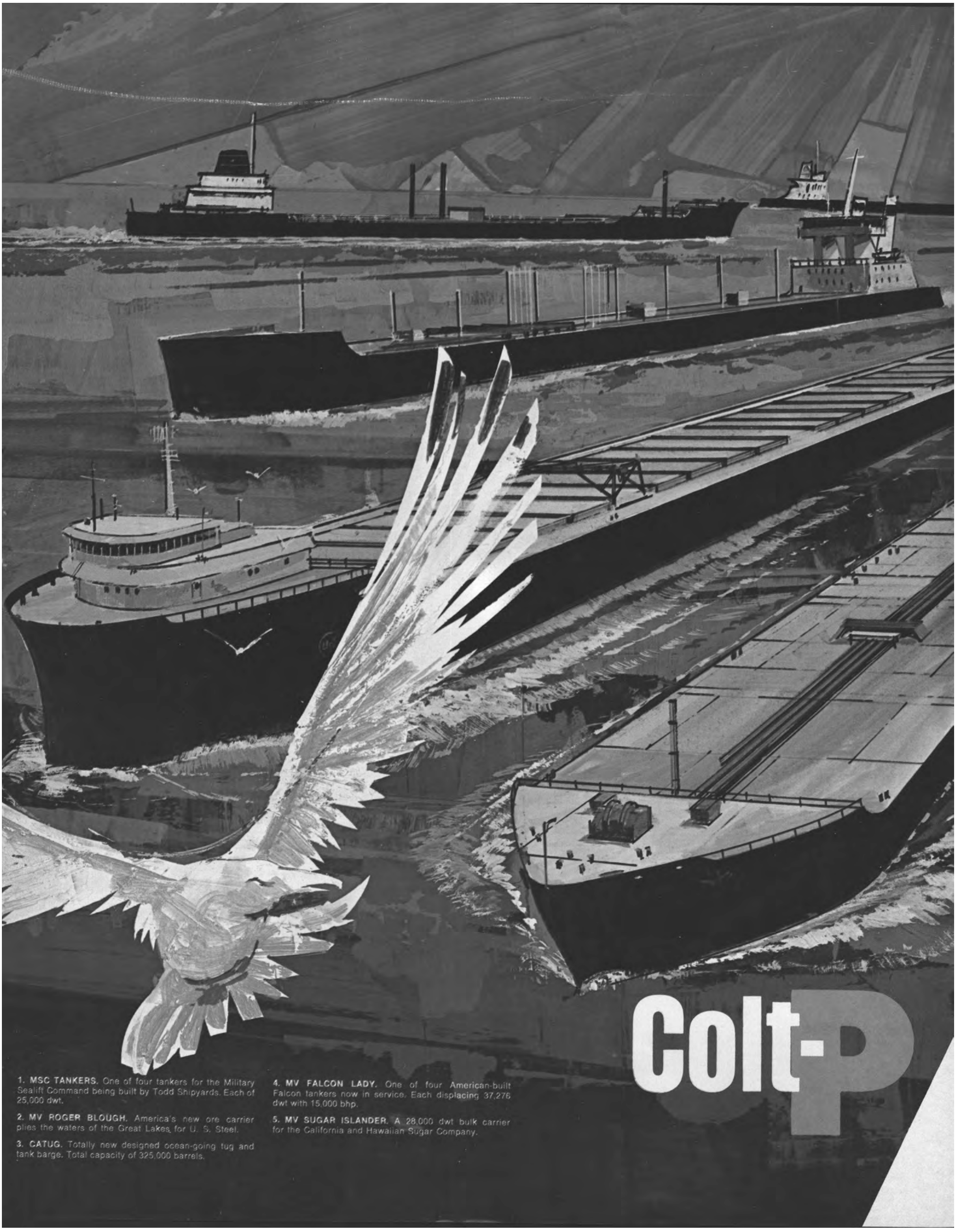
In the three main energy consuming areas of the world different situations are seen to exist. By 1985, the U.S. could need to import 3.6 million million cubic feet per annum of LNG. There exist projects for U.S. imports of almost the whole of this volume, but because of political constraints within the U.S. and the political, financial and physical problems associated with many of these projects, actual imports in 1985 are forecast to be only 2.5 million million cubic feet. By the same date, Japan could need to import 1.3 million million cubic feet per annum, the total being limited by the lack of premium (high price) markets for LNG. Projects exist for Japanese imports of about twice this volume, so that some projects are almost certain to fall by the wayside. Western European LNG imports will be limited by the price structure for the large domestic natural gas industries and the potential overland imports from the USSR. Thus, total seaborne imports are expected to be 0.9 million million cubic feet per annum in 1985, all of which is covered by existing or fairly firm projects.

H.P. Drewry sees restraints on LNG trade being imposed also by the location and ownership of natural gas reserves. Although the OPEC countries control only 20 percent of the world's proven gas reserves, compared with 58 percent in the case of oil, their significance among potential export countries is much greater. Both within OPEC and in other areas, H.P. Drewry (Shipping Consultants) Limited categorizes those countries which can be considered to have a favorable attitude to LNG export development and those which have an unfavorable attitude. Within the former category come Algeria, Iran, Nigeria and Abu Dhabi; in the latter, Iraq, Saudi Arabia, Kuwait and Venezuela. The three Middle East countries unfavorable to LNG exports are considered so because they might not develop gas production, which could adversely affect outlets for their oil production. In this context, the position of Abu Dhabi can be considered unique because her oil is low-sulfur and so is not at a quality-disadvantage with natural gas. The country with the largest individual proven reserves and the largest export potential of natural gas is the USSR, but many financial and political obstacles could still prevent their early exploitation.

The likelihood, therefore, is that the Middle East will not figure significantly in the LNG imports of the three main energy-consuming areas, and on this basis LNG carrier requirements by 1985 are predicted by H.P. Drewry (Shipping Consultants) Limited to reach 12.9 million cubic meters of capacity, with the largest tankers being 200,000 cubic meters.

H.P. Drewry (Shipping Consultants) Limited consider that at least 15 shipyards have the ability to produce LNG carriers at a combined rate of about 25 vessels per annum. An output capability of 10-15 vessels per annum would meet the foreseen demand for LNG tankers over the period of 1976-85. Therefore, it is apparent that potential maximum capacity considerably exceeds demand.

"World Trade in Liquefied Natural Gas," No. 17 in a series of reports prepared by the Research Division of H.P. Drewry (Shipping Consultants) Limited, 87-91 New Bond Street, London W1Y 9LA, England, is available on a subscription basis at £40 per 10 reports (about $100), or a single copy rate of £10 (about $25).



1. MSC TANKERS. One of four tankers for the Military Sealift Command being built by Todd Shipyards. Each of 25,000 dwt.

2. MV ROGER BLOUGH. America's new ore carrier plies the waters of the Great Lakes for U. S. Steel.

3. CATUG. Totally new designed ocean-going tug and tank barge. Total capacity of 325,000 barrels.

4. MV FALCON LADY. One of four American-built Falcon tankers now in service. Each displacing 37,276 dwt with 15,000 bhp.

5. MV SUGAR ISLANDER. A 28,000 dwt bulk carrier for the California and Hawaiian Sugar Company.

From the makers of Fairbanks Morse Engines

Introducing the U.S. Colt-Pielstick* Fleet. Powered by the world's most experienced marine diesel.

Built in the United States for American Ships.

Our Pielstick diesels are in the engine room of the new ore carrier the MV "Roger Blough". They are already in service in the Falcon fleet. (The four Falcon tankers set the pace for new U.S. Flag merchant vessels.)

Plus, you'll now find Colt-Pielstick diesels in the new MV "Sugar Islander"—a new 28,000 dwt C & H Sugar carrier. Then, a unique tug and tank barge, "CATUG" for Seabulk Tankers. Also, the Military Sealift Command fleet of 25,000 dwt tankers being built by Todd Shipyards.

The reason?

The Pielstick is more economical than steam or gas turbines. More compact and lighter in weight than cast-block engines. This allows maximum flexibility in ship design with benefits of larger payloads, smaller engine rooms, far aft installations, and greater variety of machinery arrangement.

Pielstick engines are the most experienced, the most widely used marine diesels in the world, in excess of 7 million horsepower for marine service alone. Pielsticks power more than 700 vessels in service or on order. More than 50% of all medium speed diesels at sea are Pielsticks.

American built Colt-Pielstick PC-2 diesels are available in ratings from 5,000 to 9,000 hp, 10 to 18 cylinders. Every unit is backed by a worldwide service organization with facilities in major ports.

For vessels in your future, specify Colt-Pielstick PC-2 diesel propulsion systems, including controls and monitoring from our Power Systems Division.

Welcome to the fleet.

Write today for our Colt-Pielstick brochure. Colt Industries, Fairbanks Morse Power Systems Division, Beloit, Wisconsin 53511.

*S.E.M.T.-Pielstick is a registered trademark of Societe d'Etudes de Machines Thermiques, Paris, France.

Colt Industries
Fairbanks Morse
Power Systems Division
Beloit, Wisconsin 53511

IELSTICK

...packs more power in less space

U.S. Tanker Building Should Be Doubled To Meet Fuel Needs

To provide vessels to transport Alaskan North Slope crude oil and percentages of oil imports envisioned by legislation now pending before the Congress, "the present U.S. shipyard order book for tankers should be swiftly doubled if sequential deliveries are to be 'on stream' as needed."

This is the judgment of the board of directors of the Shipbuilders Council of America, composed of major shipbuilders and allied suppliers in all sections of the country, conveyed in nearly identical letters to Chairman **Leonor K. Sullivan** of the House Merchant Marine and Fisheries Committee and Chairman **Warren G. Magnuson** of the Senate Commerce Committee. These letters were signed by **Edwin M. Hood,** Council president and board chairman.

In urging prompt enactment of legislation to reserve certain percentages of oil imports for U.S.-flag U.S.-built tankers, Mr. **Hood** wrote:

"Shipbuilding capabilities and tanker requirements are inexorably related. Usual tenets of supply and demand are, and will be, controlling. Measured against current forecasts of demand, the annual aggregate U.S. tanker building capacity is expected to increase from the present level of 1.5-million dwt to more than 2-million dwt by 1976-77, and then to expand to more than 3-million dwt by 1978 and thereafter.

"But, these expectations presuppose that additional shipyard contracts will be quickly placed so as to enable tanker construction and deliveries in an orderly manner. Placement of contracts for tankers, now or in the immediate future, will, in the ultimate sense, determine the near-term and long-term characteristics of the American-flag tanker fleet. Our preliminary estimate is that the present U.S. shipyard order book for tankers should be swiftly doubled if sequential deliveries are to be 'on stream' as needed to transport both Alaskan and import oil."

As of August 1, 1973, U.S. shipyards held orders for 49 tankers totaling 4.5-million dwt ranging in sizes from 25,000 to 265,000 dwt. Deliveries are presently scheduled at the rate of five in 1973, eighteen in 1974, ten each in 1975 and 1976, and six in 1977.

Hydronautics, Inc. Names Dr. Wechsler Chief Mech. Engineer

Dr. Laskar Wechsler

Phillip Eisenberg, president of Hydronautics, Incorporated, 7210 Pindell School Road, Laurel, Md. 20810, has announced the appointment of Dr. **Laskar Wechsler** to the position of chief mechanical engineer. Dr. **Wechsler** brings a strong background in ships machinery design and maintenance, accumulated during 33 years with the Naval Ship Systems Command and its predecessor, the Bureau of Ships. He recently retired from the position of technical director of the Machinery Division of the Naval Ship Engineering Center.

Philadelphia Resins Names Golten Marine

Golten Marine Co., Inc., 330 Broad Avenue, Wilmington, Calif., has been named California distributor for Philadelphia Resins Corp., Montgomeryville, Pa. Golten will be responsible for the sale of Chockfast pourable resin chocking systems to shipyards and shipowners, primarily in port cities, including San Diego, Los Angeles, and San Francisco. The appointment was announced by **David P. Kollock,** company vice president.

Subsidy Requested For 400,000-Dwt Tankers For Exxon

Exxon Corp., New York City, has applied for construction subsidy to help build what are the two largest tankers yet planned under the U.S. flag. The ships would be of about 400,000 deadweight tons, with a 73-foot loaded draft and 15.4-knot speed.

Exxon advised the Maritime Administration it expected the ships would cost $120 million each and that the subsidy rate would run the 39 percent maximum. No builder was named.

The closest very large crude carriers (VLCCs) to these in size for which subsidy has been applied were the three 390,000 dwts for Zapata Bulk Transport Inc. and six 380,000-dwt tankers for Superport Tankers Inc.

The application from Exxon pushed MarAd's backlog of subsidy applications to 118 ships worth some $6.1 billion, and including 35 VLCCs in excess of 200,000 deadweight tons.

Exxon said it planned to use the two ships, for which it hopes for delivery in 1978, in its own services.

Alltransport Names John Albrecht VP

Alltransport, Inc., has appointed **John C. Albrecht** as vice president in charge of its Baltimore, Md., office. The company serves as international freight forwarders, steamship agents, custom house brokers, freight brokers and airline agents.

Imodco, Technigaz Plan Joint Venture

Imodco, Inc., Los Angeles, Calif., and Technigaz, S.A., a company of the Gazocean Group, Paris, France, have signed a letter of intent, looking toward a joint venture to develop, manufacture, sell and lease equipment for the loading and unloading of cryogenic liquids to or from bulk liquid carriers through Offshore Single Point Mooring Terminals.

Both companies are leaders in their respective fields — Imodco, Inc. for the engineering, development, and construction of offshore SPM systems; and Technigaz for the design of transportation systems of liquids at cryogenic temperatures.

In making the announcement, **Robert C. Houser,** president of Imodco, Inc., and **Michael Gondouin,** vice president of American Technigaz, Inc., Boston (Gazocean's naval architect and engineering arm in the USA and a subsidiary of Technigaz, S.A.), pointed to the rapid construction and use of LNG vessels for transporting natural gas to growing world markets.

Technigaz has made a most significant contribution in handling cryogenic liquids aboard ship through use of cylindrical self-supporting tanks, spherical tanks, and the waffled membrane technique. Not only its own ships but also most other large LNG carriers now under construction utilize Technigaz's membrane technique. Three 125,000-cubic-meter LNG ships of this design are under construction at Newport News, Va. The required waffled membrane plates for these ships will be fabricated by F.W. Glitsch Company of Dallas, Texas.

Shore terminal facilities for cryogenic liquids have also been designed and constructed by Technigaz in various parts of the world.

Imodco has designed, constructed and installed some 45 SPM systems over the past 15 years, utilizing a unique (patented) product distribution unit. It numbers many leading international oil companies among its customers.

As part of the agreement, Mr. **Houser** and Mr. **Gondouin** point out operation of LNG carriers at offshore SPM terminals requires the development of a flexible conduit which will respond to severe marine environmental conditions, and yet maintain extremely low temperatures during the cargo loading and unloading process.

Such a development has application in the design of SPM terminals to handle other bulk liquids such as liquid ammonia, LPG, ethylene and other chemicals.

The joint-venture agreement is presently being finalized.

Helen Bentley To Be Honored By Legion's Robert L. Hague Post

The Robert L. Hague Merchant Marine Industries' Post American Legion has selected the Honorable **Helen Delich Bentley** as the recipient of its Distinguished Service Medal and Citation. **Mrs. Bentley** will receive this award at the Thirty-Third Annual Guard of Honor Ball to be held at the Waldorf-Astoria Hotel, New York, N.Y., on Saturday, November 3, 1973.

Mrs. Bentley, a former newspaperwoman and now Chairman of the Federal Maritime Commission, is the first woman to serve in a key Government position in the maritime field, and also the first woman to be appointed by a President to serve as chairman of a regulatory agency.

A native of Ruth, Nev., **Mrs. Bentley** is a paradox in that she grew up in Ruth and Ely some 8,000 feet above sea level, but is now recognized worldwide as an expert on the sea.

Because of her unusual ability and record, the University of Maryland conferred an honorary degree of Doctor of Laws upon Chairman **Bentley** in 1970. This was the first time in American history that such an award had been bestowed upon a Federal maritime official.

In 1971, **Mrs. Bentley** received an honory Doctorate of Humane Letters from Bryant College in Providence, R.I., and that same year, her own alma mater, the University of Missouri, selected her to receive its most significant award—The Faculty-Alumni Gold Medal.

Helen Delich Bentley

Mrs. Bentley produced a half-hour television series on shipping in Baltimore and Philadelphia, which ran on Sunday afternoons for 14 years.

In 1941, she was selected by the Elks National Foundation as the nation's outstanding high school girl graduate and then was presented with their number one national scholarship to the college of her choice. Chairman **Bentley** has received numerous other national honors for outstanding contributions from various institutions throughout her career, including the Freedoms Foundation Honor Medal Award.

She attended the University of Nevada one year and then went to Washington, D.C., to work on Capitol Hill for the late Senator **James G. Scrugham,** whose campaign she had managed successfully in two counties in Nevada before she was old enough to vote. However, the determination to pursue journalism caused her to leave Washington and complete her studies at the University of Missouri, from which she was graduated in September 1944.

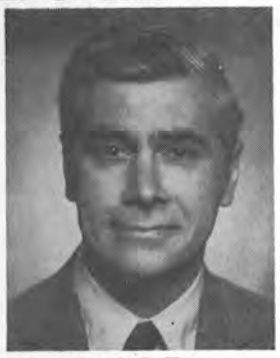
After brief stints with the United Press and the Lewiston (Idaho) Tribune, she joined the Baltimore Sun in June 1945. As soon as the war was over and labor strife began overtaking the nation, she was assigned to assist on the labor beat and shortly became the labor reporter. In 1948, she requested a change and was told to "go down and look at the port, we've had nobody there since before the war."

She is listed in Who's Who in America, and numerous other international directories of dignitaries. The Ladies Home Journal also selected her as one of the 75 Most Important Women in the United States.

Mr. and **Mrs. William R. Bentley** reside in Lutherville, Md.

She is the daughter of the late Mike (Delich) Ivanesevich, born in Vedasic, Yugoslavia, and the late Mrs. Mary Kovac Grubich, born in Pakrac, Yugoslavia

Texaco Appoints Frank C. Toto



Frank C. Toto

Texaco Inc. has announced the appointment of **Frank C. Toto** as account supervisor in the company's International Marine Sales Department at New York. In his new position effective immediately, Mr. **Toto** will be responsible for sales of Texaco marine products to major shipping companies based in New York City.

In 1955, Mr. **Toto** was graduated from the U.S. Merchant Marine Academy at Kings Point, N.Y., with a bachelor of science degree. For the next 13 years he worked in engineering positions in the maritime industry, including nine years as an engineer for the American Bureau of Shipping in New York. He joined Texaco's Marine Department in 1968 as an engineer with the company's United States fleet. Mr. **Toto** was appointed marine engineer in the International Marine Sales Department in New York in 1972.

Stig Host Joins Skaarup Shipping As Board Vice Chairman

Stig Host has been elected vice chairman of the board of Skaarup Shipping Corporation and its affiliated companies.

Mr. **Host**, a native of Denmark and a graduate of Harvard University, comes to Skaarup from Mobil Oil Corporation where he has held a number of senior executive positions, most recently vice president and director of Mobil Europe in London and since 1968, president and general manager of Mobil Oil Italiana. Previously, he served as director of Mobil's international sales activities for the Far East, headquartered in Tokyo.

Skaarup Shipping Corporation is one of the leading ship brokerage and ship management companies in the United States. The company has specialized in dry bulk materials and manages the ocean transportation for several large U.S. corporations. It is currently engaged in an expansion program in the area of natural resources and transportation, with special emphasis on petroleum trading and transport.

In addition to assuming a leading role in the general management of Skaarup Shipping Corporation, Mr. **Host** will direct the company's entry into the petroleum activities. A number of major programs involving large U.S. consumers are now being developed by the Skaarup Group.

Bethlehem Singapore Names J.W. Bramblet

The appointment of **James W. Bramblet** as assistant general manager-administration of Bethlehem Singapore Private Limited, a Singapore shipyard, was announced by **John C. Estes,** newly appointed vice president and general manager of the facility.

Mr. **Bramblet** has been serving as assistant to the shipyard's general manager.

A native of Galveston, Texas, Mr. **Bramblet** received a bachelor of arts degree from Baylor University in 1961 and earned a bachelor of laws degree from the University of Texas in 1965.

Beginning his career with Bethlehem Steel in 1968, Mr. **Bramblet** was assigned to the industrial relations department at the Beaumont, Texas, shipyard and later that year became supervisor of contract administration for the yard.

When the Singapore shipyard was established in 1970, he was assigned there as assistant to the general manager.

Bethlehem Singapore Private Limited, known as Bethsing, is a joint venture of Bethlehem Steel Corporation and the Development Bank of Singapore. It deals primarily in building mobile oil drilling rigs and associated equipment, along with barges and miscellaneous steel fabrications.

"Where's The Money Coming From?"

The Leveraged Lease In Marine Financing

James J. Colbert*

There is little need to belabor the fact of a renaissance in American shipping—and American shipbuilding. The boom is here, and from all evidence, here to stay for the foreseeable future.

This boom, of course, will also have a profound effect on the many services that support the shipping industry.

The boom results from two primary forces: an intelligent and forward-looking Federal subsidy policy, and a growing crisis in our energy needs and supply.

Much of this seems like the arrival of the millenium to the shipping and shipbuilding industry. To financial people, despite the obvious demand for the oil and gas that have stimulated the boom; despite the broadening of subsidy, some very basic questions remain to be faced.

Summed up, they are: "Where's the money coming from?"

For one thing, technology in shipbuilding—even disregarding rising labor and material costs—is causing a continuing rise in costs. In other words, bigger ships, more complex ships, cost more.

That's one factor.

A second factor is the currently rising cost of money—a situation that past experience shows will inevitably lead to a shortage of private funds via conventional channels.

On the other hand, the shipping industry—in our opinion—has always shown a high degree of sophistication and flexibility in financing. While much of land-based industry had yet to learn the value of leasing—use without ownership — chartering was already an established norm with the maritime business.

Therefore, the leveraged lease in particular—will be the industry's answer to the financial pressures of the future.

One trend that is working to the advantage of the shipping concern is the increased length of charter. The 20-year charter is now becoming common in the United States, and the rising complexity and cost of the upcoming ships will shortly increase that term.

The charter has become the primary collateral in ship financing in the modern era, displacing in some instances the ship itself, and the charter is a firm part of the leveraged lease.

*Mr. **Colbert** is manager, marine financing & leasing, General Electric Credit Corporation, wholly-owned sales financing subsidiary, General Electric Company.

The intent of the leveraged lease is to secure savings in the only direction now possible — via savings in lease costs vs. outright ownership. One authority has even noted that these savings can outweigh the savings in operating costs obtainable through "flag of convenience" registry.

James J. Colbert

It has been said that the leveraged lease has advantages for all of the many parties concerned. Particularly in a situation such as we referred to earlier, in which money costs are on the rise and not due for a descent in the foreseeable future, the leveraged lease may hold the only offer of relief. It usually offers a rate below prime to the user—more important the rate is fixed over the lease term. It cannot be equalled anywhere.

In fact, we believe that the worst disaster that could hit the industry in the next few years would be the suspension of the Investment Tax Credit and present method of accelerated depreciation on which leveraged leases are based.

As we see it, the leveraged lease is the only type of financial implement that will permit the underwriting of the extremely high costs of ships to come.

The leveraged lease is unlike any other financial transaction in its structure. Its involvement of a number of participants and lenders gives it the financial muscle needed for the financing of ships and other high-cost transportation equipment.

The leveraged lease for a ship may involve as many as six distinct parties.

Perhaps the most important to the lessee is the equity owner—the key position played by General Electric Credit in the leveraged lease. The equity owner usually puts up as much as 20-30 percent of the cost of the ship. It is possible for a number of parties to join together to operate as equity owner, but we feel strongly that it is to the best interests of the lessee to deal with only a single equity owner. Most important among these reasons: it's faster and more convenient. Because time is so vital to all parties of any business transaction, these factors also have distinct overtones of economy.

The lenders or loan participants may be a group that purchases registered debt offered to the public, or may simply be a small group of institutional lenders purchasing on a private placement basis. This group funds the balance of the cost of the ship to the owner trustee, who then issues non-recourse notes for the balance of the ship cost. The owner trustee also acquires title and actually leases the vessel to the lessee.

The lessee leases the ship for a period generally shorter than its expected economic life to meet the requirements of the Internal Revenue Service. The lease often contains an option to renew at lease expiration at the ship's fair market rental value.

Another party—the indenture trustee — receives a security interest in the ship, receives payments from the lessee, and generally protects the security of the lenders.

The remaining party to any marine lease transaction, of course, is the yard or builder of the ship.

Because of the complexity and number of parties involved in the leveraged lease, the documentation is usually extensive. Typical of the documents involved are:

A trust agreement between the owner or participants and the owner trustee.

The contract for construction of the vessel. This is usually between the potential lessee and the builder. It is assigned to the owner trustee when the final lease and charter agreements are formed. This act requires that a contract assignment be made from the lessee (as purchaser) to the owner trustee with consent of the builder.

A lease between the owner trustee and the lessee.

A security agreement to the indenture trustee (mortgagee) from the owner trustee.

There is generally a participation agreement among all parties to the lease/charter detailing the obligations of each party to the transaction, for example, the purchase of the vessel, the advance of funds by the lender and equity owner and payment to the yard, as well as detailing warranties, covenants, and obligations of all parties concerned.

Assuming a continuation of the conditions mentioned earlier, the leveraged lease is here to stay. Certainly it is the most attractive form of marine financing available. It offers the operator or shipper an opportunity to get the most for the least, dollarwise. It is the most advantageous for raising the large sums necessary because it gives so many investors an opportunity to participate.

The equity participant is offered the opportunity to realize a higher return early in the life of the lease. The institutional lenders get 100 percent of the vessel as collateral with their 70-75 percent participation. These marked benefits have the effect of drawing more capital at attractive rates into the marine industry.

We said earlier that a characteristic of the leveraged lease is the fact that all participants receive benefits.

How about you — the lessee — and your benefits? Picking a lessor these days could be just as important as picking the right design of ship and the right yard to build it.

How do you know a good lessor when you see one?

As we see it at GE Credit, the name of the game is experience and know-how. It means stability, and the certainty that the lessor will be around 10 to 20 years from now. It means that the lessor and the sources available to him know all the tax, documentation, and legal answers to leasing in your field because he has been through it many times before. It means that the lessor knows those participants who have good track records (and those who do not). It means that the lessor is not just "putting a deal together" — that he will step away from it and "broker" it to someone else as soon as you have signed. It means that he's strong enough and responsible enough to carry the ball for you without your excessive involvement in looking over his shoulder to check details. More than that, it means that he has the self-confidence to be perfectly open about all fees, all participants, and what details and facts are related to those participants—so that there are no last minute surprises for all parties.

Paste these qualifications in your hat. The leveraged lease is going to be more important in the future, the way things look at this writing. A lot of things that people are buying or thinking of buying now are going to be leased from now on.

For example, it is entirely conceivable that the leveraged lease may also be applied in the one area that may hold the key to the entire energy-shipping dilemma — the construction of offshore unloading stations to accommodate the huge tankers that are themselves procured under leveraged leases.

Gale C. Named For Veteran Riverman Christened In Ceremonies At St. Louis Ship

The St. Louis arch forms a backdrop for the Gale C., which is very similar to the Leslie Ann delivered by St. Louis Ship in 1971 to the same company.

The powerful new 7,500-hp triple-screw towboat Gale C., named in honor of **Gale H. Chapman,** senior vice president of Upper Mississippi Towing Corporation, was appropriately christened by **Louise J. Chapman,** wife of the vessel's namesake, before a large assemblage of visitors and well-wishers. Serving the sponsor as matrons of honor were **Mrs. Wayne Feyereisen,** daughter of the Chapmans, and **Mrs. Gale H. Chapman Jr.**

The Gale C. is the 218th towboat built at St. Louis Ship. The hull is a hydrodyne, the 39th delivered since this St. Louis Ship concept of hull configuration was extensively tested and proved to provide greater thrust, as well as superior handling and steering ability.

The Gale C. hull is 200 feet by 50 feet by 11 feet 6 inches, with a normal draft of 8 feet 6 inches. Fuel oil capacity is 172,268 gallons (about three weeks supply) carried in six tanks.

Propulsion power is furnished by three General Motors Model 16-645E5 marine diesel engines each developing 2,500 hp at 800 rpm through Lufkin Model RS-3626 vertical offset gears and #28VC 1000 Fawick clutches. The engines are cooled with clear water circulated through a St. Louis Ship-designed skin cooling system. The engines are started from the engine room only and controlled from the pilothouse by means of Mathers Controls, Inc., pneumatic control equipment.

In addition to the conventional engine room gaugeboards installed in all towboats, the Gale C. is equipped with a monitoring system which features an alarm panel in the pilothouse and in the engine room.

The propellers are 109-inch diameter, 5-blade stainless steel, turning in St. Louis Ship-designed stainless steel lined Kort nozzles.

The Gale C. has nine rudders—three for steering, six for flanking. A powerful hydraulic system provides power to turn the rudders hard over to hard over in 20 seconds at full rpm. A Sperry automatic pilot system is incorporated.

Electric power is furnished by two 160-kw Caterpillar Series C Model D342 diesel electric sets, 230-460 volt, 3-phase, 60-cycle, 1,200 rpm, with Century generators.

Five staterooms on the second deck are provided for the chief engineer, assistant engineers, mates and four guests. The captain and pilot are quartered on the third deck with an office for the captain and a general storage room.

The pilothouse is unusually large—21 feet wide, 18 feet fore and aft. All windows are heavy safety glass set in rubber moldings.

The pilothouse is raised 7 feet above the fourth deck, making the pilot's eye level about 40 feet above water level.

Navigating and communicating equipment includes a Radiomarine Model CRM-N14-40XR Custom Built duo switching system, two ELAC-LAZ-13 depth indicators, Rivertronics Swing Master swing indicator, Radiomarine V.H.F. marine radiotelephone, Motorola V.H.F. radiotelephone, Motorola 11-channel Public Correspondence radio, Johnson Messenger C.B. radio, Radiomarine single sideband radio, an eight-station battery-operated dial telephone system, and a three-speaker talk-back public address system.

Two Carlisle & Finch 19-inch arc searchlights with remote electric controls are located at the forward corners of the third deckhouse roof. A Carlisle & Finch 19-inch Xenon manually-controlled searchlight and a Kahlenberg 8-inch T3 air whistle are located atop the pilothouse. Seven 300-watt floodlights illuminate work areas.

The M/V Gale C. is an exceptional towboat and should give her owners many years of reliable service.

Exxon Corporation Elects Russel Herman Vice Pres.-Logistics

Russel H. Herman, a senior vice president of Exxon USA, has been elected vice president-logistics of Exxon Corporation.

He succeeds **Roy A. Baze,** who becomes senior vice president and member of the management committee of Exxon USA in Houston, Texas. Both appointments are effective October 1, 1973.

A native of Woodbury, N.J., Mr. **Herman** received his bachelor of science degree in chemical engineering from Pennsylvania State University in 1951 and began his career that same year as an engineer with Exxon Corporation's Research Division.

He later served in Exxon's coordination and petroleum economics department, and after a loan assignment in England, he joined Exxon's International Marketing and Supply Division in New York in 1964. He became a vice president in 1970.

Mr. **Herman** was corporate planning manager in Exxon's planning coordination department in 1968 and became the department's deputy coordinator in 1969. He was named executive vice president and a director of Exxon's International Division in 1970, and became a senior vice president and member of the management committee of Exxon USA in June 1972.

Mr. **Baze,** a native of Snyder, Texas, was graduated from the University of Oklahoma in 1943 with a bachelor of science degree in petroleum engineering. He joined Exxon USA's production department in 1946 and served in various engineering and management positions.

In 1966, he was appointed general manager of Exxon USA's supply department, and in 1967 transferred to Exxon Corporation as executive assistant to Exxon's president. The following year, he was appointed worldwide producing coordinator for Exxon Corporation, a position he held until his election as vice president-producing in 1970. In 1972, he was elected vice president-logistics.

ADVERTISE TO THOUSANDS MORE ...IN MARITIME REPORTER/

Marine sales managers agree... management, engineering and purchasing personnel... shoreside... in vessel operations, shipbuilding, ship repair and naval architecture have the authority to specify, order and buy all types of marine equipment, products and services.

Sales managers tell us men aboard ship do not specify or purchase.

COMPARE THE TITLES OF THE READERS OF THE TWO MAGAZINES

MARINE ENGINEERING/LOG

OCCUPATIONAL BREAKDOWN OF TOTAL WORLD-WIDE CIRCULATION

		BUYING POWER
SHIPBUILDING & SHIP REPAIR COMPANIES		
Companies, Presidents, Vice Presidents, Secretaries, Treasurers, General Managers & Purchasing Agents		1,828
Works Managers & Superintendents		196
Naval Architects, Marine Engineers, Chief Draftsmen		767
Shipbuilding & Ship Repair Personnel (Draftsmen, Foremen, Inspectors & Others) not included in above classification	454	
SHIP OPERATING COMPANIES, OWNERS, AGENTS & BROKERS:		
Companies, Presidents, Vice Presidents, Secretaries, Treasurers, General Managers, Purchasing Agents, Passenger & Freight Agents		2,721
Marine Superintendents, Port Captains, Port Engineers, Port Stewards		1,224
Deck Captains, First, Second & Third Mates Only	1,979	
Engine Room Chiefs & Licensed Assistants	2,935	
Ship Operating Personnel Ashore & Aboard not included in above classifications	398	
PROFESSIONAL MEN:		
Naval Architects & Marine Engineers		1,476
Admiralty lawyers	20	
Insurance Companies, Agents & Brokers	55	
NAVY	313	
MARINE SUPPLIES & EQUIPMENT: Manufacturers	1,777	
Ship Chandlers, Dealers & Agents	34	
Bunkers (Coal & Fuel Oil)	4	
ALLIED MARINE INDUSTRIES:		
Freight Agents & Forwarders	1	
Exporter & Importers	7	
Stevedoring Companies not owning Floating Equipment	25	
Government Schools, Libraries, Students & Commercial Organizations	1,069	
Miscellaneous	863	
Awaiting Classification by Business & Industry	51	
NON BUYING POWER	9,985	

WORLD-WIDE BUYING POWER TOTAL 8,212

Why settle for less . . . . . MARITIME REPORTER/Engineering News

Source of information—Each publication's own official circulation statement—Available July, 1973.

MARINE BUYERS IN 1973–'74 ENGINEERING NEWS

Total circulation numbers are meaningless. Some magazines, apparently not wanted by thousands of shoreside buyers, inflate their total circulation numbers with thousands of non-buyers. The only readers of any value to marine advertisers are those with the authority to purchase... the shoreside buyers.

You be the judge... compare the readers of both magazines... separate the buyers from the non-buyers... for the one reaching the largest number of men you know can give business to your company.

...FOR THE ONE REACHING THOUSANDS MORE BUYERS.

MARITIME REPORTER/Engineering News

OCCUPATIONAL BREAKDOWN OF TOTAL WORLD-WIDE CIRCULATION

	BUYING POWER	
SHIPBUILDING & SHIP REPAIR (Commercial, U.S. Navy and U.S. Coast Guard):		
Companies, directors, owners, presidents, vice-presidents, secretaries, treasurers, superintendents, managers and purchasing agents	4,044	
Naval architects, engineers and chief draftsmen	1,166	
Other employees (draftsmen, inspectors, foremen and others employed by shipbuilding and repair companies) not included in above classifications		110
VESSEL OPERATING COMPANIES		
OCEAN, RIVERS, HARBORS, OFFSHORE OIL DRILLING AND RELATED OPERATIONS		
(Owners, Agencies & Brokers) Companies, directors, owners, agents, presidents, vice-presidents, managers, secretaries and treasurers	5,600	
Port engineers, superintendents, purchasing agents, port captains, port stewards, naval architects and engineers shoreside	1,719	
Other employees ashore not included in above classifications		49
PROFESSIONAL MEN:		
Naval architects, engineers and consultants shoreside	1,625	
Admiralty lawyers and insurance		35
MARINE SUPPLIES & EQUIPMENT:		
Manufacturers, dealers and agents		1,896
Ship Chandlers		172
Allied marine industries		302
GOVERNMENT:		
U.S. Maritime Administration, U.S. Senators, U.S. Congressmen and others in official capacities		31
SCHOOLS, LIBRARIES AND ORGANIZATIONS		54
NON BUYING POWER		2,649

WORLD-WIDE BUYING POWER TOTAL 14,154

OUR TOTAL CIRCULATION IS OVER 97% REQUESTED ... IN WRITING ... BY EACH INDIVIDUAL READER

BRINGS YOUR ADVERTISING TO THOUSANDS MORE BUYERS WORLD-WIDE ... TWICE AS MANY IN THE U.S. MARKET.

MARITIME REPORTER AND ENGINEERING NEWS

107 EAST 31st STREET
NEW YORK, N. Y. 10016
MUrray Hill 9-3266 • 7 • 8 • 9

DIESEL GENERATOR SETS

1

350 KW DIESEL GENERATOR SET

350 KW—120/240 volts DC—600 RPM—compound wound G.E. generator with switchgear. ENGINE: Ingersoll-Rand—heavy-duty type S—505 HP—10½x12—reconditioned to ABS.

2

250 KW DIESEL GENERATOR SET

ENGINE: Enterprise 12 x 15 DSG-6 — 6 cyl. — 450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 3S-10P-913. Complete with switch gear.

3

EMERGENCY GENERATOR SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET

With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.

4

UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET

GENERATOR: Delco 10 KW — 120 VDC — 83.3 amps—1200 RPM. ENGINE: Superior diesel—2 cyl.—4½x5¾ — 15 HP — heat exchanger cooled.

5

500 KW— 120/240 VOLT DC DIESEL GENERATOR SET EQUAL TO NEW

GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8½"x10½"—air starting—720 RPM. Complete with switchgear. Condition very good. Still aboard naval vessel. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.

6

300 KW DIESEL GENERATOR SET

ENGINE: G.M. 6-278—6-cylinder—2 cycle—8¾"x10½"—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators.

GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

TURBO GENERATOR SETS

7

400 KW WESTINGHOUSE TURBO GEN SETS FOR BETH. SPARROWS PT. HULLS 400 TO 4500; QUINCY HULLS 1600

400 KW (500 KVA)—80% PF—1200 RPM—450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA—400 KW—450 volts—641 amps—80%PF—3 phase 60 cycle—1200 RPM—CR 40°—excitation amps 41—excitation voltage 120. Instruction book 5442. Switchgear available.

8

UNUSED 300 KW—240 VOLT DC WESTINGHOUSE LOW-PRESSURE TURBO-GENERATOR SET

GENERATOR: 300 KW—240 VDC—1250 amps—1200 RPM. GEAR: 5286/1200—frame 6x15—serial 10A-2612-4. TURBINE: Frame C-325—225 PSI—397° TF—5286 RPM—Serial 10-A-2611-4. Wt. 16,700 lbs. —complete in original factory crate.

9

LOW-PRESSURE UNUSED 300 KW G.E. 120/240 VOLT DC TURBO-GENERATOR SET

GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1 — 10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

10

WESTINGHOUSE 440/3/60 200 KW UNIT

GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse — 540 PSI — superheat 322°F. Test 930 PSI 800°TT. Also operate 615 PSI—850°TT.

11

1250 KW G.E. 10-STAGE TURBO GENERATOR SET

TURBINE: 525—615 PSI—850°TT—7938 RPM—10-stage—type FSN. GEAR: Single helix—7938/3600. GENERATOR: 1250 KW—450/3/60/3600—.80 PF—type ATB with surface air cooler. Overload 25%— 2 hours—1563 KW.

12

6 EQUAL-TO-NEW LATE TYPE 500 KW SHIPS SERVICE TURBO GENERATORS

1962—DeLaval. Very little use. Completely preserved with rotors and diaphragms crated separately. TURBINE: DeLaval —585 PSI — 840°TT—6-stage—6391 RPM—class CD — Also suitable 440 lbs.—740°TT—25" vac. GEAR: 6391/1200 RPM. GENERATOR: Allis-Chalmers—450/3/60. Totally enclosed, with static exciter and voltage regulator system. Weight 17,665 lbs. Complete with latest dead front switch gear. Also available are the condensers, circulating and condenser pumps. All very up-to-date, compact construction. Turbines will easily handle 600 KW if up-grading is desired.

13

AP2 VICTORY WORTHINGTON-MOORE CROCKER-WHEELER 300 KW UNIT

TURBINE: 440 PSI—740°TT—28½" vacuum—type S4 — 5-stage — 6097 RPM — serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8½"; B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

14

UNUSED C-4 CROCKER-WHEELER 500 KW GENERATOR ENDS ONLY 120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

Upgraded by U.S. Navy—rewound in glass. Generator Frame and Armature—Marine 500 KW type 3-1200—dripproof enclosure—base mount. Modified from Crocker-Wheeler generator frame 152HD — 240/120 volts DC — 2083/521 amps — 1200 RPM. Ambient temperatures 50°C. APPLICATION: For C-4-SA1; C4-SA-3; T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10. No pedestal bearing.

15

WESTINGHOUSE 400 KW TURBO-GEN 835 LBS — 840°TT

Newport News Hulls 480—541 Esso ships. TURBINE: Westinghouse 835 lbs/840°TT—9018 RPM—6-stage —instruction book 1430-C1—serial 5A-7090-7 & 8. GEAR: 9018/1200 RPM. GENERATOR: Westinghouse 400 KW—440/3/60/1200 RPM—rewound field—instruction book 5442. EXCITER: 5.5 KW.

16

TWO 538 KW WESTINGHOUSE T-2 AUX. GENERATORS

(COMPLETE)

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

TURBINES & ROTORS

MAIN PROPULSION

17

BETH. CLASS—13,600 H.P.

Sparrows Point & Quincy 1600 hulls. H.P. turbine casing only. Excellent blading & labyrinth packing.

18

H.P. & L.P. COUPLINGS

1 Set—for Beth Class 13,600 HP 4400 hulls and Quincy 1600 hulls.

19

G.E. 6690 HP @ 7062 RPM HIGH PRESSURE 8-STAGE TURBINE

835 lbs—840°TT—#83341—originally built for Esso Christobol—Newport News.

T-2 TURBINES & ROTORS

20

COMPLETE WESTINGHOUSE T-2 MAIN TURBINE—UNSHROUDED 6600 HP—435 PSI—750°F 28" VACUUM—3720 RPM

Instruction book IB-8345—type D—serial No. 5A-2124-6—unshrouded. Unit complete with all packing, stationary blading, linkage, governors, diaphragms, nozzles, etc. WILL SELL ROTOR SEPARATELY OR COMPLETE TURBINE CASING & ROTOR. Always well maintained by major oil company.

21

2 COMPLETE T-2 G.E. TURBINES

#61818 and #61834—large Lynn—all stages magnafluxed.

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE

Will Sell Rotors Separately

22

T2-SE-A1 MAIN PROPULSION ROTOR — G.E.

Large Schenectady — serial 77418 — reconditioned Bethlehem Steel 1970—all stages magnafluxed.

23

T-2 TANKER

UNUSED—4 UNITS AVAILABLE

AUX. G.E. TURBO GEN. ROTORS

DORV — 325M — 5645 RPM — for 525 KW G.E.

VICTORY SHIP TURBINES & ROTORS

24

8500 H.P. 8-STAGE TURBINES FOR LARGE VICTORY SHIPS

L.P. – 3509 RPM
H.P. – 6159 RPM

LP Serial #77943—HP Serial #77942—Interchanges Ingalls C-3—Class 442 & Sun C-4 vessels—U.S. Navy Victory "Liberty".

LP Serial #72272—HP Serial #72271—Interchanges Ingalls C-3—10 boxes of spares.

LP Serial #62042—HP Serial #62043—GEI 16263—Ridgeway Victory.

WRITE OR PHONE FOR DETAILED INFORMATION AND PRICES

TON METALS CO.

ORE ST. • BALTIMORE, MD. 21202

539-1900 Marine Dept.: (301) 355-5050

25 **VICTORY SHIP AP2 H.P. & L.P. TURBINES NEW — UNUSED — 6000 H.P. SETS**

G.E.—H.P. & L.P.—with throttle valve
Westinghouse—L.P.—with throttle valve
Allis-Chalmers—H.P & L.P.—with throttle valve

26 **6000 H.P. G.E. — NORTH CAROLINA C-2**

H.P.—8-stage—serial 78040
L.P.—7-stage—serial 78043
G.E.I. 16262

27

19 STAGE WESTINGHOUSE H.P. ROTOR FOR AP2 VICTORY

Reconditioned — balanced—with ABS. Serial 4A-2079—type B — 19 stage reaction blades. Excellent — just out of shop. 13" Flange diameter with 14 bolts.

28

G.E. 8500 H.P. REDUCTON GEAR FOR LARGE AP3 VICTORY & C3

MD-48A—8500 HP—6159/3509/763/85 RPM.

29 **ALSO 6000 H.P. VICTORY AP2 REDUCTION GEAR**

Westinghouse 4A-1640.

PUMPS

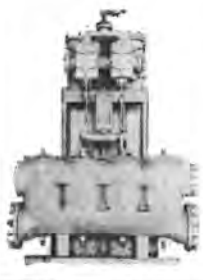
30

CARGO STRIPPING PUMPS

BRONZE T2 TANKER STRIPPING PUMPS

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

31



WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

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

32

UNUSED DELAVAL IMO ROTARY PUMP

175 GPM—35 PSIG—10 HP—120 volts DC—1750 RPM—serial E-8619—frame 324 VY—76 amps—mfg. by Electro Dynamics. With magnetic control. Excellent condition.

33 **NEW TURBINE DRIVEN FIRE AND GENERAL SERVICE PUMP**

Allis-Chalmers 6 x 5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppos turbine type TF-22-2½ — 3500 RPM. 273#—50° superheat.

34

DAYTON-DAWD 2-STAGE FIRE AND BILGE PUMP

Vertical 2-stage type TDV-10—20 HP—20 GPM @ 184'—3" discharge—4" suction—1775 RPM—Maumee Sun. Motor: 120 volts DC—20 HP—1775 RPM.

BOILER FEED PUMPS

Suitable for Navy and Merchant Vessels

35

COFFIN TYPE CG-4A FEED PUMP

2 Available—very little use. Maximum 325 GPM—1760' head or 750 lbs Steam inlet 575 lbs. — 540°TT — exhaust 20 lbs. — speed 760 RPM.

36 **UNUSED DD445 CLASS WORTHINGTON TURBINE-DRIVEN FEED PUMP**

Worthington — drawing SL5043—425 GPM—1675' total dynamic head—5000 RPM 3-stage — double suction. Flanged 4½" inlet—4" outlet. Powered by Sturtevant steam turbine—282 HP—590 PSI. For Fletcher DD-445 Class Destroyers.

37

BUFFALO SIZE 4 FEED PUMPS

Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs—5"x4"—built for USN DD destroyers. DD 445 Class Fletcher.

38

WORTHINGTON 3-STAGE UNUSED BOILER FEED PUMP

PUMP: 5" Worthington—460 GPM @ 750 PSI—5000 RPM—305 HP—steam flow 8052/hr—26.4 lbs HP hr. TURBINE: Sturtevant C-22—type 21—575# dry saturated steam—15 lb. back pressure—259°F water temperature—15 lbs/inch suction pressure.

39 **INGERSOLL-RAND BRONZE CARGO PUMP**

10GT—4500 GPM at 125 lbs.—2-stage—size 14x12.

40

C-25 CARGO PUMP TURBINE SPARE GEARS

One set of gears available for Westinghouse C-25 Cargo Pump Turbine.

MISCELLANEOUS

DOUBLE REDUCTION GEARS for Diesel Drive

41

3200 HP DOUBLE INPUT SINGLE OUTPUT DIESEL REDUCTION GEARS 20 DEGREE OFFSET

Farrell-Birmingham — 3200 SHP. REDUCTION GEAR: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard. Gear output 400 RPM. Suitable for dredge pumps. Non-reversing. OK for 38D8-⅛ engine.

42 **2:67:1 RATIO DOUBLE IN-LINE GEARS**

Farrell-Birmingham 3200 HP non-reversing — from seaplane tenders. Ratio 1.867:1. Complete with hydraulic couplings, etc. Will handle two 38D8-⅛ FM diesels. Has Fawick clutch.

43 **2100 HP DOUBLE INPUT SINGLE OUTPUT GEARS—3:435:1 RATIO**

Farrell-Birmingham — heavy duty — originally built for 2 heavy-duty direct-reversing engines —300 RPM—1050 HP each. Ratio 3.435:1.

44 **SINGLE ENGINE REDUCTION GEAR**

Farrell-Birmingham — non-reversing—1600 HP at 2.4909:1. With hydraulic couplings.

45 **ANCHOR WINDLASS**

Hyde 2-11/16" — 12x14 — 100 PSI — steam — 54,100 lbs.

46

SHARPLESS LUBE & DIESEL OIL PURIFIERS

Type M-34-W22-UM—15,000 RPM. BOWL MOTOR: 2 HP—230 volts DC—8.5 amps—3450 RPM—250 to 300 GPH. Originally built for C-1-A diesel vessels.

47

UNUSED 1135 SQ. FT. C.H. WHEELER CONDENSER

20" Ex. inlet—⅝" CU-NI tubes—with or without air ejector.

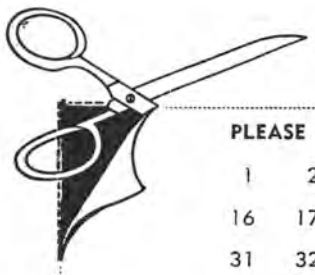
48

UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

Chain and two 10640 lb anchor & 30 fathoms chain @ 30 FPM. 70 HP—230 volts—shunt DC motors—233 amps—550 RPM—55°C rise. Wildcat centers 47½". Base 9'5" wide x 11' long. Weight 36,000 lbs.

INQUIRE FOR ALL OTHER ITEMS

Forced draft blowers, reduction gear parts, bilge and ballast pumps, main circulators, general service pumps, F.O. transfer pumps, lube oil service, standby feed pumps, condensate pumps, aux. circulating pumps, feed water heaters, wash water pumps, etc.



PLEASE SEND INFORMATION ON THE FOLLOWING: (Please circle items) 10/15/73

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48												

NAME..... COMPANY.....

ADDRESS..... POSITION..... PHONE.....

CITY..... ZONE..... STATE.....

Astilleros Espanoles Awarded Contracts To Build 7 Vessels

Astilleros Espanoles, S.A. has recently signed contracts for the construction of seven vessels with a total of 1,497,000 deadweight tons.

Four of the vessels, totaling 1,210,000 deadweight tons, are for the home market, and the remaining three, totaling 287,000 deadweight tons, are for export.

Two 130,000-dwt tankers are to be built at Astilleros' Sestao yard for Zerlina Corporation Panama. The vessels, to be delivered in June and September of 1977, will have the following approximate measurements: length overall, 900 feet; length between perpendiculars, 869 feet; breadth, 131 feet, and draft, 73 feet. They will be powered by an 8K90GF AESA-B&W engine totaling 27,300 bhp at 114 rpm, producing a service speed of 15.30 knots.

One 260,000-dwt tanker is to be built at the New Shipyard for Union de Explosivos Riotinto, S.A. Scheduled for delivery in September of 1977, the approximate dimensions of the vessel will be: length between perpendiculars, 1,034 feet; molded breadth, 180 feet; molded depth, 89 feet, and molded draft, 66 feet. The vessel will be powered by AESA-G.E. Turbines MST14 totaling 36,000 shp, producing a speed of 15.8 knots.

Astilleros' Sestao yard is to build a 130,000-dwt tanker for Naviera Fierro, S.A. Dimensions of the tanker will be about as follows: length overall, 900 feet; length between perpendiculars, 869 feet; breadth, 131 feet, and draft, 73 feet. It will be powered by an 8K90GF AESA-B&W engine totaling 27,300 bhp at 114 rpm, producing a service speed of 15.30 knots. Delivery is scheduled for January of 1977.

The Nuevo Astillero shipyard is to build two 410,000 tankers for Naviera Abasotas, S.A. The vessels, scheduled for delivery in June 1977 and December 1977, will have the following approximate dimensions and principal particulars: length overall, 1,263 feet; length between perpendiculars, 1,201 feet; molded breadth, 217 feet; molded depth, 98 feet, and molded draft, 75 feet. Propulsion will be by AESA-Stal Laval type AP turbines with an output of 48,000 shp at 92 rpm, producing a speed of 15.5 knots.

One 27,000-dwt bulk carrier scheduled for delivery in December 1974 will be built at Astilleros' Sevilla shipyard. The vessel, to be built for Whitwill, Cole & Co. Ltd., will measure about 600 feet in length overall; have a length between perpendiculars of 563 feet; a molded breadth of 73 feet; molded depth of 47 feet, and a molded draft of 34 feet. It will be powered by an AESA-Sulzer 7RND68 engine with an output of 11,550 bhp at 150 rpm, producing a speed of 16 knots.

Global Terminal Elects Ragucci And Reardon

Carmine F. Ragucci

R.T. Norton, president of Global Terminal & Container Services, Port Jersey, Jersey City, N.J., announced the following assignment and promotion.

Carmine F. Ragucci, who recently joined Global, was elected by the board of directors as vice president, operations. Mr. **Ragucci** brings to Global 18 years of experience in terminal management and operations. Following two years at sea after graduation from the United States Merchant Marine Academy at Kings Point, N.Y., Mr. **Ragucci** joined I.T.O. in their operating department and served in a variety of field assignments culminating as general manager of their largest container terminal at Port Elizabeth, N.J.

James F. Reardon was elected by the Global board of directors as assistant vice president, operations. Mr. **Reardon,** a Manhattan College engineering graduate, was promoted from his previous post as executive assistant to the vice president, operations. Mr. **Reardon** joined Global in 1972, following managerial assignments with Associated Transport, American Export Industries, the Port of New York Authority, and the Great Lakes Dredge and Dock Co.

1 M/V W.W. Marting	2 M/V Henry S. Sturgis	3 M/V A.H. Crane	4 M/V Mike Creditor
5 M/V A.L. Long	6 M/V John J. Rowe	7 M/V Walter C. Beckjord	8 M/V Tom Ragsdale
9 M/V City of Huntington	10 M/V Ovec	11 M/V Queen City	12 M/V Des Plaines
13 M/V Bob Benter	14 M/V E.F. Campbell	15 M/V John Ladd Dean	16 M/V Orco
17 M/V Robert P. Tibolt	18 M/V Wm. H. Zimmer	19 M/V L. Fiore	20 M/V B. John Yeager

M/V ROBERT A. TAFT 21ST ST. LOUIS SHIP TOWBOAT FOR THE OHIO RIVER COMPANY

22
Coming

23
Coming

24
Coming

The 6650 HP M/V Robert A. Taft is the latest Hydrodyne Hull towboat added to the Ohio River Company's fleet. The Robert A. Taft is a sister ship of the M/V B. John Yeager. Both boats feature the increased pushing and backing performance for which St. Louis Ship's exclusive HYDRODYNE concept is well known. Performance tests of the Hydrodyne design by St. Louis Ship customers have produced some outstanding testimonials. Its own performance and maintenance records prompted the Ohio River Co. to purchase its 21st towboat from St. Louis Ship.

Remember, the Hydrodyne design produces maximum efficiency, regardless of towboat size. Please contact us about your individual requirements. Call us at (314) 638-4000.

ST. LOUIS SHIP
DIVISION OF POTT INDUSTRIES INC.
611 EAST MARCEAU STREET, ST. LOUIS, MO. 63111

New York, Chicago, Kansas City, New Orleans, Memphis, Minneapolis, Houston and Mobile.

Remote-Controlled Underwater Hull Cleaning

Sheldon Kass*

Pictured at the meeting of the Society of Marine Port Engineers New York, N.Y., Inc., held in the Downtown Athletic Club, are: (seated, left to right) **John C. Fox Jr.,** Exxon International, tanker department, chairman of the board of directors of the Society; **Philip A. Donahue,** Maritime Overseas Corp., president of the Society; **Sheldon Kass,** Butterworth System, Inc., speaker; **Bernard W. Seile,** Bull & Roberts, sponsor; (standing, left to right) **John Antonetz,** Texaco Inc., chairman, papers committee; **Tom Jones,** American Export Lines, chaplain; **Edward English,** Atlantic Repair Co., chairman, program committee; **Joseph Thelgie,** Marine Transport Lines, first vice president; **William Towner,** American Bureau of Shipbuilding, second vice president, and **Harry H. Hunt Jr.,** marine surveyor, secretary-treasurer.

During a most interesting conversation with a naval architect from one of the major tanker companies on the West Coast, our firm was asked for available data on the effectiveness of underwater hull cleaning. The caller took the opportunity to advise that, in his experience, the top management of many shipping companies did not sufficiently appreciate the enormous debits associated with hull friction or, to say it another way, did not appreciate the enormous credits generated by underwater hull cleaning. We agree with this theory. Thus, it's a real pleasure to be invited to discuss underwater hull cleaning with you and maybe improve your appreciation of the subject. Some facts will be given in this paper in the form of actual performance data on ships cleaned with my company's equipment.

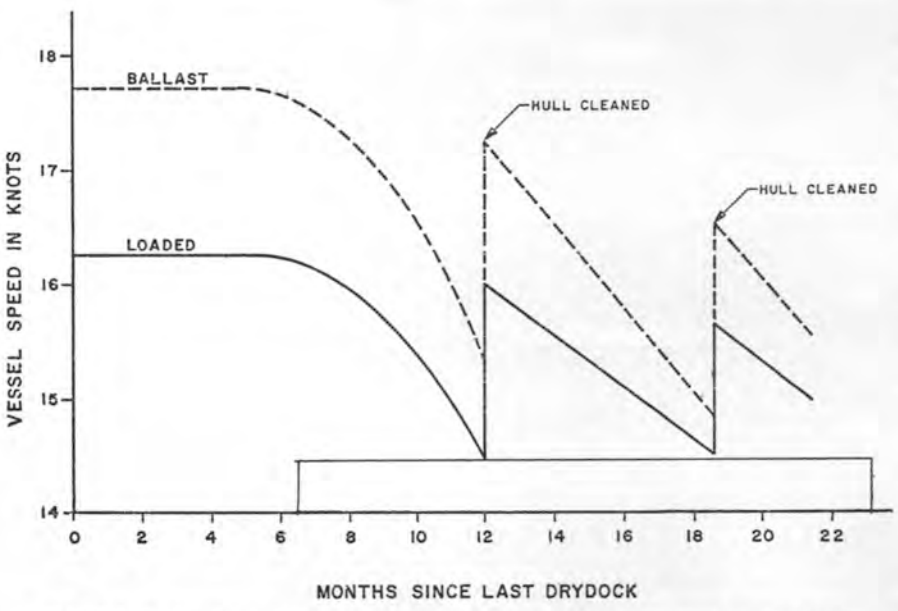
By way of definition, my company manufactures and establishes franchises for a line of underwater hull-cleaning equipment under the trademark, "SCAMP".

*Mr. **Kass** of Butterworth System, Incorporated, recently presented the paper reprinted here before a meeting of the New York Society of Marine Port Engineers. The system of hull cleaning described here was developed by Butterworth Systems and the name "SCAMP" is their trademark for the system.

To date, over 450 vessels have been cleaned with this equipment for approximately 150 different owners. Measuring the effectiveness of a hull cleaning is theoretically a simple task. One only needs to observe the vessel's speed before and after the cleaning. However, as we well know, many factors other than hull condition can affect speed; thus, a routine analysis of logs is not sufficient for an accurate determination. A specific program must be set up with built-in guidelines to be sure that the data are taken during fair weather days, when the vessel is operating under normal power output and no other extraneous factor is affecting the vessel's speed.

Furthermore, one requires a lot of data taken over a long period of time on many ships, for it must be recognized that we are trying to measure a relatively small, although quite valuable, parameter. This amount of detail is usually not available to us from an owner using our service. Exxon, however, has established a program to specifically evaluate the effectiveness of underwater hull cleaning, and these data are available to us.

Figure 1 shows the effect of two hull cleanings on the speed of a large tanker, plotted against the number of months since the last drydocking. Separate curves for ballast and loaded voyages are shown. These curves reflect the best lines that can be drawn from the data which, as one would expect, do not automatically fall out on the smooth curve we have shown here. This cleaning is one of the clearest demonstrations of the effectiveness of SCAMP hull cleaning. We have several other examples on which similar gains have been realized.



SCAMP hull cleaning results of an actual 190,000-dwt tanker—speed versus time.

A number of interesting observations can be made from these curves. First, your attention is called to the quite dramatic immediate speed gain realized after each of the hull cleaning: the first, at 12 months out of dry dock; the second, about six months later. On this particular vessel, the immediate speed gains were over one and a half knots.

Second, note from the slope of the lines that the speed fall-off rate after each hull cleaning is not noticeably different from the speed fall-off rate immediately prior to cleaning. We know that some owners are reluctant to hull clean, as they believe that the fouling returns at an accelerated rate after the first cleaning. Our data, however, contradict that theory which we accordingly believe to be false.

Lastly, when this vessel eventually went into dry dock where it was thoroughly inspected, there was no indication of any damage to the bottom paint as a result of the hull cleaning.

Figure 2 shows results obtained on five other hull cleanings. The data include the size of the vessel, the time required to complete the cleaning, the immediate speed gain and the value of that gain in thousands of dollars per month. Lastly, we show the time required to break even; that is, the time required for the saving to equal the cost of the hull cleaning. These five vessels, averaging 173,000 deadweight tons, were cleaned in an average time of about 14 hours.

The speed gain of 0.7 knots resulted in a time saving of about one day per month, the replacement value of which was worth about $17,000 per month at the time the data were collected. In today's market, the value of one day a month would be considerably higher than $17,000 for a vessel of this size. In the last column, we show the time required for the saving to recover the cost of the hull cleaning, which you see is significantly less than one month.

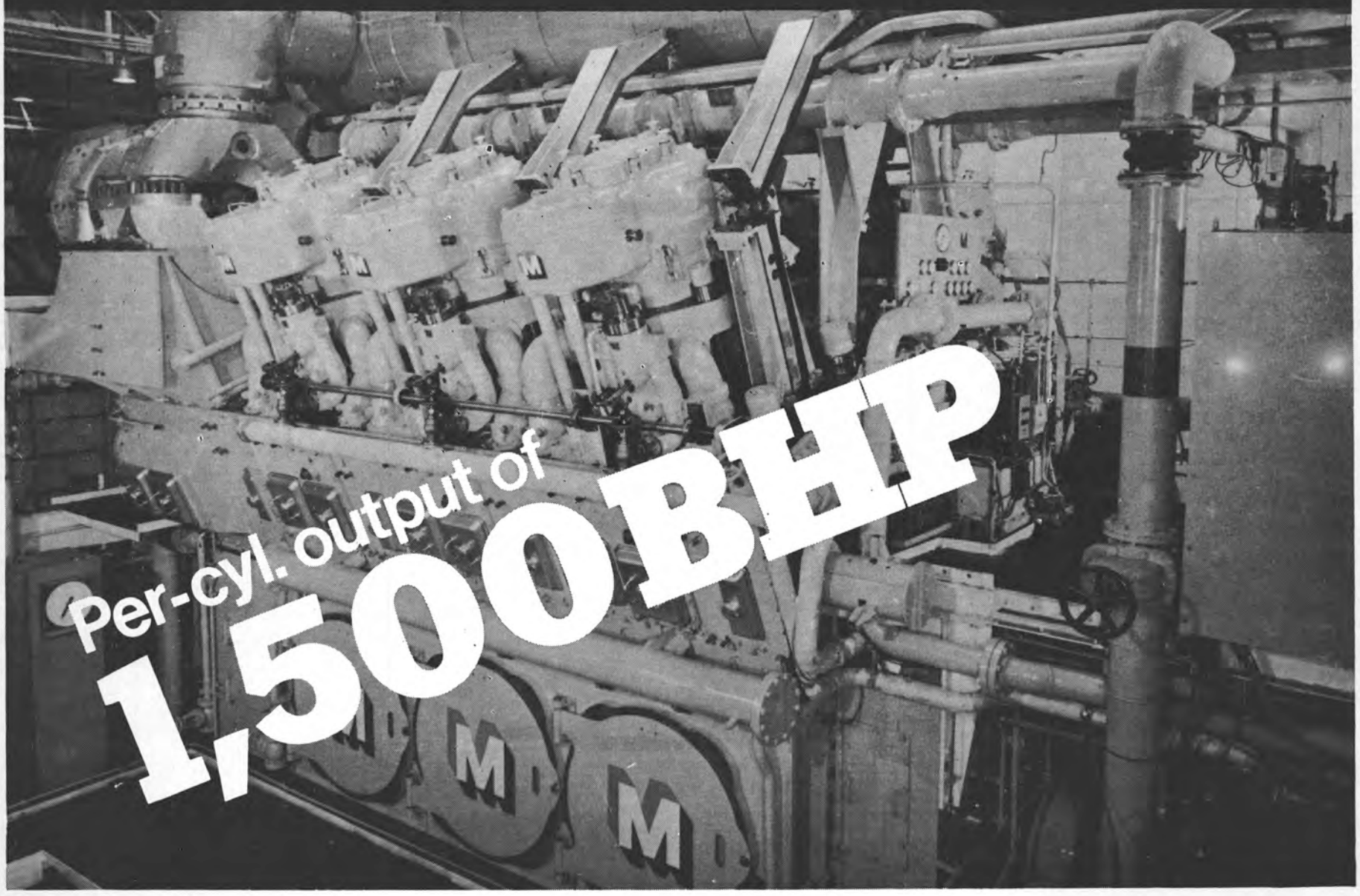
Figure 2—Effectiveness Of SCAMP Hull Cleaning

Vessel	Size (Dwt)	Cleaning Time (Hours)	Immediate Speed Gain (Knots)	Savings $/Month	Time To Break Even (Months)
A	250,000	15	0.6	21,000	0.7
B	253,000	18	0.9	27,300	0.6
C	190,000	12	0.3	12,500	0.9
D	85,000	11	0.6	8,000	0.9
E	85,000	12	1.1	16,300	0.5
Average	173,000	14	0.7	17,000	0.7

We believe that the advent of the Very Large and Ultra Large Crude Carriers and the limited number of dry docks available to service these vessels are causing shipowners to continue to evaluate the economics of in-service maintenance, and extending the drydocking interval. Accordingly, we see a bright future for underwater hull cleaning services. The main problem with past techniques has been limited reliability and effectiveness, and extensive time to clean underwater, particularly at the deep drafts found on today's vessels. The net result has been that underwater cleaning has inherited a somewhat "tainted" history of failure or, at best, a reputation for marginal effectiveness. We believe these limitations have been overcome, and there is now a tool big enough and fast enough to effectively clean the largest vessels afloat in their normal port discharging time.

New High-powered 4-cycle Medium Speed Diesel Engine

MITSUI V60M

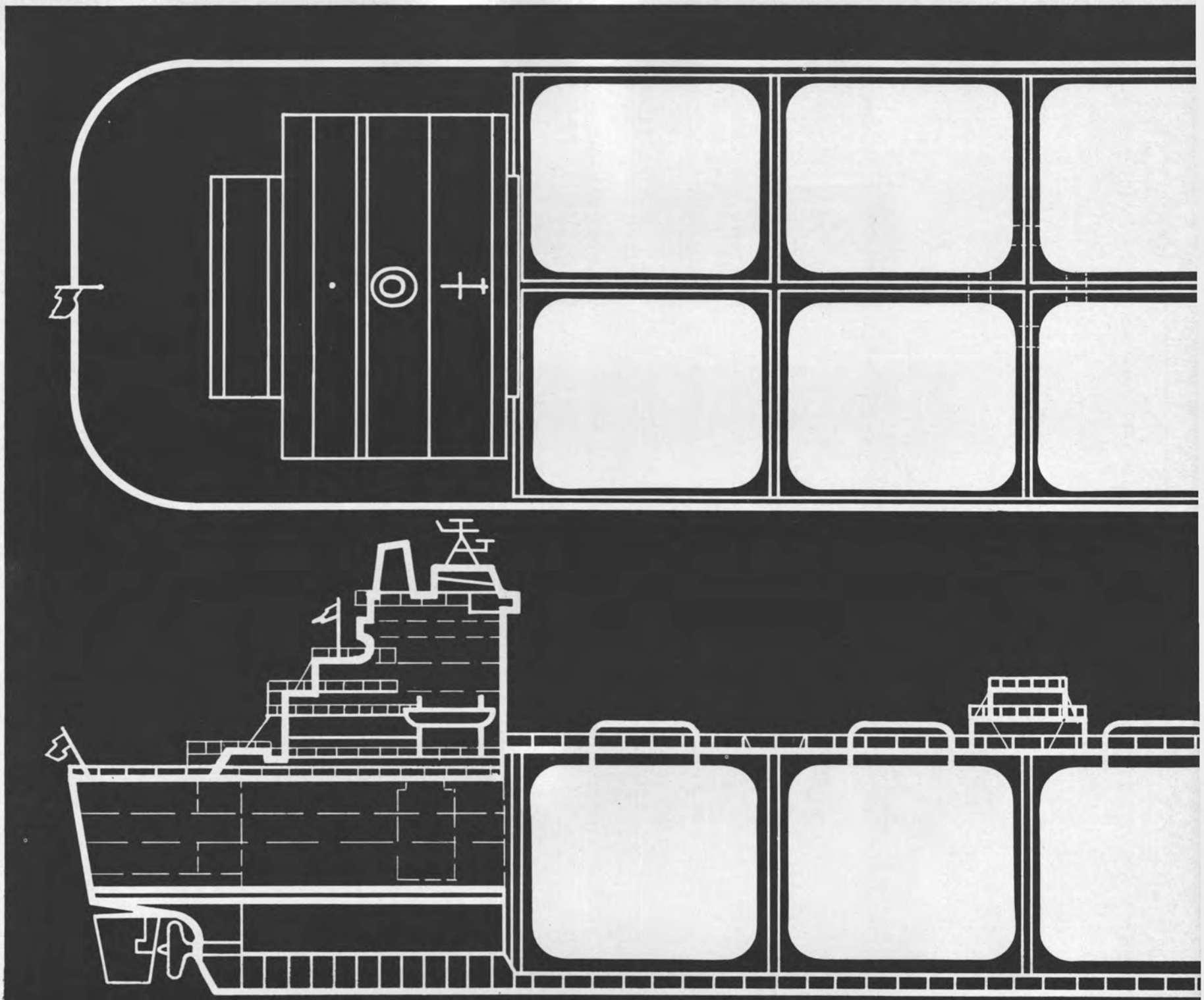


OVERHAUL...MAINTENANCE OF MULTI-CYLINDER ENGINE ARE NO LONGER PROBLEMS

Making a complete breakthrough from the conventional concept in engine maintenance, the Mitsui V60M engine features time-saving, labor-saving and thorough maintenance.
Overhaul of pistons, main bearings, valves etc. can be done by fully mechanized special tools and equipment.

When used in a geared propulsion plant of even super-large capacity, the Mitsui V60M engine makes possible a wide selection of propeller revolutions and output. The new engine can also be used as a generating plant ashore.
You will find Mitsui V60M engine most satisfactory in every respect.

MITSUI SHIPBUILDING & ENGINEERING CO., LTD.
Head Office: 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Overseas Offices: New York, Los Angeles, London, Duesseldorf, Hong Kong

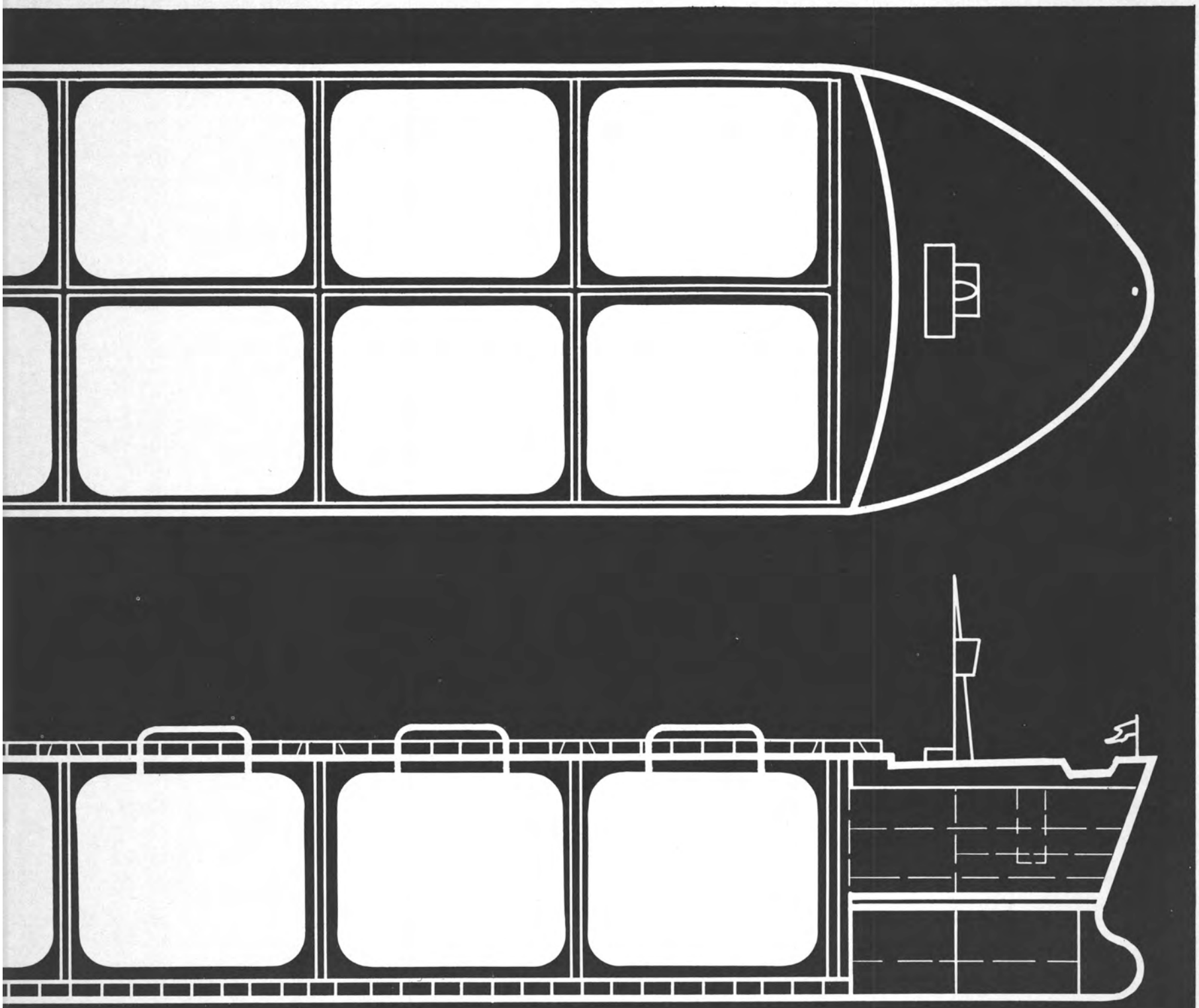


The first step in turning 30,000 tons of steel into

First, the containment tank material is of critical importance. Armco CRYONIC 5 Steel may be the answer. It's economical—20% lower in cost than 9% Nickel Steel. It's tough—meets these *minimum* Charpy V-Notch values at —275 F: 25 ft-lbs longitudinal, 20 ft-lbs transverse. It's weldable—can be joined to other nickel-alloy steels, carbon steels and austenitic stainless steels by all commonly used welding processes. It's strong—included in the ASME Boiler and Pressure Vessel Code as SA-645 with an allowable design stress of 23,700 psi at room temperature. This combination of strength, toughness, weldability and economy make Armco CRYONIC 5 Steel the logical material for LNG containment tanks.

Second, what about shell and deck plating, framing and beams and the rest of the components that comprise the ship? Here, too, Armco has the answer. In addition to supplying standard ABS Grades such as CS, E, DH and EH, Armco provides a broad array of Heat-Treated Carbon Steels for shipbuilding applications.

For example, Armco QTC is used extensively in the scantlings of LASH vessels; Armco LTM-QT for the hull of the icebreaking Coast Guard cutter, *Polar Star.* Others, such as Armco LTM-N, Lo-Temp, and Super-



an LNG tanker is knowing how Armco can help

Lo-Temp can also provide excellent low temperature notch toughness in a variety of strengths for use in all environments and climates.

Just knowing that Armco can supply marine steels for virtually every type of marine construction is an important step in ship design and construction. Take the next step and mail the coupon to receive more information on the complete line of Armco Marine Steels.

Armco Steel Corporation, Dept. H-113, Box 723, Houston, Texas 77001.

Send information on_____

Name _____ Title _____

Company _____ Street _____

City _____ State _____ ZIP _____

ARMCO STEEL

ABS Elects 25 Maritime Executives To Bureau Membership

At a meeting of the board of managers of the American Bureau of Shipping, held September 18 in New York, N.Y., 25 persons prominent in ship design, construction and operation as well as marine underwriting were elected to membership in the international ship classification society. They are:

Robert W. Bailey, vice president, American Re-insurance Company, New York, N.Y.

James R. Barker, chairman of the board and president, Moore-McCormack Lines, Inc., New York, N.Y.

Roberto S. Benedicto, president, Northern Lines, Inc., Manila, Philippines.

Robert J. Blackwell, Assistant Secretary for Maritime Affairs, Department of Commerce, Washington, D.C.

T.Y. Chao, chairman, Wah Kwong & Co. (H.K.) Ltd., Hong Kong.

Jo Ho Chu, president, Korea Shipping Corporation, Ltd., Seoul, Korea.

Thomas O. Clark, vice president, Commercial Union Companies, New York, N.Y.

E.M.J. Colocotronis, Colocotronis Ltd., London, England.

R.R. Cresswell, manager, Marine Division, Algoma Central Railway, Sault Ste. Marie, Canada.

Joseph J. Cuneo, president, Energy Transportation Corporation, New York, N.Y.

John P. Diesel, president, Newport News Shipbuilding and Dry Dock Co., Newport News, Va.

Robert W. Fraser, president, Fraser Shipyards, Inc., Superior, Wis.

David A. Groh, vice president, Pickands Mather & Co., Interlake Steamship Division, Cleveland, Ohio.

Robert E. Gross, president, United States Salvage Association, New York, N.Y.

W.L. Hammond, director of marine transportation, PPG Industries, Inc., Pittsburgh, Pa.

Dr. **Kiyokatsu Hanita,** director and vice president, Nippon Kokan K.K., Tokyo, Japan.

Iver Hoppe, managing director, Harland and Wolff Ltd., Belfast, Northern Ireland.

W.H. Eddie Hsu, chairman, Eddie Steamship Co., Ltd., Taipei, Taiwan.

Dr. **W.L. Hughes,** general manager, Walkers Ltd., Maryborough, Australia.

Capt. **Robert E. Moran,** manager, Great Lakes Steamship Division, Bethlehem Steel Corporation, Cleveland, Ohio.

Richard L. Preston, vice president and manager, Tanker Department, Exxon International Co., New York, N.Y.

James R. Smith, president, The American Waterways Operators, Inc., Washington, D.C.

Gregory J. Sullivan, president, Marine Transport Lines, Inc., New York, N.Y.

Col. **Generoso F. Tanseco,** president, United Philippine Lines, Inc., Manila, Philippines.

I. Yamashita, president, Mitsui Shipbuilding & Engineering Co., Tokyo, Japan.

Rosencrance Named To C-E Industrial Boiler Operations Post

Robert K. Rosencrance has been appointed sales engineer, it was announced by **Harold Massey Jr.,** director of sales and marketing, C-E Industrial Boiler Operations.

Mr. **Rosencrance** will be located in the company's Washington, D.C., office and be responsible for the sale of field-erected and shop-assembled boilers, chemical and recovery and incineration units and fuel burning and auxiliary equipment.

Mr. **Rosencrance** joined C-E in 1967, holding positions in engineering, service contract performance, estimating, and most recently, sales specialist, shop-assembled boilers. He received a B.S.M.E. degree from Newark College of Engineering.

In his new post, he will report to **L.F. Johnson**, regional sales manager, Philadelphia.

Marathon-Built Rig Delivered To ODECO For Gulf Of Mexico

Ocean Drilling & Exploration Company has announced the completion and entry into service in the Gulf of Mexico of the Ocean King, the 24th drilling rig belonging to the New Orleans, La.-based company.

A triangular-shaped self-contained jackup, the new unit is under contract to Sun Oil Co. It is the fourth of six new rigs completed or under construction for ODECO in 1973. The vessels remaining to be completed are the Ocean Scout at Baltimore, Md., and the Ocean Endeavour in Australia.

The six new units are part of a $130-million new construction program initiated by ODECO in 1971.

The Ocean King measures 230 feet by 200 feet and has 5,000 diesel-electric horsepower. It is designed to operate in up to a maximum of 340-foot water depth and to drill to 25,000 feet beneath the ocean floor.

Built by Marathon LeTourneau Co. at Vicksburg, Miss., the Ocean King has modern quarters for 59 men.

USSR Committee Signs Cooperative Agreement With Gen'l Dynamics

General Dynamics Corporation and the State Committee for Science and Technology of the USSR recently announced that they have signed a broad five-year agreement for scientific and technical cooperation.

It was signed for the Soviet Union by **Jerhman Gvishiani,** vice chairman of the State Committee for Science and Technology, and by **David S. Lewis,** chairman and chief executive officer of General Dynamics.

The agreement identified a number of preliminary areas for mutual efforts in science and technology.

Initially, it covers the fields of commercial ships and shipbuilding, telecommunications equipment, asbestos mining and processing, commercial and special purpose aircraft, computer-operated microfilm equipment, and navigation and weather buoys.

This agreement could lead to production of General Dynamics products in the Soviet Union and also to the purchase by the USSR of certain products manufactured by General Dynamics in this country.

"We believe this agreement opens the way for substantial joint activity with Soviet industry, particularly in the fields of telecommunications and liquefied natural gas ships which will be required for shipment of Soviet natural gas to the U.S. and other countries," Mr. **Lewis** said. "We expect this cooperation to lead to more definitive contractural agreements in the months ahead."

Mr. **Gvishiani** said: "We believe that the broad areas of work we will participate in together give us opportunities to improve our technical progress and increase international trade. Many of the technical achievements of General Dynamics are of particular interest to us."

General Dynamics, a diversified corporation headquartered in St. Louis, Mo., reported sales last year of almost $1.6 billion.

Its Quincy Shipbuilding Division received contracts totaling $270 million to construct three giant liquefied natural gas tankers a year ago, the first contracts awarded a U.S. shipyard for LNG tankers.

Stromberg-Carlson Corporation, a General Dynamics subsidiary, is a leader in design, development, production and sales of telephone instruments and equipment. One of the company's Canadian subsidiaries, Asbestos Corporation, is among the world's largest producers of asbestos, and another Canadian subsidiary, Canadair Limited, produces the CL-215 water bomber used in fighting forest fires. The company's Electronics Division has produced navigation and weather buoys now on sea duty in several locations.

Another subsidiary, Stromberg DatagraphiX, is a leader in the computer-output-microfilm industry.

Santa Fe International Signs $50-Million Pipelaying Contract

Santa Fe International Corp., Orange, Calif., has signed a contract with Phillips Petroleum Company Norway (acting for a company owned by the Government of Norway and the Phillips Norway Group) to lay 120 miles of a 36-inch gas pipeline in the North Sea next year.

Edfred L. Shannon Jr., Santa Fe president, said the contract provides for Santa Fe to lay approximately one-half of the total length of the line which will deliver natural gas from Ekofisk Field to an onshore terminal near Emden, Germany. He said the contract is expected to produce revenues to Santa Fe in excess of $50 million.

Mr. **Shannon** said the line will be the largest diameter line yet laid in the North Sea. Santa Fe presently is one of three contractors laying the 34-inch crude-oil line from Ekofisk to Teesside, England, currently the largest line in the North Sea.

Santa Fe's gas line contract covers two 60-mile segments, one of which will be laid by the Choctaw I, the semisubmersible derrick and pipelaying barge currently working on the crude-oil line. The other will be laid by the Choctaw II, a new semisubmersible nearing completion in Hamburg, Germany.

Santa Fe's Cherokee, currently being used to bury the Ekofisk crude line, will be employed to bury both Santa Fe sections of the gas line.

Mr. **Shannon** said all three major pieces of equipment are scheduled to begin work next April 1.

The two Santa Fe segments, Mr. **Shannon** said, are the farthest seaward, beginning in Ekofisk Field in Norwegian waters and passing through Danish waters to a halfway point off Germany.

The Phillips Norway Group includes Phillips as operator, Petrofina, Agip, Norsk Hydro, Elf, Total, Aquitaine, and other French interests.

John A. Potts Elected New MOAC President

John A. Potts

John A. Potts was elected president and a director of Marine Office - Appleton & Cox Corp. (MOAC) at a recent board meeting held in New York, N.Y. The announcement was made by MOAC chairman **John B. Ricker.**

A native of Montreal, Mr. **Potts** had been executive vice president of MOAC. He joined the firm in 1954 as manager of MOAC's Canadian Department at Toronto. He advanced to resident vice president there in 1959, transferring to San Francisco, Calif., in the same capacity seven years later. In 1970, Mr. **Potts** was named vice president and manager at Dallas, Texas, and moved to New York the following year as senior vice president. In 1972, he was appointed executive vice president of MOAC.

As president, Mr. **Potts** will assume additional duties in areas of MOAC operations that previously had been the responsibility of the joint office of chairman and president held by Mr. **Ricker** since 1971.

Mr. **Potts** is a member of the American Institute of Marine Underwriters, the National Cargo Bureau, and a director of the United States Salvage Association. He is past president of the Canadian Board of Marine Underwriters, and past director of the San Francisco Board of Marine Underwriters.

Gulf Oil And CNA Plan Multibillion-Dollar Merger

Gulf Oil Corp. has announced it will merge with CNA Financial Corp. in a stock-and-bond swap involving two multibillion-dollar giants of energy and finance.

The big oil company said the merger talks are in a "preliminary stage" and that the proposal needs the okay of both firms' directors and stockholders, as well as regulatory agencies.

CNA common stockholders would receive $10 of a new Gulf 7 percent convertible debenture and one share of a new Gulf 19 cents convertible preferred stock for each share of CNA they own. CNA preferred holders will also receive a similar package.

Gulf, the third largest crude oil producing firm, had sales of $6.2 billion and profits of $447 million in 1972. CNA, which owns Continental Casualty and Continental Assurance companies and other financial firms, had gross revenues of $1.5 billion and earnings of $98.7 million.

Construction Begins On Zapata Drillship

The drillship Zapata Trader, now under construction at Gulfport Shipbuilding Corporation, Port Arthur, Texas, features the latest innovations in equipment.

Zapata Corporation, Houston, Texas, has announced that construction of the ship-shaped drilling vessel Zapata Trader is now under way at Gulfport Shipbuilding Corporation (a subsidiary of Levingston Shipbuilding Company), Port Arthur, Texas. The self-propelled drillship, to be built at an overall cost of about $16 million, is scheduled for completion in mid-1974. It will be owned by Zapata North Sea, Inc., one of the company's offshore drilling subsidiaries.

The highly mobile Zapata Trader will be initially equipped for operation in 600 feet of water and drilling to a depth of 20,000 feet. Its design provides for the later addition of equipment for operation in 1,000 feet of water. Other special features include a motion compensator, automatic pipe racking system, flume tank stabilizing system, and below deck storage for drillpipe and other tubular materials. The Panamanian-flag vessel will have a service speed of more than 11 knots, quarters for 90 men, and displacement of about 14,000 tons at drilling draft. Utilizing a former bulk carrier for its basic hull, the Zapata Trader will be 427 feet long, with a 77-foot beam and a hull depth of 32 feet.

Zapata Corporation, a pioneer in the offshore drilling field, currently has 11 rigs in operation around the world, with a super semisubmersible rig under construction. In addition to offshore drilling, the company's activities include supply vessel services for offshore operators, petroleum exploration, menhaden and tuna fishing, copper and coal mining, and building and general construction.

Radiomarine Corp. Names Bruce Nankervis As Chief Engineer

The appointment of **H. Bruce Nankervis** as chief engineer of Radiomarine Corporation, Red Bank, N..J, was announced by **C. Webber Parrish,** vice president and general manager.

Mr. **Nankervis** will be in charge of all engineering activity for Radiomarine and two sister firms in Red Bank, The Hammarlund Manufacturing Company and the DuMont Mobile Communications Division. The three together comprise the marine navigation and marine and land communications group of the parent Electronic Assistance Corporation.

A holder of several radar patents, Mr. **Nankervis** served for six years as an engineering consultant to several major electronic firms before joining Radiomarine. Earlier, he held executive posts with Compass Communications Corporation, RCA International and Hartman Marine.

Mr. **Nankervis** holds a commercial radio license and is a "Ham" radio operator. He received a bachelor of science degree in electrical engineering from the University of Wisconsin in 1950.

Santa Fe Int'l To Use Three Barges To Lay 120-Mile Pipeline

Santa Fe International Corp., Orange, Calif., has extended its contract with the German Shipbuilder Blohm & Voss A.G. to include modifications to the pipelaying barge Choctaw II, presently under construction at the Blohm & Voss yard in Hamburg.

Santa Fe president **Edfred L. Shannon Jr.** said the modifications were undertaken in preparation for the particular requirements of the 1974 Ekofisk project in the North Sea. The revised construction schedule calls for completion of the barge by January 15, followed by installation of pipelaying equipment. The unit is expected to be ready to start work next March 1.

On its first project, the Choctaw II will join two other Santa Fe barges, Choctaw I and Cherokee, in laying and burying a 120-mile segment of the 36-inch gas pipeline, which will extend from Ekofisk Field in the Norwegian Sector of the North Sea to the German shore near Emden.

A & P Appledore Names Scutcher To Ship Repair Post

Gordon Scutcher

A & P Appledore (International) Limited, the joint company owned by Court Line Limited and Austin & Pickersgill Limited, announces the appointment of **Gordon Scutcher**, C.Eng, M.I. Mar.E., AMRINA, member of The Society of Naval Architects and Marine Engineers, as a director with special responsibilities for ship repairing.

Mr. **Scutcher** has a background in international ship repair and conversion, including marketing, costing, yard reorganization and production control.

From January 1968 to May 1973, he was technical assistant to the general manager of the Bethlehem Steel Corporation's Baltimore, Md., yards, and as yard contract administrator he headed the management team for the construction of drilling rigs and major ship conversions, including contract negotiations and claims settlements.

Before that, he was the assistant technical director, Society Provencale des Ateliers Terrin, Marseilles, France, for five years, where he was responsible for technical supervision of major ship repairs and modifications and reorganization of costing, planning and yard production systems utilizing computerized control methods.

FMC Reorganization Plan Announced By Chairman Bentley

Helen Delich Bentley, Chairman of the Federal Maritime Commission, has announced a major reorganization of the Commission, which she said was necessary to help the agency function more efficiently and to cope with internal changes in departmental activities and responsibilities.

Two major changes in the reorganization—which became effective September 15, 1973—include the creation of an Assistant Managing Director's Office and a Bureau of Industry Economics.

Edward F. Duffy, who has been serving as the Federal Maritime Commission's Director of the Office of Budget and Finance, has been appointed Assistant Managing Director. In his new position, Mr. **Duffy** has technical and administrative responsibility for the Office of Personnel, the Office of Budget and Finance, and the Division of Office Services. He has also assumed the technical and administrative direction of all the field components of the Commission. In announcing the latter change, **Mrs. Bentley** said: ". . . We hope that the field offices will become mini-staffs in their respective areas to handle all sorts of regulatory problems in conjunction with the Washington staff." (The agency currently has field offices in New York, New Orleans, San Francisco, and Old San Juan, Puerto Rico.)

Under the reorganization, the Bureau of Enforcement has been dissolved, although the important functions of that bureau will continue to be discharged through reassignment. Investigations, along with the field organizations, have been placed under the supervision of the Assistant Managing Director. All investigative efforts will be maintained and coordinated between Mr. **Duffy** and **Daniel Connors,** who has been supervising the former Office of Investigation within the Bureau of Enforcement. The other functions of the old Bureau of Enforcement — Informal Complaints—have been reassigned to the Bureau of Compliance.

The Bureau of Compliance is now comprised of the Office of Agreements, the Office of Tariffs and Intermodalism, and the Office of Domestic Commerce, which is also a new office. Agreements and Tariffs have not been significantly changed, except that the Terminals Branch of Agreements and the Domestic Offshore Branch of Tariffs have been reassigned to the new Office of Domestic Commerce. In addition, the new Office of Domestic Commerce, which will be headed by **Eugene P. Stakem,** includes Informal Complaints, formerly under Mr. **Stakem's** direction in the Bureau of Enforcement.

As already mentioned, the second major change is the creation of the Bureau of Industry Economics, which is under the direction of **Albert J. Klingel Jr.,** formerly Chief of the Office of Economic Analysis; **Andrew H. Weissler** is Mr. **Klingel's** Deputy. This new bureau is composed of three offices: Office of Economic Analysis; Office of Financial Analysis (both of which were formerly in the Bureau of Compliance) and the Office of Military Sealift Procurement Studies, which has been transferred from the Office of the Managing Director.

In releasing the reorganization plan, **Mrs. Bentley** also announced the abolishment of the Office of International Affairs and Relations. **Myer Trupp,** Director of that office, retired August 31 of this year, and **Mrs. Bentley** revealed the public information functions of that office are now assigned to the Office of the Secretary. They will be handled by **Albert J. Dennis.** The international activities of that office have been assigned to the staff of the Office of the Managing Director and will be headed by **John C. Wirth Jr.,** an attorney who recently joined the staff of the agency.

ABS-Classed Tonnage Continues To Increase

The classification figures for the first six months of this year show a continual increase in American Bureau of Shipping activity, it was announced at the semi-annual meeting of its board of managers, held in New York on September 18. **Robert T. Young,** chairman and president, said that for the first six months of this year the American Bureau of Shipping has classed 789 new vessels of 3,868,000 gross tons or 7,094,000 deadweight tons. "This is an increase of over 27 percent in both gross tons and deadweight tons compared with the first half of 1972, and we expect this pace to continue throughout 1973," reported Mr. **Young.** Also classed by midyear were 50 existing vessels of 479,000 gross tons or 789,000 deadweight tons.

Under American Bureau of Shipping classification as of July 1, 1973, were 9,794 vessels of 70,582,000 gross tons, or approximately 110,711,000 deadweight tons. At midyear, the world order book contained under contract to be built to ABS classification 3,049 vessels of 25,621,000 gross tons or 46,971,000 deadweight tons.

Mr. **Young** noted growing activity with offshore mobile drilling units. "At present, there are 102 mobile drilling units of various types classed with the Bureau and 81 units contracted to be built to American Bureau of Shipping classification or have had their plans reviewed by our staff," he stated. "Of these 81 units, 15 are surface type, 23 are self-elevating, and 43 are column stabilized."

Continued growth was also reported for container certification. Since 1969, when this activity began, 91,000 units have been ordered to American Bureau of Shipping certification. Included in this figure are approximately 14,000 containers which have been ordered to ABS certification during the first six months of this year.

The involvement of the American Bureau of Shipping with LNG carriers continues to expand. Presently contracted to ABS classification are nine 125,000-cubic-meter LNG carriers to be built in the United States, and three 125,000-cubic-meter and two 35,000-cubic-meter LNG vessels being built in France. Further, a 5,000-cubic-meter LNG barge is now being completed to ABS classification.

During the first half of 1973, a number of new designs for integrated tug-barge combinations have been reviewed. The largest such combination involves an 80,000-deadweight-ton barge. In addition, there are proposals to employ integrated tug-barge combinations for the transportation of liquefied natural gas.

Mr. **Young** mentioned that American Bureau of Shipping activity in tanker construction continues to be strong. In a sidelight, he noted that the Spyros Niarchos, at 47,450 deadweight tons, claimed the title "world's largest tanker" at its launching in 1955. Since that time, this title has been consecutively held by nine ships, and presently, at 476,000-deadweight-tons, is held by the Globtik Tokyo. "All of these vessels have been built to American Bureau of Shipping classification," the chairman cited.

Mr. **Young** also reported on ABS Worldwide Technical Services, Inc., the wholly owned subsidiary of ABS. The activity of ABSTECH continues to maintain a steady growth. Its activity involves material testing, machinery unit inspection, cargo gear and crane certification, on-hire and off-hire surveys, towing surveys, third-party inspections, and general consulting services. In addition, ABSTECH has entered into formal owner's representation contracts for new vessel construction which, at present, extend through October 1974. ABSTECH has been formally registered in 37 states and 13 countries. At present, formal registration is being pursued in three additional countries.

China Shipbuilding Corp. To Build Tankers For U.S. Firm —N.Y.C. Company Named Agent

The appointment of Amerny Shipping Agency, Inc. as U.S. general agents for China Shipbuilding Corp. was announced by Capt. **Hao Wang,** president of Amerny Shipping Agency, Inc. of One World Trade Center, New York, N.Y.

Located in Kaohsiung, Taiwan, China Shipbuilding Corp. was founded in July 1973, with 45 percent of the company owned by the Republic of China and 55 percent by private firms. The board of directors, headed by Vice Adm. **S.T. Wang** as chairman, consists of seven Chinese Government and eight other directors associated with Gatx Oswego Corp., Consolidated Navigation Corp., Associated Maritime Industries, Inc., and Camerona Navigation Corp.

With initial construction already under way and completion expected by 1975, the new shipyard will offer the facility of the largest graving dock in the world, with building capacity rated at 1,000,000 deadweight tons.

Together with announcing Amerny Shipping Agency, Inc.'s appointment, Captain **Wang** commented that initial new order commitments are very encouraging. The first order, by Gatx Oswego Corp., is for six 360,000-dwt tankers to be completed and delivered in early 1977. Marine Transport Lines, N.Y.C. has already been designated as operators for the new buildings.

Kelso Marine Awarded Contract To Build $14.5-Million Integrated Tug-Barge Tanker

Artist's conception of the 35,000-ton integrated tug and barge tanker similar to another under construction at Kelso for **Hans Hvide** interests.

Kelso Shipbuilding Division of Kelso Marine, Inc., the Galveston, Texas, subsidiary of C. Brewer and Company, Limited, will build a $14.5-million 35,000-ton integrated tug and barge (ITB) tanker for Port Everglades Towing, Inc.

Hans J. Hvide, owner of Port Everglades Towing of Fort Lauderdale, Fla., indicated that he expected delivery of the 629-foot-long tug and barge combination in November 1974.

The 320,000-barrel barge and 14,000-horsepower tug are among the largest vessels of this type being built in the U.S. today. The ITB is similar to another under construction at Kelso's Galveston shipyard for Seabulk Tankers, Ltd., of which Port Everglades Towing is the general partner. The ITB will have an operating speed of 14½ knots.

An estimated 6 million dollars worth of additional construction is also under way at this shipbuilding facility, including a 14,000-ton chemical tank barge for ocean service, and six chemical barges for inland employment.

C. Brewer in an unrelated matter, also announced it has acquired Texas Gulf Construction Co., Inc. of Galveston and Houston. Terms of the contract were not disclosed. The company's principal business is marine pile driving and road and bridge construction in the Gulf Coast area.

Kelso Marine, in addition to its tug and barge building operations, also operates a building materials business—principally ready-mix concrete—and a barge towing division.

C. Brewer is headquartered in Hawaii with major operations both in Hawaii and on the U.S. mainland. Principal interests are in agriculture, land development and leisure time. In 1972, net earnings were $7.3 million. Brewer shares are traded on the American, Pacific Coast and Honolulu stock exchanges. Brewer is 54 percent owned by IU International Corporation of Wilmington, Del., which provides products and services to worldwide energy, transportation/distribution, and environmental markets.

Rucker Receives $10-Million Offshore Drilling Equipment Order From Odfjell Group

The Rucker Company, Oakland, Calif., a major manufacturer of equipment for offshore oil and gas drilling (NYSE, PCE-RK), has received an order in excess of $10 million from Odfjell Drilling and Consulting Company A/S of Bergen, Norway, one of the new Norwegian drilling contractors. Rucker officials said it is the largest single order for offshore drilling equipment in the company's history and raises the company's backlog to in excess of $45 million, compared with $20 million a year ago.

The equipment will be fitted to seven new semisubmersible drilling rigs. Three of the Rucker rig sets are subject to obtaining Export-Import Bank credit.

Rucker will supply subsea blowout preventer stacks, drill string compensators, riser and guideline tensioning systems and spares. The equipment, specially developed by Rucker for offshore drilling operations, will be manufactured by the Rucker Shaffer Division in Houston, Texas, and Rucker Control Systems Division, in Oakland, Calif., for shipment during 1974.

Stal og Tau Rope Co. Names Atlantic Cordage & Supply

Atlantic Cordage & Supply Corp., 60 Grant Avenue, Carteret, N.J. 07008, one of the largest suppliers of manila, synthetic and wire rope to the maritime industry, has recently announced their appointment as U.S. distributors for Stal og Tau Rope Co., a division of Elkem-Spigerverket, Norway. Strategically located bonded warehouses in various ports enable Atlantic Cordage to supply foreign operators with their mooring line requirements quickly and efficiently.

Peter Dorey To Head Hydrofoil Society

The International Hydrofoil Society and the Institute of Marine Engineers are holding their next joint meeting in London on October 30.

The first president of the society, Baron **Hanns Von Schertel,** will hand over the office to the president elect, **Peter Dorey,** a shipowner who operates passenger hydrofoil services in the Channel Islands.

Mr. **Dorey** will speak about his operational experience and Baron **Von Schertel** will discuss "Design of Hydrofoils."

Egypt Awards $400-Million Pipeline Contract To Bechtel To Bypass The Suez Canal

Egypt has accepted an offer by Bechtel Inc., a U.S. firm headquartered in San Francisco, Calif., to build a $400-million oil pipeline from the Red Sea to the Mediterranean. The line will bypass the Suez Canal which has been closed since the 1967 Arab-Israeli war.

In choosing Bechtel, Egypt rejected a rival European offer that would have cost $18 million more.

The 42-inch-diameter pipeline will have two parallel lines, each of which will have a capacity of 40 million tons annually. It will run from Ain Sukhna, on the Gulf of Suez, westward to the south of Cairo, then north to Sidi Krer, west of Alexandria. Construction will be in two stages, with the first due to start January 1, 1974, and to be completed within two years, and the second to be completed six months after the first line. A third line, to bring capacity to 120 million tons a year, may be considered in the future.

The Export-Import Bank, an American Government institution, has told Egypt it is willing to finance as much as 45 percent of the cost of equipment for the pipeline project bought from the United States, according to **Ahmed Hillal,** Egyptian Minister of Oil and Mineral Resources. The Eximbank loan would not exceed $120 million, he said, and Egypt has not yet decided whether to accept the offer, pending a decision on the other aspects of financing.

Kidder, Peabody, the New York investment bank that was instrumental in bringing Bechtel and the United States into the picture, is understood to have assured the Egyptians that financing for the whole $400-million project would be available from American, Arab and other private international capital sources.

The first National City Bank of New York is understood to be willing to participate on a major scale.

The Egyptians are expecting revenues of $300,000 to $400,000 a day from the pipeline, according to Mr. **Hillal.**

Bechtel has undertaken to build the double pipeline, complete with deepsea terminals for supertankers at both ends and pumping stations, for $397.6-million, according to Mr. **Hillal**—just $18.4 million less than the offer made by a consortium of European banks and constructors.

The European project would basically have cost $391 million, but the Egyptians would have had to construct on their own a pumping station near Alexandria, included in the Bechtel project, which would have added $25 million to the European estimate.

The object of the pipeline is to provide a faster and less expensive route to Western markets for oil from the Persian Gulf area, notably Iran, than is possible via the tanker passage around the Cape of Good Hope.

Potential pipeline users include Mobil Oil, Standard Oil of California, Texaco, Shell, British Petroleum, Continental, Amoco, the French groups C.F.P. and ERAP, Italy's AGIP, Belgium's Petrofina, the Spanish oil group and Saudi Arabia's Petromin.

It costs $7 to $10 a ton to take crude oil from the Persian Gulf south around the Cape of Good Hope and north to Europe in large tankers. The cost of moving a ton of oil straight north through the pipeline is estimated at about $2 a ton.

For the Egyptians, the pipeline would recapture millions of dollars of revenue lost because of the closing of the Suez Canal. The pipeline would also counter a new Israeli line running from the Port of Elath on the Gulf of Aqaba to Ashkelon on the Mediterranean.

HONORED BY AWO: H.G. Noland (at left), project manager, Western States Distribution Complex, Union Carbide Corporation, Bound Brook, N.J., and former chairman of the board of The American Waterways Operators, Inc., is shown above as he received a commemorative gavel mounted on a plaque, from his successor in the AWO post, **Robert J. Hughes,** president, James Hughes, Inc., New York City. Mr. **Noland** was honored for his outstanding contributions to the barge and towing industry while serving as AWO board chairman in 1972. The ceremony was held in connection with the fall quarterly meeting of the AWO board of directors at The Bellevue-Stratford Hotel, Philadelphia, Pa. AWO is the national association of the barge and towing industry, with headquarters in Washington, D.C., and regional offices in New York City and New Orleans, La.

IHI Signs Technical Pact With Gaz Transport S.A.R.L.

IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.), Japan, has obtained permission to enter into technical agreement on the membrane tank system for liquid natural gas carriers with the French company Gaz Transport S.A.R.L. Permission was granted by the Japanese governmental authorities concerned.

In the field of LNG carrier construction, IHI, in September 1972, completed development of the IHI Flat Tank System (a semi-membrane tank design) using its own technology. This was the first system of this kind developed in Japan. Classification societies have already given their approvals to it, and IHI is now promoting its sale.

Apart from this, IHI, every year since 1969, undertook the annual drydockings and repairs of two LNG carriers, the Arctic Tokyo and the Polar Alaska, built to the Gaz Transport membrane tank design by Kockums Mekaniska Verkstads AB of Sweden, for Arctic LNG Transportation Co. and Polar LNG Shipping Corp.

The membrane tanks of the vessels, however, have not been repaired by IHI but by licensees of Gaz Transport's membrane tank.

At the recent request by the owners for IHI to undertake all the repair work for the two LNG carriers, including repairs on their membrane tanks, IHI decided to introduce membrane tank technology from Gaz Transport in order to expand the scope of its business and to satisfy repair requirements by the owners of LNG carriers.

The agreement concluded between the two parties is for the construction of new LNG carriers and for repair works of LNG carriers already in service and constructed to the Gaz Transport membrane tank design.

Technological information of LNG carriers and their Japanese licensees

System	Tank shape	Licenser	Japanese licensee
Self-supporting	Prismatic	Conch International Methan (ENGLAND)	Mitsubishi Heavy Industries, Ltd. Sumitomo Shipbuilding & Machinery
		Esso-Conch (Double wall structure)	
		Esso International (U.S.A.) (Single wall structure)	Hitachi Shipbuilding & Engineering Co., Ltd.
	Spherical	Moss Rosenverge (NORWAY)	Mitsubishi Heavy Industries, Ltd. Kawasaki Heavy Industries, Ltd. Mitsui Shipbuilding & Engineering Co., Ltd.
		Technigas (FRANCE)	Sumitomo Shipbuilding & Machinery Co., Ltd.
		Gaz Transport (FRANCE)	Mitsui Shipbuilding & Engineering Co., Ltd.
Membrane	Prismatic	Technigas (FRANCE)	Mitsubishi Heavy Industries, Ltd. Nippon Kokan Kabushiki Kaisha Sumitomo Shipbuilding & Machinery Co., Ltd.
		Gaz Transport (FRANCE)	Mitsui Shipbuilding & Engineering Co., Ltd. Nippon Kokan Kabushiki Kaisha
Semi-membrane	Prismatic	Bridgestone Liquefied Gas (JAPAN)	Sasebo Heavy Industries Co., Ltd.
		Ishikawajima-Harima Heavy Industries (JAPAN)	

*The Gaz Transport membrane tank system, for which IHI concluded an agreement at this time, has already been introduced by two other Japanese shipbuilders—Mitsui Shipbuilding & Engineering Co., Ltd. and Nippon Kokan Kabushiki Kaisha.

Luckenbach Forms International Corporation

Edgar F. Luckenbach Jr. has announced the formation of a new shipping firm to be known as Luckenbach International Corporation. This shipowning company will operate vessels under the American flag and will be responsible for the building and operation of the two 56,000-dwt lumber carriers which will be built at Lockheed Shipbuilding in Seattle, Wash.

Mr. **Luckenbach** announced that Capt. **Kalle Jensen,** presently vice president of operations for Luckenbach Steamship Company, has been elected executive vice president of the new corporation, and will be responsible for the daily administration of that corporation's functions.

Luckenbach International is an affiliate of Luckenbach Steamship Co., Inc., and will maintain offices at 120 Wall Street, New York City.

American-Standard Appoints F.W. Guy

Frederick W. Guy has been named western regional manager, with offices in Los Angeles, Calif., for the general sales force of the American-Standard Heat Transfer Division and WABCO Fluid Power Division. The announcement was made by **Ronald L. Gaylord,** field sales manager of the general sales force.

Mr. **Guy** has served as district sales manager of the Los Angeles office of the WABCO Fluid Power Division since 1969. He was previously with Dresser Industries, Valve & Instrument Division, and Miller Fluid Power. He attended Rutland Junior College, Rutland, Vt.

The Heat Transfer Division and WABCO Fluid Power Division are members of the American-Standard Power and Controls Group, headquartered in Dearborn, Mich.

Avondale Lays Keel For Second Of Three Giant LASH Vessels For Central Gulf Lines

Taking part in the keel-laying ceremonies at Avondale for the S/S Green Harbour, are (from left) Avondale president **Edwin Hartzman; Harold S. Grehan Jr.,** senior vice president of Central Gulf; **C.V. Wolff,** general manager of Central Gulf's Marine Division, and **R.E. Dassey,** assistant general manager of Central Gulf's Marine Division.

A $100-million U.S.-flag fleet expansion program for Central Gulf Lines, Inc. moved nearer to completion last month with the keel-laying of the S/S Green Harbour, second of three giant LASH vessels being built as part of the expansion program.

The keel of the 893-foot-long Green Harbour was laid at Avondale Shipyards, New Orleans, La., which is building the three LASH ocean carriers for Central Gulf. The three vessels will be delivered at 75-day intervals, beginning August 1974.

Central Gulf's expansion program also includes a group of 440 LASH barges that are under construction at Union Tank Car Company's East Chicago, Ind., plant. The barges are scheduled for completion in 1974.

Central Gulf, which now operates the world's first two LASH vessels in a fortnightly service between U.S. Gulf ports, the United Kingdom and Continental Europe, plans to operate the Green Harbour and sister ships Green Valley and Green Island between U.S. Gulf and East Coast ports and the Middle East, Indian subcontinent, Southeast Asia and the Far East.

Designed by the naval architectural firm of Friede & Goldman, Inc., the new Central Gulf LASH vessels have an overall length of 893 feet, beam of 100 feet, molded depth of 60 feet at the side, shaft horsepower of 32,000, speed of 22 knots and a deadweight of 40,400 tons at 38 feet. Each of the new ships is designed to carry 89 LASH barges.

Central Gulf, an affiliate of Trans Union Corporation, maintains headquarters in New Orleans, with principal offices in New York, N.Y., Houston, Texas, and Memphis, Tenn., and a network of agency affiliates in major United States and world ports.

BP SIGN WITH HAVEN FOR PLANNED MAINTENANCE AT SEA: BP Tanker Co. Ltd. and Haven Automation Ltd. have signed a maintenance agreement whereby the instrumentation on a large range of crude oil and product carriers will have an increased operational availability. The new agreement will ensure that specified planned maintenance programs are kept up to date, and instead of confining overhauls to drydock calls and emergency visits, Haven's specialists in this field will regularly visit the ships and sail with them as the occasion demands. This mobility of maintenance effort will mean shorter intervals between maintenance periods, which should lead to a higher level of instrument and control equipment availability. The new maintenance contract is signed by **G.A.B. King,** assistant general manager-operations for BP Tanker. Facing the camera from left to right are **M.T. Usher** of BP engineering department; Mr. **King; B.G. Smith,** director and general manager of Haven; **M.R.L. Hayes,** chairman of Haven; **F.T. James,** financial director of Haven, and **E.F. Chambers,** operations manager of "C" Fleet, BP Tanker.

Atlantic Richfield President Says Alaska Holds U.S. Hopes For Future Energy Resources

America will find the near-term answer to the nation's energy requirements in Alaska and in the continental shelf offshore that state, **Thornton F. Bradshaw,** president of Atlantic Richfield Company, said recently in Anchorage.

"The petroleum products that we must have are in the fields of the North Slope and under the waters of the Gulf of Alaska . . . we have delayed too long in both areas," Mr. **Bradshaw** said in remarks prepared for the Council on Environmental Quality at an environmental impact hearing concerning potential oil and gas development in the Gulf of Alaska.

Mr. **Bradshaw** and nine other industry witnesses were scheduled for two days of testimony before the CEQ. Previous regional hearings that included areas off the Atlantic Seaboard were held in Washington, D.C., and Boston, Mass. Others are scheduled for New York, N.Y., Philadelphia, Pa., and Jacksonville, Fla.

Pointing out that Prudhoe Bay alone, on Alaska's North Slope, has been credited with proved reserves of 9.6-billion barrels of oil and 26-trillion cubic feet of gas, Mr. **Bradshaw** emphasized that the importance of Prudhoe and the Gulf of Alaska lies in providing "help to give us time, a breathing space in which to intensify development of new energy technologies.

"Reasonable estimates place the reserves within the nominated area of the Gulf of Alaska at a level possibly two to three times that of Prudhoe Bay," he said. "If you consider the entire basin beneath the Gulf, the reserves could be even greater. If the energy crisis is not a fiction—and we know it to be all too real—then I fail to see how this nation can delay for a moment in commencing an orderly development of this vast treasure of energy lying off our Alaskan Coast."

Mr. **Bradshaw** noted that a trend to small cars and other energy-efficiency mechanisms will help in the future, but cannot at present "radically reverse the accelerating demand for energy that threatens to overwhelm available supplies . . . we will continue to need increasing amounts of power for all purposes—transportation, heating, manufacturing—for the indefinite future."

A new energy policy is called for, he said, providing "a coherent plan of incremental steps that will help us balance on the tightrope of the present, and hopefully guide us to a future of energy sufficiency."

Mr. **Bradshaw** stressed that the need to develop new technologies is urgent, because the nation will have used up readily obtainable supplies of petroleum and natural gas by the turn of the century.

He cautioned that if the trend toward dependence on foreign crude continues, "by 1985 we would be importing 60 percent of our oil. And we would be bound to some of the politically unstable countries of the world.

"The energy needs of the United States in the next decade will require the development of oil and gas reserves from both state and Federal leases within the onshore and the offshore areas of Alaska," he said.

He emphasized the sincerity of the oil industry's concern for the environment, adding: "We seek a development of these resources that is closely compatible with the desires and needs of the American people, as well as with our investment."

AML Merger Into APL Moves Robert Benedict To Everett Steamship

The announcement was made that subsequent to the merger of American Mail Line Ltd. into American President Lines, Ltd., **Robert E. Benedict,** currently president of American Mail Line Ltd., will be associated with Everett Steamship Corporation, S/A. The announcement was made by **George P. Bradford,** president of Everett Steamship Corporation.

Mr. **Benedict's** initial assignment, starting November 15 as vice president of Everett, will be to coordinate the arrangements for Everett's activities as they are affected by the merger of AML into APL. He will be based in San Mateo, Calif., in the office of G.P. Bradford, Inc.

Mr. **Benedict** has been president of American Mail Line for the past three years, having joined that company on July 1, 1970. Prior to that time, he served as president and chief executive officer for Phelps Dodge International Corporation.

Active in community and maritime affairs, Mr. **Benedict** has served as a director and member of the executive committee of American Mail Line and American President Lines, and as a director for the Natomas Company and The National Bank of Commerce of Seattle. He has been a member of the board of trustees and executive committee of the Seattle Chamber of Commerce, a director of the Seattle-King County Economic Development Council, Pacific Maritime Association, National Cargo Bureau, Inc., The Propeller Club of the United States, Evergreen Safety Council, and a member of the executive committee of the National Maritime Council board of governors. He is a Washington State representative on the board of directors of Pacific Northwest International Trade Council, a member of the Mayor's Maritime Advisory Board, and is a member of the Washington State Commission for the United Nations-ECAFE Trade and Investment Conference.

Established in 1917, Everett maintains 26 offices throughout the Far East, where they have served as general agent for AML since 1940. As shipowners in their own right, they operate a fleet of 30 vessels on various trade routes between Far Eastern countries, extending from Japan and South Korea through the Philippines, Hong Kong, Thailand, Singapore, Malaysia and Indonesia as far as Burma, Bangladesh and East India. As I.A.T.A. agents, they also conduct air cargo consolidation/forwarding and travel services on a worldwide scope. In addition to their substantial activities on behalf of AML, they are performing agency representation on an extensive scale for such prominent regular scheduled berth operators as Johnson Line, Australia West Pacific Line, ScanDutch, Lauritzen Reefer Services, Canisa, Burma Five Star Line, Cho Yang Shipping Co., in trades to and from the Arabian Gulf, Australia, North Europe, New Zealand, South America and other areas, and as husbanding and dispatch agents for many of the leading bulk cargo and tanker owners and operators. Headquarters are maintained in Yokohama, Japan.

Dunaif And Tusiani Join Poten Staff

James G. Dunaif has joined the staff of Poten & Partners Inc., tanker and shipbrokers, 711 Third Avenue, New York, N.Y., as a ship sales and purchase broker. He will also handle newbuilding contracts, according to the company announcement.

It was also revealed by the firm that **Michael D. Tusiani** has joined the company as director of planning, research and development. He was previously associated with Anglo Nordic Shipping Co. Ltd. He is a member of the economics faculty at Fordham University and is a candidate for a Ph.D. there, conducting research on the tanker industry.

GIBBS & COX, Inc.

Naval Architects and Marine Engineers

is expanding its organization in its new facilities in New York City. Backlog includes new Patrol Frigate, Sea Control Ship, RO/RO Ship and others. Career positions are available for experienced engineers, designers and draftsmen in:

Naval Architecture, Ship Arrangements, Structural, HVAC, Deck Machinery, Replenishment and Handling Systems, Outfit and Furnishings, Test and Evaluation, Shock, Noise and Vibration

Marine Engineering, Piping Systems Engineering, Piping Layout, Machinery Arrangements, Mechanical Systems, Purchase Specifications and Materials.

Electrical Engineering, Electric Power, Lighting and Cableways.

Electronics Engineering, Compartment Arrangements, Interior and Exterior Communications Systems, Radar, Sonar and ECM Systems.

Weapons Engineering, Arrangements, and Weapon Control Systems.

Project Management, Naval and Merchant, New Construction and Conversion.

Excellent salaries and benefits. Relocation expenses.

U.S. Citizenship Required.

Openings also in Hyattsville, Maryland office.

Send resume, including salary history, to:

Gibbs & Cox, Inc.

40 Rector Street, New York, New York 10006

An Equal Opportunity Employer (m/f)

WE HAVE OPENINGS IN THESE ENGINEERING POSITIONS

MARINE ELECTRICAL

Degree—2-3 years marine experience or 5 years industrial or utility experience. Duties—engineering design.

MARINE OR MECHANICAL

Degree — prefer 2 years sea-time or shipyard design office experience. Duties include specification of propulsion plant machinery, piping systems, piping system calculations, mechanical stress and vibration problems and heat balance calculations.

MARINE OR ELECTRICAL

Degree — with 3 years experience in controls and instrumentation. Candidate should be familiar with process instrumentation and controls. Should have detailed knowledge of the application of mechanical, electrical, hydraulic and pneumatic measuring and control devices.

NAVAL ARCHITECTURE

Degree — 2 years experience in Hull Design. Duties include ship hull design calculations in the area of stability, speed and power and ship structure.

INDUSTRIAL

Degree—BS. Minimum 5 years experience in shipbuilding or heavy fabrication. Welding experience desired. Candidate should have a knowledge of incentive program and ability to set up performance standards. Supervisory experience helpful.

Send resume including salary requirements to PERSONNEL MANAGER.

SUN SHIPBUILDING & DRYDOCK COMPANY
Chester, Pennsylvania 19013

An Equal Opportunity Employer m/f

Nicolai Joffe Corporation
MACHINERY DIVISION

SHIPS FOR SALE
4 CIMAVI TYPE VESSELS
NON TRANSPORTATION USE

Dimensions: LOA 338' 8" — Beam 50' — Depth 29' — Draft 23' 5"
Tonnage: Gross 3805 — Net 2123 — DWT 6090 — Displ 8370
Main Propulsion: Single Screw, 1700 HP Diesel
Auxiliary Generators: 250 KW, 230V D.C. Diesel
Complete With All Accessories. Saw Very Little Service Before Government Layup. Extremely Good Condition.
Ideal as Self Propelled Drill Ship, Crane Ship, or as Stationary Supply or Quarter Ship.
4 Available — Gulf Location

SAN FRANCISCO (415) 761-0993
445 Littlefield Ave. (Box 2445)
So. San Francisco, Ca. 94080
TWX-910-371-7248

NEW YORK SALES OFFICE	BEVERLY HILLS MAIN OFFICE
(212) 832-3320	(213) 878-0650

REPAIR INSPECTOR
EXXON COMPANY, U.S.A.

Prepare repair specifications and conduct damage surveys. Coordinate and supervise shipyard and voyage repairs to Exxon Company, U.S.A. tankers. Requires knowledge of USCG Regulations and ABS Survey requirements. Candidates should hold a Chief Engineer's license, or have served as a USCG or ABS Marine Inspector, or have extensive ship repair experience. Requires relocation to Houston, Texas. Excellent salary and benefits. Forward resume and salary requirements to:

Exxon Company, U.S.A.
Marine Department
P.O. Box 1512
Houston, Texas 77001

Attention: Repair Superintendent

An Equal Opportunity Employer

SYNCROLIFT® DRYDOCKS AND TRANSFER SYSTEMS

Estimates at no cost or obligation
PEARLSON ENGINEERING CO., INC.
P.O. BOX 8/MIAMI, FLA. 33156/(305) 271-5721
TELEX: 051-9340/CABLE: SYNCROLIFT

OPERATORS (4) WANTED FOR EXOTIC BARGE. GAS OR CHEMICAL PROCESS EXPERIENCE NECESSARY. ELECTRICAL, INSTRUMENTATION, AND COMPRESSOR KNOWLEDGE A PLUS. NO SEA DUTY.

Box 1003 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

T 2 TANKER "MISSION BUENAVENTURA"

For sale or rent worldwide for "non-transportation" use at exceptionally attractive terms. Ideal for:

6,500,000 gallon heated Storage Tank
8450 KW, 3500/60/3 Power Plant
Conversion to Offshore Drilling Rig.

Phone M.B. Wender, owner 313-863-9047 or write P.O. Box 43, Detroit, Mich. 48221.

RESIDENT ENGINEER—MARINE MANAGER
SHIP CONSTRUCTION—CONVERSION—REPAIR

Engineer seeking position as local representative/supervisor. 18 years experience in all phases of new construction, conversions and repairs, including position as owner's representative. Degree naval architecture and marine engineering. Will travel or relocate world wide. Resume sent on request.

Box 1001 Maritime Reporter/Engineering News
107 East 31 Street New York, N.Y. 10016

FOR SALE

2 Each—Fairbanks Morse Diesel Marine Engines—complete with mufflers—slightly used — less than 7,000 hours. Model 38D, OP — 8 x 8⅛, S/N — 848498 and 848501, 10 Cyl. 1800 Lp. each. May be seen at Bellinger Shipyard in Jacksonville, Fla., or contact Birdsall Inc., as Agents for Tropical Shipping Co. at 821 Ave. "E", Riviera Beach, Fla. Phone 844-0281 A.C. 305.

BOTTOM DUMP BARGES

For charter, located on East Coast. Barges—Hydraulic Bottom Dumpers. 5 units, steel, double rake, 250'x50'x12', good condition. Photos on request. Barge Leasing Corporation—6611 Kenilworth Ave., Riverdale, Maryland 20840. Contact Homer Garner — 301-779-1318.

Position Wanted
HULL SUPERINTENDENT

Twenty years experience in shipbuilding, managing up to a 2500-man force on government, commercial, and drill rigs on the East and Gulf Coast. College graduate and graduate apprentice shipfitter. 512/546-0749.

WINCHES—Steam or Air Operated

4x6 Lidgerwood, 13000# Static Load $995.00 each
8x8 Lidgerwood, 6,000# at 200 FPM $1500.00 each
7x12 American Hoist & Derrick 10,000# at 125 FPM $1500.00 each
9x12 American Hoist & Derrick 20,000# at 110 FPM $2750.00 each
10½x12 Lidgerwood, 32,000# at 90 FPM $4750.00 each

Also Electric

2 Almon A. Johnson Towing Engines Model 232 wire rope included at $19,000.00 each

All sizes of stud link chain, anchors, fittings available from stock

STANDARD STEAM WINCH CO., INC.
Agents for Baldt Anchor & Chain and Crosby Group
16 Beaver St., N.Y., N.Y. 10004 212/269-1557

SHIPBOARD EQUIPMENT

From

ZIDELL

Explorations, Inc.

Contact: Ralph E. Ingram
3121 S.W. Moody Avenue
Portland, Oregon 97201
TELEX: 36-0503 · CABLE "Zidell"

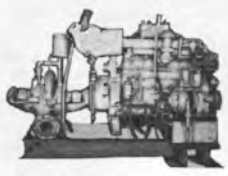
PHONE:
A/C 503
228-8691

A partial listing of our stock from EX-NAVY and MARITIME VESSELS

Certification to A.B.S. or Lloyd's a routine

MARINE PUMPS

FIRE PUMPS



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

DC, VERTICAL-ROTARY

1—WORTHINGTON, Size 4GRVS, with Westinghouse Motor, 15 HP, 230 Volts DC, 1310/1750 RPM.

DC, VERTICAL - ROTARY cont.

2—QUIMBY, Size 5, 6x5, 400 GPM, 48 PSI, 25 HP, 230 DC.

2—WORTHINGTON, Type 3GRVS, 90 GPM, 75 PSI, 7½ HP, 230 DC.

DC, HORIZONTAL-CENTRIFUGAL

1—WORTHINGTON, Size 3UB1, 400 GPM, 280′ head, with Westingtouse Motor, 50 HP, 230 DC.

2—WORTHINGTON, Size 8L1, 2100 GPM, 138.5 TDM, with Westinghouse Motors, 100 HP, 230 DC.

3—GOULDS, 250 GPM, 100 PSI, Figure 3380, 4″x3″, with 30 HP Motors, 230 DC.

4—WORTHINGTON, Size 12LA1, 4000 GPM, 67.3 TDM, 100 HP, 230 DC.

AC, HORIZONTAL-CENTRIFUGAL

1—WARREN, 600 GPM, 50 PSI, 8¼ HP, 440/3/60, 1135 RPM.

4—WORTHINGTON, 200 GPM, 100 PSI, 3½″ suction, 3″ discharge, Size 2UB1, with Wagner Motor, 25 HP, 440/3/60.

1—GARDNER-DENVER, 5″ suction, 3″ discharge, 350 GPM, 336′ head, 50 HP, 440/3/60, 3500 RPM.

1—CARVER, 400 GPM, 100 PSI, 3½″ suction, 2½″ discharge, 3500 RPM, 35.7 HP, 440/3/60.

2—BUFFALO, 250 GPM, 100 PSI, Class CCS, Size 4x3½″, with Westinghouse Motors, 25 HP, 440/3/60.

DC, VERTICAL-CENTRIFUGAL

2—ALLIS-CHALMERS, 170 GPM, 208′ head, Type CF2V, 6″ suction, 3½″ discharge, 20 HP, 230 DC.

2—ALLIS-CHALMERS, 30 GPM, 208′ head, Type CF2V, 2½″ suction, 1½″ discharge, 7½ HP, 230 DC.

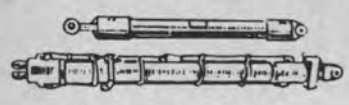
1—ALLIS-CHALMERS, 400 GPM, 100 PSI, 4″x3″, 50 HP, 230 DC.

1—WORTHINGTON FIRE & BUTTERWORTH, Size 3 UBS, 400 GPM, 200 PSI, 75 HP, 230 DC.

2—ALLIS-CHALMERS, Type SGV, 600 GPM, 30 PSI, 20 HP, 230 DC.

THE ABOVE LIST REPRESENTS BUT A FRACTION OF OUR MARINE PUMP STOCK. PLEASE INQUIRE FOR SPECIFIC TYPES AND SIZES NOT SHOWN.

HYDRAULIC CYLINDERS



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

FORGED STEEL LINE SHAFTING

1000 Tons of miscellaneous line shafting—Call on your requirements.

We also have . . . Machinery and Equipment from:

AP2 and AP3 Vessels
C2-SB1 Vessels
C3-S1-A3 Vessels
and Liberty Ships

AXIAL FLOW FANS

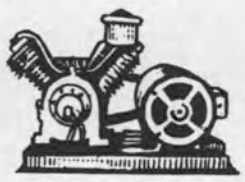
Rebuilt Guaranteed LaDel, STURTEVANT, etc.

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

EXAMPLE LISTING:

Size A¼	Size A3	Size A8
Size A½	Size A4	Size A10
Size A1	Size A5	Size A12
Size A2	Size A6	Size A16

AIR COMPRESSORS



2—SULLIVAN, Size WL60, Model A-UB-8, 100 PSI, 2 stage, with 30 HP G.E. Motors. 440/3/60.

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

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

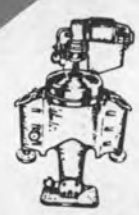
2—WESTINGHOUSE Air Brake Steam, Size 11x11x12, approximately 60 CFM at 100 PSI.

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

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

IF YOU DON'T SEE IT CALL!

"IF IT'S ON A SHIP, WE PROBABLY HAVE IT!"



CENTRIFUGES

SHARPLES AND DE LAVAL

150 GPH—440 AC
230 DC

350 GPH—230 DC

600 GPH 230 DC

☆

PROPELLER SHAFTS

From
CS-SI-A3 VESSEL

From AP3 VICTORY SHIP

MARINE DIESEL GENERATORS

HERCULES, DOOC, 10 KW, 120 DC.

CATERPILLAR, D3400, 15 KW, 120/240 DC.

BUDA, 4 cylinder, 15 KW, 120/240 DC.

HERCULES, DJXC, 25 KW, 120 DC.

CUMMINS, WA255, 30 KW, 120 DC.

P&H, 387C-18, 45/56 KVA, 120/208/3/60.

BUDA, 6DH909, 40 KW, 120 DC.

BUDA, 6 DHG691, 60 KW, 120 DC.

GENERAL MOTORS, 6067, 60 KW, 450/3/60.

BUDA, 6DC844, 75 KW, 125-250 DC.

1—CUMMINS, Model HCD, 60 KW, 120/240 DC.

CATERPILLAR, D17000, 85 KW, 220/3/60.

4—COOPER-BESSEMER, Model FSN6, 6 cylinders, 375 HP, 900 RPM, with General Electric Generators, 250 KW, 440/3/60.

MORE DIESEL GENERATORS ON FOLLOWING PAGE

REDUCTION GEARS

WESTINGHOUSE, as orig. used on two 1362 HP electric motors in submarine, 2 pinions, single gear.

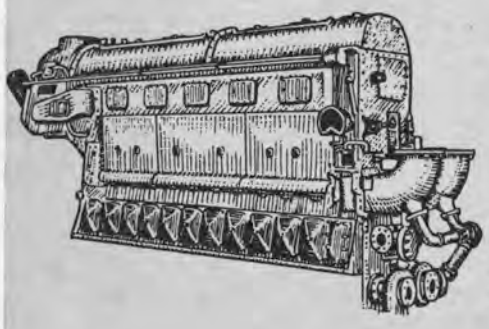
FALK Reduction Gears—Port & Starboard, Interchangeable with T-3 Tanker Gears, Falk No. 148-300. Also interchangeable with Falk Gears on AO51 Class Tankers (14 ships). Also on AO97 and AO100 Tankers.

1—L.S.T. TYPE VESSEL HULL

328′

Steel Hull, 328′ overall, 50′ extreme beam, maximum draft 14′, approximate displacement 1780 tons. To be sold stripped of all machinery and deck house. Located in Portland, Oregon.

MARINE DIESEL ENGINES



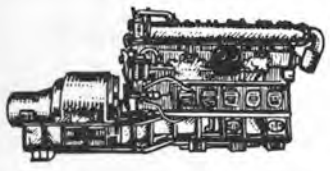
MATCHED PAIR . . . FAIRBANKS MORSE

Model 38D8⅛ — 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.

3—COOPER-BESSEMER DIESEL ENGINES, Model LS-8-DR, 1300 HP, 277 RPM, direct reversing, turbo charged.

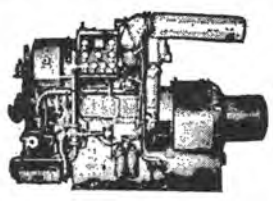
2—SUPERIOR DIESEL ENGINES, Model VDSS, 1160 HP, 325 RPM.

MARINE DIESEL GENERATORS



3—DE LAVERGNE, Marine, 560 HP, 514 RPM, Serials #2180 and #2181, with Electric Machinery Generators, 375 KW, 450/3/60.

2 — SUPERIOR Diesel Engines, Model GBD-8, Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100 KW, 120/240 DC.



1—GENERAL MOTORS, Model 3-268A, Marine, 150 BHP, 1200 RPM, 3 cylinders, with 100 KW Generator. 120/240 DC.

4—GENERAL MOTORS, Model 3-268A, 150 HP, 1200 RPM, 3 cylinder, with 100 KW Generators, 450/3/60.

TURBINE GENERATORS A.C. AND D.C. VOLTAGES

A.C.

2—1500 KW, GENERAL ELECTRIC Turbines: Type FN4-FN30, Steam 525 PSIG. 8145 RPM, with G.E. Generators, 1500 KW, 450/3/60.

4—1250 KW, GENERAL ELECTRIC Turbines: Type FSN, 525 PSI, 7938 RPM. Generators: 1250 KW, 450/3/60, 3600 RPM, Type ABT2.

4—600 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, Steam 525/565 PSIG, 10033 RPM, with G.E. Generators, 600 KW, 450/3/60.

8—750 KW, GENERAL ELECTRIC Turbines: Type FN3-FN24, 525 PSI, 10,033 RPM. Generators: 750 KW, 450/3/60, 1200 RPM, Type ATI.

2—500 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

D.C.

1—WORTHINGTON, 225 PSI, 397°F, 6510 RPM, with Westinghouse Generator, 150 KW, 120 DC, 1250 Amperes.

6—WESTINGHOUSE, 200 PSI, with Westinghouse Generators, 60 KW, 120 DC.

4—ALLIS-CHALMERS, 440 PSI, 740°F, with Allis-Chalmers Generators 300 KW, 240/240 DC.

1—GENERAL ELECTRIC, 525 PSI, with G.E. Generator, 250 KW, 440/3/60.

1—GENERAL ELECTRIC, with G.E. Generator, 350 KW, 440/3/60.

ALLIS-CHALMERS, 440 PSI, 740°F, 300 KW, 120/240 DC.

JOSHUA HENDY, 300 PSI, 550°F, with Westinghouse Generator, 300 KW, 120/240 DC.

WORTHINGTON, Form S4, 440 PSI, 740°F to a Westinghouse Generator, 250 KW, 440/3/60, and to a 90 KW, 120 DC.

DELAVAL, 450 PSI, 750°F, 300 KW, 120/240 DC.

SUBMARINE DIESEL GENERATOR ENGINES

(Without Generators)

2—GENERAL MOTORS, Model 16-278A, 1600 HP, 750 RPM.

1—FAIRBANKS-MORSE, Model 38D8-1/8, 16 cylinder, O.P., 1600 HP, 720 RPM.

☆

FOR ELECTRICAL EQUIPMENT 503/228-8691 ASK FOR "ELECTRICAL DIV."

FOR MARINE VALVES & FITTINGS: 503/228-8691 ASK FOR "VALVE DIV."

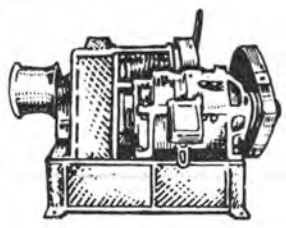
Steel Watertight DOORS

Used, Good Condition, Trimmed Frames.

Many sizes available, priced reasonable. Some Typical Prices shown below. Please inquire for other sizes.

26"x48"—4 Dogs—**$60.00** ea.
26"x57"—6 Dogs—**$80.00** ea.
26"x60"—4 Dogs, 6 Dogs—**$86.00** ea.
26"x66"—6 Dogs, 8 Dogs—**$100.00** ea.
26"x66"—Q.A. Type **$175.00** ea.

CARGO WINCHES



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

Single Speed, Single Drum

UNIT WINCHES

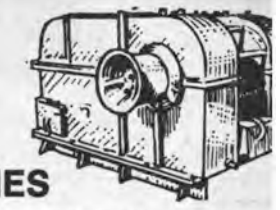
American Hoist and Derrick Co.

U3H—SINGLE DRUM, Single speed (4)
Line Pull: 7450#—223 FPM,
6360#—237 FPM,
3720#—287 FPM.

U6H—DOUBLE DRUM, Single Speed (2)
Line Pull: 7450#—223 FPM,
6360#—237 FPM,
3720#—287 FPM.

Motor: Westinghouse, 50 HP, 230 Volts DC, 1900 RPM, Model 288212, 183 Amperes, compound wound, Frame 9 UW, horizontal.

Unit Winches complete with Contactor Panels, Resistors, Master Switches.



UNIWINCHES

LAKESHORE UNIWINCHES, 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.

ANCHOR WINDLASSES

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.

2—AMERICAN HOIST AND DERRICK COMPANY, horizontal, double wildcat for 2¼" chain, double gypsy, 70 HP, 230 Volts DC with electric controls.

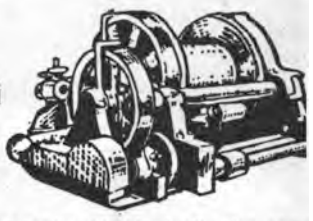
2—HESSE-ERSTED, horizontal, double wildcat, 2⅛" chain, 60 HP, 230 DC.

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

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

STEAM TOWING WINCH



Single drum capacity 2000' of 2" wire rope cylinder size 9" bore by 10" stroke.

ANCHOR CHAIN

Used, good, with or without test certificate.

1⅜" size
1½" size
2 1/16" size
2¼" size
2⅝" size
2¾" size
3⅜" size

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.

2—HESSE-ERSTED VERTICAL, Single Wildcat—for 1⅜" Anchor Chain, single gypsy, with 35 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.

CARGO HOISTER BLOCKS

5 ton rated, Steel, as removed from surplus ships. Manufactured by: Young, Draper, etc., 12" and 14" sizes.

$44.50 ea.

$49.50 each with pull test certificates

Hundreds of other items in stock from Carriers, Cruisers, Destroyers, Submarines, Landing Vessels, Troop Ships and Cargo Ships

★

YOUR INQUIRIES INVITED AND PROMPTLY ANSWERED

Contact: Ralph E. Ingram

ZIDELL EXPLORATIONS, INC.

3121 S.W. Moody Avenue
Portland, Oregon 97201

A/C 503, Phone 228-8691

MONTHLY MARINE SPECIALS

FOR SALE

A. **STEEL DIESEL TUG**—Rebuilt 1973
85′ x 24′ x 11.5′ 1800 HP $600,000.00

B. **TWO WELDED STEEL COVERED DECK BARGES**
210′ x 35′ x 9′ ea. $60,000.00

C. **OIL BARGE**—Built 1952 Price
250′ x 35′ x 15′ 30,000 Bbls. upon request

D. **3 COVERED and 3 DECK BARGES**—Built 1954
90′ x 30′ x 9′ 350-ton cap. ea. $7,500.00

ALL COMMERCIAL FLOATING EQUIPMENT AVAILABLE. SEND FOR FREE BROCHURE.

MOWBRAY'S
TUG & BARGE
SALES CORP.
21 West St. New York N.Y. 10006
TELEPHONE (212) 943-7070

Europe's Largest Marine Stocks

FACTORY RECONDITIONED
WITH CERTIFICATES

Anchors (1500)
Chain Cables (3000 t)
Winches (150)
Windlasses (50)
Accommodation Ladders (20)
(60) **Generators**
(250) **Pumps**
(20) **Lifeboats**
(10) **Gangways**
Spare Parts

PROMPT DELIVERY ALL PORTS
ASK FOR OUR STOCKLIST

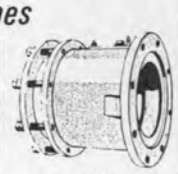
WILLEM POT B.V.
45 Stationsplein—Rotterdam
HOLLAND
TELEX: 22496
Phone: 11 98 70 Grams: "Windlass"

Bearings & Stuffing Boxes

... the reliable ones

DOVETAILED BRONZE HOUSINGS WITH METAL-BACKED RUBBER STAVE BEARINGS

PRECISION FITTED DEMOUNTABLE WATER LUBRICATED RUBBER STAVE BEARINGS



BRONZE STUFFING BOXES—FOUR STYLES AIR SEAL DESIGN FOR EASY PACKING CHANGE

For A Full Range of Shaft Sizes—*Write for Data*

Johnson® DURAMAX® PRODUCTS
JOHNSON RUBBER COMPANY
MARINE DIVISION
MIDDLEFIELD, OHIO 44062 U.S.A., Area Code 216-632-2111

" YOU'D THINK THIS CITY COULD AFFORD A FIRE-TUG TO GREET NEW SHIPS ! "

Nicolai Joffe Corporation

MACHINERY DIVISION

TURBINES
for
Your Ship

In Stock
With A.B.S. Certificate

MAIN PROPULSION FOR C4, C3, C2, C1, T2, & VICTORY

General Electric
High and Low Pressure ..... 8500 HP
Westinghouse High & Low Pressure
Turbine & Type H & Type C Gears.... 8500 HP
Allis Chalmers Low Pressure..... 6000 HP
De Laval
Reduction Gear Components..... 6000 HP
General Electric T-2 Diaphragms..... 6000 HP
General Electric
High & Low Pressure..... 6000 HP
Westinghouse High Pressure..... 6000 HP
Westinghouse and Allis Chalmers
High & Low Pressure..... 4400 HP

AUXILIARY TURBO-GENERATORS

General Electric FN4-FN30..... 1500 KW
General Electric
FN3-FN20 10030 RPM ..... 600 KW
Westinghouse 5015 RPM..... 538 KW
General Electric DORV 325..... 525 KW
Allis Chalmers (G.E. Design)
5645 RPM ..... 500 KW
General Electric
DORV 618N 10059 RPM ..... 400 KW
Worthington 6097 RPM..... 400 KW
Allis Chalmers 8000 RPM..... 300 KW
Allis Chalmers 5645 RPM..... 300 KW
De Laval 5692 RPM ..... 300 KW
General Electric
DORV 325 5636 RPM..... 300 KW
Joshua Hendy (Terry Design)
HM-5 5965 RPM..... 300 KW
Westinghouse Non-Recessed ..... 300 KW
Westinghouse Recessed..... 300 KW
Worthington 6097 RPM..... 300 KW
General Electric
DS 60-25 5660 RPM..... 250 KW
Westinghouse 5015 RPM..... 250 KW
General Electric
DORV 518N 10012 RPM..... 240 KW
Worthington 6510 RPM..... 150 KW
Westinghouse 7283 RPM ..... 60 KW

Many Units Complete
With Reduction Gears and Generators

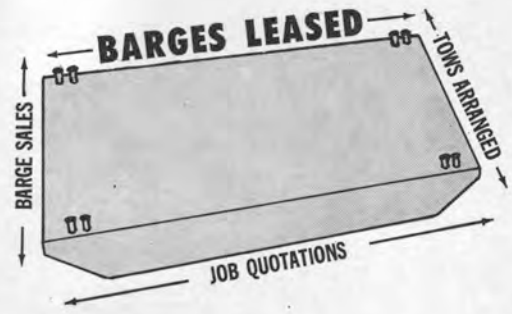
We Offer Complete Units or Component Parts

SAN FRANCISCO (415) 761-0993
445 Littlefield Ave. (Box 2445)
So. San Francisco, Ca. 94080
TWX 910-371-7248

NEW YORK SALES OFFICE
(212) 832-3320

BEVERLY HILLS MAIN OFFICE
(213) 878-0650

SERVICE IN ALL DIMENSIONS



McDONOUGH MARINE SERVICE

P. O. BOX 26206
NEW ORLEANS, LOUISIANA 70186/504-949-7586
BRANCH OFFICE: P. O. BOX 233 CHANNELVIEW, TEXAS 77530
PHONE HOUSTON 713-622-9977

"WHEN YOU NEED IT YESTERDAY"
"Largest and Most Diversified Stocks in the World"
VALVES • FITTINGS • FLANGES • STRAINERS
EXPANSION JOINTS • PIPING SPECIALTIES • MACHINE SHOP
"We Got It", "We'll Get It" or "We'll Make It"
METROPOLITAN PLUMBING SUPPLY CORP.
5000 2nd St., L.I.C., N.Y. 11101 Phone (212) EM 1-2111
Free Phone: 800-221-9672
In N.Y. State—Phone 212 EM 1-2111

NEW 7" RADIUS PANAMA CHOCKS
(MEET PANAMA REGULATIONS)
With extended legs for welding to deck. IMMEDIATE DELIVERY FROM STOCK.

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

RECONDITIONED 30,000 CFM AXIAL FANS

Made by Joy Manufacturing Co.—A30A4W6. MOTOR: 25/14 HP—440/3/60—36-20.4 amps—1200/1900 RPM.

OTHER AVAILABLE AXIAL FLOW FANS

115 VOLTS DC
4000 CFM/5000 CFM/6000 CFM/10,000 CFM/12,000 CFM

230 VOLTS DC
Unused 2000 CFM 20AF—mfg. by Joy—0.75 HP motor—3450 RPM—3.4 amps—0.5" static—15" ID—17" flange

ALSO
8000 CFM/10,000 CFM/35,000 CFM

440 VOLTS AC
1000 CFM—Bufallo A1A4W5—¾ HP—440/3/60/3450
2000 CFM—220/440/3/60—1.5 HP/3400 RPM
Other sizes from 3,000 CFM to 16,000 CFM

THE BOSTON METALS COMPANY
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

NATIONAL METAL'S CURRENT T-2 INVENTORY

MANY OTHER ITEMS NOT LISTED • ALL ITEMS FURNISHED WITH A.B.S. OR LLOYDS'

TURBOGENERATORS

525 KW GENERAL ELECTRIC AUXILIARY TURBOGENERATOR UNIT

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

538 KW WESTINGHOUSE TURBOGENERATOR UNIT

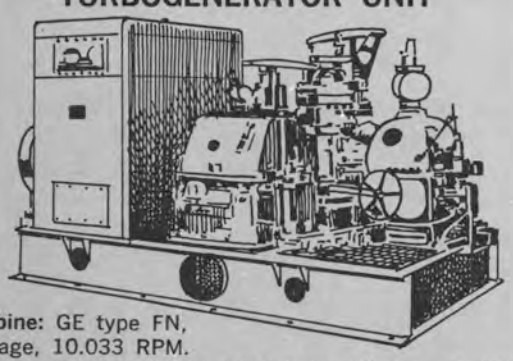
Complete with L.O. Coolers and exciters. **Turbine:** Westinghouse 538 KW, 5010 RPM. Inlet pressure 435 psi. Temp. 750 degrees F.TT. Exhaust pressure 28½ hg vac. **Generators:** (1) 400 KW, 450 VAC, 3 pole, 60 cycle, PF 80%, 1200 RPM, ship's service. (2) 32.5 KW, 125 VDC, 1200 RPM, variable voltage exciter.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

535 KW GENERAL ELECTRIC TURBOGENERATOR UNIT

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

★★ ALSO AVAILABLE!! ★★

600 KW GENERAL ELECTRIC TURBOGENERATOR UNIT



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

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

MAIN MOTOR FOR T2

Gen. Elect. #5690714 Type TSM-80, 6000 HP, 90 RPM, form H.L., 2300 Volts, Amps. arm. 1160, P.F. 1.0, KVA 4625 Phase 3 cycle 60, Exciter volts 120, amps field 390 contin. @ 60°C. rise.

5400 KW MAIN GENERATOR

General Electric, S/N 79938, Marks 6937958 G-4, 5F-1690-2, 164-M.

PUMP UNITS

CARGO STRIPPING PUMP

(Steam) Worthington, vertical duplex, double acting, size 14" x 14" x 12", speed 46 ft./min., 700 GPM, 150 psi operating pressure.

MAIN FEED PUMP

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

MAIN FEED PUMP

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

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, single stage, double suction centrifugal, 585 RPM, 16,500 GPM against TDH 25 ft. @ 30 psi, 26" x 24". **Motor:** General Electric, Model 5K633AP1, Frame N-6336-B, 585 RPM, 440 volts AC, 191 amps, 3 phase, 60 cycle, complete with controller.

MAIN CIRCULATING PUMP

Pump: Ingersoll Rand, type 24 VCM, size 24", 585 RPM, 14,000 GPM @ 25 ft. TDH, 26" x 24", operating pressure 15 psi. **Motor:** Westinghouse, Model CS, Frame 876C, 125 HP, 585 RPM, 440 volts AC, 159 amps, 3 phase, 60 cycle, complete with controller.

MAIN CARGO PUMP UNIT

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

FUEL AND LUBE OIL PUMP

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

LUBE OIL SERVICE PUMP

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

MAIN CONDENSATE PUMP

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

AIR COMPRESSORS

COMBUSTION CONTROL AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, type 30, Model 253 x 5, 20 CFM at 100 psi, 600 RPM. **Motor:** General Electric, Model 5KG254B2782, Frame 254, Type K, 440 volts, AC, 7.5 amps, 3 phase, 60 cycles, 5 HP, 1723 RPM, complete with controller and switch.

SHIP SERVICE AIR COMPRESSOR UNIT

Compressor: Ingersoll Rand, Type 30, Model 5 x 5 x 4, 545 CFM at 100 psi, 750 RPM. With motor and base.

VALVES

Gate: 10", 12", 14", 16", 20" and 24"
Angle: 12", 14" and 18" **Crossover:** 16"
High suction: 26" **Low suction:** 26"

TURBINE ROTORS

5400 KW GENERAL ELECTRIC TURBINE ROTOR

ABS, 6275-31, AB-142-WD-8-10-44, 1701461 T8604259, 6275-31 67-KU-102032, A853BY 21 Jan. 1967.

525 KW GENERAL ELECTRIC TURBINE ROTOR

S/N 60137, ABS 71-LA-12430-624 A624 B, Reconditioned April 21, 1971.

5400 KW WESTINGHOUSE TURBINE ROTOR

ABS report 66KU11942 A853B, 6 Sept., 1966, Marks: 6275-45. AB-142 WD9-30-44, 170-1467, 8604259-1, 6275-45.

5400 KW WESTINGHOUSE MAIN TURBINE (Profile type):

5400 KW ELLIOTT TURBINE ROTOR

ABS, 67-LA9644-830, AB-JCB-3-31-67, 9013039-9230P1, 66-KU-11895, A853 1071941, AB142 WDG-4-45.

MISCELLANEOUS T-2 EQUIPMENT

MAIN AIR EJECTOR

Main air ejector, Graham Mfg. Co., type 2 stage twin, size 163B, capacity, 65 PPH of air (220 GPM cont. @ 79°F.), oper. press. 150 PPH.

MAIN CONDENSER END

Graham (waterbox).

MAIN CONDENSER END

Westinghouse (waterbox).

MAIN CONDENSER END

Westinghouse (return head).

AUXILIARY CONDENSER END

Graham (waterbox and return head), surface condenser, size 1500 sq. ft., S/N 2915, Design press Shell 15-Tubes 25, Test press Shell 30-Tubes 50.

TAIL SHAFTS

ABS 59-S1768-AB810
Reconditioned, ABS 70-LA-11901-946

RUDDER WITH STOCK (complete)

SEND NOW FOR NEW 1973 CATALOG

HUNDREDS OF OTHER ITEMS ALSO AVAILABLE!

* * * * * * * * * * * * * * * * *

National Metal AND STEEL CORP.

691 New Dock Street, Terminal Island, California 90731
Area Code (213) 775-3321 • Telex: TWX 213-548-0990

* * * * * * * * * * * * * * * * *

M.G. SETS

APPROX. ½ KW
110/1/60 M.G. SET
NEW—UNUSED

INPUT: 115 VDC—6.1 amps—3600 RPM. AC OUTPUT: 425 watts—4.55 amps—110/1/60. Ball bearing. 13⅞" long—7 9/16" wide—10½" high. Has radio noise supression filter. Net wt. 58 lbs—83 lbs packed for shipping.

$89.50 EACH

UNUSED—10 KW—120/1/60 M.G. SET

INPUT: Motor 25 HP — 120 VDC — 156 amps — 1800 RPM —flange-coupled to output generator.

OUTPUT: 10 KW generator — 120 volts 60 cycle single phase —108 amps — 0.80 PF — with direct-connected 125 volt 8 amp exciter. Motor starter by Cutler-Hammer. AC generator has voltmeter and ammeter. Bassler voltage regulator.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

NEW WATERTIGHT DOORS

6-Dog right and left hand hinged steel doors—with frames. Built and tested to A.B.S. spe-specifications.

SIZE	NET WT.
26"x48"	250 lbs.
26"x60"	300 lbs.
26"x66"	320 lbs.
30"x60"	330 lbs.

EACH DOOR

IMMEDIATE DELIVERY

THE BOSTON METALS COMPANY

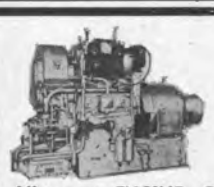
313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

100,000 lb. Almon Johnson Series 232 Constant Tension Mooring Winches

5 Available. In very good condition. Series 232 mooring & anchoring winches—automatic self-tensioning. Wide range from 100,000 lb line pull at 10 FPM to 26,000 lbs at 400 FPM. Gypsy line pull 12,000 lbs at 125 FPM. Drum declutchable through spiral jaw clutch for free spooling. Driven by 50 HP—230 VDC motors—Westinghouse CK—575 RPM—½ hour—75°C rise—stab. shunt—181 amps—max. RPM 1900. Cutler-Hammer brake—18"—type NM. Complete with magnetic control panel, resistor banks & remote control pedestal—mounted master switch. **Can spool up to 2000' 1¼" wire.**

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050



G.M. 3-268A 100 KW A.C. Diesel Generator Set

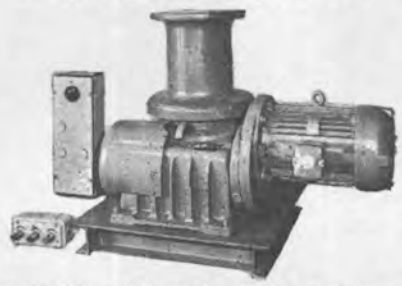
Like new. ENGINE: G M. 3-268A—3 cylinder—6½"x7" bore & stroke. GENERATOR: General Electric—100 KW—440 volts—3-phase—60 cycle.

$2450

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

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—220/440/3/60—1760 RPM. CONTROL: Marine type watertight pushbutton — forward / reverse / stop—watertight starter box—rated for 40 starts/hour—triple pole contactor with silver contacts, thermal overload relay & trip adjustment. DIMENSIONS: Barrel 10" diam.—flange 10" diam.—approx. 26" wide & 36" long.

$2450

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

1000 GPM—125 LB
BRONZE FAIRBANKS-MORSE FIRE & GENERAL SERVICE PUMP

PUMP: Mfg by Fairbanks-Morse.. Horizontally split case — 1000 GPM—281' head — 3545 RPM. Suction pressure flooded—6" suction—5" discharge. Steelflex coupling. MOTOR: Fairbanks-Morse—440/3/60—squirrel cage—3600 RPM—class A insulation. Type KZK—continuous duty—dripproof—ambient temp. 50°C. Complete with Cutler-Hammer controller (reduced voltage magnetic starter). DIMENSIONS: 5' 5" OAL—23" OAW—2' 11" OAH. UNIT HAS HAD VERY LITTLE USE.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED 1-5/16" IDEAL WINDLASS

For 1-5/16" chain—on 36" centers. 15 H.P.—115 volts DC—1750 R.P.M.—6000 lb. line pull.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

Berger-Type Deck-Mounted FAIRLEADS

For 1" wire rope—12" diameter sheave—steel frame—self-aligning — 180° swing. Formerly in Naval use on LCT.

$745 EACH

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

T-2 TANKER VALVES

Reconditioned to ABS standards

24" OVERBOARD DISCHARGE VALVE

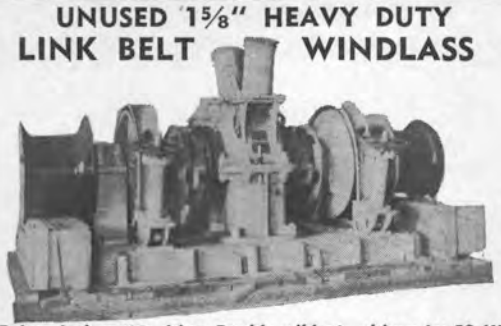
●

MAIN INJECTION VALVE

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

UNUSED 1⅝" HEAVY DUTY LINK BELT WINDLASS

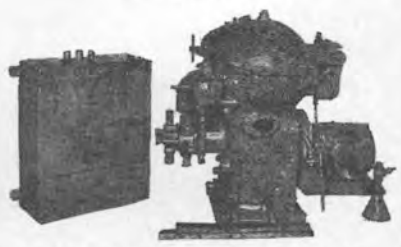


Below deck motor drive. Double wildcat—driven by 50 HP 230 VDC motor with vertical shaft and worm drive. Single speed—handles 7000 lb anchors and 60 fathoms of 1⅝" chain at 7 fathoms per minute. Wildcat centers 56". Complete with all controls and warping features. Total weight 27,500 lbs. With spares.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

FUEL OIL OR LUBE OIL PURIFIER



DeLaval—600 G.P.M.—type B-1529C-60—with 3 H.P. 440/3/60 Motor. Mfg. by German DeLaval. Spare parts available.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

REVOLVING FIELDS

GENERAL ELECTRIC
Rewound — with A.B.S. — ex-Pioneer Valley.

WESTINGHOUSE
For T2SE—A-1 tankers—with A.B.S.—ex-Caltex J.H. MacGaregill.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
539-1900 (301) 355-5050

BUYERS DIRECTORY

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ANCHORS AND ANCHOR CHAINS
Lockstad Co., Inc., 179 West 5th Street, Bayonne, N.J. 07002

AUTOMATIC DRAFTING SYSTEMS
Gerber Scientific Instruments Co., P.O. Box 305, Hartford, Conn. 06101

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

BUNKERING SERVICE
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.I., England

CLUTCHES, GEARS & BRAKES
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., Inc., 21 West Street, New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Oreans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
RPC Division, Midland-Ross Corp., P.O. Box 490, Roxboro, N.C. 27573

CONTAINER LASHINGS & COMPONENTS
American Engineered Products, P.O. Box 74 Nichol Ave., McKees Rock, Pa. 15136
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

CONTROL SYSTEMS
Frederick Cowan & Co., Inc., 120 Terminal Drive, Plainview, L.I. New York 11803
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
WABCO Fluid Power Division, 1953 Mercer Road, Lexington, Kentucky 40505

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407

DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
A. G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ACCESSORIES
A.G. Schoonmaker, Box 757, Sausalito, Calif. 95965

DIESEL ENGINES
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wisc. 53511
De Laval Turbine Inc., Engine & Compressor Div., 550 85th Ave., Oakland, Calif. 94621
Electro-Motive Division General Motors, La Grange, Illinois 60525
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
H.O. Penn Machinery Co., Inc., 1561 Stewart Ave., Westbury, N.Y. 11590
Waukesha Motor Co., 1000 W. St. Paul Ave., Waukesha, Wis. 53186

DIESEL ENGINE MUFFLERS
Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOCK BUILDERS
GHH Sterkrade Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004

DOORS—Watertight—Bulkhead
Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICÁL EQUIPMENT
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

EVAPORATORS
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Riley-Beaird, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130

FAIRLEADS
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.

FENDERING SYSTEMS—Dock & Vessel
BJ Marine Products, subsidiary of Borg-Warner, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

FITTINGS & HARDWARE
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FLOATING EQUIPMENT—Steel—Aluminum Pontoons
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

GAS ALARM SYSTEMS
Lisnave, P.O. Box 2138, Lisboa 3, Portugal
Riken Keiki Fine Instrument Co., Ltd., 2-7-6 Azusawa Itabashi-ku, Tokyo, Japan

HATCH COVERS
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, Md. 07016

HEATERS & COOLERS
Way-Wolff Associates, Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

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

LIGHTS—Emergency, Search & Navigation
Snelson Oilfield Lighting Co., P.O. Box 1284, Fort Worth, Texas 76101

LNG SHIP DESIGN AND LICENSING
PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022

LNG TANKAGE
Gazocean U.S.A. Inc., 125 High St., Boston, Mass. 02110
LGA—Liquid Gas Anlagen Union GmbH, c/o Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004
Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. 15225

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

MARINE BLOCKS & RIGGING
Crosby Group, Box 3128, Tulsa, Okla. 74101

MARINE DRIVES—GEARS
Hoffert-Lowe, Inc., 108 Ridge Road, North Arlington, N.J. 07032
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

MARINE EQUIPMENT
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

MARINE FURNITURE
Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231

MARINE INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105
UK P&I Club (Bermuda): Thos. R. Miller & Son, Mercury House, Front St., Hamilton, Bermuda (P.O. Box 665)

MARINE PROPULSION
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Ark. 72204
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

MARINE SURVEYORS
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316

MARITIME FINANCING—Leasing
General Electric Credit Corp., 4 Corporate Drive, White Plains, N.Y. 10604
Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

NAVAL ARCHITECTS AND MARINE ENGINEERS
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Arthur D. Darden, Inc., 1040 International Trade Mart, New Orleans, La. 70130
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, 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Gurainick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Ilariucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503
Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701
Raytheon Co. Marine Products, 676 Island Pond Rd., Manchester, N.H. 03103

Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

OILS—Marine—Additives
Exxon Company, U.S.A., P.O. Box 2180, Houston, Texas 77001
Exxon International Company, 1251 Avenue of the Americas, New York, N.Y. 10020
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., 21 West St., New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Transocean Marine Paint Association, P.O. Box 456, Delftseplain 37, Rotterdam, Holland

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

PIPE—Cargo Oil
Kubota, Ltd., 22, Funade-cho 2-chome, Naniwa-Ku, Osaka, Japan

PLASTICS—Marine Applications
Ameron Corrosion Control Div., Brea, Calif. 92621
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936

PORTS
Port of Galveston, P.O. Box 328, Galveston, Texas
Jacksonville Port Authority, 2701 Tallyrand Ave., Jacksonville, Fla.

PROPELLERS: NEW AND RECONDITIONED
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

RATCHETS
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SANDBLASTING EQUIPMENT
Pauli & Griffin Co., 826 Folsom St., San Francisco, Calif. 94107

SCAFFOLD BOARDS
Howmet Corporaton, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

SHAFT REVOLUTION INDICATOR EQUIP.
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

SHIPBOARD VENTILATION
Coppus Engineering Corp., P.O. Box 457, Worcester, Mass. 01613
TANK S.A.P.P. Inc., 330 Madison Avenue, New York, N.Y. 10017 and 1020 Springfield Avenue, Mountainside, N.J. 07092

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
Agemar, P.O. Box 1465, Maracaibo, Venezuela
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 STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720
International Nickel Co., 1 New York Plaza, New York, N.Y. 10004
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Oregon 97208
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bertram Marine, Division of Whittaker, 3663 N.W. 21 Street, Miami, Fla. 33142.
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Devcon Corporation, Endicott Street, Danvers, Mass. 01923
Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empresa Nacional Bazon, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong & Whampoa Dock Co. Ltd., Kowloon Docks, Hong Kong
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigon-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
Litton Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840.
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Service Machine & Shipbuilding Corp., Box 1578, Morgan City, La. 70380
Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP ROUTING
Weather Routing, Inc., 90 Broad Street, New York, N.Y. 10004

SHIP STABILIZERS
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEERING SYSTEMS
Wm. E. Hough Co., 1125 P N.W. 45th St.. Seattle, Wash. 98107

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 West 23 St., N.Y., N.Y. 10011

TOWING—Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Puerto Rico Lighterage Co., P.O. Box 1072, San Juan, P.R. 00902
State Boat Corporation, 3701 Kirby Drive, Houston, Texas 77006
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

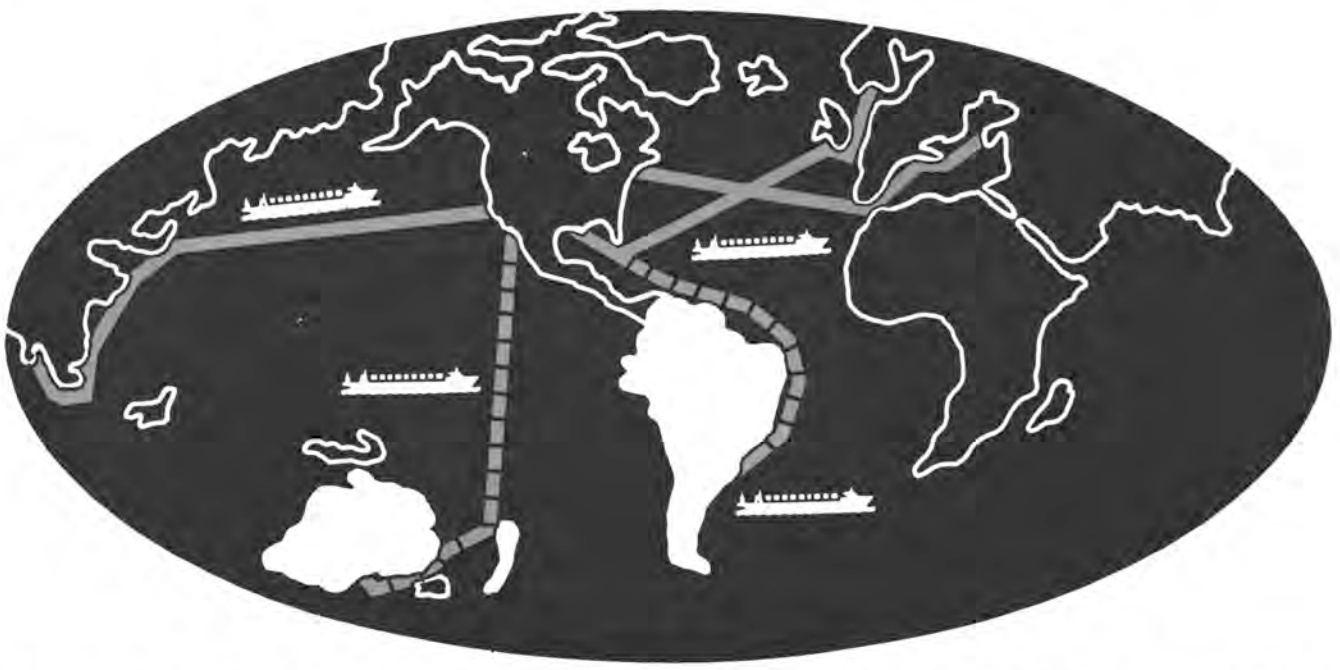
VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
Fabri-Valve Co., 2100 N. Albina Ave., Portland, Oregon 97208
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18016

ZINC
Smith & McCrorken, 153 Franklin St., New York, N.Y. 10013

LASH adds Australia and South America...

and now serves all major continents.



Barely 3½ years after the first LASH vessel embarked on its maiden voyage, the LASH System links the world's major continents with regularly-scheduled, express service on established trade routes.

In the summer of 1973, Pacific Far East Line began operating LASH service between U. S. West coast ports and Australia, New Zealand and selected South Pacific islands; and Delta Steamship Lines inaugurated a LASH trade route between U. S. Gulf ports and the East coast of South America with calls at Caribbean ports.

North America, Europe, Africa, Asia, and now Australia and South America. LASH vessels serve them all. Seventeen LASH vessels have been launched, to be followed by seven more in the next 18 months. More than 3,000 standard-size LASH barges, interchangeable throughout the worldwide LASH System, are in operation or ordered to serve the LASH ocean carriers. LASH has come a long way in just a few years, and its growth will continue in the coming months as new trade routes to the Middle East, Indian subcontinent and Southeast Asia are opened by Waterman Steamship Corporation and Central Gulf Lines, Inc.

LASH

SYSTEMS, INC. SUITE 1414, 225 BARONNE ST., NEW ORLEANS, LOUSIANA, U.S.A.

Bunkering should be fast, efficient.

At 60 world ports we deliver at better than 500 tons an hour. At two dozen the hourly rate can exceed 800 tons. Sixteen Exxon ports top a thousand tons an hour.

Bunkering is a burden, we know. Ships' engineers are busy. Space alongside and on the dock is needed for other things. Fueling should be fast, efficient.

So we've invested well over $100-million in facilities. To give the fast turnarounds you want, and need, to run your business at a profit.

All part of the service your Lady Of The Sea gets from Exxon Marine — The Sign of Service.

Exxon International Company
Marine Sales Department
1251 Avenue of the Americas, New York, New York 10020
(212) 974-5216

EXXON

THE SIGN OF SERVICE