

MARITIME REPORTER

AND
ENGINEERING NEWS



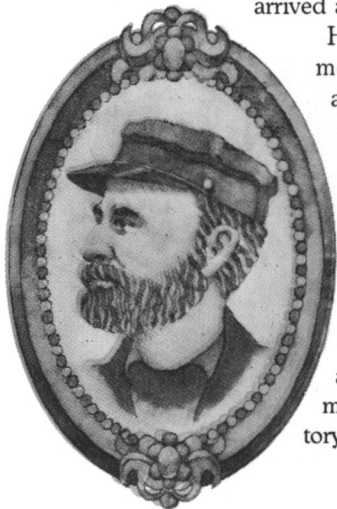
**Hitachi Zosen Delivers
46,877-Dwt LPG Tanker**

(SEE PAGE 6)

OCTOBER 1, 1971

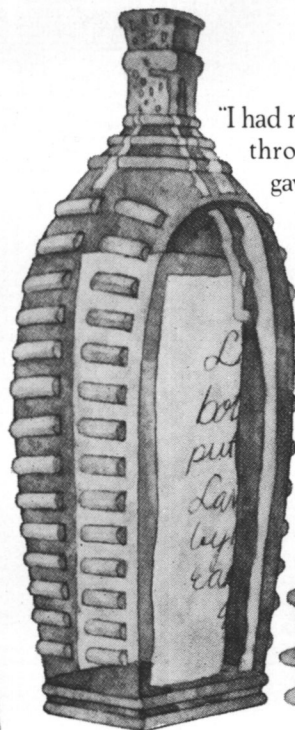
The incredible sea voyage of Capt. William Andrews.

On July 21, 1892, Captain William Andrews set sail, alone, from Atlantic City, New Jersey, and on September 20th he arrived at Palos, Spain.



His craft, the *Sapolio*, measured 14 feet 6 inches and he made it himself. Her rig was archaic. She had no engine and wasn't watertight. As for Andrews, he didn't even have a flashlight.

But he had unbelievable courage, endurance and tenacity and his voyage stands as one of the most remarkable in the history of small boat sailing.

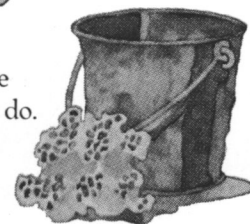


"I had notes prepared and every day I would throw one over in a bottle. The notes gave my position and destination."

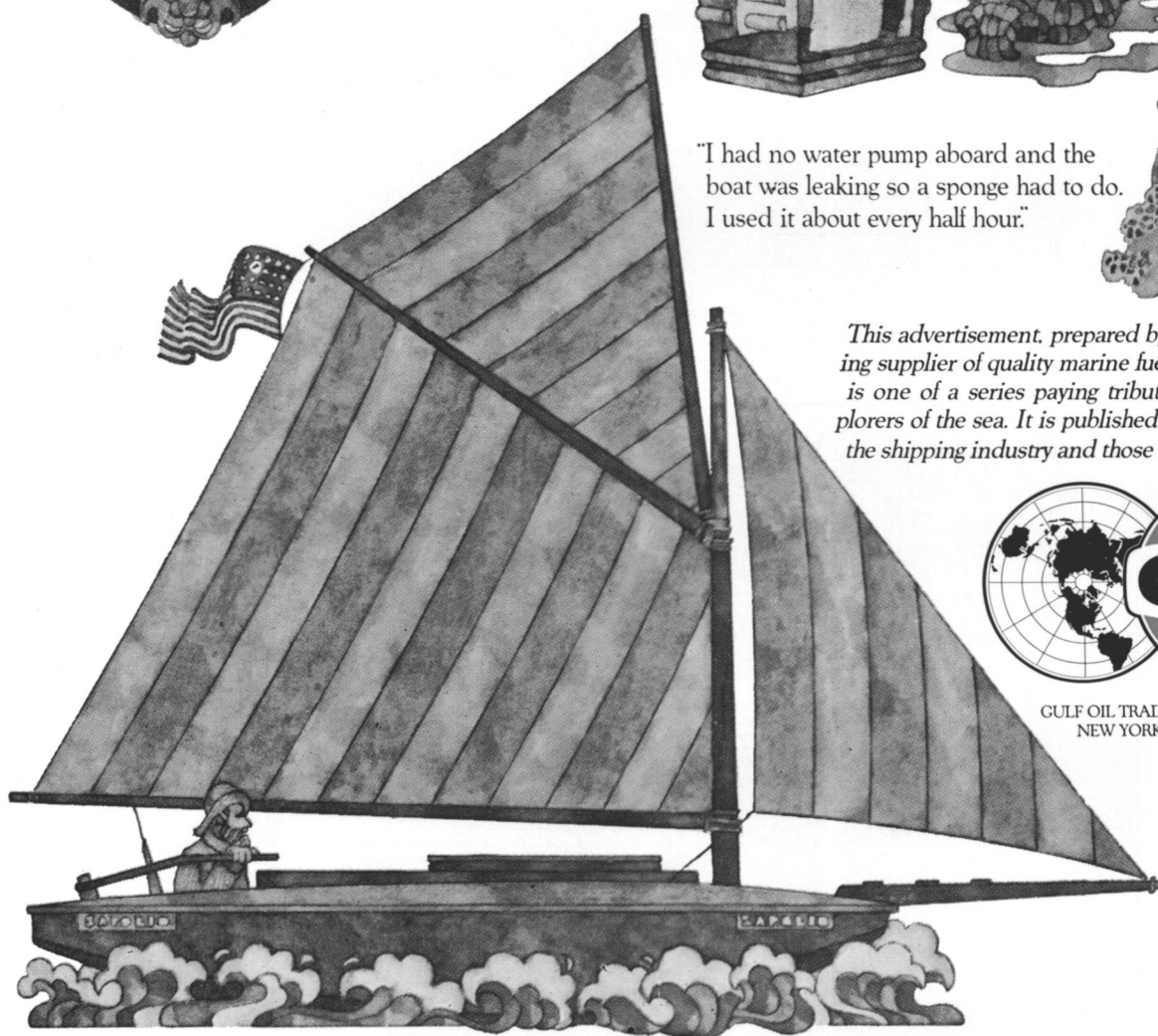
"It was about two feet wide and thirty feet long. I never saw anything like it in my life. It was a sea monster."



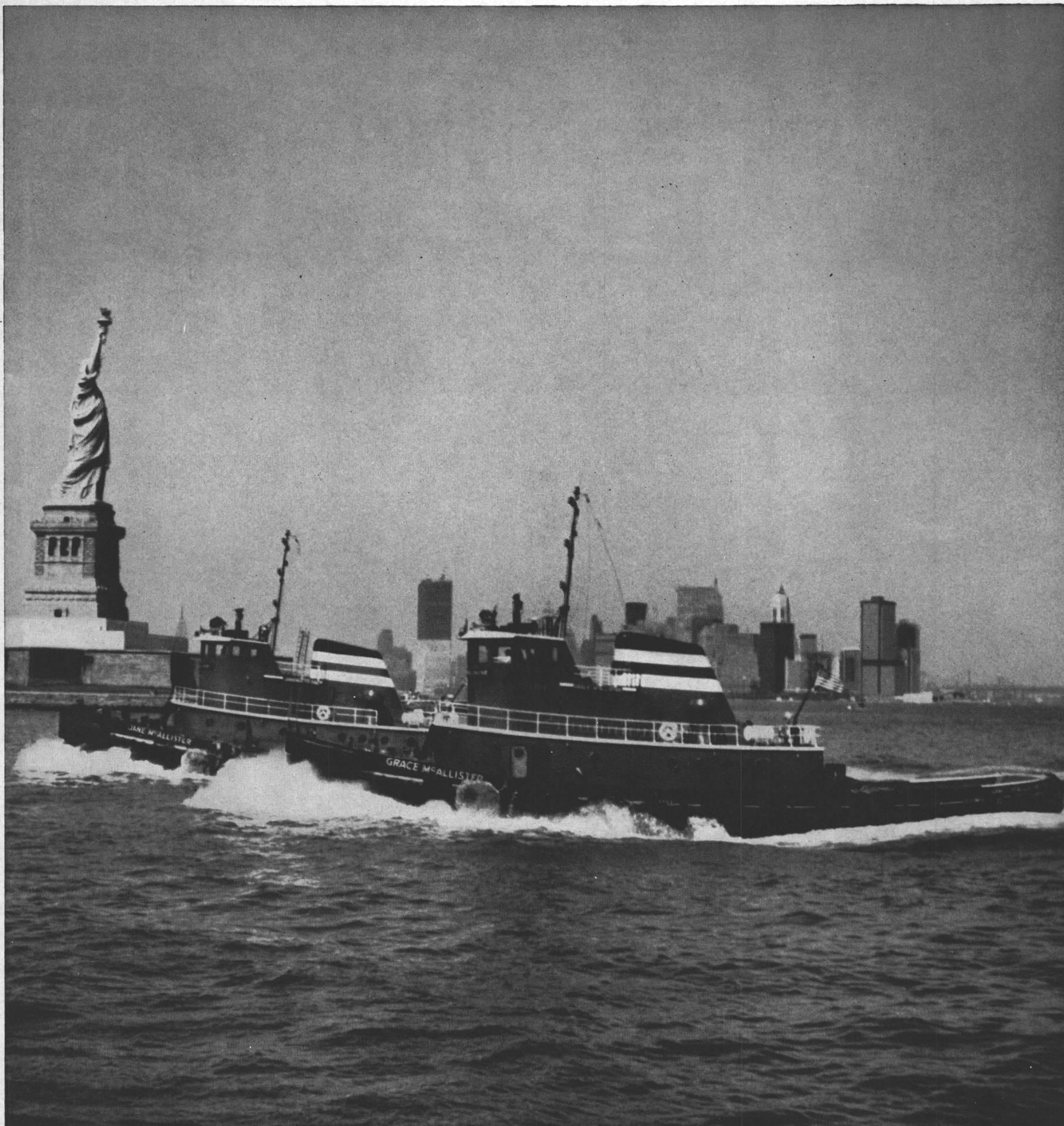
"I had no water pump aboard and the boat was leaking so a sponge had to do. I used it about every half hour."



This advertisement, prepared by Gulf Oil, a leading supplier of quality marine fuels and lubricants, is one of a series paying tribute to the great explorers of the sea. It is published in the interest of the shipping industry and those associated with it.

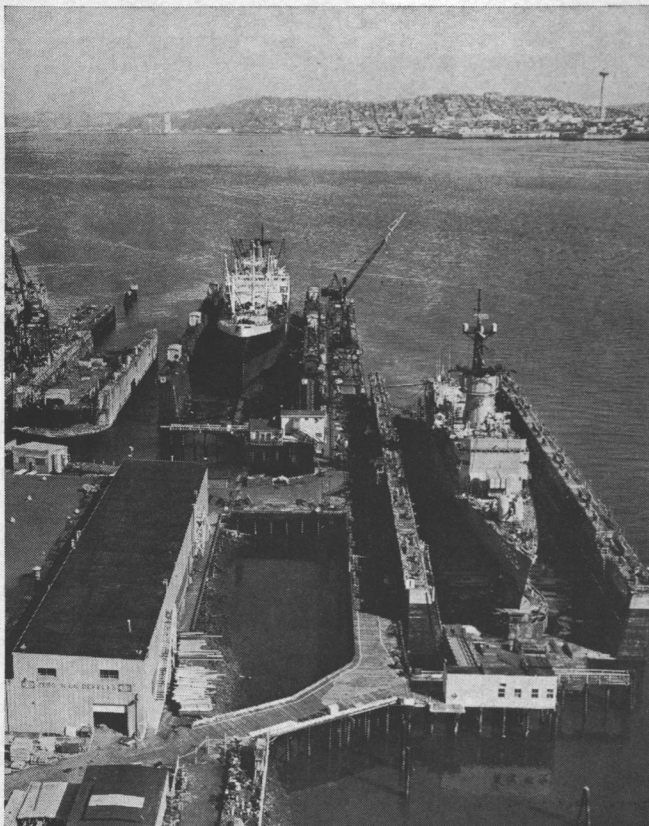


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Bids To Be Invited On Construction Of Four S.F. Bay Ferries

Bids in connection with the construction of four ferries for use on San Francisco Bay may be received sometime this fall by San Francisco's Golden Gate Bridge, Highway and Transportation District. The agency is currently seeking Federal funds to help pay the estimated \$8.4-million cost for the 750-passenger vessels. Philip F. Spaulding, Division of Nickum and Spaulding Associates, Seattle, Wash., received a contract to design a new San Francisco ferry fleet earlier this year.

Sabine Towing Applies For Mortgage Insurance

The Maritime Administration has disclosed that the Sabine Towing & Transportation Co., Port Arthur, Texas, has applied for mortgage insurance on a 7,000 horsepower tug to be used to tow oil-carrying barges from producing areas in the Gulf to Atlantic Coast ports.

The tug is to be built, at a cost of some \$1.7 million, by Main Iron Works, Inc., Houma, La.

Jan-Erik Dyvi Orders Giant Car Carriers

Norwegian shipowner Jan-Erik Dyvi of Oslo has placed orders in the Netherlands for two car carriers which will be the biggest of their kind in the world, with a capacity of 3,800 medium-size cars each.

The ships are scheduled for delivery in 1973, when Jan-Erik Dyvi will have a fleet of five carriers capable of transporting 230,000 cars a year between Europe and the U.S. East Coast.

Dravo Building Ten Covered Hopper Barges For Central Soya Co.

Ten covered hopper barges, each capable of carrying more than 1,500 tons of material at a nine-foot draft, are being built by Dravo Corporation, Pittsburgh, Pa., for Central Soya Company, whose corporate headquarters are in Fort Wayne, Ind.

The 200-foot by 35-foot by 12-foot semi-integrated vessels will be equipped with weathertight lift-off covers for added cargo protection. They will be used to transport grain in the inland waterways.

Delivery of the new barges will begin next spring at the rate of two per week. They are being built at Dravo's Neville Island yard on the Ohio River near Pittsburgh.

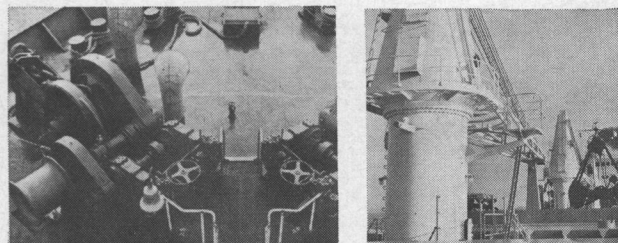
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*Shock Test Report LE-827

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MARITIME REPORTER AND ENGINEERING NEWS

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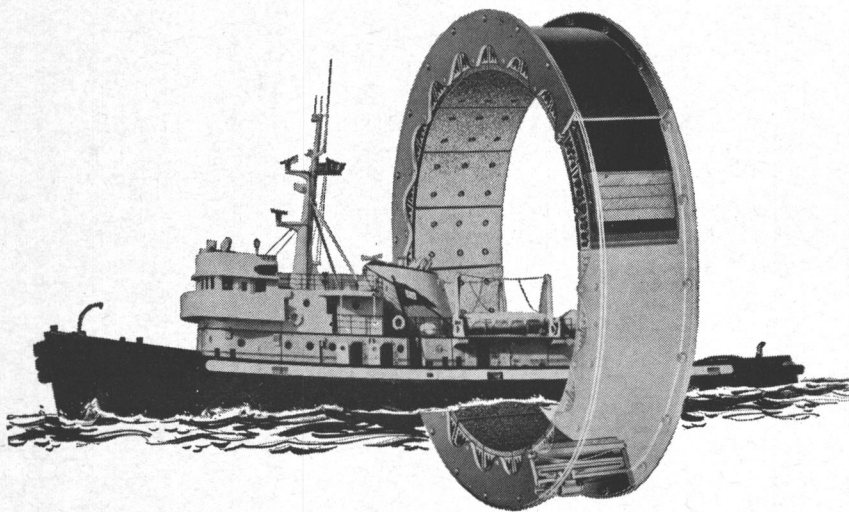
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Stop stalling...with Fawick marine propeller shaft brakes



Engine stalling during hard reversing maneuvers are eliminated when Fawick ventilated clutch units are used as propeller shaft brakes.

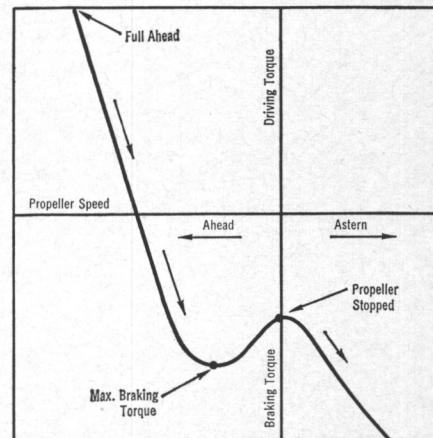
That's just one of the benefits of using these air-actuated brakes which are programmed to engage the moment the shaft is in neutral. Because load on the reversing clutch is greatly reduced, clutch life is extended. Gears, engine and other major components of the propulsion system are subjected to less shock.

Use of Fawick brakes increases the maneuverability of vessels powered by direct reversing diesel engines. In most applications, the propeller can be stopped in two seconds or less. And when disengaged, there is never any drag — regardless of propeller shaft speed, angle of propeller shaft, or degree of pitch or roll in the vessel.

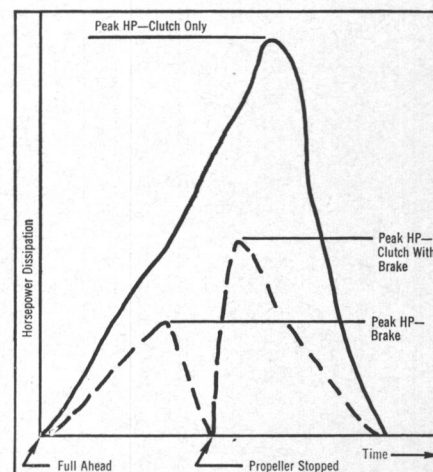
Ability to stop the prop quickly reduces the danger of striking damaging debris or fouling the blades in lines or nets. And the brake locks the shaft when in neutral, preventing freewheeling of the propeller in heavy currents — thus protecting marine gears.

Write Eaton Corporation, Industrial Drives Division, 9919 Clinton Road, Cleveland, Ohio 44111.

EAT•N
Power Transmission Systems



The propeller shaft reversing torque curve at maximum speed ahead — generally the operating condition requiring the greatest stopping torque. The brake must have enough torque capacity to pull the propeller speed through the maximum brake torque point and to the propeller stopped point. This torque rarely exceeds 70% of full power torque. After the propeller is stopped, the reversing clutch is engaged and the propeller turned hard in the astern direction to stop the vessel.



This chart compares the heat dissipation required of a reversing clutch through a "crash astern maneuver" and a brake and reverse clutch through the same maneuver. Less total work is needed when the brake/clutch combination is used. Because of this, the peak HP dissipation in the clutch is much less, prolonging clutch life. Also the greatly reduced total "work load" reduces the demand on the engine during reversing, preventing engine stalls and overload and this means the gear and other components are lightly loaded during these maneuvers.

Hitachi Zosen Delivers 46,877-Dwt LPG Tanker



The LPG tanker Yusho Maru shown on her trials obtained a speed of 18.5 knots.

Shown on the cover and above is the liquid-petroleum-gas (LPG) tanker Yusho Maru which was recently delivered to her owners, the Yuyo Steamship Co., Ltd., by Hitachi Zosen's Innoshima shipyard. This LPG tanker was built under the Japanese government's 26th shipbuilding program. It will be used to transport liquefied petroleum gases from the Persian Gulf to Japan.

The Yusho Maru has a length between perpendiculars of 705 feet 3 inches, a breadth of 114 feet 1 inch, a depth of 76 feet 1 inch and a design full-load draft of 37 feet 9 inches. The 46,877-dwt ship's cargo tanks can carry 3,585,078 cubic feet of liquefied gas. The main propulsion plant consists of one Hitachi B&W, Model 7K84EF diesel engine developing 17,500 bhp. On trials the tanker obtained a speed of 18.5 knots. The powerplant is classed for unmanned operation.

The cargo is carried in insulated tanks at a temperature of minus 49°F. This low temperature is suitable for the carriage of such petroleum gases in the liquefied form as propane, butane, etc. These types of petroleum gases are in plentiful supply in the Persian Gulf. The Japanese government has sponsored the building of a number of LPG tankers since the construction of the first such vessel, the Bridgestone Maru, several years ago.

The loading of the cargo is remotely controlled from a central control room. Cargo piping and valves are made of special steel that will withstand the low temperature and are lagged with polyurethane foam.

Hitachi Zosen's Innoshima shipyard constructed the ship in a very short time span. The keel was laid on

November 18, 1970; launching took place on April 13, 1971, and the ship was delivered on August 26, 1971.

Considerable interest and activity is being shown worldwide in vessels designed to carry liquefied gases to countries in short supply of energy sources. Japan is a good example of such countries. For years the Japanese have imported tremendous quantities of coal. With the development in the United States of means of liquefying gases and transporting this liquid in ships over long distances, the Japanese have chosen liquid petroleum gas and liquid natural gas as the fuels to supplement the use of coal and to fulfill their expanding requirements.

At the present time there are 25 LPG tankers under construction or on order in the world. At the same time a year ago there were only 15 such ships on order. The ships now on order range in size from 2,000 dwt to 62,000 dwt, giving a total deadweight carrying capacity of about 300,000 tons. Besides the LPG tankers on order, there are many liquid natural gas (LNG) ships on order.

The LPG tankers that use the refrigerated system to liquefy the gas are designed for temperatures of minus 50 to 60°F. The LNG tankers carry natural gas in liquefied form at minus 259°F. Several ships that were built to carry LNG are currently in the LPG trades. However, a tanker designed to carry LPG cannot be used in the LNG trades. There is a considerable construction cost difference between the LPG tanker and the LNG tanker because of the great difference in insulation and materials created by the differences in temperature.

Seatrains' Container Terminal Purchased By Port Of Oakland

The \$20-million purchase by the Port of Oakland of Seatrain Line's 33-acre container terminal became final with the closing of escrow in New York and Oakland. The facility had been the only shipping terminal on the Oakland waterfront not owned by the Port.

The Port has negotiated a lease and preferential assignment of the complex back to Seatrain. The agreement gives Seatrain primary use of the terminal facilities, but allows either the Port or Seatrain to assign the marine terminal area on a secondary basis to another steamship line. A portion of the parcel will be exclusively leased by Seatrain for office and container freight station facilities.

To make the purchase, the Port recently sold \$20 million in certificates of indebtedness at an effective average interest rate of 8.026 percent to a syndicate headed by Kuhn, Loeb & Co., Merrill Lynch, Pierce, Fenner & Smith, Inc., and Salomon Brothers. The certificates of indebtedness are secured by the long-term lease with Seatrain of California, Inc., and will be additionally secured by surplus Port revenues, if available, up to one-million dollars for any 12-month period. Under the lease, Seatrain will pay the Port approximately \$1.75 million annually.

The terminal is located on the Oakland Estuary in the Port's Middle Harbor area adjacent to a 52-acre parcel of land currently being developed by the Port as another major container terminal. The new facility, which will be known as Middle Harbor Terminal, is designed to be compatible with the Seatrain base so that together they will offer 85 acres of container facilities, including four in-line berths served by four container cranes.

When the Middle Harbor Termi-

nal is completed next year, the Port of Oakland will have nearly 280 acres of container facilities served by 12 container cranes. Oakland already is the world's second largest container port, behind only New York.

Waterman Asks MarAd For Mortgage Insurance On 3 More LASH Ships

Waterman Steamship Corp. has applied for mortgage insurance to build three LASH (Lighter Aboard Ship) vessels for its Gulf-Far East service, for which it hopes eventually to receive subsidy.

Waterman was awarded a subsidy contract for its Atlantic and Gulf-India, Persian Gulf, and Red Sea service in June, with an accompanying approval of construction subsidy for three of the same type LASH ships. That contract put costs at \$83.8 million and a subsidy of 44.2 percent of that total.

The company has been negotiating with Avondale Shipyards, Inc., which has built all LASH vessels for U.S.-flag so far, and expects this latest group of three to run possibly \$6 million higher.

The Maritime Subsidy Board is still processing Waterman's bids for subsidy on the Gulf-Far East route, and two others as well.

Matson Promotes Wayne E. Brobst

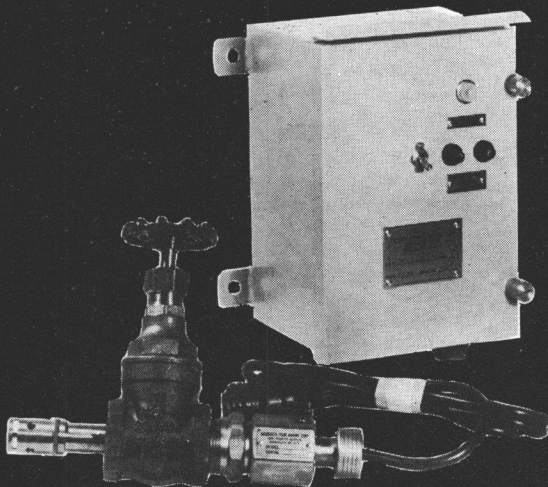
The promotion of Wayne E. Brobst to the post of director of labor relations for Matson Navigation Co. has been announced by Malcolm H. Blaisdell, president of the firm. Mr. Brobst formerly served the company as general manager of freight operations. Succeeding Mr. Brobst as general manager of freight operations is Robert E. Waegner, formerly traffic and operations manager for Matson's Far East freight services.



TODD PRESENTS SHIP MODEL TO LYKES: At a recent luncheon at the Plimssoll Club in New Orleans, La., John T. Gilbride, president, and Ralph Anselmi, general manager, Galveston Division, Todd Shipyards Corporation, presented a model of the converted S/S Solon Turman to Solon B. Turman, chairman of executive committee, and Joseph T. Lykes Jr., chairman of the board, Lykes Bros. Steamship Company, Inc. A \$30-million contract was awarded Todd to convert nine of the Lykes Gulf Pride Class vessels to combination breakbulk and containerships. Two of the ships have already been delivered. Messrs. Lykes, Gilbride, Turman and Anselmi (left to right) are shown with the model in the above photograph. In addition to the above, attending the luncheon were officials of Todd: John Meghrian, general manager, New Orleans Division, and Arthur W. Stout, general manager, Houston Division; and for Lykes: W.J. Amoss Jr., executive vice president, Stuart Thayer, vice president, engineering, and R.T. Reckling, vice president, operations. Also attending were Monroe Levy, vice president of Todd's engineering subsidiary, Designers & Planners, Inc., and C.A. Spurl Jr. of C.A. Spurl & Co., Inc. It is reported that the seven-foot model will be displayed in the lobby of the new Lykes Building when completed.

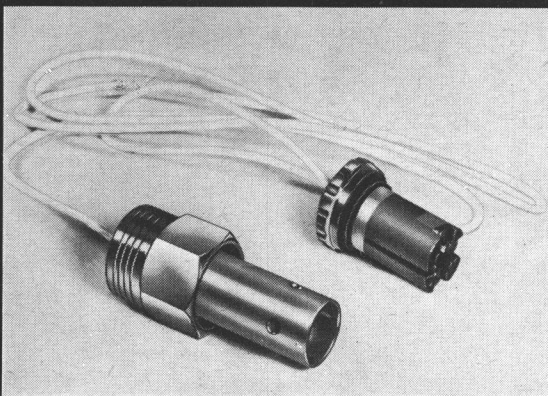
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OIL IN OVERBOARD DISCHARGE CONTROL (Model OWD-2)

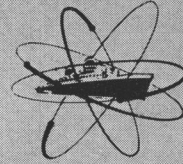


This sensor-probe and panel module will control oil-laden overboard discharge down to 5,000 ppm ($\frac{1}{2}\%$ by volume). The sensor-probe and valve are placed directly in the overboard discharge pipe ahead of the check valve gate. The control panel incorporates the latest in design circuitry and is designed to detect oil and oil-based fluids such as accumulate along the top of bilgewater or ballasted fuel tanks.

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The Application Of Super Barges For Distributing Petroleum Products

Super Barges Are Becoming An Important Part Of The Distribution System For Petroleum On The East And Gulf Coasts. They Can Compete Economically With Handy-Size Tankers On All But The Longest Runs.

Adrian S. Hooper*

Generally speaking, those of us engaged in offshore barging spend a great deal of time, effort and money on research and development of hull forms for barges and tugs.

In towing a large barge it is necessary to be sure that the barge will follow the tugboat on a true course under all weather conditions, light and loaded. Since the writer's company prefers not to ballast the barge on the ballast voyage, it is extremely important that in this light condition the barge remains on a stable course in high winds and avoids structural damage in heavy seas.

Although much has been done in this field, we find experts disagreeing on fundamentals. The writer's company assisted in the funding of a study for the determination of an optimum seagoing barge design at the University of Michigan. The paper, "Design Considerations and the Resistance of Large, Towed, Seagoing Barges" by J.L. Moss and Corning Townsend III, was submitted to The Society of Naval Architects and Marine Engineers in September, 1967. However, since that time hull designs for seagoing barges that have been built would not be recognizable in the study. For our 31,000-ton barges, seven separate stern models were constructed and tested prior to final determination.

Hull form is important since barges are inherently slow. An increase of half a knot is a much higher percentage increase than with a ship making 15 knots.

The seagoing tugs required to handle these barges are deep draft with high horsepower, watertight bulkheads, monitoring systems for engine-room equipment, back-up electrical systems, twin screw and are constructed under American Bureau of Shipping rules. The tugs have radio-signal systems with anchoring devices on the barges that automatically drop the barge's anchor. There are back-up systems for towline pick-up and back-up systems for anchor con-

trol. In short, these vessels are seaworthy, safe and practical and they are a product of research and development for the use intended—towing large barges at sea at designed hull speed.

Growth Of Barging

For the purpose of this discussion, we have set an arbitrary minimum size of around 80,000 barrels or about 10,000 dwt for the barges. Also, the barging considered is coastwise and ocean barging and bears little relationship to river barging.

Our prime interest should be how present day and future barges will affect petroleum distribution as it now relates to tankers. As to the maximum size of barges, there is no known physical limitation. There are reasons why we would not rush out and build a 300,000-ton barge, but there is no reason why it could not be built.

The writer feels that sheer size in itself is not what we are striving for but rather an optimum, economically feasible vehicle to serve the industry on a particular path of the product's journey to the ultimate consumer.

Pushing at sea using the so-called conventional method with cables where there is no "mechanical connection" has been successful in moderate seas. There is little question about the advantages of pushing.

So far the Coast Guard has approved only one mechanical pushing system for operation on the high seas. This is the Breit-Ingram System. The system was approved acknowledging the cargo-carrying unit as an unmanned seagoing barge and the tug as a self-propelled motor vessel over 300 gt and subject to inspection, certification and appropriate manning requirements.

In recent months additional research into mechanical methods of pushing at sea has been somewhat restricted. The writer's company has had to completely re-evaluate the extensive and costly testing done in the Netherlands Ship Model Basin due to the uncertainty of the regulations pertaining to mechanical linkage systems. As the interpretation of regulations are put into workable perimeters, much more will be accomplished to improve the technology of tug-barge linkage.

Economics

Perhaps the least thought of cost advantage and yet one that should have a significant place in a shipper's determination of transport methods is the probable increase in escalating costs. This becomes an important input for projecting one's future position in a market. Many ships operating in coastwise trade today are operating on costs determined by depreciated values and their ratio of operating costs to fixed cost should be a barometer in considering future needs.

The barge industry is working from a high base. Super barges are all relatively new with a high book value so that the ratio of fixed cost to total is presently high, indicating that rate increases due to unpredictables would not necessarily be shockers.

The moment you make comparisons on a new for new basis, the cost of capital or fixed-capital investment comparison is changed. However, on a new for new basis capital required per deadweight ton is over twice as much for ship construction as for combination barge-tug, unless the barge system is designed for the potential of obtaining ship speed, then construction costs are comparable with ships and the major saving becomes one of crew costs only.

In order to quantify the advantages of large barges in this trade, an analysis was made of four new hypothetical vessels, namely, a 31,000-dwt barge and tug unit and a 30,000-dwt tanker, and a 20,000-dwt

barge unit and a tanker of equal deadweight, operating between Houston and various East Coast ports.

A simple deterministic model was made to generate the Required Freight Rates starting with a typical cross-Gulf trip (Houston to Tampa) and then for a series of greater distances in increments of 100 nautical miles up to maximum of 2,500 miles between ports. The latter distance covers the entire range of ports from Texas to Portland, Me.

Tug and barge performance criteria is based on our average experience with equipment of this size as are capital and operating costs. Ship costs and criteria were harder to obtain and, consequently, the data used is a compromise of information obtained from ship-owners, shipyards and various reference sources. It should be noted that we have not attempted to develop actual freight rates. We have tried to objectively compare the relative economic advantages of barges versus self-propelled tankers of equivalent deadweight.

Fixed operating costs are shown in Chart 1. Freight rates assume unlimited demand and are based on cargo on one leg only and 100-percent vessel utilization. A weather factor was applied to the design speeds, which in the case of the two barges ranged from five to seven percent, depending on distance and, in the case of the tank-

(Continued on page 11)

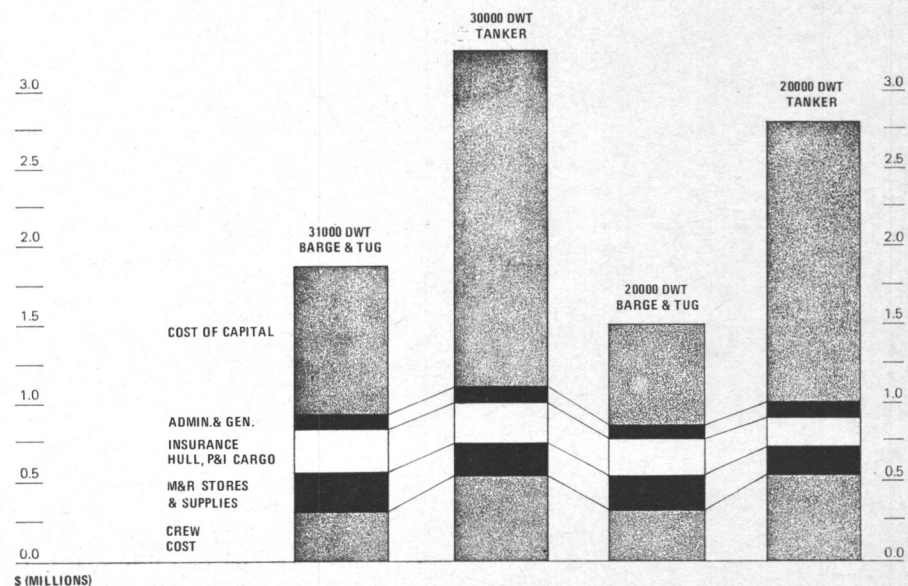
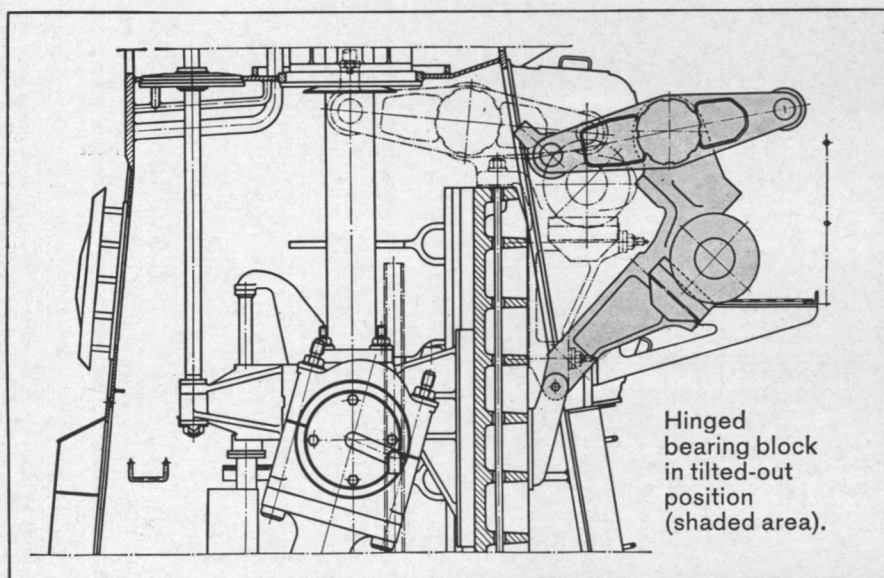
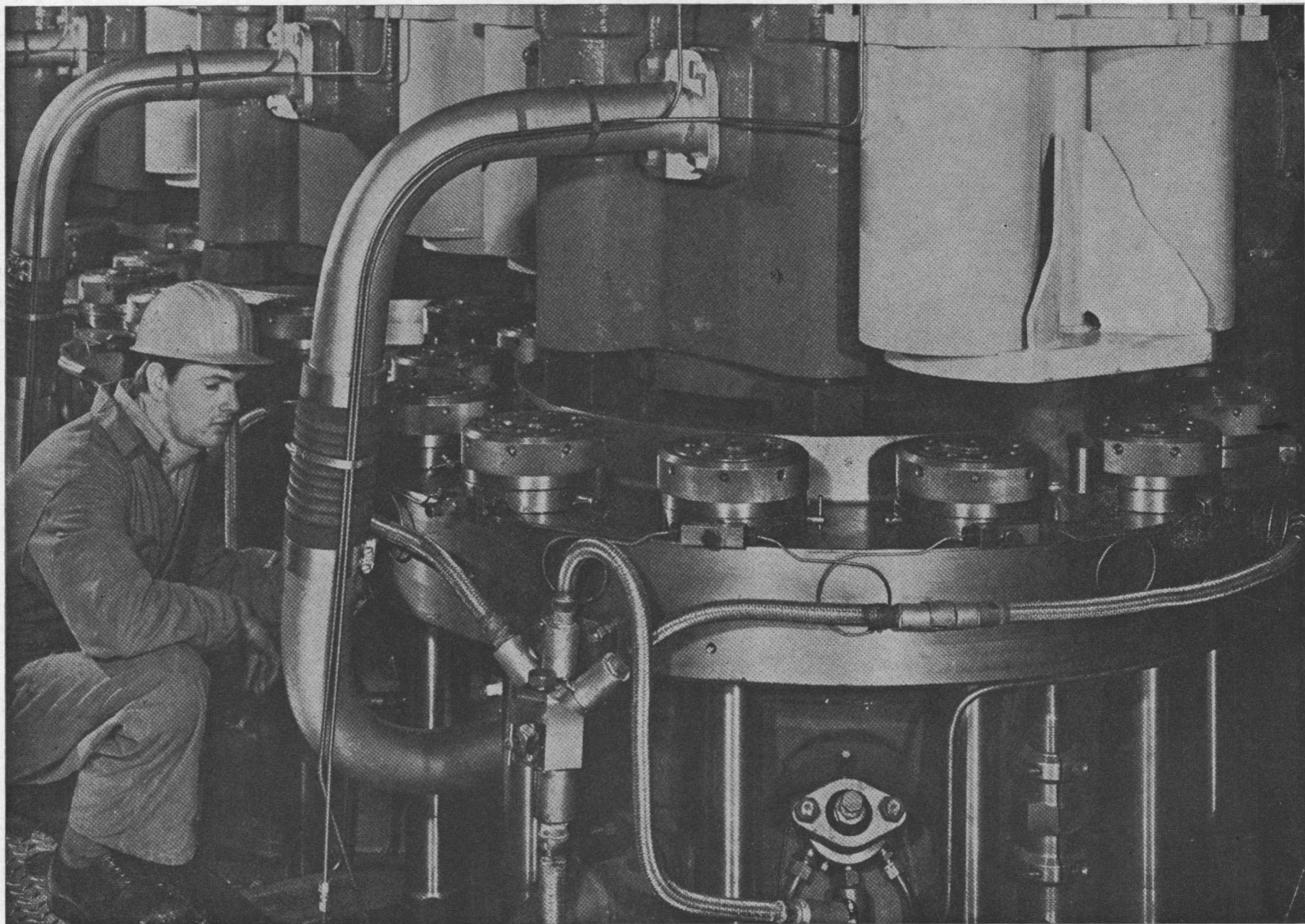


Chart 1—Fixed operating expense (annual average).

*Mr. Hooper, president, Interstate Oil Transport Company, presented the paper condensed here before the 16th Annual Tanker Conference of the Central Committee on Transportation by Water of the Division of Transportation of the American Petroleum Institute held in Ponte Vedra Beach, Fla.

Latest GV large-bore engine simplified for maintenance



Important new features have been added to Götaverken's large-bore engine, GV 850/1700 VGS-U. The levers controlling the exhaust valve movement are now fitted in a hinged bearing block which can be tilted out of the engine. This feature makes all the parts in this section easily accessible.

To reduce the time required for removing the cylinder heads, a regular routine in overhauling work, all cylinder nuts are now of the Götaverken patented hydraulic-jack type. This means that all 12 nuts in a cylinder head can be tightened simultaneously by oil pressure.

These two innovations are typical of the several improvements made for the purpose of simplifying maintenance work and increasing the reliability of this engine still further.

The first engine to incorporate these new features, a 9-cylinder unit developing 23,850 b.h.p., has been installed in an ore-bulk-oil carrier of 100,000 tons d.w. built at Götaverken's Arendal yard. A series of over 20 ships of this type is on order at Götaverken. Five have already been delivered. The remaining ships in the series will have the latest 9-cylinder large-bore engine as standard propelling machinery.

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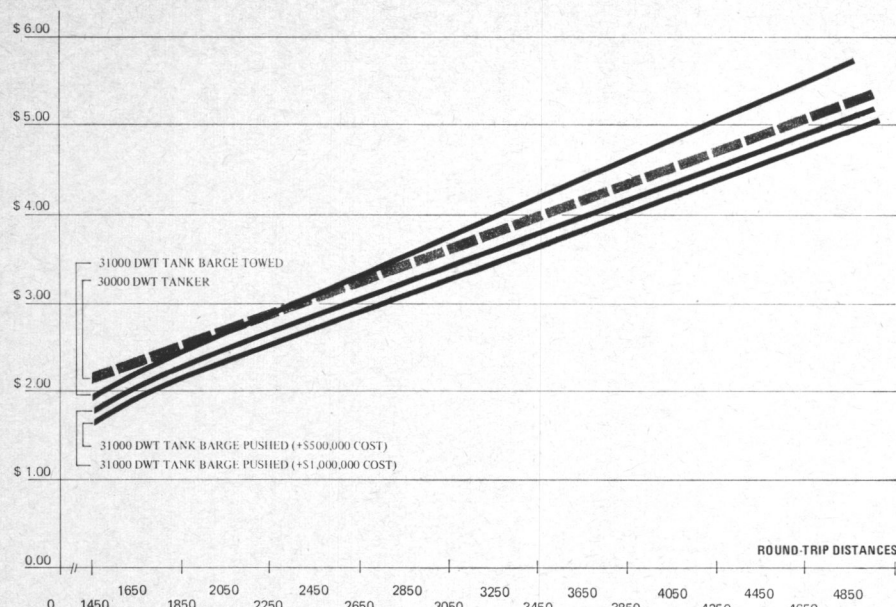


Chart 2—Freight rates (\$/LT) versus distance (comparison of pushed versus towed).

Super Barges—

(Continued from page 9)

ers, consisted of a flat allowance of three percent for all trips.

In Chart 2, Required Freight Rates were calculated for each vessel unit assuming two levels of increased construction cost; \$500,000 and then \$1.0 million to push with a non-rigid system with corresponding adjustments made to fixed and voyage costs. The same weather factors were applied to the new speeds used but in all other respects the units were assumed to be the same as investigated with hawser towing.

Chart 3 shows that both conventionally towed barges have lower Required Freight Rates on the cross-Gulf route than the faster tankers of equal size. Based on the assumptions used, the 31,000-dwt barge-tug is overtaken economically by the 30,000-dwt tanker on a round-trip voyage of about 2,250 miles. The smaller and slightly faster 20,000-dwt barge unit, however, maintains its advantage over its counterpart for round-trip voyages in excess of 3,000 miles.

This means that on the Tampa

run the 30,000-ton tanker would require approximately 70 percent more tonnage than the barge for full utilization. Similarly, on a Texas to New England route, the same tanker would need roughly twice as much annual cargo availability. The limited transport capacity of the barges can, therefore, be an advantage depending on the shipper's annual distribution requirements.

Also, there are many ports where the 30,000-ton tanker and larger ships cannot carry a full load at prevailing depths, necessitating split-port discharging which increases the actual transportation cost. It is also clear that underutilization will have a more adverse effect on tanker rates than on barge rates due to the higher operating cost of the former. Required Freight Rates for barges and tankers as developed by this analysis and expressed in terms of ATRS are given in Chart 4.

In the realm of speculation, it is interesting to note that the pushed 31,000-ton barge (assumed to cost \$1.0 million more than the conventional unit) produces lower RFRs than the same size tanker over the

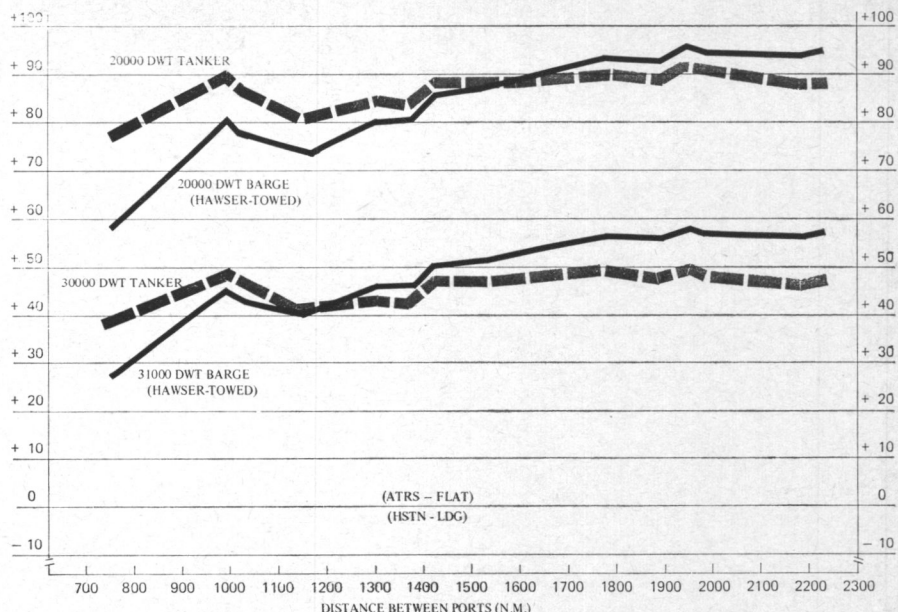


Chart 4—ATRS equivalents—barges versus tankers.

entire range of distances investigated, as does the 20,000-ton barge over its tanker counterpart. The effect of the 22-24 percent increase in average design speed of the barges is to reduce the freight rates on the order of 1.5-6 percent and 5-10 percent for the 20,000 and 30,000-ton barges, respectively, over the range of distances used.

Future developments will determine whether the industry can realize these and greater benefits.

Crewing

A major consideration in ocean barging is the crew. The barges are unmanned so only the tug crew is involved. The nature of the work requires a different type of seaman with all the qualifications for offshore operations. The master must have an acute understanding of weather conditions and the ability to predict these conditions at sea. He is concerned with the control of two vessels from dock to dock in addition to all of the in-port problems. This type of seaman is hard to come by and for the most part is trained in house.

Voyages under 600 miles are manned by crews that stand a two-watch system. They usually handle this by working six hours on and six hours off.

Those vessels that have an automated engine room usually carry just one engineer who stands no particular watches. Some of the companies carry a captain and two mates. Others carry a captain and a relief captain depending on the type of voyage patterns.

The deck crews vary with different companies. Generally large tugs have a minimum of seven men (two deck officers, two deck hands, two in the engine room and a cook). When a non-watch standing engineer is aboard, the tugs usually have a utility man to assist.

The handling of the loading and discharging of the barges varies from company to company.

Crew costs vary substantially between companies. Some crews work on a year-round basis with several months vacation. Others work a

day on for a day off with full transportation to the seaman's home port and back twice a month.

Lightering

One increasingly important facet of the barge industry is the lightering of deep-draft vessels to accommodate the shallow channels of existing American ports. Extensive studies have been made for setting up new ports to handle the increasingly large tankers in the world fleet.

Due to the uncertainty of permanent offshore unloading facilities, barges specifically designed for lightering have not been economically feasible. The present method is to use barges for the lightering that are ordinarily used in the transport of petroleum products from refineries to terminals and port to port. Admittedly, this is not the most economical means of lightering ships.

The Future

Barges will have an increasingly significant role in ocean transportation. The economics cannot be ignored for the bulk products or the other forms of cargo now moving by rail and truck.

Seagoing tugs and barges are eligible for most of the benefits under the new Merchant Marine Act of 1970. With the ability to obtain Title XI construction and mortgage insurance the industry has available to it larger money markets with more favorable repayment terms. Barge companies are going to take advantage of this new act.

Lightering and trans-shipment by barge will become an increasingly more important part of the distribution system. It is possible that barges will be constructed of a size that they themselves will have to be lightered to pursue the limited channels.

The barging industry has been dominated by family controlled companies. This situation will probably continue but we can expect competition from new sources, companies completely new in the field. For some reason, this old industry suddenly has glamour.

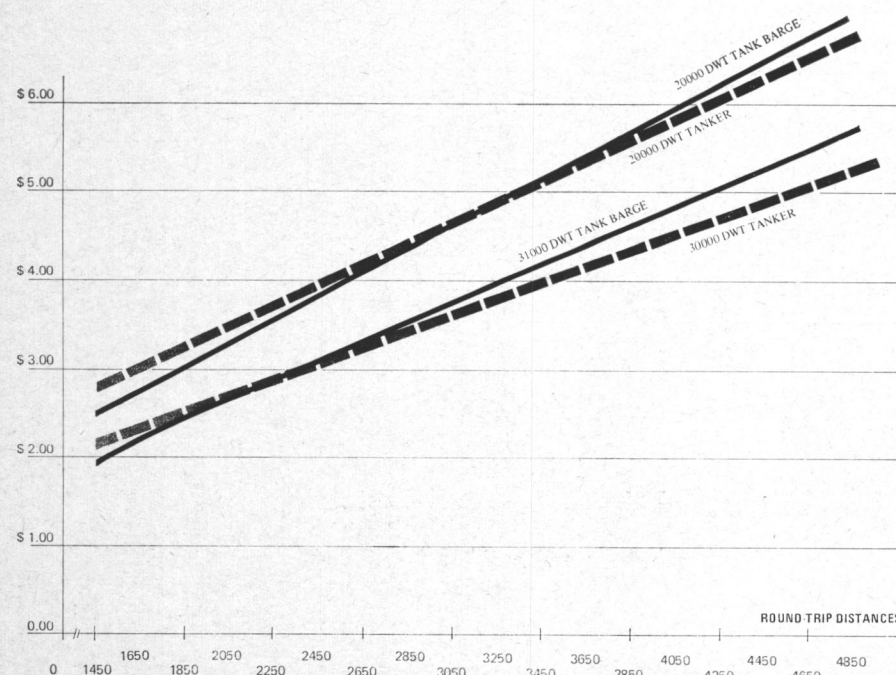
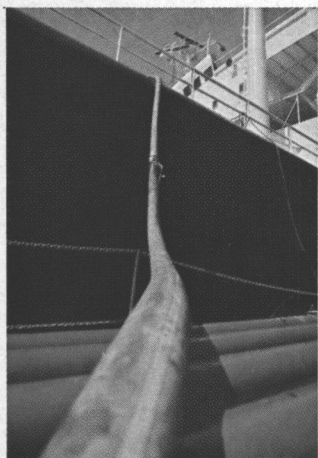


Chart 3—Freight rates (\$/LT) versus distance.

Bulk lube oil delivery



at major U.S. ports



Shell distributors at 13 U.S. ports are lifting lube oil in bulk directly into ships' tanks.

Advantages: faster than drums, safer than drums, more economical than drums, and with less material handling, less likelihood of product contamination.

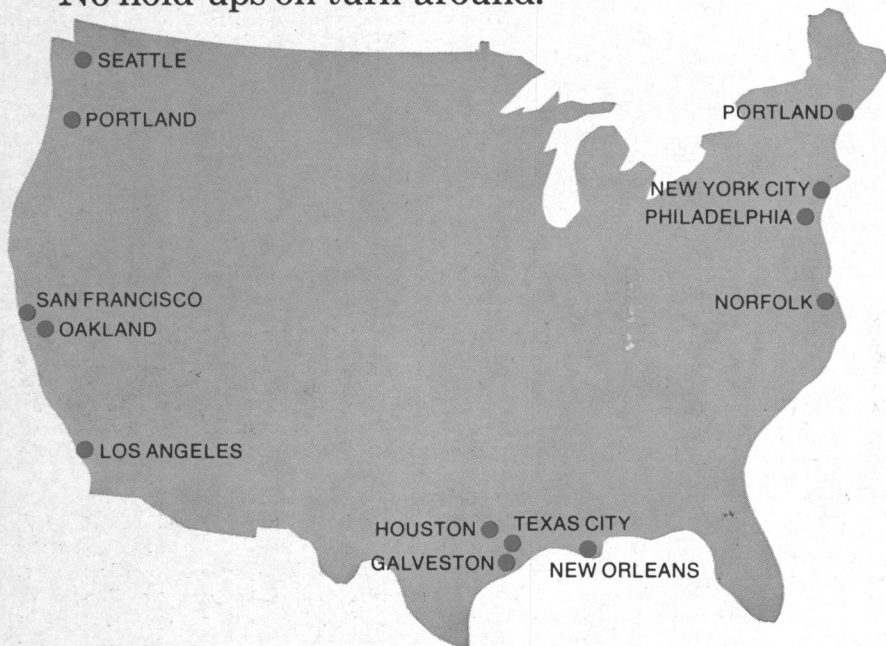
Our large photo on the opposite page shows a bulk lube oil delivery by Standard Boat Company, Shell's marine distributor at the Port of New York.

Those silvery objects on the lighter's deck are "jumbo tanks."

Pumping from the 450-gallon jumbos, Standard Boat delivers more than 1300 gallons of lube oil in 30 minutes.

At Port of Portland, Maine, the Shell marine distributor delivers lube oil in bulk by "tank boat"—a four-compartment vessel with total capacity of 48,000 gallons.

From port to port, equipment may vary but results are the same: fast, clean, safe delivery. Minimum assistance needed from ships' hands. No interference with cargo operations. No hold-ups on turn-around.



Shell has completed bulk lube oil delivery systems at the ports shown on the map. For details, call the Shell Marine representative at the Shell Transportation Sales area office nearest you.

◀ Standard Boat Company, Shell's marine distributor at the Port of New York, pumps lube oil from 450-gallon "jumbo tanks" directly into ship's tanks at a rate of 2640 gallons per hour. A fast, clean, safe delivery.



"Jumbo tanks" positioned on lighter of Standard Boat Company. Each jumbo is "dedicated"—receives only one type of oil—thus assuring freedom from contamination.

And with the increasing use of Shell's MELINA Oil, a heavy-duty multipurpose lube oil, this bulk delivery trend is accelerating.

The more motorships that use Shell MELINA® Oil, the more advantage there is to bulk delivery facilities. And the more reason to believe that bulk lube oil facilities are a good investment for all concerned.

If you want to take full advantage of the speed, cleanliness, safety and economy of bulk lube oil delivery, Shell is ready for you at major ports on the East, West and Gulf Coasts. Shell Commercial Marketing, One Shell Plaza, Houston, Texas 77002.

For details, call the nearest Shell Transportation Sales area office:

Stamford, Conn., (203) 327-3600

Baltimore, Md., (301) 821-5905

Chicago, Ill., (312) 341-3275

New Orleans, La., (504) 521-2684

Menlo Park, Calif. (415) 325-0721

Bulk Lube Oil Delivery



Lloyd's Sets Up Special Ocean Engineering Group

Lloyd's Register of Shipping has established a special Ocean Engineering Group, which will coordinate all the Society's present work in the ocean engineering and ancillary fields and will also develop new aspects. The group forms part of the research and technical advisory services department and is headed by **T.A. Lamplough**, B.Sc., C.Eng., formerly principal surveyor in charge of the Rule Development Section.

The intensification of interest in offshore oil prospecting is leading to exploration in more exposed sea areas and in greater depths of water. Lloyd's Register recognizes that its already large commitments in the ocean engineering field will inevitably increase as it is called upon to deal with the additional problems that are already arising in the more haz-

ardous environment. The Society feels that it can make the most effective use of its wide engineering background and more than a dozen years of experience in the ocean engineering field through a specialized group.

Ocean Engineering is seen as embracing a wide range of equipment, including drill rigs, crane barges, supply boats, tugs, workover and production platforms, submersibles, underwater habitats, sea bed wellhead equipment, pipelines, single point mooring systems, sand carriers, dredgers and hopper barges. The new Ocean Engineering Group will be concerned with all of these, offering design appraisal, consultancy, classification, supervision of construction and/or specification requirements and technical inspection.

Lloyd's Register already has wide experience, dating from 1958, of classing drill rigs, including semisubmersible rigs such as *Staflo*, *Sea Quest*, *Sedneth 1* and *Pentagone 81*, as

well as self-elevating types, fixed platform tenders, etc.

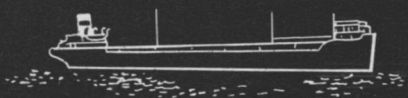
Structural feasibility studies for new rig designs are being carried out on a consulting basis and design appraisals are being made of manned and unmanned submersibles.

Several crane barges, including the *Santa Fe* International Corporation's *Choctaw*, have been classed (with structural appraisal of the cranes) and numerous dredgers, hopper barges, sand carriers and service and supply boats have been built under survey.

The growing activity in all aspects of ocean engineering is reflected in the changes that have been made in the Society's Rules. Rules for dredgers, hopper dredgers, sand carriers, reclamation craft and hopper barges have already been completely revised. The technical committee of Lloyd's Register is currently dealing with provisional rules for the Construction and Classification of Mobile Offshore Units and similar rules for submersible craft are being drafted, while a working party is formulating draft specifications for underwater routine surveys and damage surveys.

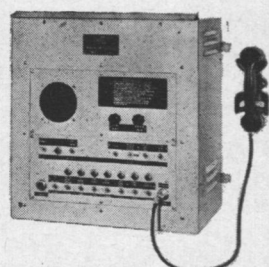
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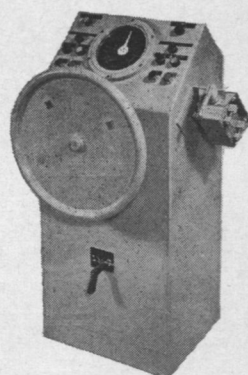


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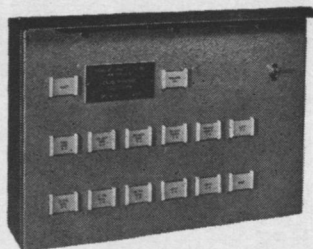
Every Hose-McCann product is precision engineered and manufactured to provide many years of dependable, trouble-free operation. The name Hose-McCann as always, stands for reliability, integrity and the highest standard of quality.



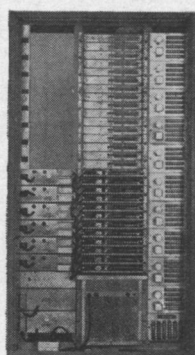
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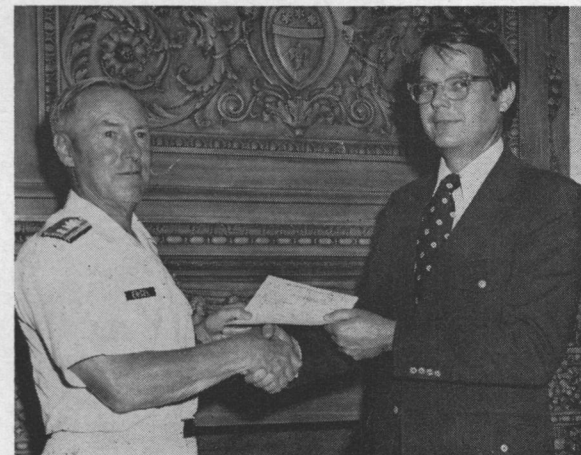
Universal Terminal Promotes J.J. Dickman To Chairman

—J.G. Barkan Named President

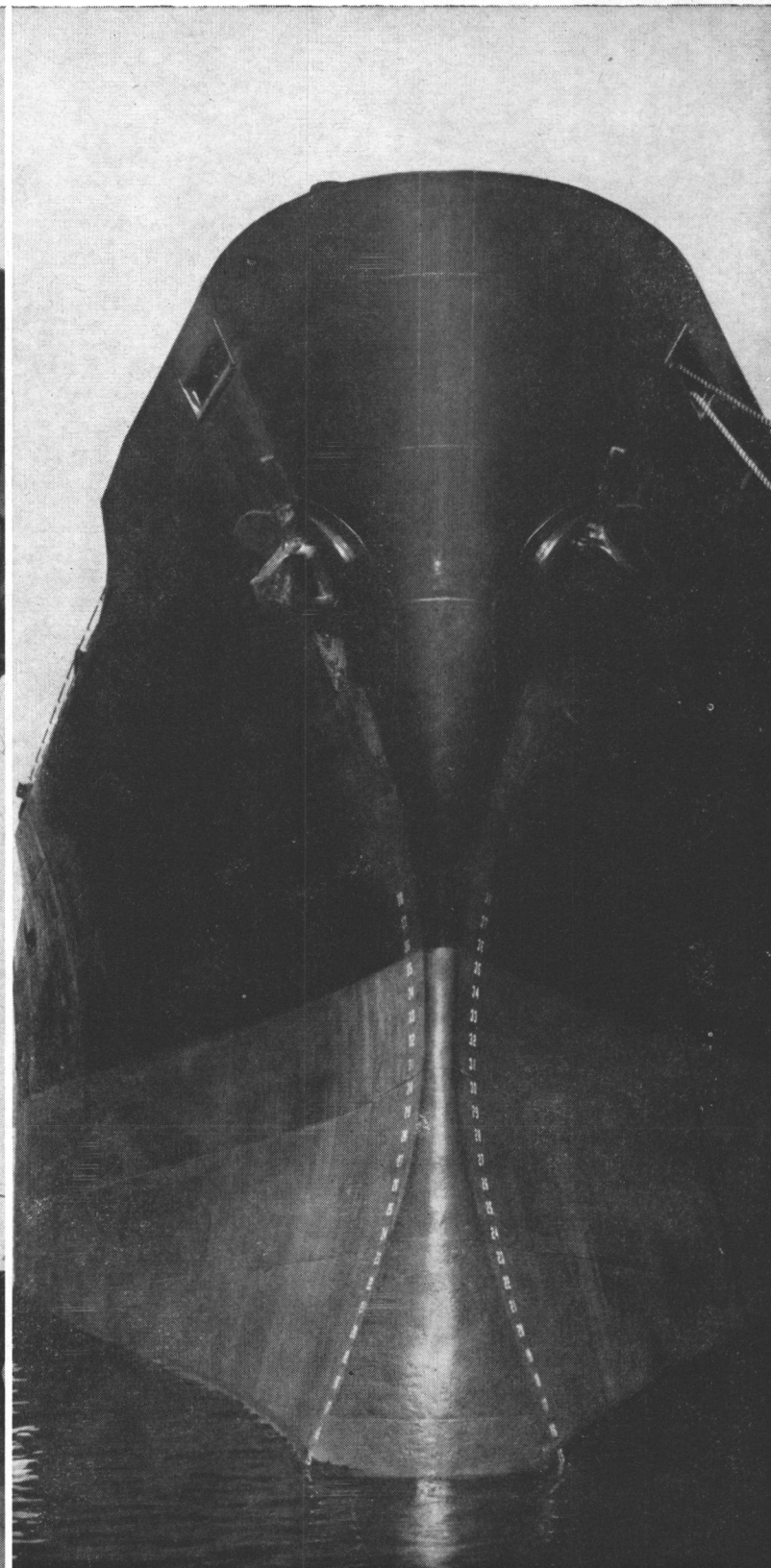
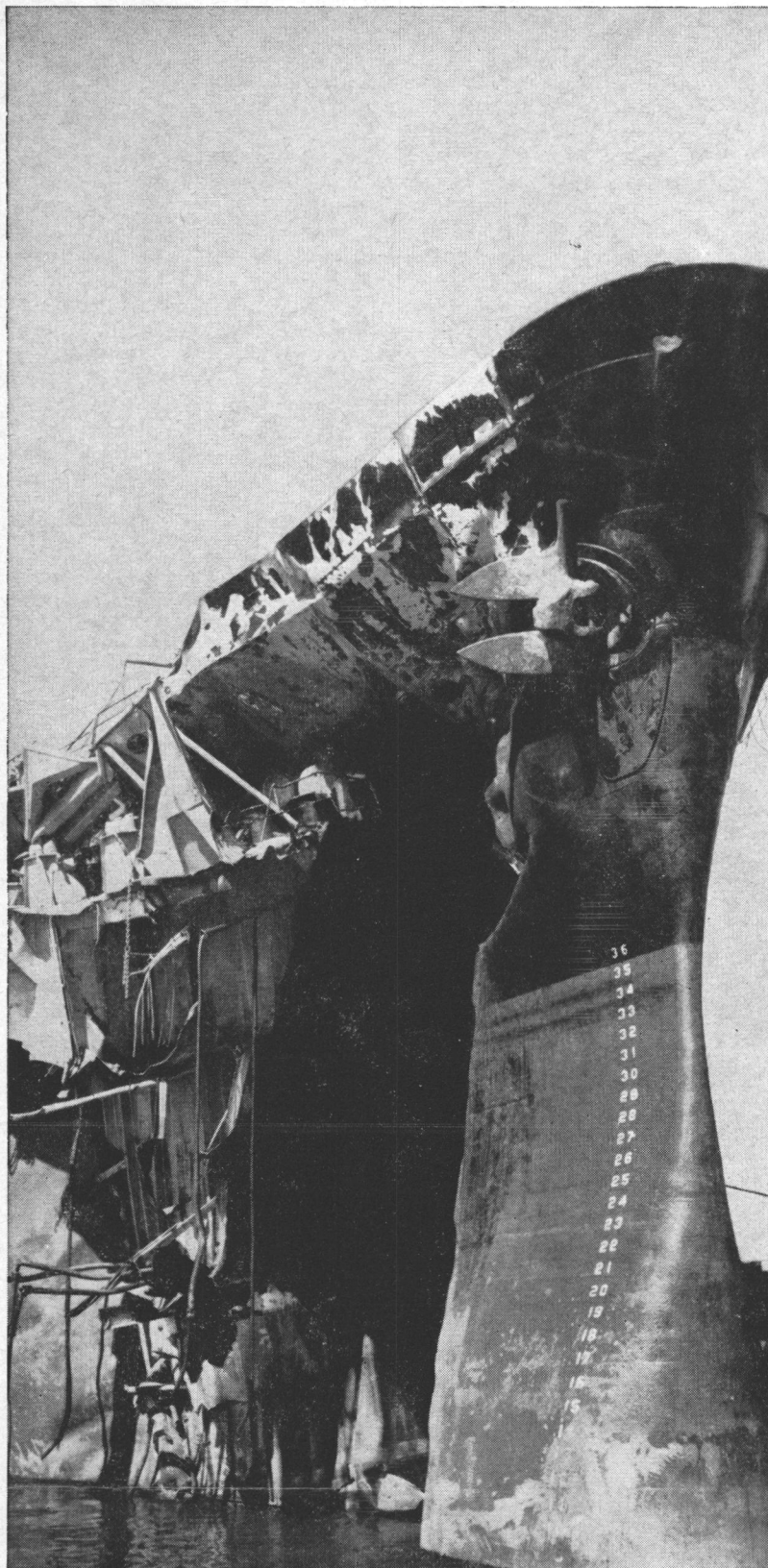
Universal Terminal & Stevedoring Corp., New York, N.Y., has announced the promotion of **James J. Dickman** to chairman of the board and chief executive officer, and the appointment of **J.G. Barkan** as president.

Mr. Dickman had been president of Universal Terminal since 1968. He was recently elected president of the New York Shipping Association, Inc., and president of the Council of North Atlantic Shipping Associations. Prior to that, Mr. Dickman held various operating positions in the terminal company dating back to 1955.

Prior to joining U T & S, Mr. Barkan was Regional Director for the Department of Labor. He was formerly president of American Export Isbrandtsen Lines, Inc., executive vice president of Prudential Lines, and Comptroller of the Atlantic Coast District for the Maritime Administration.



GULF OIL GRANT TO USMMA, KINGS POINT: The United States Merchant Marine Academy, Kings Point, L.I., N.Y., has received a \$1,500 Assistance Grant from Gulf Oil Foundation. Rear Adm. **Arthur B. Engel**, USCG, (ret.), Superintendent of the Academy that is operated by the Maritime Administration, U.S. Department of Commerce, is shown receiving the Gulf Oil gift from **Donald G. Brown**, manager, U.S. fleet, Gulf Oil Corporation, and a 1949 graduate of the Academy. The Gulf Oil Foundation grant will be given to the Kings Point Fund for the welfare and extracurricular activities of the midshipmen. The Kings Point Fund supports such activities and programs as the Midshipman Loan Program, varsity athletics, sail training, extracurricular activities and improvement of campus, buildings and equipment. These are all in areas not completely funded by the Government. The Kings Point gift is part of the \$3 million that Gulf will distribute to students and institutions of higher learning this year. The Gulf Oil funds will provide for undergraduate scholarships, graduate fellowships, employee gift matching, capital grants and other educational projects.



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SNAME Publication 'Marine Engineering' New Edition Available

Myriad technological advancements have evolved in the marine engineering field in the past 29 years. The 1971 edition of "Marine Engineering," published by The Society of Naval Architects and Marine Engineers, narrates these advancements that have occurred since the publication of Volumes I and II of the original "Marine Engineering" in 1942 and 1944, respectively.

Dramatically different in content from the original, having been completely rewritten, the 1971 edition covers naval as well as merchant practice. It is comprehensive, factual, and accurately represents the consensus of opinion of the marine industry.

To provide expert knowledge on all subjects, the chapters have been written by individual authors, highly competent engineers, who have devoted a great part of their lives to their profession. Each chapter

has been carefully reviewed by editor **Roy L. Harrington**, the control committee, and selected members of the marine industry.

Fulfilling its purpose, "Marine Engineering" acquaints those already familiar with basic engineering fundamentals with the various engineering disciplines and applications which make up marine engineering. It is intended to complement "Principles of Naval Architecture" and "Ship Design and Construction," which deal similarly with naval architecture and ship construction practices.

The chapters listed are proof of the comprehensiveness of this treatise.

Technical editor **Roy L. Harrington's** total dedication to "Marine Engineering" over the past three years is evidenced by the consistency of style and content of the book. Mr. Harrington has had 12 years of technical ship design experience in a major shipyard. In 1960, he was awarded a SNAME scholarship to pursue an M.S. degree in marine engineering. His

background and literary prowess qualify him to bridge expertly the academic and practicing professional points of view of the SNAME membership.

The 27 authors listed are a very impressive who's who in marine engineering, each being a specialist in his field. The sum of their experience and learning constitutes an all-inclusive book of marine engineering knowledge. In addition, a control committee of 10 experts in the field has provided sound guidance throughout all stages of the prepublication of the book.

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Division 1—Introductory—Chapter I, General Considerations in Marine Engineering, **J.R. Kane**, director of engineering, Newport News Shipbuilding & Dry Dock Co.

Division 2—Power Plants—Chapter II, Thermodynamics and Heat Engineering, **Jens T. Holm**, professor, Webb Institute of Naval Architecture; **J.B. Woodward III**, professor, University of Michigan. Chapter III, Boilers and Combustion, **Everett A. Catlin**, marine engineer, The Babcock & Wilcox Company. Chapter IV, Nuclear Marine Propulsion, **Robert T. Pennington**, formerly manager of nuclear marine engineering, Advanced Products Operation, General Electric Company. Chapter V, Steam Turbines, **William I.H. Budd**, assistant to manager of engineering, marine systems, De Laval Turbine, Inc. Chapter VI, Gas Turbines, **A.O. White**, manager, advanced applications unit, Medium Gas Turbine Operation, General Electric Company. Chapter VII, Medium and High-Speed Diesel Engines, **Laskar Wechsler**, technical director, Machinery Systems Division, Naval Ship Engineering Center. Chapter VIII, Low-Speed Direct-Coupled Diesel Engines, **Kurt Illies**, professor, Technische Universität Hannover.

Division 3—Transmissions—Chapter IX, Reduction Gears, **Harold W. Semar**, manager, technical support, marine mechanical department, Westinghouse Electric Corporation. Chapter X, Electric Propulsion Drives, **W.E. Jacobsen**, manager, marine systems engineering General Electric Company. Chapter XI, Propellers, Shafting, and Shafting System Vibration Analysis, **C.L. Long**, assistant chief engineer, Newport News Shipbuilding & Dry Dock Co.

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ter XVI, Hull Machinery, **Irving W. Smith**, mechanical engineer, Office of Ship Construction, Maritime Administration; **Archer M. Nickerson Jr.**, senior engineer, J.E. Bowker Associates, Inc.

Division 5—Shipboard Systems—Chapter XVII, Electric Plants, **Burr Melvin**, manager, electrical design department, Newport News Shipbuilding & Dry Dock Co. Chapter XVIII, Piping Systems, **E.E. Stephenson**, manager, piping design department, Newport News Shipbuilding & Dry Dock Co. Chapter XIX, Environmental Control, **John W. Markert**, Professional Support—Air Conditioning, Office of Construction Management, Public Buildings Service, General Services Administration.

Division 6—Supporting Technology—Chapter XX, Bearings and Lubrication, **Watt V. Smith**, Head, Friction and Wear Branch Materials Department, Naval Ship Research and Development Laboratory; **J.M. Gruber**, vice president, Waukesha Industries Corporation. Chapter XXI, Automation, **W.O. Nichols**, chief engineer, Central Technical Division, shipbuilding department, Bethlehem Steel Corporation. Chapter XXII, Construction Materials, **W. Lee Williams**, Assistant Head, Materials Department, Naval Ship Research and Development Laboratory; **M. Robert Gross**, Head, Materials Department, Naval Ship Research and Development Laboratory. Chapter XXIII, Petroleum Fuels, **Carl E. Habermann**, manager, technical services, marine sales department, Mobil Sales and Supply Corporation.

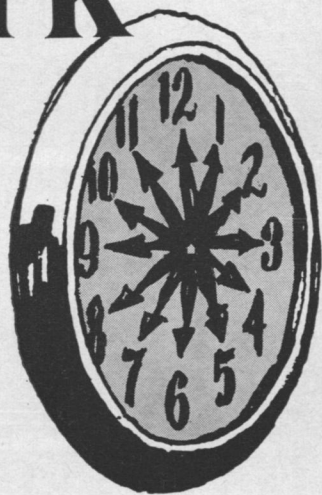
Handsomely bound in rich red and stamped in gold, "Marine Engineering" is priced at \$30 for members of SNAME and \$45 for nonmembers (add \$2.50 for overseas handling). Copies may be ordered from The Society of Naval Architects and Marine Engineers, 74 Trinity Place, New York, N.Y. 10006.

Export-Import Bank Aids Tug Financing

The Export-Import Bank announced that it has authorized a \$920,000 loan and a comparable loan guarantee to help finance a \$2.3 million oceangoing tug to be built in the United States for use by a subsidiary of the Banque de Paris et des Pays Bas. Eximbank said the French bank will make a down payment of \$460,000 in cash, representing 20 percent of the cost of the 5,600-hp tug. Eximbank also authorized a guarantee of a further \$920,000 loan made by American Security and Trust Co. of Washington, D.C.

Southern Shipbuilding Co. in Louisiana will build the tug for eventual movement to Hong Kong by its operator, Union Navale S.A., a subsidiary of the French bank, where it will pick up a barge being constructed there. It was learned that Navale S.A. plans to use the tug-barge unit to haul coal to France, probably from Germany and Poland.

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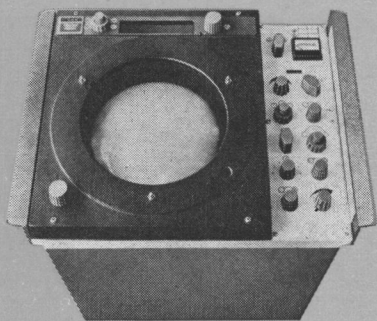


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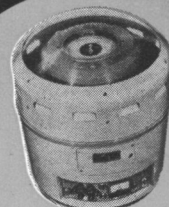


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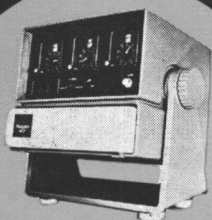


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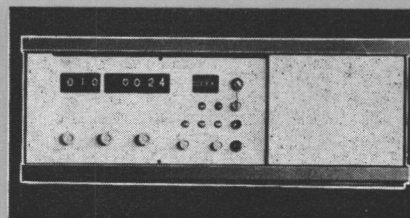
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Seven Steamship Lines Operating Or Have Ordered A Total Of 22 LASH Ships

A LASH (Lighter Aboard Ship) trade route network, linking ports in the world's major trading areas, has become a reality less than two years after the first of the new barge-carrying ships was placed in operation.

A total of seven steamship lines are operating or have placed firm orders for 22 LASH ships that will serve trade routes between principal ports in North America, South America, Europe, Asia, Africa and Australia.

The newest LASH trade route was opened in August, when the S/S Thomas E. Cuffe sailed from San Francisco to inaugurate LASH service between U.S. West Coast ports and the Far East. Pacific Far East Line, owner of the Cuffe and five sister ships now building at Avondale Shipyards in New Orleans, La., also plans to operate LASH ships to Australia and New Zealand.



The LASH Ship S/S Thomas E. Cuffe returns to San Francisco Bay from the voyage that inaugurated LASH service between U.S. West Coast ports and the Far East.

The LASH System, which combines the "mothership" or ocean carrier and a fleet of shallow-draft standard-size cargo lighters or barges to form an intermodal waterborne transportation system, is the invention and design of New Orleans naval architect **Jerome L. Goldman**. Mr. **Goldman** is president of Friede & Goldman, Inc., naval architects and marine engineers, and LASH Systems, Inc., the firm that licenses construction of the LASH ships.

The LASH ships are designed so that they can be operated as barge-carrying ships, as combination lighter/containerships or as pure containerships. The Thomas E. Cuffe and most of the other LASH ships are designed and fitted out to carry a mix of LASH lighters and standard over-the-road containers. The standard dimensions of the lighters permit complete interchangeability from ship to ship throughout the network of trade routes served by LASH ships.

LASH has played a prominent part in the activation of the Merchant Marine Act of 1970, President **Nixon's** 10-year program to revitalize the American merchant marine. The first seven ships under this new act were ordered in May and June of this year by three United States steamship operators, and will be delivered in 1973 and 1974. All are LASH vessels.

The LASH ships which were ordered this summer bring the total operating or ordered to 22, reflecting an investment of more than \$500 million. A review of the companies already participating in LASH operations and the trade routes now served or projected are:

Central Gulf Steamship Corporation—Oper-

ating two LASH ships, under long-term charter from Norwegian owners, between U.S. Gulf ports, United Kingdom and Continental Europe. The company has ordered a U.S.-flag LASH ship for delivery in 1974 and has options to contract for two additional ships this year.

Prudential-Grace Lines—Operating three LASH ships between U.S. East Coast ports and Mediterranean Sea ports. Two additional ships are under construction and will be delivered in 1973. The company also plans to provide LASH service on trade routes between U.S. East Coast and West Coast ports and the West Coast of South America.

Pacific Far East Line—Operating one LASH ship between U.S. West Coast ports and the Far East. Five additional ships are under construction and scheduled for delivery in 1972 and 1973. The company's LASH ships will also serve a trade route between U.S. West Coast ports and ports in Australia and New Zealand.

Combi Line (Holland America Line and Hapag-Lloyd Line)—The companies have two LASH ships under construction and scheduled for delivery in 1972. They will be operated between U.S. Gulf ports and northern Europe.

Delta Steamship Lines—The company has three LASH ships ordered and scheduled for delivery in 1973. They will serve a trade route between U.S. Gulf ports and ports in the Caribbean and on the East Coast of South America. Delta's LASH service may also be extended to include its trade route between U.S. Gulf ports and the West Coast of Africa.

Waterman Steamship Corporation—The company has three LASH ships ordered and scheduled for delivery in 1973 and 1974. They will be operated on a trade route between U.S. East Coast and Gulf Coast ports and Red Sea, Persian Gulf and Indian Ocean ports.

Avondale Shipyards, Inc., of New Orleans, has built or has under construction or contract all 18 of the U.S.-flag LASH ships. Two of the foreign-flag LASH ships were built in Japan by Sumitomo Shipbuilding & Machinery Co., and two are under construction at the Cock-erill Shipyards in Belgium.

Marine Resource Consultants Appoints Edwin Browne VP

Marine Resource Consultants, a division of MARCONSULT, Inc. of Santa Monica, Calif. has announced the appointment of **Edwin R. Browne** as vice president of geophysical operations, where he will direct MRC's expanded marine geophysical projects on a worldwide basis.

Mr. **Browne** has had over 20 years of experience in land and marine geophysical operations, specializing primarily in petroleum exploration. Prior to joining MRC, Mr. **Browne** managed the marine operations for United Geophysical Corporation. During the initial period of development, Mr. **Browne** directed sparker surveys in the general areas of Australia, New Guinea, Malaysia, and the Gulf Coast. Subsequently, he was responsible for three survey vessels equipped with air gun or sleeve exploder systems, satellite and sonar doppler navigation systems, sonobuoy refraction, and marine magnetic systems.

Mr. **Browne** has extensive experience in exploration geophysics in several different parts of the world. While with the Standard Vacuum Company in Sumatra, Indonesia, he was responsible for acquiring and interpreting refraction seismic data throughout Southern and Central Sumatra. He was engaged in similar operations with International Petroleum Company, Peru, in the Sechura Desert and in Southern Peru. He was then responsible for seismic mapping in the Llanos area of Colombia, from the Andes Mountains to the Orinoco River, and subsequently directed a data pro-

cessing center in Bogota, Colombia, using computers to solve certain geophysical problems.

Mr. **Browne** received a bachelor of science degree in electrical engineering from the University of Colorado in 1947.

Tugs, Towboats And Barges Costing \$25 Million Receive MarAd Mortgage Approval

The Maritime Administration has approved Government mortgage insurance for Midland Enterprises Inc., Cincinnati, Ohio, to help finance construction of two 6,600-horsepower towboats, two 3,000-horsepower tugs, and 200 jumbo open hopper barges. Total cost was put at \$25.5 million.

Midland expected to use the towboats and barges to haul coal to the Gulf from Ohio River points and the tugs in the Port of Boston, Mass., area, according to the company's application.

Colt Industries Awarded Contract To Build Diesels For Twelve Navy Tugs

Colt Industries' Power Systems Division will build diesel engines for 12 new Navy harbor tugs, of a Large YTB 760 Class, under a contract awarded by Marinette Marine Corporation of Marinette, Wis. The 12 engines are Fairbanks Morse Model 38D8-1/8 opposed piston design. The firm has previously provided engines of the same design for more than 40 Navy YTBs now in service.

Each Fairbanks Morse engine propulsion system, as furnished by the division, consists of a Model 38D8-1/8 opposed piston engine driving through reverse-reduction gears, with air operated clutches and air operated propulsion controls. The system is a single-screw drive.

The engines for this order are of a 10-cylinder configuration, rated at 2,000 hp at 850 rpm, and will be built at the firm's Beloit, Wis., plant. Twenty-five tugs of the same class have previously been built at the Marinette yard, all with Fairbanks Morse engines. The tugs will be used for general towing, for berthing large ships and for waterfront fire protection. The YTB 760 Class tug has an overall length of 109 feet with a beam of 29 feet and a displacement at full load of 343 tons.



FIRST OF FIVE: The inland service LPG pressure tank barge Cherokee slides down the ways of Bethlehem Steel's Beaumont, Texas, shipyard. She is the first of five similar barges being built by Bethlehem for Warren Petroleum Corporation. Designed by Bethlehem for the transportation of butane, she has an overall length of 175 feet, beam of 42 feet, depth of 12 feet and loaded draft of 8½ feet at her 10,000-barrel capacity. She is equipped with two cylindrical pressure tanks, 16 feet 9 inches internal diameter, by 141 feet internal length, with hemispherical heads. She will be fitted with rain shields in the openings between the tanks, and between the tanks and tank hold compartments. Built under U.S. Coast Guard inspection, the vessel is classed with the highest rating for craft of her type by the American Bureau of Shipping.

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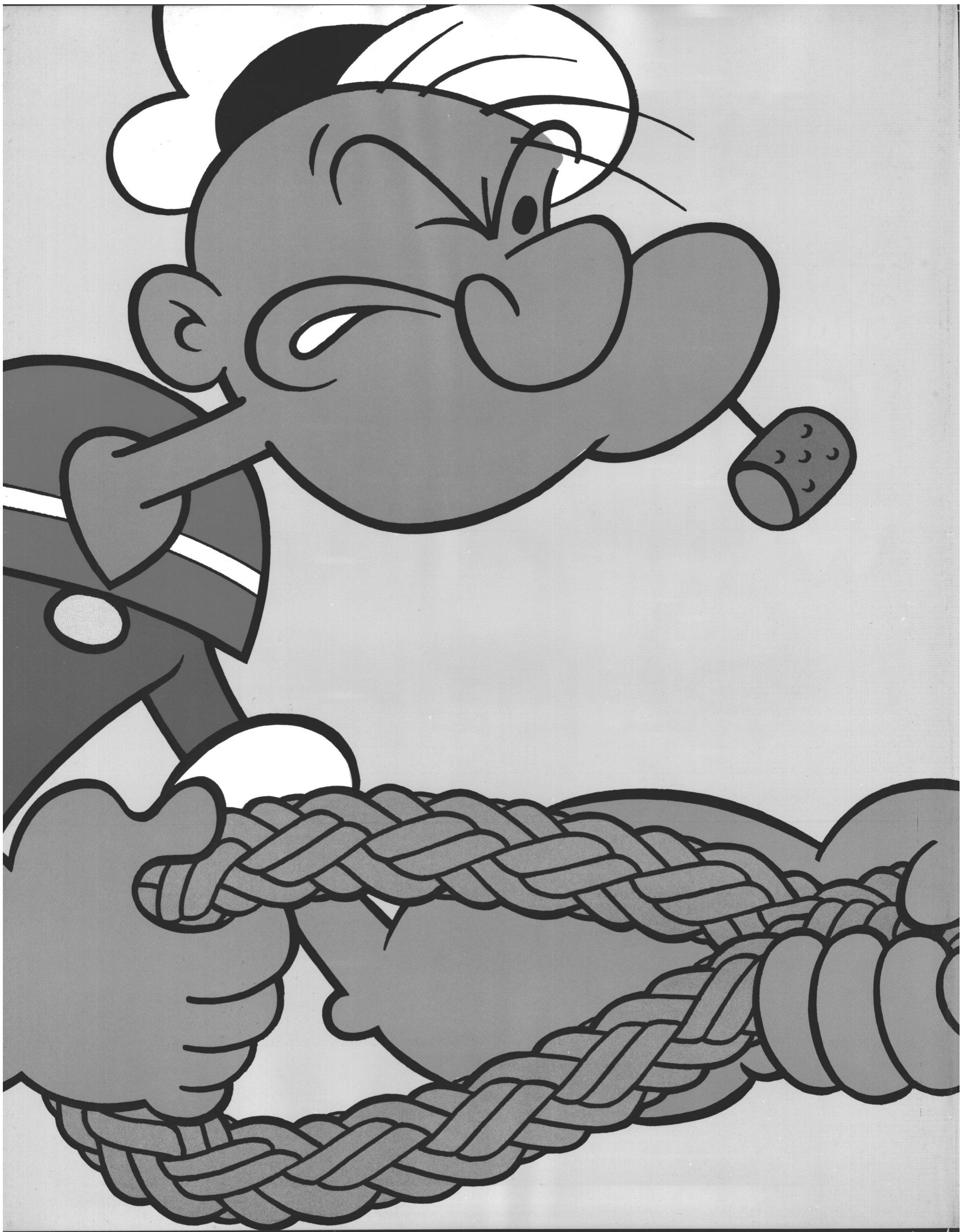
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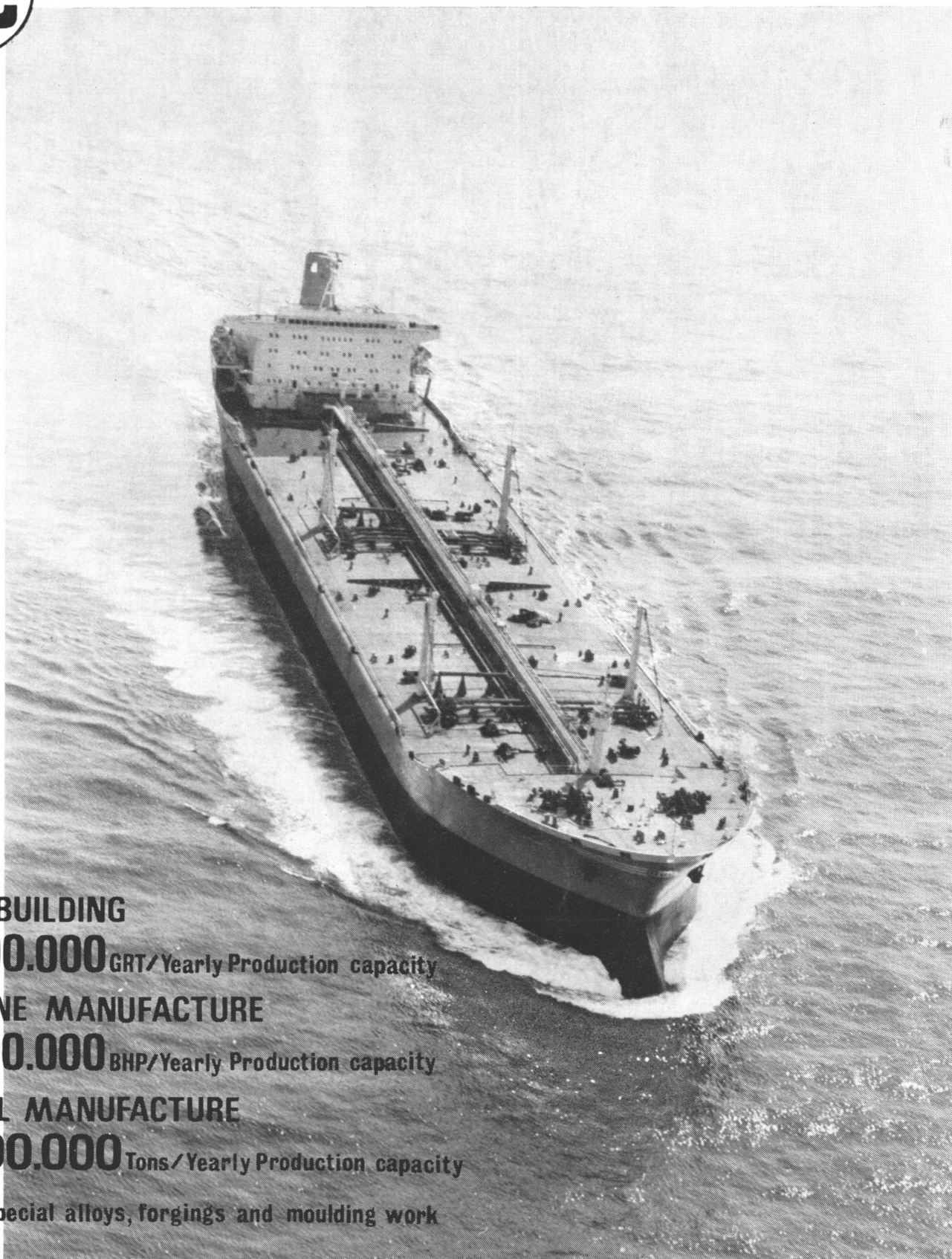
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Marine Industries Ltd. Awarded Contracts For Twelve Containerships

In one of the largest shipbuilding orders in Canadian history, Marine Industries Ltd., of Sorel, Quebec, has won contracts to produce a dozen 15,600-ton containerships for two major French shipping contractors.

Sale of the ships to La Compagnie Maritime des Chargeurs Reunis and La Societe Naval Chargeurs Delmas Vieljeux of France, will represent an export transaction totaling \$106 million for Canada. The Export Development Corp., a Canadian Government agency, is financing the sale with a loan of \$86 million, and the Bank of Montreal will lend an additional \$10 million, but without an EDC guarantee.

Each of the two French companies will receive six of the multipurpose vessels. Although designed for containers, they can be adapted to carry logs and such bulk cargoes as grain and ore and will also be equipped for refrigerated cargo. An EDC spokesman in Ottawa said the vessels will probably be used in trade between Europe and Africa.

Construction of the 12 ships will keep the Marine Industries' facilities at Sorel fully utilized until the end of 1975 and will provide employment for 1,000 men for four years. The highly automated vessels are of Canadian design.

Although it is a Crown Corporation, EDC makes its loans on a commercial basis, the Ottawa spokesman said. While it and its predecessor agencies have been in existence since 1946, this year it has become active in the field of shipbuilding for the first time. The corporation can lend up to 80 percent of an export sale.

Earlier this year, EDC provided a loan of \$20.4 million to finance the sale of two roll-on/roll-off ships built by Port Weller Dry Docks, Ltd. of Port Weller, Ontario, to the Burnett Steamship Co. of Newcastle-on-Tyne, England. The vessels are to be used in the container trade between Canada and the United Kingdom.

At the same time, the agency made a loan of \$43.5 million in the sale of three 80,000-ton tanker orders by the N.J. Vardinoyannis group of companies of Piraeus, Greece, by Davie Shipbuilding, Ltd. of Lauzon, Quebec.

Harry T. Martin Named Assistant Comptroller Of United States Lines

Harry T. Martin has been named assistant comptroller of United States Lines, it was announced by E.K. Rumpel Jr., vice president and treasurer of the containership company. As assistant comptroller, Mr. Martin will be the chief financial representative for the company's Pacific Coast Division, with headquarters in Oakland, Calif.

Mr. Martin was formerly chief accountant for three divisions of Kaiser Industries. He is a graduate of Armstrong College and earned his master's degree at Trinity University.

American Ship To Buy Litton's Erie Yard And Wilson Marine Fleet

The American Ship Building Company has reached an agreement in principle with Litton Industries to purchase substantially all of Litton's Great Lakes divisions for approximately \$20,000,000 in obligations, assumption of liabilities and cash. The agreement is subject to the resolution of cer-

tain issues now being negotiated, the approval of the board of directors of both companies, favorable review by the Department of Justice and any other appropriate governmental authorities, and other conditions.

The announcement was made jointly by **George M. Steinbrenner III**, chairman and chief executive officer of American Ship, and **Roy L. Ash**, president of Litton Industries. The proposed agreement calls

for the acquisition by American Ship of Litton's Erie Marine Shipyard and its Wilson Marine fleet of Great Lakes ships.

"The acquisition is the most logical and efficient way for us to be able to perform the giant task of helping rebuild an aging Great Lakes fleet in accord with the policies set forth by President Nixon when he signed the Merchant Marine Act of 1970 into law," Mr. Steinbrenner said.



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FUELS AND LUBRICANTS

Lloyd To Head New Engineering Dept. For Santa Fe Drilling

A special engineering department oriented primarily toward marine operations has been created by Santa Fe Drilling Co.

S.H. Lloyd, pioneer in the development of column-stabilized drilling and construction vessels, has been named senior vice president of the company and will head

the new department. The department will include marine engineering, equipment engineering, and marine safety groups. Edfred L. Shannon Jr., president of Santa Fe International Corp., of which Santa Fe Drilling is a subsidiary, said that because of the department's strong marine orientation, it will also have responsibilities in other Santa Fe divisions.

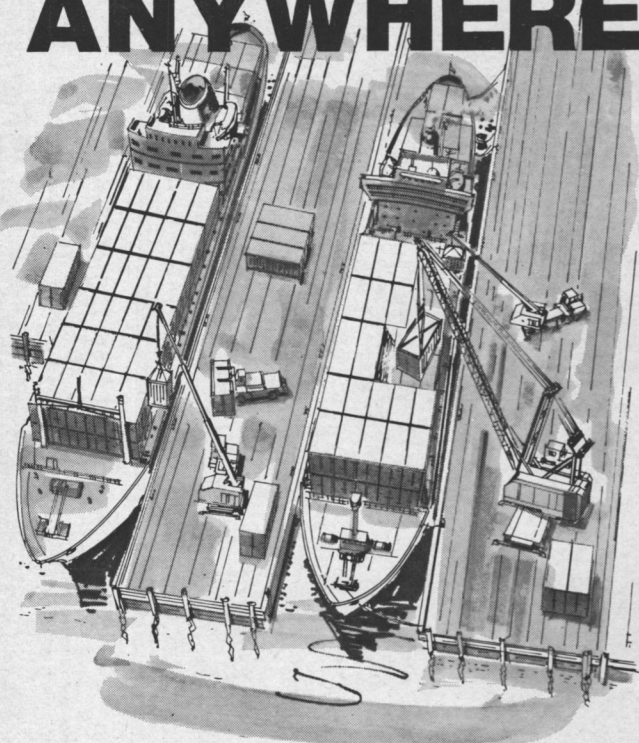
Dr. Yoram Goren, technical director of marine operations, will

head the marine engineering group, assisted by Svend Jorgensen and C.N. Springett, project engineers. Key members of the equipment engineering group include: H.G. Henderson, technical coordinator of marine engineering; A.S. Huebner, project manager, marine construction; R.R. Sartain, technical coordinator of marine construction, and Harry P. Weldon, project engineer. Also reporting to Mr. Lloyd

will be W.H. Blaylock, technical coordinator of marine safety.

Mr. Lloyd and his associates developed the Blue Water class of vessels, including Blue Water No. 1, the first column-stabilized unit to serve as a semisubmersible drilling vessel. They also designed and built the Santa Fe Mariner 1, the world's first twin-hulled column-stabilized drilling vessel, and the Choctaw, the world's first twin-hulled column-stabilized derrick and pipelaying barge.

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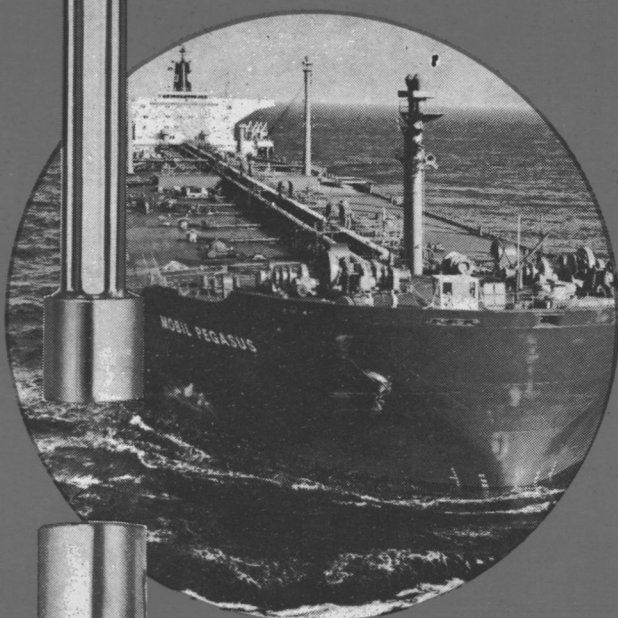
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Bethlehem Steel Appoints Allan Stacy



Allan F. Stacy Jr.

The appointment of Allan F. Stacy Jr. as technical assistant to the vice president, shipbuilding department, Bethlehem Steel Corporation, has been announced by Walter F. Williams, vice president in charge of shipbuilding.

A native of Bethlehem, Pa., Mr. Stacy had served as project coordinator in the office of the vice president in charge of engineering from July 1967 until his new appointment became effective September 1.

In his new position, Mr. Stacy will be responsible for cost and statistics analysis for the vice president, shipbuilding department.

Mr. Stacy, who served with the U.S. Air Force in an engineering group from August 1945 to April 1947, joined Bethlehem as a drafting apprentice trainee in the engineering department of the steel plant in 1948. He subsequently served as a draftsman, worked as a draftsman-engineer on the Burns Harbor, Ind., plant project, and was later named an engineer on the staff of the vice president in charge of steel operations. In his last post, as project coordinator for engineering, he handled administration and coordination matters.

A June 1945 graduate of Easton High School, Mr. Stacy served four years in Bethlehem Steel's apprentice training program and supplemented this with various courses in drafting and engineering from the International Correspondence Schools and the Bethlehem Vocational Night School in Bethlehem, Pa.

National Cargo Bureau Moves To New Offices

The National Cargo Bureau, Inc. announced that it has moved its office and is now located at One World Trade Center, Suite 2757, New York, N.Y. 10048.



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Suciu To Head R&D For GE Gas Turbine Business Operations



Dr. Spiridon N. Suciu

Dr. Spiridon N. Suciu has been appointed manager of the Technical Resources Operation for General Electric Gas Turbine Business Operations, it has been announced by **Whitman Ridgway**, deputy division general manager of the operations.

Dr. Suciu, in his new position, will be responsible for all research and development for GE's Gas Turbine Business Operations. He will also have prime engineering responsibility for the design and development of all new gas turbine products and the development of advanced manufacturing processes. Among the projects currently under way, are the development of more efficient gas turbines with greater power output and optimized for ecological considerations.

The Gas Turbine Business Operation is engaged in the production of gas turbines for worldwide use by electric utilities, gas transmission companies, process industries such as petroleum and refining companies, and the maritime industry.

In order to support the further growth in these areas, the Gas Turbine Business Operation expects to complete a new \$6.7 million Gas Turbine Development Laboratory in Schenectady, N.Y. by mid-1972. Dr. Suciu will also be responsible for this laboratory and its activities, in addition to his other duties.

Dr. Suciu is presently manager of the Design Technology Operation in the Aircraft Engine Group of the General Electric Company in Cincinnati, Ohio. He is responsible for directing advanced technology and component design and development for all aircraft engines produced by the Aircraft Engine Group.

AEIL Appoints Helm Baltimore Terminal Mgr.

George R. Helm has been appointed Baltimore terminal manager of American Export Isbrandtsen Lines, according to **Karl Wettstein**, vice president, freight, American Export Freight, Inc.

Mr. Helm was previously with Sea-Land Service, Inc., where he served as outport equipment control manager based at Elizabeth, N.J., and as terminal manager at Portsmouth, Va.

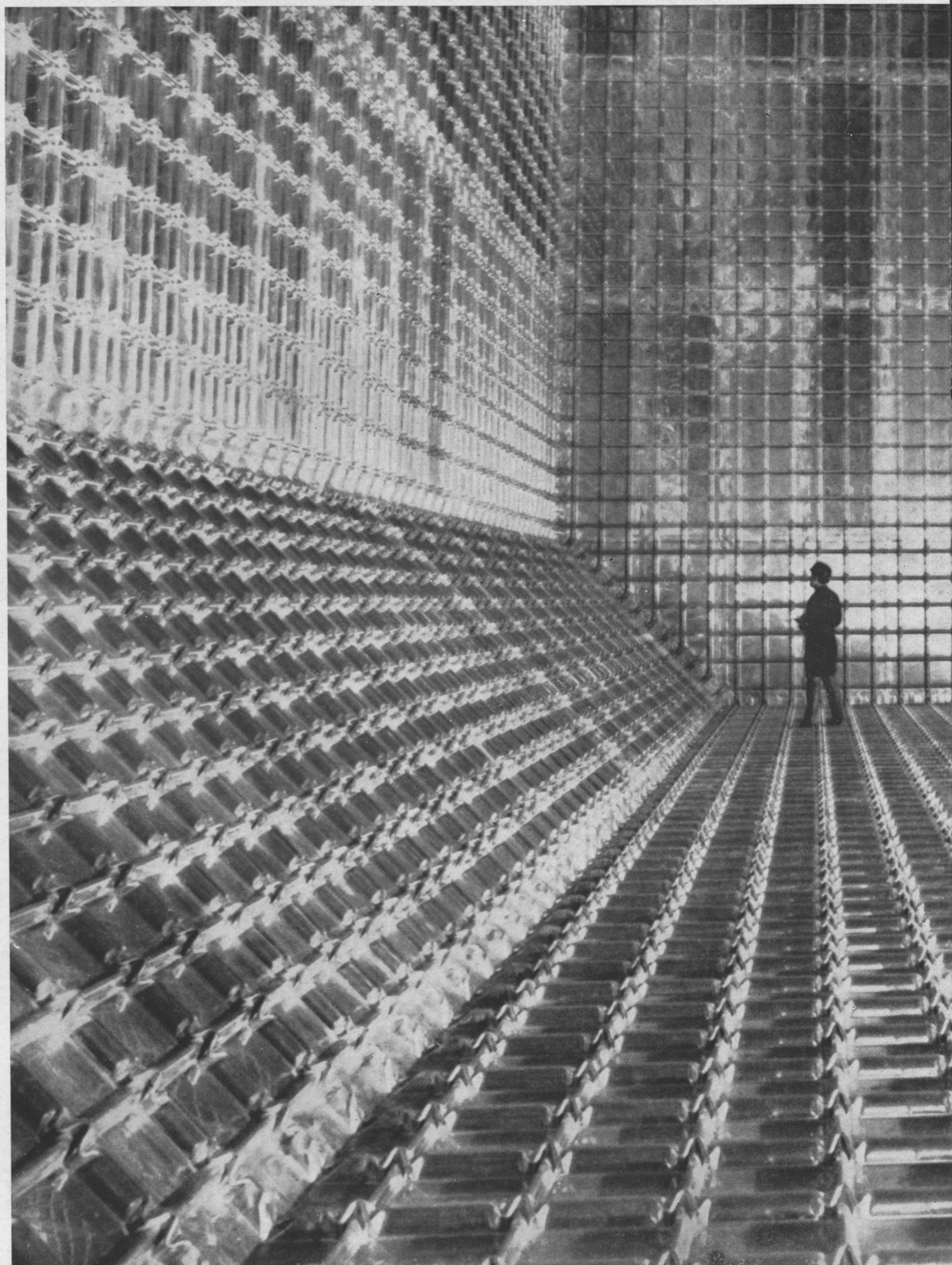
Rice Barton Wins Avondale Contract To Supply LASH Ships

Rice Barton Corporation, Worcester, Mass., in conjunction with its subsidiary, Pine Tree Engineering, Brunswick, Maine, has been awarded a contract for seven ship sets of deck equipment for the second series of LASH (Lighter Aboard Ship) vessels by Avondale Shipyards, Inc., Avondale, La. In

making the announcement, **Winship B. Moody Sr.**, president and chief executive officer of Rice Barton, stated that under the terms of the agreement equipment design will be performed by Pine Tree Engineering, while Rice Barton will handle the manufacturing at its Worcester plant.

Active participation in modern, innovative marine engineering projects is nothing new for Pine Tree

Engineering. The deck equipment for the first series of LASH vessels was also designed by Pine Tree Engineering, as was the deck equipment for the three Lykes Brothers sea barges being built by the Quincy Division of General Dynamics. Another recent joint venture is equipment for Bath Iron Works AEIL containerships, with design by Pine Tree Engineering and manufactured by Rice Barton.



Gage Named Director Int'l Activities Office Established By MarAd

Richard J. Gage, former chairman of the Puerto Rico Ocean Service Association, has been named Director of the newly established Office of International Activities in the Maritime Administration, A.E. Gibson, Assistant Secretary of Commerce for Maritime Affairs, announced.

A graduate of the University of Toronto, Mr. Gage received his law degree from Cornell Law School. He began his professional career in 1955 as an attorney in the Antitrust Division of the U.S. Department of Justice. For three years he was an attorney with the Federal Maritime Board, the predecessor of both the Federal Maritime Commission and the Maritime Administration. In 1959, he assumed the chairmanship of the New York

Terminal Conference, which represents 27 stevedore and steamship companies. Five years later, he became chairman of the North Atlantic United Kingdom Freight Conference, which represents 12 steamship companies in the United Kingdom, Ireland, Belgium and the United States. From 1968 to 1969, Mr. Gage was the Maritime Transportation Officer in the Office of International Transportation,

U.S. Department of Transportation.

"Mr. Gage's extensive background in maritime law and international transportation will be invaluable to increasing the Maritime Administration's and shipping industry's participation in international activities that, directly or indirectly, have a significant impact on the well-being of the American merchant marine," Mr. Gibson said in making the announcement.

As Director of the Office of International Activities, Mr. Gage will be working closely with such organizations as the International Maritime Consultative Organization and the United Nations Conference on Trade and Development. He will also present this agency's point of view should problems arise with foreign governments over maritime matters. Mr. Gibson made clear that this office will not duplicate the functions of other Maritime Administration offices or the international functions performed by other Government agencies.

Portugal To Build Fleet Of Giant Tankers

Portugal plans to build a fleet of giant tankers within the next four years to supply its network of oil refineries now being built.

The Portuguese tanker company Soponata said it has already placed orders for two 136,000-ton tankers at Sweden's Eriksberg shipyards, and a contract for a third one is being negotiated. It said the order of a fourth 136,000-ton tanker was placed last year with Kawasaki Shipyards of Japan. All four will be delivered by 1974.

Soponata said it plans to order at least two 300,000-ton tankers to be delivered by 1975 to meet the increasing demand of oil in Portugal at the minimum cost through the route around the Cape. These tankers will transport oil for the giant southern refinery projected for the Port of Sines, as well as refineries in Setubal and near Oporto.



MINI SPONSOR: Pretty little Nicole DeFelice, eight-year-old daughter of Mr. and Mrs. Lloyd DeFelice of New Orleans, holds a bouquet of flowers presented her as sponsor of an oceangoing vessel, the Luke Z. DeFelice, background, christened recently at McDermott Shipyard in Morgan City, La. Built for DeFelice Marine Contractors Inc., the 120-foot twin-screw tug has a rating of 3,000 horsepower and joins a fleet of 10 tugs owned and operated by the company.

You're standing in the "Descartes"—newest of 20 mammoth LNG tankers that will have innards of nickel alloys.

The 310,000-bbl. "Descartes," with her flexible waffle membranes of Type 304L stainless steel designed by Technigaz/Gazocean, is now nearing completion at St. Nazaire, France.

When she's finished, she'll be the third in a whole new generation of larger-sized LNG tankers scheduled for service by 1976.

All 20 of the bigger tankers ordered to date have capacities in the 300,000 bbl. to 750,000 bbl. range.

And all 20 ships, like many of today's smaller LNG tankers, will have cryogenic piping, pumps, and inner tanks of nickel alloys—*alloys designed and proved to be tough and ductile at cryogenic temperatures, highly resistant to corrosive saltwater atmospheres, and easily fabricated and welded.*

The "Descartes" has six tanks of Type 304L stainless in the flexible waffle membrane structure, the Gazocean design being used for nine of the larger LNG tankers.

For your own LNG tanker, of course, you could also choose either 9% nickel steel or Invar* 36% nickel-iron alloy.

It all depends on the design you prefer for your ship.

For more details on nickel alloys for cryogenic service, write Dept. MR-1071, The International Nickel Company, Inc., One New York Plaza, New York, N. Y. 10004.

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Navy Contract Awarded To Marine Propulsion Engineering

Marine Propulsion Engineering, Inc. of Quincy, Mass., has received a contract from the Department of the Navy, Naval Undersea R&D Center, San Diego, Calif., and Kailua, Hawaii, in the amount of \$83,500. The award was announced by the company's president, **Bruce S. Wilkinson**. The contract calls for the design and fabrication of two 78-inch diameter Model 240 Wilkinson controllable pitch propellers. These propellers will be installed on a new versatile vessel called the SSP (Semi-Submerged Platform) which is powered by two aircraft-type gas turbine engines of 2,500 horsepower each. The vessel uses an entirely new hull design which will permit a top speed of 26 knots.

Marine Propulsion Engineering, which went public in 1969, will provide two of their unique

controllable pitch propellers. The system was originally conceived by the president and vice president, who were former employees of AVCO in Wilmington. Since forming Marine Propulsion Engineering in 1966, they have developed the system into large propellers now in use at sea.

Marine Propulsion's unit eliminates rotary hydraulic joints and rotating control bearings by installing their unit on a conventional solid tailshaft. MPE's unit also has a free-flooding hub and does not require auxiliary power to hold pitch.

To increase the company's potentials and capabilities, MPE became affiliated with Murray & Tregurtha, Division of Mathewson Corporation, in October of 1970. Murray & Tregurtha, a company with a reputation in the marine industry for over 85 years manufactures bow thrusters and M&T Harbormaster stern drives.

MarAd Project Seeks Improved Merchant Ship Designs Through Ocean Wave Study

A multi-faceted project to gather and interpret data on ocean waves and their effect on ship structures has been initiated by the Maritime Administration, U.S. Department of Commerce.

"The end-product of this research," according to Assistant Secretary of Commerce for Maritime Affairs **A.E. Gibson**, "will be improved merchant-ship designs, particularly for vessels transiting the North Pacific in the Far East and Alaska trades."

The award of a \$282,000 two-year contract by the agency to the Sea Use Council, a group formed by the states of Alaska, Washington, Oregon, and Hawaii to coordinate regional oceanographic studies, which will oversee the entire project, marked the beginning of the undertaking, Mr. **Gibson** explained.

Measurements of wave heights, frequencies and lengths at an open-ocean site will be correlated with wave-forces as measured aboard ships transiting the area and the resulting stresses and strains in the ships' structure, he said.

Specifically, a pressure meter wave gage built by the University of Washington's department of oceanography, will be placed on the Cobb Seamount, a submerged mountain which protrudes within 110 feet of the Pacific Ocean's surface about 250 miles off the Washington-British Columbia coast.

For the shipboard measurements, Lockheed Shipbuilding and Construction Co. of Seattle will install wave-meters and stress-strain gages aboard two American Mail Line, Ltd., vessels, the Japan Mail and the Philippine Mail, as well as process the resulting data. Ship's officers and midshipmen from the U.S. Merchant Marine Academy serving aboard the two ships will assist in recording this information.

The wave meter to be mounted on the Japan Mail is being furnished by the U.S. Naval Ship Research and Development Center, Carderock, Md.

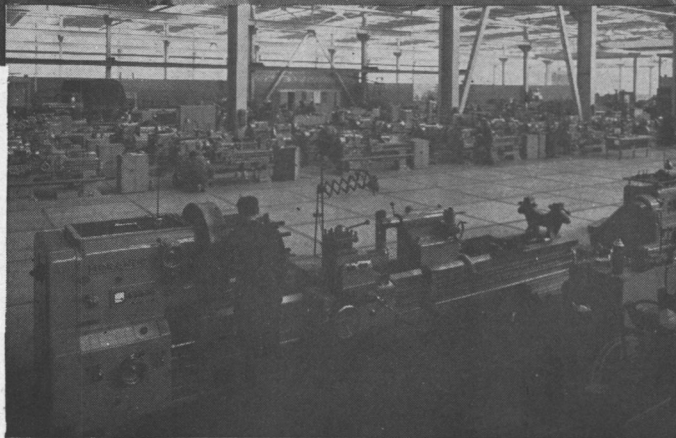
Canadian ocean station vessels operating in the North Pacific will also gather data for the study.

Finally, the Webb Institute of Naval Architecture, Glen Cove, N.Y., will correlate and evaluate all of the information obtained during the study and will relate it to improved ship designs for merchant vessels.

In addition to aiding in improving merchant ship design, this study will provide essential data for use in designing open-sea offshore platforms, as well as in routing ships in the North Pacific and Alaska trades, Mr. **Gibson** said.

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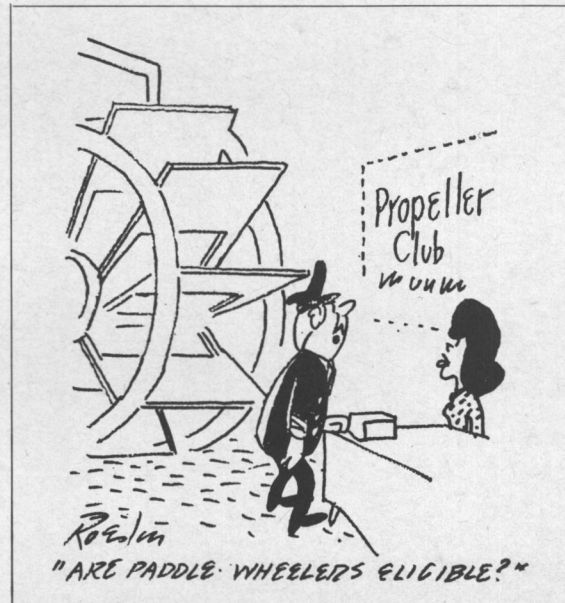
Two privately owned graving
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“When that storm hit, I thought I’d lost my tow for sure —any other rope would have parted.”

When the McAllister Towing Company first decided to use new blue-tinted Super 707 nylon rope, they didn't know what was in store for them. Captain Frank Bradley was to make a routine trip hauling two heavily laden mud dumpers. Out at sea, a sudden storm caught the captain and his tow. The load put on the Super 707 rope was so great that the heavy-

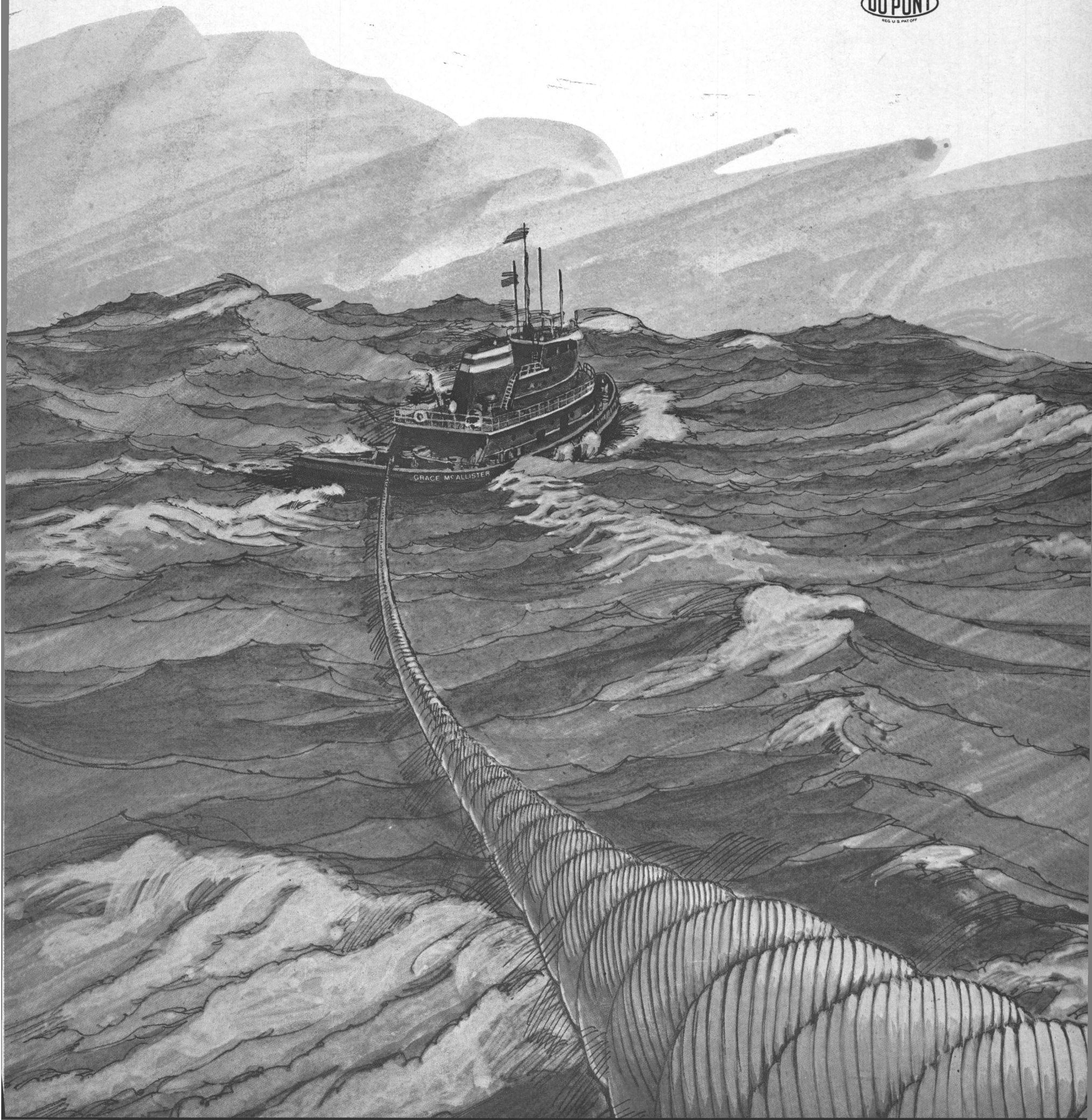
duty-steel thimble was bent. Yet the line held. And everybody and everything got back safely.

The large lines of Super 707 nylon now available are the strongest ever made per unit of weight. In a recent test, the breaking strength of a 3-inch-diameter rope of Super 707 exceeded the Military Spec (MIL-R-17343-D) for nylon by *twenty tons*—although it contained less nylon

than permitted by that spec.

And what that means to you is a tougher, more reliable rope. A longer-lasting rope—with greater resistance to abrasion.

So get Super 707 nylon rope. It's the tough one—tinted blue so you'll know it. For more information, write: Du Pont Company, Room 31H1, Wilmington, Delaware 19898.



Bailey Refrigeration Opens Miami Branch

The fast turn-around of cruise ships in the growing port of Miami has prompted Bailey Refrigeration Co., Inc., of Brooklyn, N.Y., to open a new branch in that city.

An ample inventory of products that have been designed, engineered, and manufactured especially for marine use will be maintained to assure prompt delivery. This will include

a wide variety of refrigerators, water coolers and ice cubers, as well as condensing units, controls, pipings, fittings and accessories required for shipboard installation. Complete units and parts will be available for air-conditioning needs.

Bailey is an authorized marine service and parts representative for York Corp. In addition, parts for most European refrigeration equipment such as Danfoss, Sabroe, Stal

and several other manufacturers will be stocked.

Installations of new systems, conversions, alterations, or major repairs will be provided. An affiliate, Bailey Carpenter & Insulation Co., Inc., will be available to handle insulation of compartments for refrigerated cargoes and stores, as well as voyage repairs.

The new branch is located at 2479 N.W. 77th Terrace, Miami, Fla. 33147, telephone (305) 693-5852.

Mobil Names Lemieux To Marine Sales Post



B.E. Lemieux

B.E. Lemieux has been named sales manager for the Great Lakes, Rivers & Gulf Marine District of Mobil Oil Corporation, it was announced by E.K. Arndt, general manager of the domestic marine sales department. Mr. Lemieux succeeds Mr. Arndt, and will be headquartered at the district office in Cleveland, Ohio.

A 1956 graduate of the Maine Maritime Academy, Mr. Lemieux served three years in the U.S. Navy and one year as a licensed engineer for American Export Isbrandtsen Company. Prior to joining Mobil Oil Corporation in 1966, he was with Bull & Roberts, Inc. as a marine sales service engineer. At Mobil, Mr. Lemieux has served as an industrial sales representative, commercial lubrication engineer, and equipment builders representative.

Alfred Conhagen, Inc. Announces Expansion Of Southern Operations

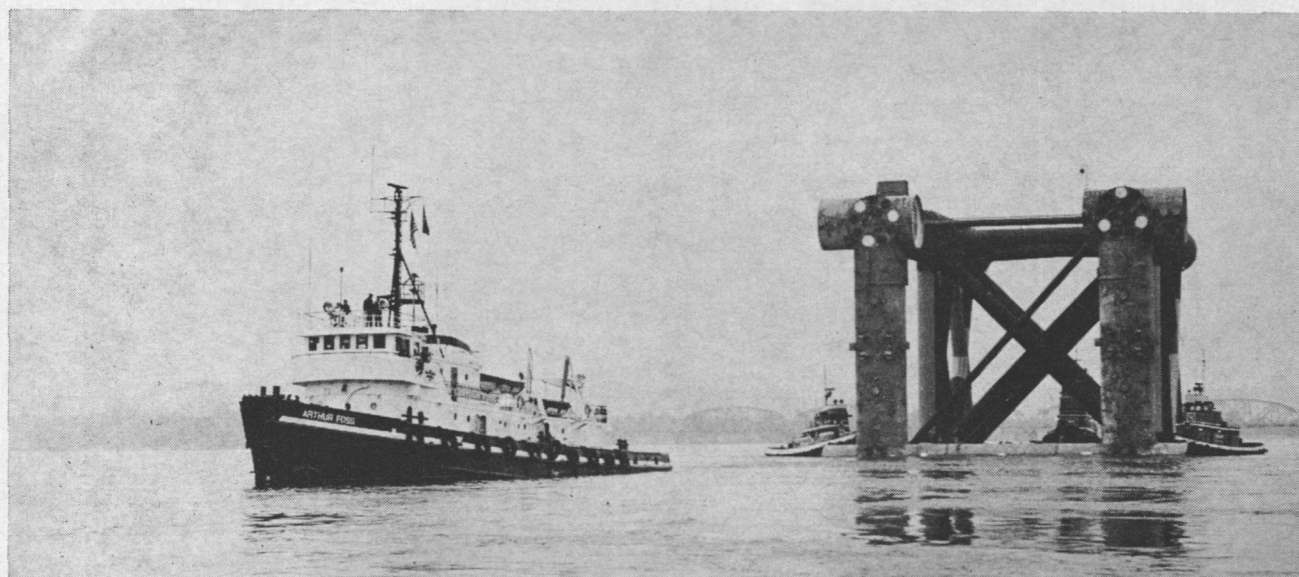
Alfred Conhagen Jr., vice president of Alfred Conhagen, Inc., Staten Island, N.Y., recently announced the opening of his corporation's new and larger facilities at 203 Texas Avenue, LaMarque, Texas 77568. In addition, a new office has been opened at 14836 South Versailles Court, Baton Rouge, La.

Louis Nilsen has been appointed manager of both offices, with Ed Hoagland in charge of the Baton Rouge location.

Alfred Conhagen, Inc. is one of the largest distributors of marine equipment, representing the leading manufacturers in the marine industry, such as Worthington Corp., Ingersoll-Rand, Fairbanks Morse, and Chempro/Sealol, among others.

Meyer To New Post At Prudential-Grace

J. Edward Meyer Jr., who has served over the past 37 years in various executive posts with Grace Line and with its successor company, Prudential-Grace Lines, will now act as a special consultant to the executive committee of the company, according to an announcement by Spyros S. Skouras Jr. In his most recent capacity, Mr. Meyer served as vice president of freight sales, and the latest move has been dictated by the press of personal business affairs, it was indicated.



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An affiliate of Dillingham

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SHIPBUILDING & MFG. CO., INC.
HAVRE DE GRACE, MD. ■ PHONE: 301 WE 9-2552

A subsidiary of M. P. HOWLETT, INC. — Est. 1875 ■ Nearly a century of 'know how' in floating cranes and barges ■ Hudson Trust Bldg., Union City, N.J. Phone: 201-866-1566

Two Companies Plan To Concentrate French Flagship Activities

The boards of directors of Compagnie Havraise et Nantaise Peninsulaire consisting of 31 vessels—24 cargoliners, six bulk carriers and one LPG carrier—totaling 150,000 grt, and Societe Francaise de Transport Petroliers consisting of 12 tankers totaling 410,000 grt, have agreed to concentrate their French flagship activities. Both companies belong to the Worms Group.

C.H.N.P. will bring all its assets to SFTP, which will then be named Societe Francaise des Transports Maritimes, and C.H.N.P. will become a holding company known as Compagnie Navale Worms.

The new organization will own and control vessels which will total over 2,000,000 deadweight tons by 1975.

Chevron Shipping Appoints Walsh

Robert F. Walsh has been appointed manager of the traffic division of Chevron Shipping Co., marine operating subsidiary of Standard Oil Co. of California, it was announced by the firm. Mr. Walsh succeeds H.M. Kimbrough, who has been given a special assignment reporting to Chevron Shipping's president. Mr. Walsh, who has been associated with Standard since 1955, previously served the parent company as coordinator of foreign supply.

Westinghouse Awards Newport News Ship \$2.8 Million Contract

Newport News Shipbuilding, Newport News, Va., will participate in the Atomic Energy Commission's liquid metal fast breeder reactor (LMFBR) program as a subcontractor to Westinghouse Electric Corporation.

The Tenneco subsidiary has been awarded a \$2.8 million contract to manufacture certain non-nuclear components for the Fast Flux Test Facility under construction near Richland, Wash. Included are the core support structure and related equipment and services for the experimental reactor to be used in developing breeder reactor technology.

Westinghouse was selected in 1968 by AEC to design the reactor plant of the facility. In 1970, Wadco, a Westinghouse subsidiary, was created to manage development and construction of the Fast Flux Test Facility and related liquid metal fast breeder reactor facilities at the AEC's Hanford Project, Richland, Wash. When the FFTF goes critical, scheduled for 1974, it will become the AEC's major facility for irradiation testing and post-irradiation examination of fuels and materials being developed for fast breeders.

President Nixon underscored the urgency of the LMFBR development program on June 4, 1971, in the first energy message ever delivered to Congress. Calling for a successful demonstration of the LMFBR by

1980, he said the nation's best hope for low-cost clean energy lies with the fast breeder: "Because of its highly efficient use of nuclear fuel, the breeder reactor could extend the life of our natural uranium supply from decades to centuries, with far less impact on the environment than the power plants which are operating today."

This type reactor is considered the solution to the shortage of domestic uranium predicted for the 1980s by

the AEC. The breeder will, in simple terms, produce more atomic fuel than it consumes and feed upon itself. The efficiency of the reactor will provide substantial savings in operating cost of power plants.

The Virginia shipyard was selected because of its facilities and experience in the nuclear field. The company has produced neutron shield tanks to house reactors, support and restraint castings, and other specialized equipment for the nuclear power industry.

A subsidiary, Nuclear Service and Construction Company, specializes in servicing, testing and refueling land-based reactors, and will provide advisory services related to the core support and reactor installations.

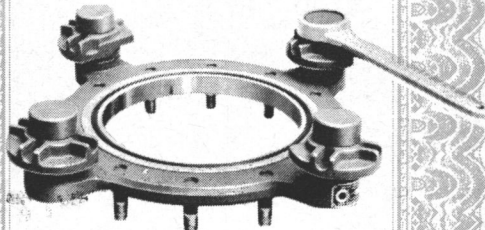
Newport News Shipbuilding has the unique capability of building and servicing the full range of nuclear powered ships. Contracts currently under construction include nuclear aircraft carriers, frigates, and the Navy's new "fast" attack submarine.

Camlock Flange Sales Corp. Announces A 5 Year Guarantee

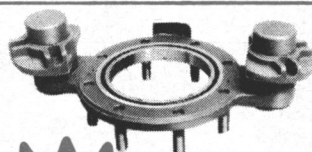


Guarantee

ALL C-L COUPLINGS ARE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR 5 YEARS ON A PRO-RATED BASIS.



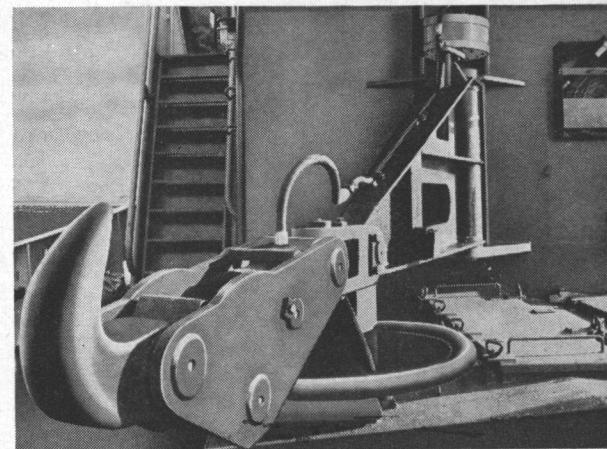
THE EXCEPTIONS TO THIS GUARANTEE ARE "O" RINGS. ALL GUARANTEED EQUIPMENT SHOULD BE RETURNED TO THE CAMLOCK FLANGE SALES CORP. FOR INSPECTION, AND CREDITS WILL BE ISSUED.



CAMLOCK FLANGE SALES CORP.

449 SHERIDAN BOULEVARD,
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Please send information about the items I have circled below:

1. Mechanical towing hook
2. Hydraulic towing hook
3. Mechanical towing hook with shock absorber
4. Hydraulic towing hook with shock absorber
5. Radial towing gear with mechanical towing hook
 - a) single towing gear
 - b) double towing gear
6. Radial towing gear with hydraulic towing hook
 - a) single towing gear
 - b) double towing gear
7. Swivelling righting arm with mechanical towing hook including hydraulic retarding device
8. Swivelling righting arm with hydraulic towing hook including hydraulic retarding device
9. Mechanical retarding device to be used in conjunction with radial towing gear (item 5a and 5b)
10. Hydraulic retarding device to be used in conjunction with radial towing gear (item 5a and 6a)
11. Electro-pneumatic gear for releasing the mechanical towing hook (item 1, 3, 5 and 7)

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Index On 7,000 Ports Updated By U.S. Navy Oceanographic Office

In cooperation with the Navy's Military Sealift Command (MSC), the U.S. Naval Oceanographic Office, with headquarters in Suitland, Md., has published an updated version of the "World Port Index," which gives easy access to pertinent information on some 7,000 world ports, Capt. F.L. Slattery,

USN, the Oceanographic Office's Commander announced.

Rear Adm. William W. Behrens Jr., Oceanographer of the Navy, in presenting the first copy to Vice Adm. Arthur R. Gralla, MSC Commander, lauded the efforts of Captain Slattery and the many people who participated in this effort. He singled out the work of John C. Martin, Charles R. McLoud and William C. Yettergren, all of the Oceanographic Office's Navigation-

al Information Services Division, and Davidson E. Cook, Joseph E. Ahern, Rae Pickrel, and Donald H. Silke of MSC, for their contributions.

The loose-leaf updated version (Pub. 150), which the Oceanographic Office (NAVOCEANO) will distribute throughout the U.S. Navy and to the Military Sealift Command, will soon be available to the general public for \$3 (without binder) from the NAV-

OCEANO's Chart Sales Desk, Suitland, Md. 20390, and its authorized sales agents in principal seaports around the world. It can also be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.



Initial copy of the U.S. Navy's new edition of "World Port Index," a compendium of information on 7,000 world ports, is presented to Vice Adm. Arthur R. Gralla (center) by Rear Adm. William W. Behrens Jr. (right), as Capt. F.L. Slattery looks on.

How Super Bearing uplifted the digestion of Jon O'Ramsky

Once upon a time, there was this eraser-chewing persnickety purchasing agent who worked for an aggressive boat builder. Jon O'Ramsky worried so much he couldn't even eat lunch.

His biggest hang-up, believe it or not, was water-lubricated shaft bearings. He had it figured this way. Why build a beauty of a boat and then goof it by taking the chance on an inferior bearing?

One particularly nervous noon hour, young O'Ramsky oozed into a very satisfying stupor, caused by swallowing too many pencil erasers.

Slouched over the morning's confirmation memos, he had a beautiful dream about a p.a.'s dream of a bearing.

Its great claim to fame came from a rare combination of specially compounded rugged rubber tenaciously bonded to a sturdy sleeve.

The rubber liner gave in to grit and gunk that got between shaft and

bearing. And the special open-grooved design helped the lubricating water whisk away those nasty little gnawing particles.

It came in over 225 standard and flanged models, with sleeves of naval brass, stainless steel, aluminum or reinforced phenolic resin. Plus bearing staves.

And to top it all off, delivery and availability were just short of stupendous.

This was Super Bearing, the purchasing-agent-pleasing creation of BJ Marine Products (and the Great Engineers of Borg-Warner).

Slowly coming out of his dream world, O'Ramsky telephoned his order for the correct sizes and models for every boat in the line.

Today, he still doesn't eat much lunch, but he sure has lots more fun worrying about his new lecherous love life.

BJ Marine Products, P.O. Box 2709 Terminal Annex, Los Angeles, California 90054, Telephone (213) 583-1811/P. O. Box 888, Keokuk, Iowa 52632, Telephone (319) 524-8430.



MORAL: BJ Super Bearing is like a dream come true and lets p.a.'s worry about more important things.

BJTM Marine Products **BORG WARNER[®]**

Tubbs Cordage Forms Tubbs-Singapore

Formation of a new company, Tubbs-Singapore, incorporated in the Republic of Singapore, has been announced by Robert S. Greenwood, president of Tubbs Cordage Company. The new company, wholly owned by Tubbs Cordage, was formed to give Tubbs added sales and distribution advantages in the Far East.

Tubbs Cordage, one of the nation's largest rope manufacturers, also has facilities in Manila, Philippine Islands; Orange, Calif., and Seattle, Wash. Corporate headquarters are located in San Francisco, Calif. The company recently entered the carpeting field with the acquisition of Valley Processing Company, Dos Palos, Calif., one of the leading West Coast producers of synthetic carpet yarns.

You can't depend on the weather. But you can depend on Latenac® Coatings.

The high-performance chlorinated rubber coatings
that let you paint anytime, anywhere.



Topside Systems

Latenac High Builds
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or
Inter-Zinc 2410/2411,
Tie-Coat and
Latenac High Build;
Latenac Finish
(optional)

Bottom Systems

Latenac High Builds
and
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or
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Antifouling

Latenac® Systems are technically advanced, single component, easy to apply, high-build, chlorinated rubber coatings that can be used in the heat of summer or the cold of winter. Even at temperatures below freezing. Temperatures when many coatings can't be used. So you can paint when you have to with Latenac Coatings without costly hold-ups and lay-ups.

They are specially formulated for airless spray application on large areas, but may also be applied by air spray, brush or roller.

Latenac Coatings can be used above or below waterline, on exteriors or interiors. And for complete antifouling protection they can be combined with Latenac Antifoulings or Wide Spectrum® Antifoulings.

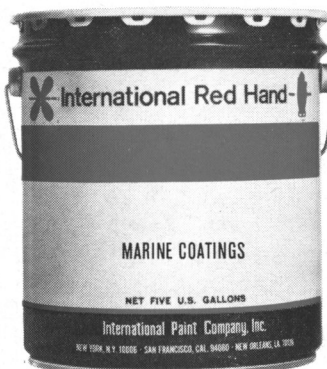
Although chlorinated rubber coatings are not new in concept, Latenac Coatings are the result of advanced formulation techniques which produce superior high-build, quick-drying coatings that combine durability, elasticity and toughness with excellent alkali and water resistance.

In addition to their use on vessels of all sizes, Latenac Coatings are especially suitable in new construction for sub-assembly painting, due to their high film build, the speed with which they dry even at low temperatures and their extraordinary recoatability characteristics.

These features make it possible to easily finish sections or entire areas of ships that have remained partially coated for weeks or even months, for there is no maximum drying time between coats with Latenac Coatings.

And because they are one-component—not two-component—there is little or no waste when you use Latenac Coatings. Which makes them ideal high-performance coatings whether maintenance is performed by ships' crews or shore personnel.

Latenac Systems are available worldwide through International Red Hand Marine Coatings distributors. For complete details on them and the advantages they can offer you, contact our nearest office, today.

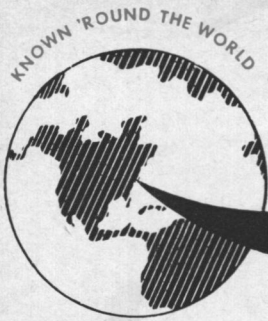


**International Red Hand
Marine Coatings**

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World's Largest Marine Paint Makers

21 West St., New York/S. Linden Ave., S. San Francisco/3915 Louisa St., New Orleans



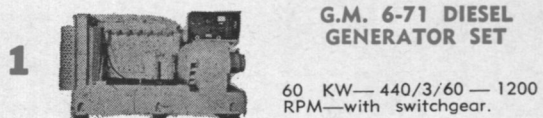


THE BOSTON METALS CO.

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

DIESEL GENERATOR SETS



G.M. 6-71 DIESEL GENERATOR SET

60 KW—440/3/60—1200 RPM—with switchgear.



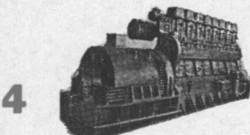
350 KW 120/240 VDC DIESEL GENERATOR SET

Ingersoll-Rand heavy duty type S engine—8 cyl.—505 HP—10½ x 12. GENERATOR: G.E. 350 K.W. 120/240—600 RPM—switchgear. Good condition—as removed from Grace Line ships.

250 KW DIESEL GENERATOR SET

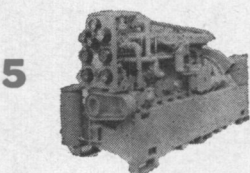
ENGINE: Enterprise 12 x 15 DSG-6—6 cyl.—450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 35-10P-913. Complete with switch gear.

\$12,500.



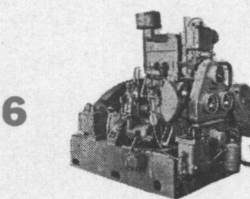
UNUSED 500 KW 120/240 VDC BALDWIN/ALLIS CHALMERS DIESEL GENERATOR SET

ENGINE: Baldwin-DeLaverne 725 HP—12½"x15½"—8 cyl.—500 RPM—air starting. Dry weight 54050 lbs. GENERATOR: Allis-Chalmers 500 KW—120/240 VDC—500 RPM—550 RPM overspeed. 60°C rise—class B insulation—3-wire—25% unbalance—2083 amps—stab. shunt—open—drip-proof—self-ventilated—8-poles.



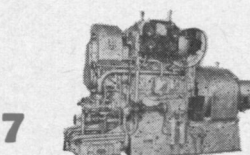
UNUSED 100KW SUPERIOR DIESEL GENERATOR SET

GENERATOR: 120/240 VDC—417 amps—stab. shunt—1200 RPM. DIESEL: Superior GBD-8—8 cyl.—5½"x7.



UNUSED 10 KW SUPERIOR DIESEL GENERATOR SET

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



100 KW G.M. 3-268A DIESEL GENERATOR SET

Like new. ENGINE: G.M. 3-268A—3 cylinder—6½"x7" bore and stroke. GENERATOR: General Electric—100 KW—440 volts—3 phase—60 cycle.



250 KW COOPER BESSEMER DIESEL GENERATOR SET

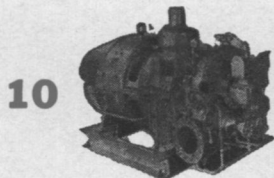
250 KW Cooper Bessemer constant duty diesel generator set. ENGINE: Cooper Bessemer FS-6—6 cylinder—8¾"x11" bore and stroke—900 RPM—3968 cubic inches. GENERATOR: General Electric 250 KW—312 K.V.A.—type ATI—frame 975Y—450 volts—3 phase—60 cycle—80% P.F. continuous. EXCITER: 4.5 KW—120 volts. With switch gear.

TURBO GENERATOR SETS



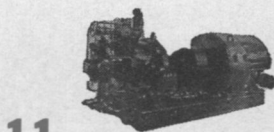
WESTINGHOUSE 440/3/60 200 KW UNIT

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 operates 615 PSI—850°TT.



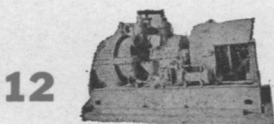
WESTINGHOUSE 60 KW 120 VDC M-20-EH

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



300 KW WORTHINGTON-MOORE CROCKER-WHEELER UNITS

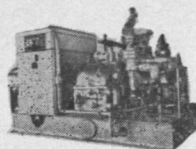
AP2 ExMedina Victory units. Worthington-Moore turbine—440 lbs—740°TT—28½" vac.—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 14x7—6097/1200. GENERATOR: Crocker-Wheeler 300 KW 120/240 DC—1250 amps—type 102-H—compound—973643—999759—armature flange 8¼"—bolt circle 7"—12 holes. Also new armature in stock (weighs 1840 lbs). Also have 2 units—generator 102 HP—300—KW120/240—stab. shunt—1200 RPM.



VICTORY 300 KW WESTINGHOUSE TURBO GENERATOR SET

440#—740°F—5930 RPM—2A-9794-15-16-17—coupling non-recessed on steam end of pinion—5¾". GENERATOR: Westinghouse 300 KW—120/240 DC—1250 amps—1200 RPM—C.B. 208.4.

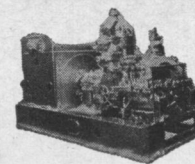
G.E. 600 KW GEARED TURBO GENERATOR SETS



G.E. 600 KW geared turbo generator sets—525 lbs—825°F. TURBINE: Type FN3-FN-20—6-stage—882 HP—600 KW—525/565 lbs. G—superheat 355/371°F—exhaust pressure 1" abs. Test steam chest 850# G. 10033 RPM—6390 lbs steam flow per hour. REDUCTION GEAR: Single helix—single reduction—10033/1200. GENERATOR: G.E.—600 KW—450/3/60—1200 RPM—type ATI—0.8 PF—961 amps continuous—2 hours 25% overload—(750 KW) 1200 amps—5 minutes (900 KW) 1400 amps. Totally enclosed—water cooled—amb. temp. reg. 50°C. EXCITER: 7.5 KW—120 VDC—direct connected. Complete with rheostat type voltage regulator & motor operated generator field rheostat.

FURNISHED WITH ABS OR LLOYD'S CERTIFICATE

WESTINGHOUSE MAIN GENERATOR LEVER OPERATED CONTROL CUBICLES — COMPLETE —



1000 KW G.E. TURBO GENERATOR—READY TO GO—WITH A.B.S.

15

TURBINE: Type FSN—eight stage—9268 RPM—525 lbs—825°F or 590 PSI & 0° superheat. Turbine serial No. 53729. GEAR: Serial 54804—9268/3600. GENERATOR: Serial 5596572—1000 KW—450 volt 3-phase 60 cycle—3600 RPM—0.8 PF—type ATB—2-pole—complete with air cooler. EXCITER: EDF—10.2 KW—120 volts—4-pole—3600 RPM—direct connected. UNIT JUST COMPLETELY OVERHAULED & IN EXCELLENT CONDITION—READY TO INSTALL.

TURBINE ROTORS

MAIN PROPULSION

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.

16

SPECIAL!

COMPLETE TURBINE OR ROTORS

8500 HP G.E. C-3 Victory—Sun C-4's

L.P.—Serial 77943 H.P. Serial 77942 G.E.I. 16263

17

NEW L.P. BLADE RINGS for large 8500 H.P. Victory

Joshua Hendy Westinghouse

18

NEW 8500 H.P. G.E. TURBINES

Large Victory or C-3

H.P. #72271 L.P. 72272

10 BOXES SPARE PARTS, TOOLS & FITTINGS. WITH MANEUVERING VALVES.

ALSO AVAILABLE

U.S.M.C. RECONDITIONED SET H.P. & L.P.

With 13 boxes spare parts. H.P. 77994—L.P. 77987—with maneuvering valves.

19

20

3500 H.P. G.E. — C-3 OR VICTORY

H.P.—8-stage—6159 RPM—serial 62043 L.P.—8-stage—3509 RPM—serial 62042 G.E.I. 16263

21

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

22

VICTORY SHIP AP2 H.P. & L.P. TURBINES NEW — UNUSED — 6000 HP 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

23

AUX. GEN. ROTORS

250 KW & 300 KW ALLIS-CHALMERS ROTORS



Typical serial No. 3067—will interchange with most 250 KW & 300 KW Allis-Chalmers as installed on Victory's and Moore C2-C3 vessels.

24

300 KW 5965 RPM JOSHUA HENDY

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

25

T-2 ROTORS, STATORS COOLERS, ETC.

26

ELLIOTT 10-STAGE MAIN PROPULSION TURBINE ROTOR

#28702—Ex-Texas Trader—will interchange with large G.E. 1st Row—1 1/8" to shroud—1 3/16" O.A.H. 2nd Row—1 7/16" to shroud—1 9/16" O.A.H.

27

UNUSED G.E. MAIN GENERATOR AIR COOLER

PUMPS

28

VICTORY AP2 MAIN CIRCULATOR

Ingersoll-Rand—18 VCM—20" x 18"—10,500—10 lbs. MOTOR: 75 HP—Allis Chalmers—230 VDC—670 RPM. Spare unused armature. Motor frame F.B.V.—162.

29

UNUSED 10x9x12 VERTICAL SIMPLEX FUEL OIL TRANSFER PUMPS

Furnished on some T-2 Tankers. 160 GPM Bunker C—viscosity 70 to 700 SSF 122°F @ 100 lbs. discharge pressure. WP steam 150 lbs.—exhaust 10 lbs. 1 1/2" steam inlet—1 1/2" exhaust. 4" Pump suction—3 1/2" discharge.

30

WORTHINGTON 16"x14"x18" VERTICAL DUPLEX STRIPPING PUMP

1400 GPM @ 110 PSI—suction lift 11.5 ft.—steam back pressure 15 lbs. 14" Suction—10" Discharge—2 1/2" Steam—4" Exhaust. Overall width 6'8"—Overall height 9'1 1/2"—depth 3'9 1/2"—wt. approx. 10,000 lbs.

31

NEW BLACKMER FUEL OIL TRANSFER PUMP

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

32

UNUSED BLACKMER VERTICAL ROTARY PUMP

4"—100 GPM—100 PSI—15 HP—440/3/60—gear head.

33

R-2418 WATEROUS CARGO PUMP

Bronze—14"—top discharge—capacity 2500 GPM—20 PSI. Bilge service—oil service—2400 GPM—75 PSI. Reduction gear. ENGINE: Cummins JN-130M—6 cylinder—4 1/8 x 5—130 HP—air starting.

34

UNUSED BOILER FEED PUMP

Worthington Triplex—36.5 GPM—590 PSI—variable stroke—2 3/4 x 5—P2—S2—R2 vessels. 40 HP—230 VDC—1800/2400 RPM.

35

UNUSED WARREN BRONZE PUMP

1175 GPM—11.1 lbs.—8" x 8". MOTOR: Reliance 10 HP—115 VDC—850—RPM—76 amps.

36

NEW WORTHINGTON VERTICAL SUBMER- SIBLE BILGE PUMP

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

37

EXCELSIOR MOLASSES PUMP—SIZE 5 1/2"

6" Suction and discharge—210 GPM—45 PSI—125 RPM. MOTOR: 10 HP—230 VDC—Frame 67—with gear.

38

NEW—UNUSED BRONZE VERTICAL LST BALLAST PUMP

1500 GPM—56' head or 25 lbs.—8" suction—6" discharge. MOTOR: Century 30 HP—230 VDC—110 amps—1750 RPM—40° rise—stab. shunt—BB drip proof—controls available.

39

UNUSED SIZE 4 BUFFALO 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" x 4"—built for USN DD destroyers.

WINCHES AND WINDLASSES

40

VICTORY UNIT WINCHES

50 HP—230 VDC—U-1, U-2, U-4, U-5—reconditioned.

41

MODEL U-6 DOUBLE DRUM WINCHES WITH GYPSIES

50 HP—230 VDC—reconditioned.

42

HYDE NO. 7 WINDLASS

1 3/4" Chain—Wildcat centers 3'3"—Handles 3000 lb anchors. MOTOR: 8.7/35 HP—440/3/60—1800/450 RPM.

43

NEW—UNUSED LINK BELT WINDLASS

1 5/8" and 7000 lb. anchors. 56" Centers—50 HP—230 VDC—spares.

44

IDEAL WINDLASS— UNUSED

1-5/16" Chain—36" Centers—15 HP—115 VDC—1750 RPM—6000 lb. line pull.

45

UNUSED 70 HP McKIERNAN-TERRY WINDLASSES

2 3/4" 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 47 1/2". Base 9'5" wide x 11' long. Weight 36,000 lbs.

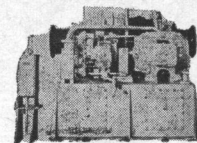
46

LCT-6 JAEGER GASOLINE DRIVEN WINCH

With torque converter & free declutchable drum, 31,000 lbs @ 6 FPM or 3000 lbs & 350 FPM. DRUM: 20"x23 3/4"x37 1/2". GYPSY: 15"x13". Twin Disc torque converter—6 cyl. Hercules gas engine model WXL-3. Total weight approx. 4500 lbs—serial 81843.

47

4 SINGLE DRUM ELECTRIC HYDRAULIC WINCHES



From Navy Research Ship Liberty AGTR-5. Like new. Mfg. by Lakeshore Engineering Co. Gypsy heads can be operated separately from drum. 7400 lbs @ 220 FPM; 624 ft. of 3/4" rope in 5 layers. Total weight of winch, motor & pump 7221 lbs. OAW 84 1/4"; OAL 88"; OAH 58". With remote control stands.

MISCELLANEOUS

48

VICTORY AP2—WESTINGHOUSE MAIN PROPULSION GEAR

6000 SHP—Serial 4A—1620—Medina Victory.

49

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

20" Ex. inlet—5/8" Cu-Ni tubes—with or without air ejector.

50

1 PAIR OF 300 HP UNION DIESEL ENGINES

Port and starboard—model 06—1300 HP at 350 RPM—4 cycle—direct reversible—11 x 15—overhauled 1966—in good condition. Just in from Navy.

51

MODEL O-2-D M&T RECONDITIONED UNITS

Hydraulic starting steering, raising & lowering tallfin. Navy reconditioned 1965—fully checked out by us. Will demonstrate running. Wt. about 5500 lbs. PROPELLOR: 48"x24"—3 blade.

52

HYDE 30" DOCK CAPSTAN

10" x 10"—reversible—W.P. 125 lbs—2 1/2" steam—3" exhaust.

53

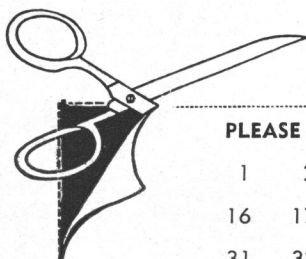
DOUBLE INPUT— SINGLE OUTPUT DIESEL REDUCTION GEARS

Farrell-Birmingham—3200 SHP. Reduction gear: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard.

54

INGERSOLL-RAND MODEL 40 AIR COMPRESSOR

Two stage—135 CFM—7" x 6 1/4" x 5"—110 lbs—870 RPM—inner cooler. MOTOR: Allis-Chalmers 40 HP—230 VDC—145 amps—1750 RPM—Model EB 121.



PLEASE SEND INFORMATION ON THE FOLLOWING: (Please circle items)

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46	47	48	49	50	51	52	53	54						

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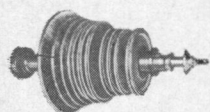
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From 2 Vessels Reconditioned by U.S. Gov't

ALL MATERIAL IN FIRST CLASS CONDITION WITH A.B.S.



**MAIN PROPULSION
ROTOR — G.E.**

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

2 COMPLETE G.E. TURBINES

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

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- 2 COMPLETE SETS MAIN DIAPHRAGMS..
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ALSO

THROTTLE VALVE ASSEMBLY



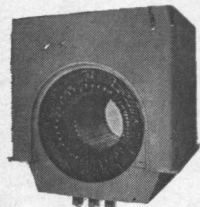
**G.E. REVOLVING
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Rewound 1968—main propulsion—by G.E. Seattle. Re-checked June 1971 by G.E. Service Shop—A.B.S.



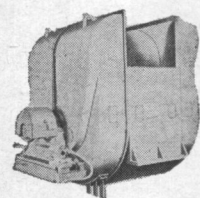
**WESTINGHOUSE
REVOLVING FIELD**

With A.B.S.—ex-Ohio Sun.



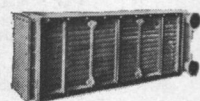
**MAIN
G.E.
STATOR**

With A.B.S. — reconditioned 1970.



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Reconditioned Westinghouse — #39519P915 — Thermoplastic winding.



**NEW—UNUSED
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Also Westinghouse—reconditioned to A.B.S.



**G.E. AUXILIARY
TURBINE ROTOR**

For 525 KW G.E. Turbine DORV-325M—5645 RPM.



**COMPLETE
T2 TANKER
TURBO
GENERATORS**

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



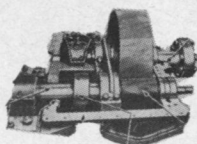
**NEW
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5LY148A—Type A.M.—Frame 605.

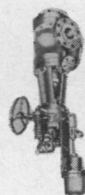


75 KW—55 KW EXCITER ARMATURES

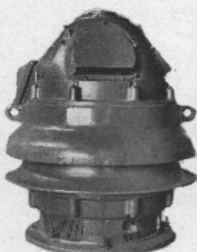
Also stators & pedestal bearings—400 KW aux. generator revolving fields.



**T2 AUXILIARY
GENERATOR S-162
REDUCTION GEARS—
PINION & BULL
GEAR—BEARINGS**



**AUXILIARY GENERATOR
THROTTLE VALVE**

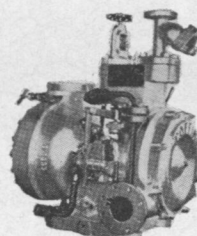


**WESTINGHOUSE
MAIN CARGO
PUMP MOTORS**

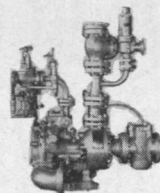
1 Unit—frame 874—125 HP—440/3/60—168 amps 590 RPM. 2 Units—frame 876C—125 HP—type CS—440/3/60—159 amps—585 RPM.

G.E. MAIN CIRCULATING PUMP MOTORS—125 HP

COFFIN FEED PUMPS



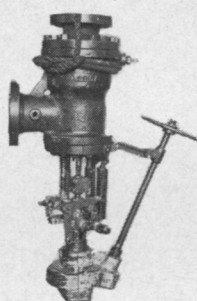
Type C-G 2-A



Type F

WESTINGHOUSE MAIN PROPULSION TURBINE

Profile (unshrouded)—serial 2-A-9361-21.



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THROTTLE
VALVE**

With governor—for above turbine.

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T2 Tailshafts—Mission T2—SAE—2 Tailshafts—T2 Propellers—Mission Propellers—T2 Rudders—Mission Rudders—Large 14½" Rudder Stocks—Auxiliary Steering Rams—Butterworth Heaters—Butterworth Pumps—Bilge Pumps—Auxiliary Circulators—Auxiliary Condensate Pumps—Main Condensate Pumps.



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Turbines—gears—400 KW generators—(110 KW—32.5 KW—5 KW excitation).

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**ALSO AVAILABLE —
EXCITERS**

(110 KW—28 KW—5 KW) or
(110 KW—32.5 KW—5 KW)

**SWITCHGEAR
FOR ABOVE**

also available.

WEST. MAIN PROPULSION MOTOR COOLER



**T2
ANCHOR WINDLASSES**

1 American Hoist & Derrick
—12x14 for 2 5/16" chain.
1 American Engineering Co.
—12x14 for 2 5/16" chain.

T2 WARPING WINCH

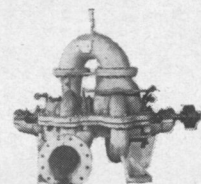
Hoop—9x12—AH&D.

T2 DECK WARPING & HOSE HANDLING WINCH

8¼ x 10—Hunt Tool Co.

MAIN CIRCULATING PUMPS

Ingersoll-Rand—24 V.C.M.

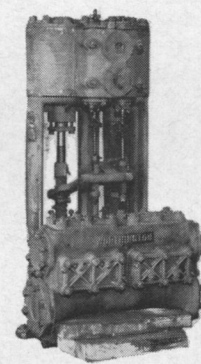


**INGERSOLL-RAND
CARGO PUMPS**

200 GPM—100 PSI—Model
6 GT—10" suction—8" discharge.

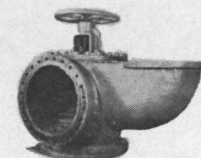
BRONZE T2 TANKER STRIPPING PUMPS

14x14x12—700 GPM @ 100
lbs. ALSO EX-MISSION 14x
14x12 WILSON-SNYDER IN
STOCK.



**T2 TANKER FIRE
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Bronze — 10x7x10—vertical
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GPM.



**MAIN
INJECTION
VALVES**

Deep-Ocean Mining

Developments In The Mining Of Manganese Nodules From The Ocean Floor Forecast An Earlier Than Predicted Growth Of A New Marine Industry.

R. Kaufman and J.P. Latimer*

The deep ocean has been considered for many years as a potential source for many of the world's much needed mineral reserves. Today, the minerals of the deep ocean are classified as "submarginal" and the era of economic recovery has been forecasted as the years 1980-2000. However, technological developments for deep-ocean mining have rapidly advanced in the past year and economic recovery may occur sooner than predicted. One major step in this direction occurred in August 1970 when the first successful recovery of minerals from the deep-ocean floor on a continuous and commercially potential basis was accomplished.

Deep-ocean seabed usually refers to the ocean floor beyond the continental shelf in which the water depths may range between 4,000 to 18,000 feet and more. The ocean floor consists of the abyss, rolling plains, many deep gorges, trenches, sea mounts and guyots. The seabed deposits which are of primary interest are customarily separated into two types. The first type occurs as a result of subsea hydrothermal activity and forms on the sea bottom as precipitates from hot brine rising from below along faults, and is associated with the world encircling oceanic ridge system. The deposit exists as metalliferous muds, which are potential sources of zinc, copper, lead, silver and gold. The best-known deposit of this type is located in the Red Sea and occurs in water depths between 6,000 and 7,000 feet.

The second type is the manganese nodules which are believed to be formed and enlarged by precipitation of elements from solution, most likely in a colloidal form and by a process of particle agglomeration. The nodules occur in areas of extremely low sedimentation under oxidizing condi-

tions and are a valuable source of manganese, copper, nickel and cobalt.

The nodules range from nearly spherical, through irregular shapes, to massive pavements of great extent. They range in size from 5½ to 8 inch and have an irregularly layered or concentric internal structure, with layers of different mineralogy varying from brown to black. Manganese nodules of economic interest occur in great abundance; however, ocean depths of these deposits are between 10,000 feet and 20,000 feet.

The key elements in an ocean mining venture include the prospecting and exploration for deposits, the detailed delineation of the deposits and the development of the mining plan, the mining of the ore and transportation to a shore facility, the processing of the ore to obtain the contained metals, marketing of the metals, and operation under a favorable legal and political environment. The present status of deep-ocean mining development requires advances in each of these elements, and all are equally important to the ultimate success of an ocean-mining venture.

The occurrence of manganese nodule deposits on the ocean floor was first reported in 1872-1876 and since then scientific oceanographic ships have recorded more than 500 such locations. Claims to the effect that over 1.5 trillion tons of nodules are distributed on the Pacific floor alone are made.

It was not until two years ago that the capability to confirm these claims was available. The development of the 20,000-foot underwater TV system provided the ability to conduct continuous TV surveys over large extents of candidate ore-body mine sites. Several extensive sites have been located containing nodules of sufficiently high assay and population, in a favorable topography, to justify further activity and interest by mining companies and groups.

Much detailed information is required about a candidate mineable deposit. This includes highly accurate mapping of the bottom; a detailed determination of the nodule population, its density and assay distribution; oceanographic and meteorological data; taking of bottom sediment samples over a wide range of

the mine site for use in designing the dredge system, and associated with the foregoing a fairly accurate navigation system for use in the mine-site development and eventually in the actual mining operation. Oceanographic hardware and systems for these tasks are presently available but will require some system integration work and adaptation for application.

Mining of an ore body consisting of surficial mineral deposits requires three principal elements: (a) a bottom device to gather the ores and concentrate them for transport to the surface; (b) a vertical transport method to raise the minerals from the sea floor to the surface, and (c) a surface vessel to provide support services including the storage of minerals awaiting transport to land.

It is generally accepted that existing shallow-water dredging techniques are not suited for this operation. Many unique methods, particularly for the mining of manganese nodules, have been conceived and proposed. The major advancements have been associated with the two key elements, i.e., bottom gathering devices and vertical transport methods.

This is not to say that the third element, the surface vessel, has been ignored. It appears that adaptation of modern marine shipping or platforms to suit the special requirements can readily be utilized without major engineering development. A possible exception to this is in the method of transferring the ore at sea, if this requirement becomes part of a mining system.

The appropriate choice of a system also depends upon actual depths at the mine site, actual bottom conditions, tonnage to be mined, and the judgment and experience of the technical people entrusted with the design of the system.

Of the many methods proposed to mine deep-ocean surficial deposits only two concepts have actually been tested. The world's first test was successfully conducted in July-August of 1970 in 2,400 feet of water on the Blake Plateau, approximately 170 miles off the Georgia/Florida coast. The test was conducted by the authors' company. This system

consisted of hydraulic dredging with an air-lift pump to induce water flow in a conduit pipe suspended from a conventional ship towing the bottom collection and concentrating device in a continuous path.

The second test was conducted during August-September 1970 by a group of Japanese companies supported by the Japanese government, and took place in about 12,000 feet of water in the Pacific Ocean off Tahiti. This system consisted of mechanical endless synthetic line equipped with buckets mounted at uniform intervals, suspended from a conventional ship dragging the buckets in a continuous path.

Equally as important to the economic success as the location and evaluation of deposits and the delivery of the ore is the method used to extract the contained metal. The unique mineralogy of manganese nodules and their intricate mixture of microscopic mineral grains and associated impurities preclude the use of conventional physical concentration or separation techniques. To recover the metal from the nodules, it becomes necessary to use a chemical or hydrometallurgical separation process in which the constituents are returned to solution by leaching of crushed nodules. No major breakthroughs are required for the development of a processing method. Of the total annual operating cost associated with an ocean-mining operation, approximately 50 to 55 percent can be associated with the metal processing function.

The ultimate success of an ocean-mining venture depends on the ability of the metals produced to be sold competitively on the open world market and to yield sufficiently high returns which are commensurate with the risks involved. The metals found in deep-ocean surficial deposits are not in quantities proportionate to world needs. A high production of 1-2 million tons per year, a mining rig and efficient processing plant could produce 25 percent of the U.S. current annual manganese needs, 10 percent of nickel requirements, 1 percent of copper requirements and 40 percent of current cobalt requirements. Accordingly, full consideration must be given to the incremental cost of production of any of the nodule constituents against the impact of increased quantities of the material on the world market. The fact that all of the metal constituents must be included in trade-off studies for mining costs cannot be ignored.

The ocean-mining test which took place during the summer of 1970 represented the culmination of a multi-year program to verify the effectiveness of a deep-ocean mining concept based upon the utilization of hydraulic dredging as a means of recovering manganese nodules. Prior to the development of the detailed plan for the ocean-mining test, a comprehensive program, including trade-off studies, engineering analyses, model tests, and large-scale land tests was undertaken which led to the conclusion that hydraulic dredging, using conduit pipe suspended from a moving ship, was a feasible solution.

* Mr. Kaufman, vice president-technical, and Mr. Latimer, chief engineer, Deepsea Ventures, Inc., presented a paper at the Spring Meeting of The Society of Naval Architects and Marine Engineers entitled "The Design and Operation of a Prototype Deep-Ocean Mining Ship." Condensed here is the portion of the paper dealing with the problems and future of deep-ocean mining.

The Containerization Institute Appoints William J. Marquette

William J. Marquette, internationally known executive specialist in intermodal freight transportation and containerization, has been appointed to the new post of executive director of The Containerization Institute, Inc., New York based trade association with an international individual and organizational membership.

The institute's president, Jacques J. Leblanc, president, Dart Containerline, Inc., New York, said that Mr. Marquette will spearhead the implementation of new, long-range membership, member-service and broad information and forum-program plans.

Glenn Mather, whose efforts led to the organization of the institute in 1960, has retired as managing director after 11 years of "dedicated service" and will serve as consultant, Mr. Leblanc said.

"Expansion plans, under intensive study

since the fall of 1970, were approved at the annual meeting in April. They recognize," he said, "what CI has accomplished and the even greater role it now can play in further coordinating and serving the many different, but interrelated, interests in the field that exists throughout the governmental and private sectors."

Mr. Marquette, whose career in commercial and military transportation and containerization covers a 37-year span, resigned as vice president, Container Development for CTI-Container Transport International, Inc., New York, to undertake his new duties with CI.

His previous civilian posts, in reverse chronological order, included: director, Container Division, Moore-McCormack Lines, Inc.; vice president, container operations, Waterman Steamship Corp.; director of transportation, Integrated Container Service, Inc.; and assistant to vice president, international department, R E A Express.

A colonel in the U.S. Army and Command-

ing Officer of the Brooklyn Army Terminal, Mr. Marquette retired in 1963, closing a 21-year military career covering operations, managerial, staff planning and executive posts, all in transportation.

A native New Yorker and graduate of de La Salle High School, Mr. Marquette received a B.A. degree in economics from Rutgers University, New Brunswick, N.J. He is a member of Delta Kappa Epsilon fraternity, the National Defense Transportation Association, The Traffic Club of New York and the Downtown Athletic Club.

USCG Cutter Midgett Launched At Avondale's Westwego Yard

The United States Coast Guard Cutter Midgett (WHEC 726), named for Chief Boatswain (CWO) John Allen Midgett, USCG, was launched on September 4 at Avondale Shipyards, Inc., Westwego Yard. The Midgett is one of a series of high endurance cutters being built by Avondale's Westwego Yard for the United States Coast Guard. Christening the vessel was Mrs. Chester R. Bender, wife of Adm. Chester R. Bender, USCG.

Principals of the launching included Admiral Bender, Commandant, United States Coast Guard, as principal speaker; Edwin Hartzman, executive vice president, engineering and production, Avondale Shipyards, Inc.; Rear Adm. John D. McCubbin, USCG, Commander 8th Coast Guard District; and the sponsor of the vessel, Mrs. Bender.

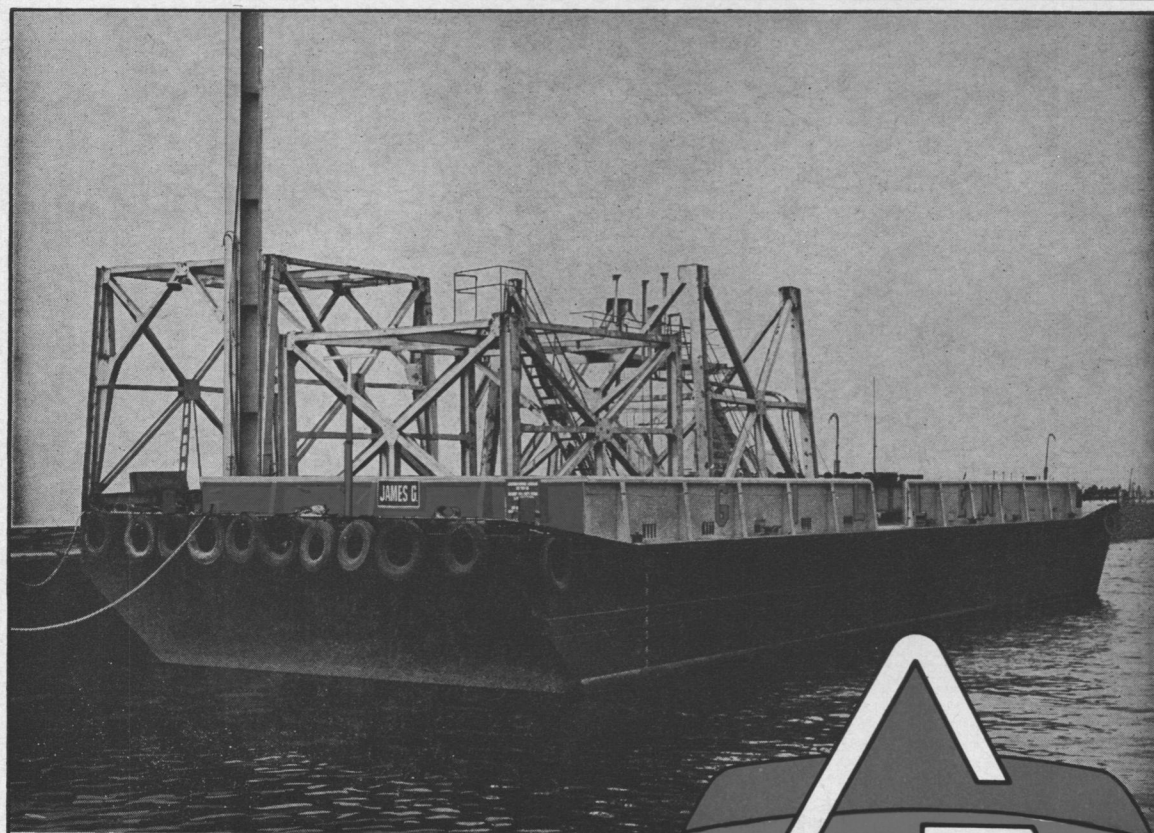


Principals of the launching included from left to right: Rear Adm. John D. McCubbin, USCG, Commander 8th Coast Guard District; Edwin Hartzman, executive vice president, engineering and production, Avondale Shipyards, Inc.; Mrs. Chester R. Bender, sponsor, and Adm. Chester R. Bender, USCG, Commandant U.S. Coast Guard.

The Midgett is a twin-screw vessel capable of 36,000 horsepower available from a combined gas turbine and diesel main propulsion system. She has a length overall of 378 feet, beam of 42 feet, displacement of 2,716 tons at 13 feet 6 inches, with a cruising speed of 20 knots and a top speed in excess of 28 knots. Other features include twin 13-foot diameter controllable pitch propellers, a bow thruster and complete air-conditioning throughout.

Chief Boatswain (CWO) Midgett won the Gold Lifesaving Medal for his heroic rescue of 36 men from the British tanker Mirlo during World War I. The Mirlo was torpedoed by an enemy submarine off the North Carolina Coast on August 16, 1918. A boat crew headed by CWO Midgett was launched through a heavy sea and proceeded to the rescue of the crew of the Mirlo, whose cargo of gasoline and refined oil, spreading over the sea, covered the immediate vicinity with a mass of fire and smoke. He took his surfboat into the midst of this conflagration and among the wreckage of the steamer, and through his splendid seamanship, 36 men from the Mirlo were rescued.

CWO Midgett enlisted in the Life Saving Service in 1898 from his native North Carolina and served continually until 1938, when he died while Officer in Charge of the Chicamacomico Lifeboat Station.



COASTWISE OR HARBOR... GILLEN MAKES SHORT WORK OF A LONG HAUL

Typical of the excellent and modern equipment available to serve you, the James G., a loadline barge, measures up to the high standards Gillen has set for both its service and its entire fleet. Designed specifically for both harbor and coastwise service, this barge is one of several added to the fleet recently as part of a continuing program to expand services for you with the finest and most versatile equipment available.

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Union Wire Rope—the dependable towline

Like the towline in the photo, the "life lines" of a tug and barge operation must hold up over the long haul. Union Wire Rope does just that, giving towing miles measured in the tens of thousands.

Puget Sound Tug and Barge Company of Seattle, Washington, is a big user of Union Wire Rope towlines. When you see a Red Stack tug like the one pictured, it's likely there's a Union Wire Rope connecting the tug to the barge's chain bridle. Red Stack uses towlines from 1500 to 2600 feet long to pull cargoes from 600 to 12,500 tons.

Whether you need towlines that stay on-the-go longer, or rope and slings for many other marine applications, ask your marine distributor about Union Wire Rope. For more information on marine rope applications, write: Union Wire Rope Sales, Armco Steel Corporation, Dept. K-361, 7000 Roberts Street, Kansas City, Missouri 64125.

ARMCO STEEL



New York SNAME Announces Schedule 1971-72 Meetings

The first meeting for the 1971-72 season of the New York Metropolitan Section of The Society of Naval Architects and Marine Engineers was held on September 16 at the Stevens Institute of Technology, Stevens Center, Hoboken, N.J. The meeting was preceded by a tour of Port Seatrain, Weehaw-

ken, located about one and one-half miles from Stevens Center.

Following a social hour and dinner, the technical session was devoted to a paper titled "System Integration of the GTS Euroliner—from Conception to Operation," by J.G. Holburn, J. & J. Denholm (Mgt.) Ltd., D.B. Carpenter and D.A. O'Neil, TP & MS, Inc. This paper provides an insight into the decisions made regarding the ship design, particularly the main prop-

pulsion plant. The vessel is considered as one part of a transportation system and the authors provide details of the ship's sub-systems, including the reasons for their selection and the interfaces involved. Of additional interest is the extent of detailed international technical collaboration associated with Euroliner's design and construction.

The future meetings for the sea-

son of the New York Metropolitan Section are listed below.

October 12, 1971—U.S. Coast Guard Officers Club, Governors Island, New York City (Past Chairman's Night). Paper: "Marine Pollution Abatement Laws, Problems and Commentary Concerning Large Vessels," by R.P. Fulton, Gibbs & Cox, Inc.

November 11-12, 1971—79th Annual Meeting and Banquet, New York Hilton Hotel, New York, N.Y.

December 15, 1971—Downtown Athletic Club, 19 West Street, New York, N.Y. (Joint Meeting with Port Engineers). Paper: "Today's Maritime College Graduate; Where To From Here?" by J.H. Winer, American President Lines, Ltd.

January 11, 1972—Seamen's Church Institute, 15 State Street, New York, N.Y. Paper: "Stability of Tugs," by Miro Kresico, John J. McMullen Associates, Inc.

February 17, 1972—New York Times Executive Dining Room, 229 West 43rd Street, New York, N.Y. Paper: "Marine Turbine Gearing for Ships to Come," by Prof. Inguar Jung, Stal-Laval.

March 14, 1972—State University of New York Maritime College, Fort Schuyler, N.Y. Tour: SUNY Maritime College, Fort Schuyler, N.Y. Paper: "Vibration Analysis and Deviation Concepts for Improved Maintenance and Monitoring Aboard Ship," by E. St. Germaine, MarAd, and Profs. N. Gleicher, J. Mathison, A. Kramer and S. Pergament, State University of N.Y. Maritime College.

April 13, 1972—Seamen's Church Institute, 15 State Street, New York, N.Y. Paper: "Operational Experience of the Pielstick Diesel," by W.T. Hiley and E. Chen, Colt Industries.

May 20, 1972—Tour of U.S. Coast Guard Academy, New London, Conn., and Mystic Seaport, Mystic, (Family Day).

May 22-25, 1972—1972 Spring Meeting, Williamsburg, Va.

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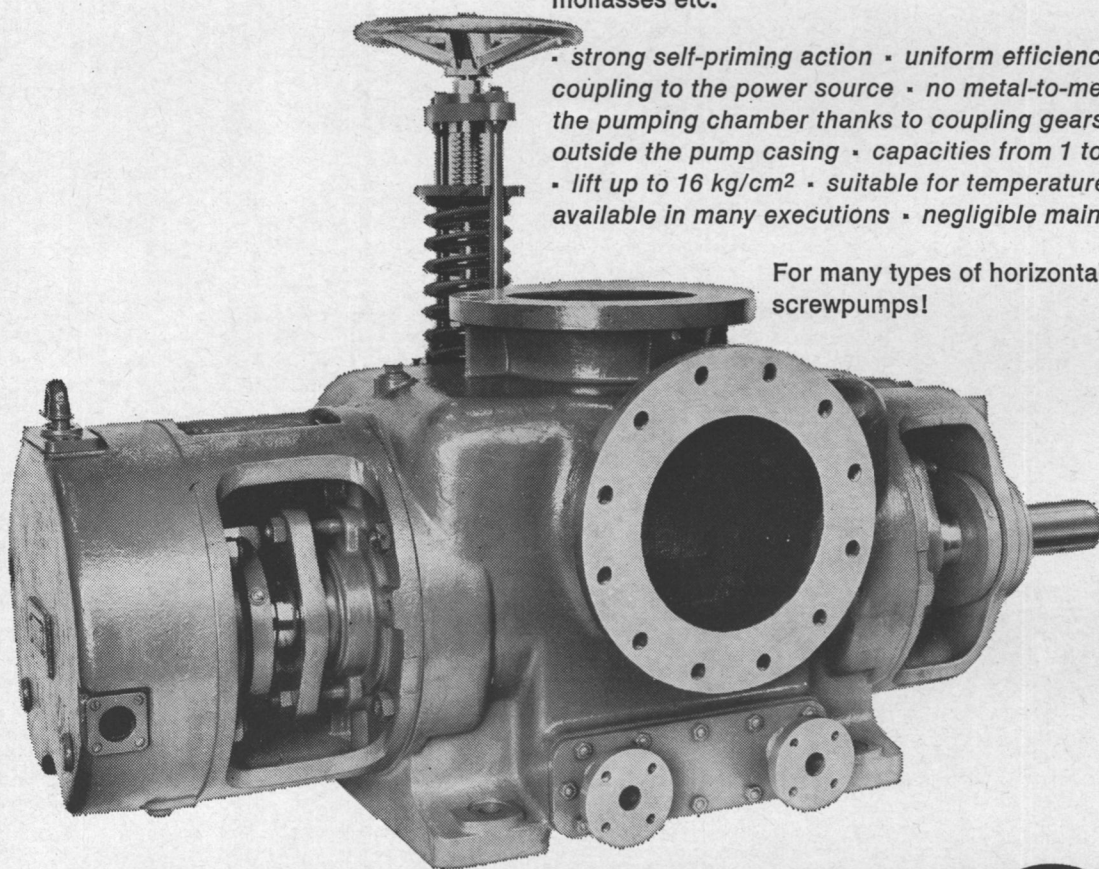
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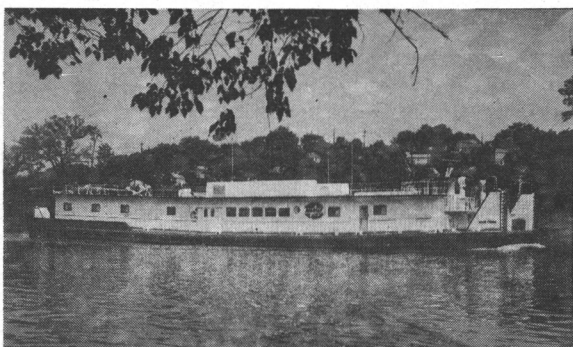


HOUTTUIN-POMPEN N.V. - SOPHIALAAN 4 - UTRECHT - HOLLAND - TELEPHON 44 16 44 - TELEX 47280

Nabrico-Built Towboat Features Retractable Pilothouse



The M/V Louis Frank with pilothouse in raised position.



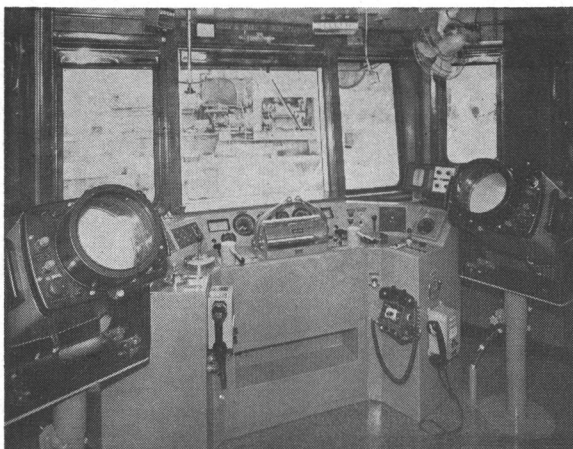
The vessel under way with retractable pilothouse lowered.

The M/V Louis Frank, newest of the towboats built by Nashville Bridge Company of Nashville, Tenn., was recently christened in St. Louis by **Mrs. Bertha Siteman**. **Mrs. Siteman** is the wife of the board chairman of Marine Petroleum Company, Inc., of St. Louis.

The new towboat will operate on the Mississippi system and in the Chicago area.

The M/V Louis Frank measures 144 feet long, 35 feet wide, and 11 feet deep. Power is by two GM LL12-645-E7 Electro-Motive diesel engines driving nine-foot five-blade stainless steel propellers. Each engine produces 2,150 hp at 900 rpm.

The M/V Louis Frank has quarters and accommodations for 16 and features a retractable pilothouse.



View of the interior of the M/V Louis Frank's pilothouse.

Int'l Code On Explosives Now Available From IMCO

The Maritime Safety Committee of IMCO (Inter-Governmental Maritime Consultative Organization) has approved the final volume of the international maritime dangerous goods code, according to reports from London. This covers class 1 explosives.

This last volume contains recommendations on the packaging, stowage, and labeling of explosives in packaged form and has been published in English and French by IMCO.

The publication, which costs \$3.60 plus 25 cents for packing and postage, is available for sale to the public. An IMCO spokesman said requests should be sent to the Publications Section of IMCO at 101-104, Piccadilly, London, England, and should be accompanied by a remittance covering the cost of the publication and packing and postage.

Model Testing Program For Arctic Engineers & Constructors Completed By ARCTEC, Inc.

ARCTEC, Incorporated, a Columbia, Md., based firm specializing in cold regions technology, recently completed a series of model tests of Arctic Engineers and Constructors' unique Air Cushioned Transporter (ACT). The vehicle is designed to provide drilling and construction services in the Arctic on a year-round basis. The model test program, which consisted of mathematical as well as experimental modeling, was primarily aimed at evaluating thermal positioning systems for maintaining the drilling version of the ACT on station during movement at the ice fields. **Jack W. Lewis**, president of ARCTEC and project leader for the test program, said the program was very successful and that the results of these tests could hasten the development of offshore drilling in ice covered waters.

The experimental portion of the program was performed in the newly constructed ARCTEC ice model basin. Besides having the distinction of being the first commercial model ice testing facility in the United States, the facility is unique in that ice sheets may be

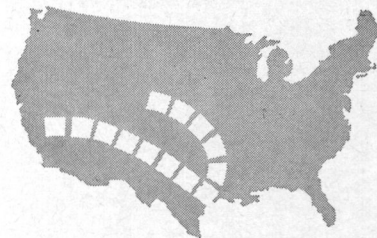
formed in it without the use of mechanical refrigeration systems. Refrigeration is accomplished through the use of controlled injections of liquid nitrogen into the interior of the facility. **Mr. Lewis** claims that substantial savings will be passed on to ARCTEC's clients because of the rapid freezing rates that are possible and because initial construction capital requirements were low. Arctic Engineers and Constructors was the first company to contract for tests in ARCTEC's facility.



GULF OIL GRANT TO TEXAS MARITIME ACADEMY:

The Gulf Oil Foundation has again selected the Texas Maritime Academy of Texas A&M University as recipient of a \$1,500 grant for equipment on the new Academy facilities on Pelican Island. The purpose of the Departmental Assistance grants is to further special projects proposed by selected departments in colleges and universities. Together with other sections of its educational assistance program, Gulf Oil will distribute more than \$3 million in awards to students and institutions of higher education this year. The funds will provide for undergraduate scholarships, graduate fellowship, employee gift matching, capital grants, and other educational purposes. Receiving the gift of \$1,500 from **Capt. C.R. North**, marine district manager of Gulf, is Cadet Corps Executive Officer **John N. Meeks** of San Marcos, Texas. Completing the group (far left) is Texas Maritime Academy Superintendent **James D. Craik**, Rear Admiral, USCG (ret.), and (far right) **Emmett O. Kirkham**, chairman of the Academy's board of visitors.

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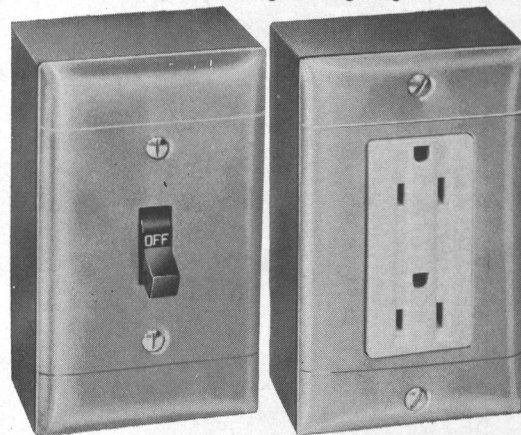
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GE Gas Turbine International Dept. Names Key Managers

Key managers in General Electric's newly formed Gas Turbine International Department were announced by **J.B. Gatzemeyer**, general manager of the department.

R.F. Naples has been appointed manager of international marketing, with worldwide marine sales responsibility and overseas responsibility for electric utility and industrial markets.

T.D. McKone has been made manager of international engineering, with responsibility for providing design engineering.

G.G. Hepburn will be manager of manufacturing support, with responsibility for procurement and quality assurance.

J.J. Merry has been named manager of financial planning and analysis.

The Gas Turbine International Department, according to Mr. Gatzemeyer, has been made a separate business entity in Gas Turbine

Business Operations to more effectively serve the fast-growing international electric utility, industrial and marine markets.

Some 100 employees will be in place both within the United States and abroad by the end of the year, Mr. Gatzemeyer said. They will work through the General Electric International Sales Division and also in conjunction with the seven Gas Turbine Business Operations' seven manufacturing associates located in Western Europe and Japan.

The importance of the international market, Mr. Gatzemeyer stated, is indicated by that fact that about 30 percent of the more than 1,800 heavy-duty gas turbines sold by General Electric have been installed abroad.

Under the new department, international customers will be served more effectively through an increased number of field-located people, working exclusively with international customers and with GE's seven heavy-duty overseas manufacturing associates.

"In today's dynamic international markets," Mr. Gatzemeyer said, "our customers are increasingly more sophisticated and demanding in their purchases of gas turbines for a growing list of major electrical and mechanical applications." He said the new Gas Turbine International Department will "increase our total business capability to more effectively anticipate and serve gas turbine purchasers."

A Merchant Marine Academy graduate, Mr. Naples holds a bachelor's degree in mechanical engineering. He joined GE in 1955 as a sales engineer for the rectifier department. The Navy veteran held several engineering assignments with the Gas Turbine Business Operations before being named manager of product planning and market research in 1963. Mr. Naples has served in several managerial capacities prior to his recent appointment.

Mr. McKone, a Navy veteran received a bachelor's degree in mechanical engineering from Brown University. He joined GE in 1946 and served in various engineering posts until 1958, when he was appointed manager of propositions and requisitions in the Gas Turbine Business Operations. In 1963, he was named manager of control and accessories.

Mr. Hepburn, a graduate of the College of the City of New York, holds a bachelor's degree in mechanical engineering. In 1950, he earned a master's degree in administrative engineering from New York University. A Navy veteran, Mr. Hepburn joined GE in 1951. Mr. Hepburn has been with the Gas Turbine Business Operations since 1963, serving as manager of materials and manager of manufacturing programming and administration.

Mr. Merry graduated from Siena College, N.Y., with a B.S. degree in economics. He joined GE in 1953, and has been with the Gas Turbine Operations since 1963. Mr. Merry has held positions as manager of general and tax accounting and manager of financial planning and analysis for the Gas Turbine Business Operations.

Swiftships To Build 65-Foot Survey Boat

The Corps of Engineers, Wilmington, N.C. 28401 has awarded Swiftships, Inc., Morgan City, La. 70380, a contract to build one 65-foot all welded twin-screw diesel powered aluminum survey boat at a price of \$150,330.



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Brig. Gen. R.H. Groves Heads Army Engineers, North Atlantic Division

Brig. Gen. Richard H. Groves has been appointed head of the Army Corps of Engineers, North Atlantic Division, according to an announcement from the Department of the Army, New York District, Corps of Engineers. In his new post, General Groves, who has served as Commander of the Army Engineer Construction Agency in Vietnam and military assistant to the Secretary of the Army, will now be responsible for corps activities in 16 Northeastern states. General Groves succeeds Maj. Gen. Charles M. Duke, who has retired.

VPA Appoints Nelson Information Officer

Charles H. Nelson Jr. has been named information officer for the Virginia Port Authority.

Before joining the Authority's staff, Mr. Nelson served as news director for Norfolk radio station WNOR for 41 months. His professional background includes professional and military writing and broadcasting, combat photography and more than 25 years of naval service.

Mr. Nelson has written news and feature articles for military and commercial maritime publications, including Naval Institute Proceedings, Marine Digest, and Maritime Reporter/Engineering News.

Devoe And Raynolds Introduces New Type Marine Coatings

The Marine Division of Devoe and Raynolds Company, Inc., a subsidiary of Celanese Coatings Company, has announced a breakthrough in marine coatings offering three to five times longer periods between drydockings.

The new type coatings, which the Devoe Marine Division is heralding as "Second Generation Coatings," have been in the research and development stages for several years, according to Clete Pinaire, vice president, marketing.

Designed specifically to lower maintenance costs and reduce the frequency of drydocking, the super-high-performance coatings come in the form of two underwater coatings, Devran 214 anti-fouling and Devran 230 anti-corrosive, and two above water coatings, Devran 229 and Crylitex 239, for freeboard and topside finishes.

Based on a combination of laboratory and field tests, the underwater coatings will provide up to 10 years of corrosion protection and two years of anti-fouling protection, according to Mr. Pinaire. The two above-water coatings will retain their color and gloss for up to two years without yellowing or chalking.

"The significance of Devoe Marine's 'Second Generation Coatings' to the maritime industry," Mr. Pinaire said, "is the immediate reduction in the cost of corrosion control and application. Although the

price of the new coatings is higher than that of conventional systems, the 'Second Generation Systems' will result in major savings."

The anti-fouling coating is based on an insoluble matrix system and contains only those toxins that meet the safety and pollution restrictions specified by shipyards and Government agencies.

For further information, write Devoe and Raynolds Co., Inc., 414 Wilson Avenue, Newark, N.J. 07105.

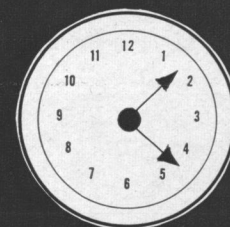
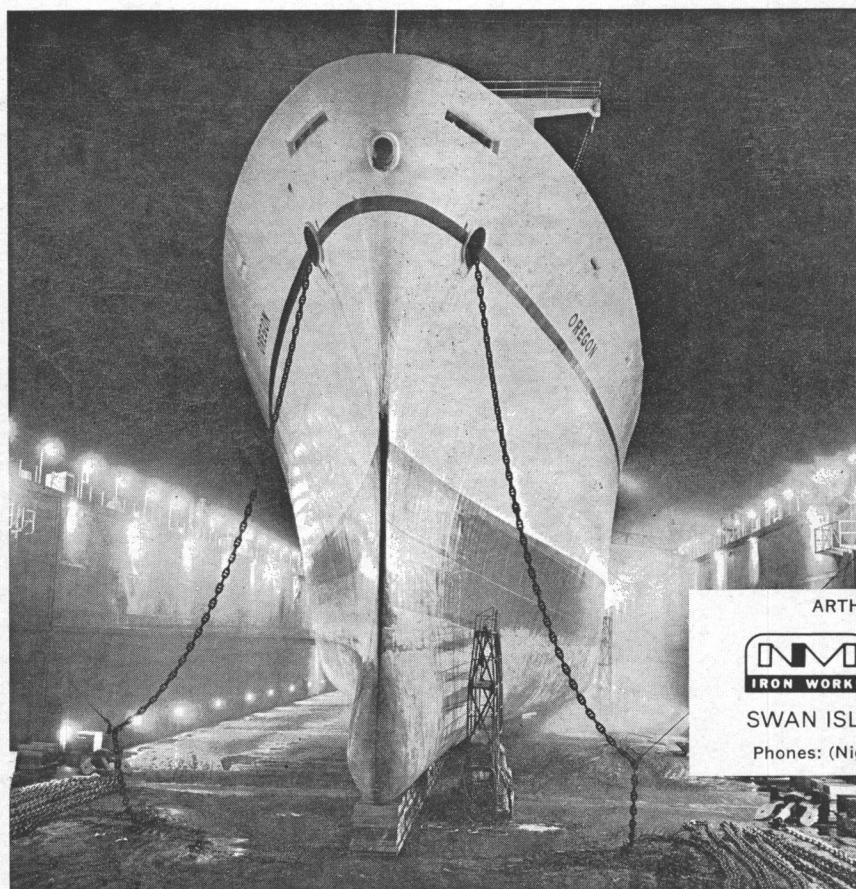
HTD Drive Systems Described In Brochure Published By Uniroyal

Uniroyal, Inc. has published a new brochure describing its Power Grip High Torque Drive systems designed for low-speed high-torque power transmission applications.

The 21-page publication describes the Uniroyal HTD belts which have been developed to service the low-speed high-torque ranges pre-

viously serviced only by chain and gear type components. The catalog describes the construction of the HTD belts and reviews drive selection procedure. It also includes stock drive selection tables, belt width selection tables and HTD sprocket specifications.

The brochure is available from Estelle Brandt at Uniroyal, Inc., Rockefeller Center, 1230 Avenue of the Americas, New York, N.Y. 10020.



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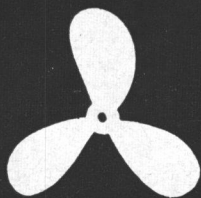
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Texaco Names Willoch Manager U.S. Fleet

Texaco Inc. has announced the appointment of **Richard Willoch** as manager of the U.S. fleet of Texaco's marine department. In his new assignment, Mr. Willoch will continue as manager (operations), but will be located at Port Arthur, Texas. His new responsibilities will include all activities of the com-

pany's U.S. fleet, including tankers, barges, tugs and port offices.

Mr. Willoch was graduated from the U.S. Merchant Marine Academy in 1951, with a bachelor of science degree in nautical science-marine transportation, and joined Texaco's marine department as a third mate in the company's U.S. tanker fleet that same year. He served as a ship's officer in a variety of tanker assignments until

1958, when he was named assistant to the port captain in New York. In 1960, he was appointed assistant to the fleet superintendent for Texaco's U.S. fleet and was named fleet superintendent later that same year.

Mr. Willoch became manager, employee and labor relations, for Texaco A.G. in Italy in 1962, and managing director of the Texaco subsidiary in Switzerland in 1964.

In 1968, he was named vice president of Texaco S.p.A. in Italy. He returned to New York in 1970 as manager, operations division of Texaco's marine department.

Newport News Ship Names Virginia Adams Assistant Secretary



Virginia Burbage Adams

Mrs. Virginia Burbage Adams has been appointed as assistant secretary of Newport News Shipbuilding. The announcement was made by **F. Hunter Creech**, secretary and general counsel of the Tenneco subsidiary.

Mrs. Adams, valedictorian of her Newport News High School class, joined Newport News Shipbuilding in May 1958 as secretary to the company's secretary and general counsel, the position held at that time by **Harry H. Holt Jr.**

Previously, she had been employed by the law firm of Ferguson, Yates and Stephens in Newport News.

In 1970, she was named assistant secretary of the shipyard's subsidiary, Nuclear Service and Construction Company.

Mrs. Adams also serves The Mariners Museum in Newport News in a dual capacity. She has been corporate secretary since 1956 and assistant treasurer since 1968.

U.S. Lines Names Edward Washeleski VP

Edward I. Washeleski has been named vice president and chief financial officer of United States Lines. The appointment was announced by **E.J. Heine Jr.**, president of the containership company.

In his new post, Mr. Washeleski will direct all financial activities of the company and will report directly to Mr. Heine.

The new vice president was formerly president and chief executive officer of Associated Testing Laboratories, Wayne, N.J.

Mr. Washeleski is a graduate of Fairleigh Dickinson University

Japan Container Ass'n Offers 15-Page Booklet

The Japan Container Association has made available a study of containerization in Japan, a 15-page booklet covering the development of containerization in that country as it applies to port development, inland transportation, shipbuilding and construction of the boxes.

Copies may be obtained from the association at Room 802—A Yaesu—Mitsui Building, 7,5-Chome, Yaesu, Chou-Ku, Tokyo.

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Condenser Service & Engineering Co., Inc. Elects Gruber President



Alvin V. Gruber

The board of directors of Condenser Service & Engineering Co., Inc., Hoboken, N.J., has elected **Alvin V. Gruber** as president and chief executive officer.

Mr. Gruber joined Condenser Service & Engineering in 1934 as shop and field supervisor. In 1941 he was named president and general manager of the Pottsville (Pa.) Casting & Machine Shop Division, and in 1951 he moved back to Hoboken as general sales manager for Condenser Service. In 1953 he was named vice president and from 1960 to 1970 executive vice president and chief executive officer.

Mr. Gruber, inventor of formulation scale prevention in desalination at elevated temperatures; use of inert gases for metal and ceramic depositions, attended the University of Wisconsin and Pratt Institute. He is a member of the Upper Montclair Country Club, Clifton, N.J.

Kings Point Honors Todd Shipyards Corp. And Nine Alumni

The alumni of the United States Merchant Marine Academy have honored nine of their own number and one major shipbuilding corporation in recognition of outstanding contributions to the Federal institution's prestige and advancement. The 10 awards were presented on behalf of the Alumni Association by Academy Superintendent Rear Adm. **Arthur B. Engel**, USCG (ret.), at the Kings Point Annual Homecoming Awards Dinner.

Recipient of the Industry Achievement Award was Todd Shipyards Corporation, whose president, **J.T. Gilbride**, accepted the citation from Admiral **Engel**. Primary basis for Todd's selection, according to Capt. **Bernard Murray**, chairman of the alumni awards committee, is the corporation's publication, *Todd Daily Maritime*, a comprehensive survey of world shipping and shipbuilding news. Its publication and wide circulation since 1961 was characterized by Admiral **Engel** as "a major service in support of the maritime industry."

The *Daily Maritime* is published under the editorial direction of **Edwin K. Linen**, Todd's corporate secretary.

Admiral **Engel** also presented one Meritorious Alumni Service Award and eight Outstanding Pro-

fessional Achievement Awards to graduates from the reunion classes. The former distinction went to Washington attorney **Penrose Lucas Albright**, of the class of 1946, presently chairman of the Alumni Association's national legislative committee, in recognition of varied public and personal activities on the Academy's behalf.

Outstanding Professional Achievement Awards, signaling the attainment of nationally promi-

nent positions in the maritime industry and other businesses and professions, were conferred by Admiral **Engel** on Capt. **W.M. Ayers** '41, president, Ayers Steamship Co. of New Orleans; **James A. Bertel** '46, president, Gulf Motorships, Inc., of the same port; **Bozdar Bulovic** '46, vice president in charge of production, William Wrigley, Jr., Co. of Chicago; **John W. Dowdle** '46, treasurer, R.J. Reynolds Industries, Inc., Winston-

Salem, N.C.; **William H. Kromann** '46, general manager, Indiana Area Manufacturing Division, Chrysler Corp., Kokomo, Ind.; **Robert J. Nolan** '46, vice president and secretary, International Terminal Operating Co., New York; **Joseph T. Stewart Jr.** '51, vice president, planning, Squibb Beech-Nut, Inc., New York; and **Robert E. Whitam** '46, manager of marine commercial operations, The Babcock & Wilcox Co., Barberton, Ohio.

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New Book Promises To Aid Management In Maritime Industry

A new book, planned to aid the managerial function within the maritime industry, has been published by the Cornell Maritime Press, Inc. The book, entitled "Planning Tools for Ocean Transportation," was written by **I.M. Datz**.

The author contends that the con-

cepts developed in "Planning Tools for Ocean Transportation" will not only prove to be immediately beneficial to the shipowner in the solution of his day-to-day problems but will also assist him in planning for the future needs of his firm. Use of the operations research approach and the computational sciences applied as it has been to the maritime transportation field will likewise prove indispensable to the student of naval ar-

chitecture, marine engineering, operations research, transportation economics, and business logistics.

After a foreword by Mr. Datz, the book has the following chapters: I. A Gaming Approach; II. Trade Forecasting; III. Ship Scheduling; IV. Cargo Selection and Profitability; V. Trade Through Simulation, and VI. Conceptual Ship Design. An appendix follows which lists a glossary of gaming and simulation terminol-

ogy. The book contains 192 pages in a 7-inch by 10-inch format.

Mr. Datz was born in 1928. He holds a B.S. degree in meteorology (1950) from the City College of New York and has done three years of graduate study at The Geophysics Institute in Bergen, Norway. He is presently Research Coordinator—Mathematics with the U.S. Naval Research & Development Laboratory, Annapolis, Md.

"Planning Tools for Ocean Transportation" is available at \$10 a copy from Cornell Maritime Press, Inc., Box 109, Cambridge, Md. 21613.

E.L. Post & Co. Elects Mrs. Elsie M. Hagel Secretary & Treasurer



Elsie M. Hagel

Walter L. Vaughan, manager of E.L. Post & Co., Inc. 233 Broadway, New York City, century-old Babbitt metal manufacturing organization, recently announced the election by the board of directors of Mrs. Elsie M. Hagel as secretary and treasurer of the corporation. Mrs. Hagel replaces the late Miss Lucille S. Tennison, who had been with Post Company for over 25 years.

Mrs. Hagel was affiliated with the Golden Marine Corporation of Brooklyn, N.Y. for many years, and prior to coming to E.L. Post Company, was with the Dale Carnegie Courses.

Star Iron Building Large Starporter Crane For APL Terminal

Star Iron & Steel Co., Tacoma, Wash., has been awarded a contract for the construction and installation of a large Starporter container crane for the American President Lines' Los Angeles Harbor terminal at San Pedro, Calif., it was announced by Charles Allen, president of Star Iron & Steel Co. The crane was purchased as part of APL's program to renovate their facility for container handling.

The crane will operate at speeds up to 300 feet per minute. This is made possible by a hoist that is driven with a 500-hp motor. Powered by a shore power system, the outreach of the crane is 115 feet. It will have a 30-long-ton capacity at that reach and a 40-long-ton capacity at 85 feet. It is 231½ feet high, weighs 582½ tons and is capable of operating in the back reach area with the boom stowed. Another special feature is a telescoping spreader that will handle both 20-foot and 40-foot containers without any mechanical changes or downtime.

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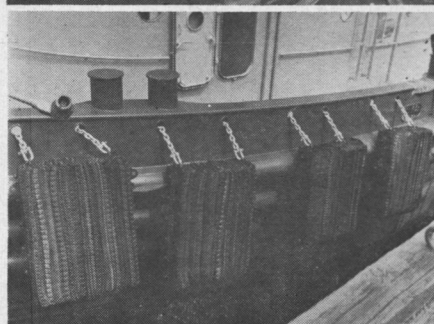
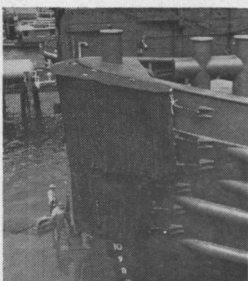
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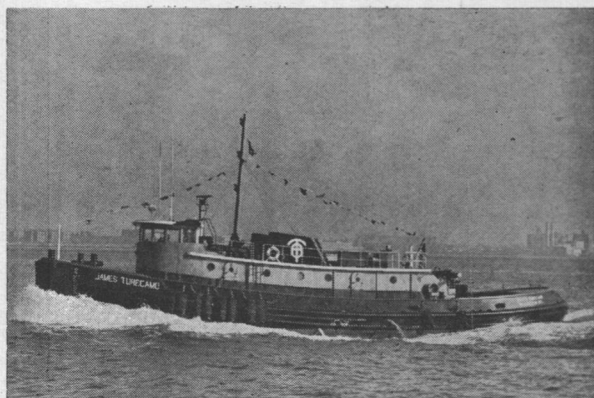
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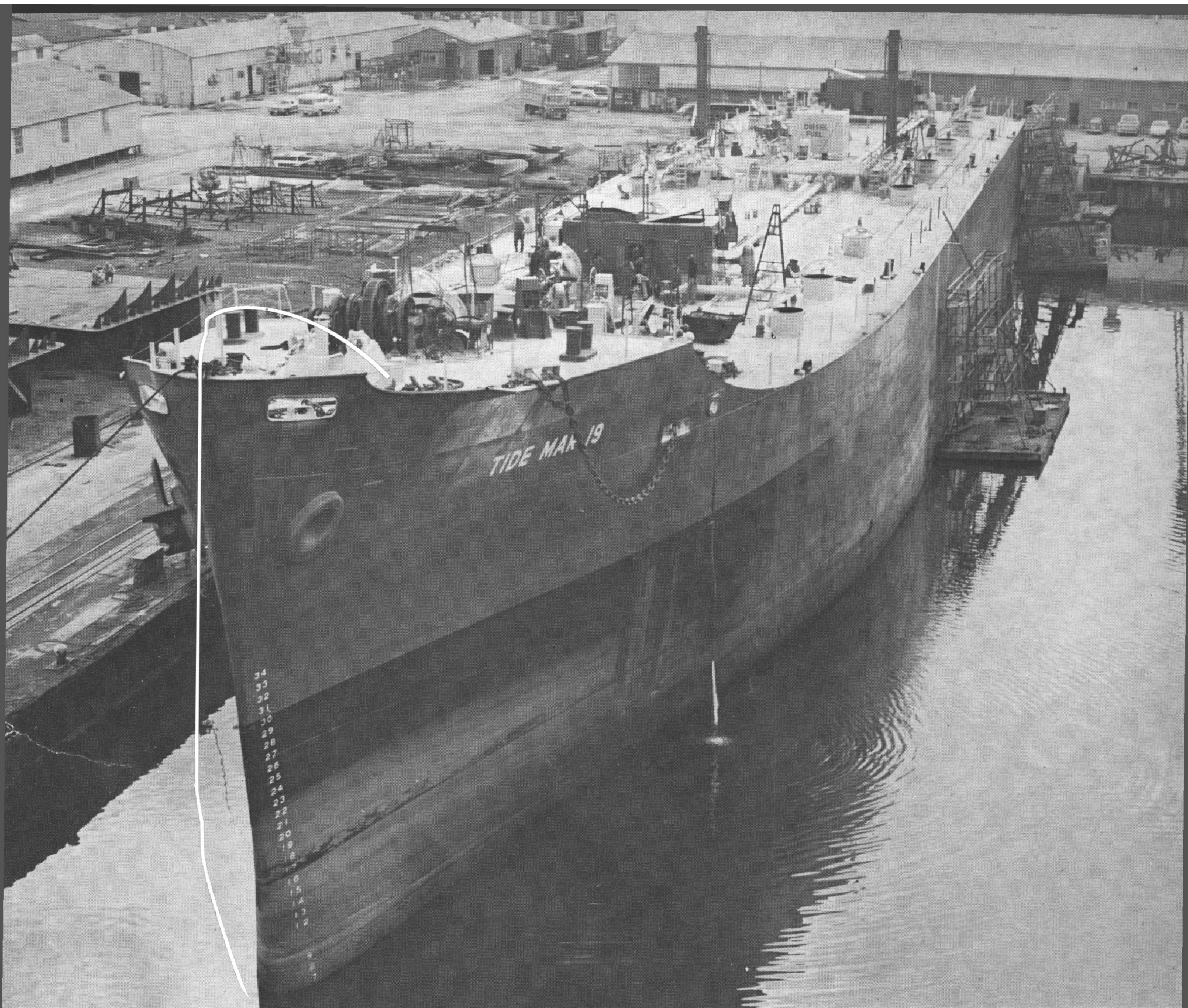
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SHAYER GRAIN BARGE: The second of two grain barges built this year for Shaver Transportation Company of Portland, Ore., is shown being side-launched recently at the yard of the builder, Gunderson, Inc., Portland-based marine construction firm. Sponsored by Mrs. Luella Shaver, wife of George Shaver, the barge, named ST-36, measures 207 feet by 42 feet by 15 feet and will be used on the upper Columbia and Willamette Rivers, primarily by Western Grain Exchange, Inc. The barge has a grain capacity of 2,700 tons of wheat or 2,200 tons of barley. According to Mr. Shaver, executive vice president of the West Coast transportation firm, the ST-36 was built according to American Bureau of Shipping regulations, insuring high quality design and construction. Portland naval architects Don Hudson & Associates were the design agents. Doug Hendrix of the Portland office of the American Bureau of Shipping was the principal surveyor. Gunderson, Inc., is a subsidiary of the FMC Corporation, San Jose, Calif.



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Caribe Hydro-Trailer To Double Equipment And Increase Sailings

Caribe Hydro-Trailer, Inc., the newly formed Miami-based ocean carrier which provides roll-on/roll-off shipment of truck trailers on "superbarges" between Miami and Puerto Rico, has announced that it will increase its sailing schedules and double its equipment.

Leo L. Collar, president of CHT, said that substantial shipper demand for the new service warranted assignment of another 400-foot by 100-foot barge, the Isla Verde, to join the original barge, Isla Grande, on the Puerto Rico trade route.

The Isla Grande and the Isla Verde, described as the largest flat deck barges in the world, each has a capacity for carrying ninety 40-foot truck trailers. The present schedule of sailings from Miami to San Juan every 10 days will be stepped up to every five days, according to G.A. (Al) Watkins, executive vice president of CHT.

"We are tremendously encouraged by shipper response to the 'big ones' which are geared to handle all types of cargo in truck trailers, including construction and building materials, automobiles, food products and perishables," Mr. Watkins said.

Caribe Hydro-Trailer, Inc., an affiliate of the Crowley/Red Stack companies, utilizes powerful 7,000-hp tugs to haul the "superbarges."

A one-way trip between Miami and Puerto Rico takes less than five days.

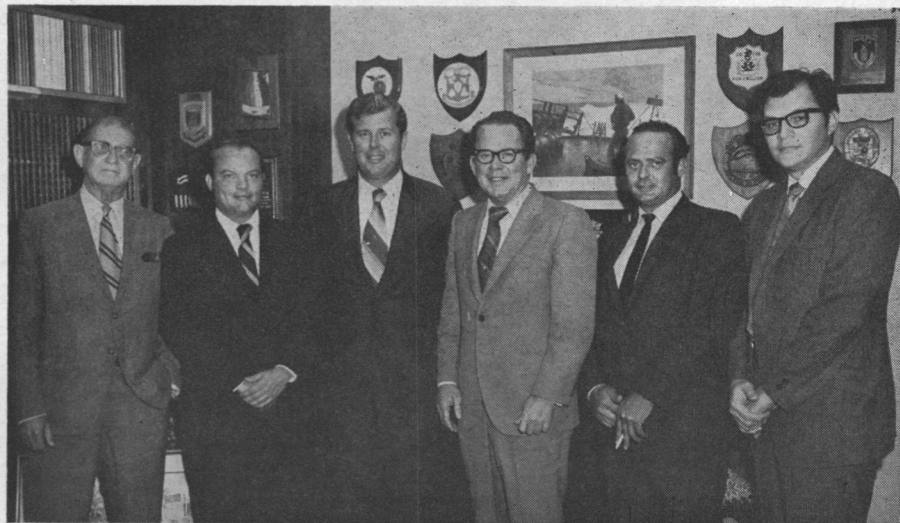
The Crowley/Red Stack group also includes Alaska Hydro-Train, a roll-on/roll-off railcar operation between the West Coast and Alaska, as well as other affiliates in the bulk petroleum, common carrier and charter services. The firm is the only tug and barge company to operate on all three coasts of the United States—Pacific, Atlantic and Gulf.

During the past five years, Crowley/Red Stack has invested more than \$50 million in new equipment and services and is generally regarded as the largest tug and barge firm on the West Coast, with the most modern equipment.

Pelagic Electronics Catalog Available

An illustrated summary catalog is now available from Pelagic Electronics, Inc., 174 Lakeshore Drive, East Falmouth, Mass. 02536, describing P.E.I.'s line of deepsea controls and actuators, pumps, motors and sampling devices, as well as equipment for deep submersibles, wire monitoring instruments, buoy beacons and the Woods Hole type settling tube sediment analyzer. Included with the "Capsule Catalog" is a response card for use in obtaining complete data on items of particular interest. Inquiries should be directed to Mrs. Carol C. Tyndale, Operations Manager.

New Ship Operators & Agents Ass'n In Miami



Miami Metro Mayor Stephen P. Clark greets members of the new Miami-based Ship Operators and Agents Association. Left to right are: Frank Rovirosa, Narovi Shipping; Alec Boriss, Harrington & Co.; Dewey Parker, Florida Motorships; Mayor Clark; John Foster, Shaw Company, and Hector Calderon, Coordinated Caribbean Transport.

John Foster, Shaw Company executive, has been elected president of the newly formed Ship Operators and Agents Association, Inc., with headquarters in Miami.

Twenty-two southeast Florida based steamship companies are on the roster of the nonprofit organization, created to advance and foster standards of practices and ethics in the field and to promote common business interests.

Other officers are: Hector Calderon, Coordinated Caribbean Transport, vice president, and

Alex Rodriguez, Florida Motorships, secretary-treasurer.

Richard Ralph is general counsel, and Lebron Shield, of Alco Transport, acts as meeting chairman.

Eligible for membership in the association are shipowners, operators and their agents engaged in passenger or freight traffic through the Port of Miami, Port Everglades, Key West, West Palm Beach, and Port Canaveral, Mr. Foster said.



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101,000-Dwt OBO Delivered By Gotaverken To Fernstroms



Shown left to right on the platform when the Eric K. Fernstrom was named are **Folke Thulin, Hans Laurin, Mrs. Marianne Thulin, Stig Danielson** and **Eric K. Fernstrom**, for whom the ship was named.

The Eric K. Fernstrom, a 101,000-ton OBO carrier was recently delivered by the Gotaverken Arendal yard to A.K. Fernstroms Granitindustri, Karlshamn, Sweden (a wholly owned subsidiary of the investment company Skansen Lejonet, Goteborg). The ship was christened by **Mrs. Marianne Thulin**, the wife of **Folke Thulin**, chairman of the board of Fernstroms Granitindustri. Among representatives of the owners at the ceremony were **Mr. Thulin, Dan-Axel Brostrom, Eric K. Fernstrom** and **Stig Danielson**. The yard was represented by the chairman of the board **Sture Odner**, the managing director **Hans Laurin**, and other members of the board and management.

The Eric K. Fernstrom will be the biggest ship in the Fernstrom fleet. The second biggest is the OBO ship **Elisabeth Fernstrom** of 75,400 deadweight tons, delivered from the Arendal yard in 1968. The company has also ordered a sister ship to the Eric K. from the Oresund yard. This ship will be delivered in 1974. The Oresund yard has previously built four ships for Fernstroms, and the Eric K. Fernstrom will consequently be the sixth ship delivered to this company by the Gotaverken Group. The total deadweight of these ships is 311,000 tons.

The new ship is one in a long series of about 25 units, which the Arendal and the Oresund yards are building for several owners. The Eric K. Fernstrom is number six in this series.

Like her sister ships, the new vessel will be propelled by a nine-cylinder diesel engine of Gotaverken's large-bore type. The engine, which has a bore of 850 mm and a stroke of 1,700 mm, develops 19,800 bhp at 115 rev/min. and gives the ship a speed of 15.9 knots.



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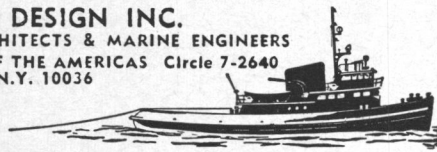
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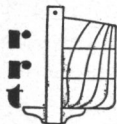
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**Alco Consolidates Operations
—Breaks Ground For New
Headquarters In Auburn, N.Y.**

Alco Engines Division of White Industrial Power, Inc., has consolidated all operations in Auburn, N.Y., and broken ground for a new 21,000-square-foot headquarters building.

In making the announcement, president **James D. Wormley** pointed out that the new headquarters building would be located directly across the street from Alco's 400,000-square-foot manufacturing complex. The new office building, scheduled for completion next January, will house the engineering, marketing and administrative staffs.



Ground breakers include (from left to right): **John Mucha**, Alco plant engineer; **Paul Lattimore**, Mayor of Auburn, N.Y.; **J.D. Wormley**, Alco president; **Vincent Klein**, Schwarz Associates financier, and **Walter Minier**, real estate manager, White Motor Corp.

"We have taken many steps for improvement during the past six months," Mr. **Wormley** pointed out, "and we know that having all our people together will enable us to achieve our ambitious long range plans."

Mr. **Wormley** said that more than \$4 million has been invested in sophisticated new production equipment during the past five years. In addition, more than 100 production workers have been added during 1971.

Alco recently shipped engines for use in the world's largest locomotive and new "super truck." A 4,500-hp Alco engine is powering the giant locomotive for the Canadian National Railways, while the 250-ton capacity truck is being tested in a mine near Tucson.

"We look to the future with confidence because our Model 251 four-cycle engine has been called the most reliable and efficient in the world. Today, more than 6,000 are in service in 23 countries . . . in locomotives, marine propulsion, electrical power generation, pumping and drilling," Mr. **Wormley** stated.

**Keel Laid At Todd-Houston
For 64,000-Bbl Tank Barge**

Todd Shipyards Corporation (Houston Division) has recently laid the keel for a 350-foot by 60-foot by 19-foot 9-inch approximately 64,000-barrel tank barge. The barge is being constructed for Seaboard Shipping Corporation of New York and will be certificated to carry Grade A petroleum products in "rivers, bays and sounds" service. The barge will have two deckhouses, one to accommodate the generating machinery and messroom and the other to accommodate the crew.

A heavily reinforced notch and bulwark is located aft to facilitate pushing by a tug. The forward end of the vessel is strengthened for ice.

Completion of the barge is scheduled for February 1972.

National River Academy Holds Board Meeting

A tour of the National River Academy's new facilities at 417 Walnut Street, Helena, Ark., was the first item on the agenda of the board of directors meeting held August 31, 1971, at the Holiday Inn in Helena.

Floyd A. Mechling, chairman of the board, presided at the meeting with a large representation of

members and guests from the industry present.

William H. Barton Jr., senior vice president, Nashville Bridge Company, was elected to the board to replace Capt. Louis H. DeLong, who has taken the position of executive director of the Academy. He was also named to the education committee by its chairman, Sheldon G. Held.

The board approved a permanent regular membership for Fed-

eral Barge Lines, for their recent generous donation to the Academy.

A staff position of training director was established. Vance A. Foreman, engineer and tankerman instructor, was nominated to fill this position.

James E. (Jim) Walden, chairman of the building committee, gave a report on the progress made toward a building on the 60-acre site owned by the Academy. Mr. Walden, also chairman of the

Helena Country Club's building committee, conducted a tour of the club's new facility being constructed, which is near completion. This building is of similar type construction for which he is to submit plans to the board for the Academy's new building at the next board meeting.

A general discussion was held pertaining to the proposed two-year cadet program following a detailed report by education committee chairman Mr. Held.

Mr. Mechling asked that Pierre R. Becker, past executive director of the Academy, be recognized for his outstanding organizational ability in developing the curriculum and administering the Academy since its inception.

John M. Donnelly, chairman of the finance committee, named Howard G. King, Arrow Transportation Company, and W.R. (Dick) Murphy, Rose Barge Line, to this committee.

A cocktail party preceded the board meeting on Monday evening, August 30, 1971, sponsored by the Helena Marine Service, Inc., and Phillips County Industrial Development Corporation.

SNAME New England LNG Symposium To Be Held Oct. 8

The timely subject of Liquid Natural Gas (LNG) will be the topic for a panel of authors at the October 8, 1971, meeting of the New England Section of The Society of Naval Architects and Marine Engineers.

The meeting will start with a tour of the Boston Gas Company liquefaction facilities and possibly an LNG carrier.

After a social hour and dinner at the Old Colony Yacht Club, Dorchester, Mass., the Symposium on Liquid Natural Gas will be held covering the following subjects: "Natural Gas as a Product," authored by "DISTRIGAS"; "Marine Transportation Aspects of Liquid Natural Gas from Ship Builder's View," authored by Quincy Shipbuilding, General Dynamics; "The Transportation Problem from the Operator's Point of View," authored by Phillips Petroleum Company, and "The Regulation Problems Involved," authored by USCG Marine Inspection.

Several papers on the subject will be bound into one volume and published as a regular section paper.

ICHCA Postpones Seminar To April 20-21

The International Cargo Handling Coordination Association technical seminar which was scheduled in Oakland, Calif. for Sept. 16-17, 1971, has been postponed until the spring of 1972, according to an announcement by the Port of Oakland. The report stated the delay was caused by the continuing dock worker strike in the West Coast ports of the United States.

ICHCA, a worldwide organization of maritime, land, and air interests, is concerned with improving the flow of freight and will now hold its Seminar in Oakland on April 20-21.

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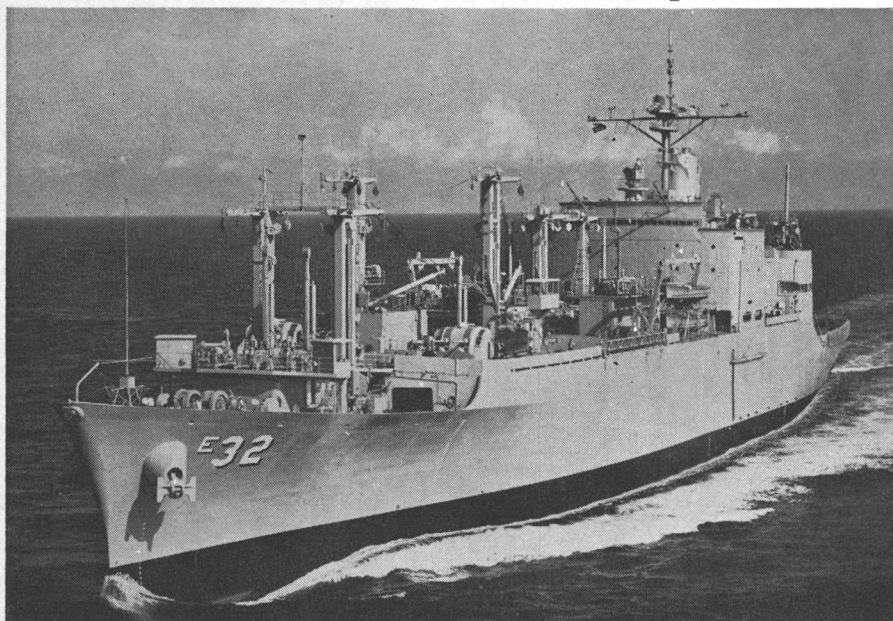
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Litton's Ingalls Nuclear Shipbuilding Division Delivers Innovative Ammunition Ship USS Flint



The USS Flint is the first in a series of four such vessels that are being built and delivered to the U.S. Navy by the Ingalls Nuclear Shipbuilding Division of Litton Industries in Pascagoula, Miss. Her features include a speed of 20 knots and on-board helicopters which will enable the Flint to keep pace with fast-moving naval task forces and handle distant resupply of other ships at sea.

The Navy took delivery on August 30 of its most modern ammunition ship, the 564-foot USS Flint (AE-32), constructed in Pascagoula, Miss., by the Ingalls Nuclear Shipbuilding Division of Litton Industries.

The Flint, equipped with the latest systems for rapid transfer of ammunition at sea, is one of four Kilauea-Class ammunition ships being built by Ingalls. Other vessels in the series—Shasta (AE-33), Mount Baker (AE-34), and Kiska (AE-35)—are currently in various stages of construction.

N.J. Marandino, vice president of Litton Industries and president of Ingalls Nuclear Shipbuilding, said the Flint will introduce in the fleet a number of new designs for ships of this class. Among the innovations are a design speed of 20 knots and a bulbous bow, which will enable the Flint to keep pace with fast-moving naval task forces as it resupplies them at sea with ammunition. The ship will be equipped with the most advanced systems for cargo handling, including helicopters for distant resupply and four "FAST" (Fast Automatic Shuttle Transfer) systems, which will enable the vessel to transfer ammunition simultaneously to two ships under way alongside.

For helicopter transfer, the vessels will be equipped with a "TACAN" system which provides a homing signal to determine ship range and bearing as helicopters conduct bad-weather resupply. Another innovation will be an "APS" (Automated Propulsion System), a central console in the engine room which gives automatic readings of the efficiency and performance of the engine plant.

The cargo compartments of the Flint are specially configured for ease of handling, loading and stowage of missiles, rocket boosters and all types of ammunition required by the mobile fleet. With a full load displacement of 18,000 tons, the ship has a beam of 81 feet and a maximum draft of 25 feet. Twenty-eight officers and

373 enlisted men will man the new ship.

The Flint is the second ship of the Navy fleet to be named in honor of the City of Flint, Michigan. The Flint officially joined the Navy fleet at the Charleston Naval Shipyard in Charleston, S.C.

Ingalls Nuclear Shipbuilding Division, Pascagoula, Miss., has constructed more than 250 commercial and military surface ships, submarine and other vessels. It is presently constructing additional Navy ammunition ships, commercial oil tankers and containerships for the merchant fleet, while building and overhauling Navy nuclear attack submarines.

Litton Industries, headquartered in Beverly Hills, Calif., is a major multinational corporation specializing in products, systems and services for business, defense, marine, industrial and professional markets.

C-E Elects Drake Corporate Vice Pres.

Dr. Robert M. Drake Jr., former dean of the College of Engineering, University of Kentucky, has been elected to the newly established post of corporate vice president, research and development, for Combustion Engineering, Inc., **Arthur J. Santry Jr.**, president, announced.

Dr. Drake's responsibilities will include coordinating research and development activities throughout C-E, and monitoring developments in environmental control. He will report to the president and be headquartered in C-E's Windsor, Conn., offices.

Before becoming dean of the University of Kentucky's College of Engineering in 1966, Dr. Drake had been chairman of the department of mechanical engineering at Princeton University and a professor of mechanical engineering at the University of California. His experience in the past 25 years has also included work in industry and

the military, primarily in mechanical engineering.

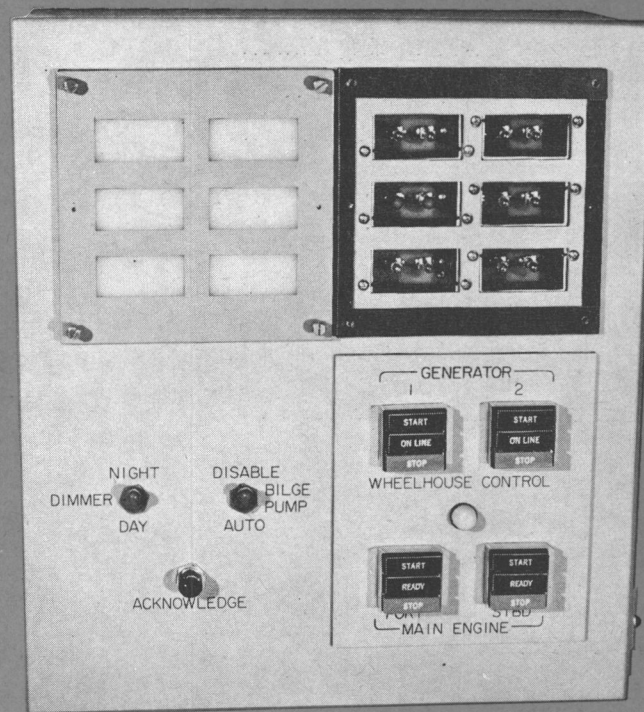
He holds a B.S. degree in mechanical engineering from the University of Kentucky, an M.S. in mechanical engineering from the University of California, and a Ph.D. from the University of California.

Combustion Engineering, which last year realized sales of \$957,247,311, supplies equipment, material and services to electric utility

and industrial markets throughout the world. The company provides fossil fueled and nuclear steam generating systems, petroleum and gas production processing equipment, refractories, foundry equipment, minerals, pollution control systems, wire cloth and screening equipment, building products, glass, nuclear components, and design and engineering of chemical and petrochemical process facilities.

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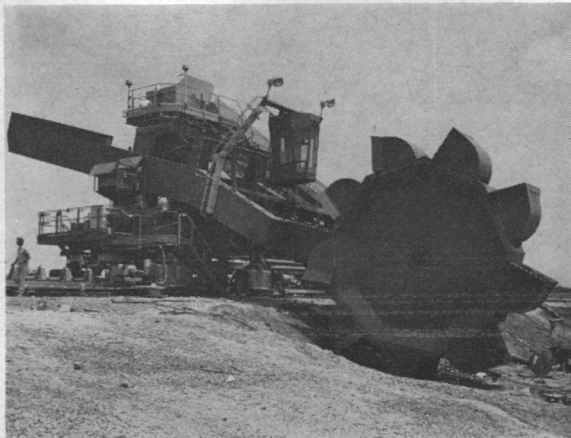
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Mitsui Yards Deliver Tanker And Multipurpose Cargo Ship

Mitsui Shipbuilding & Engineering Co., Ltd. announced in Tokyo that it has recently completed two ships and delivered them to their owners. One vessel, built at its Chiba works, was the 227,604-dwt tanker Gohryusan Maru, which was delivered to her joint owners, Mitsui Osk Lines, Ltd., and General Kai-un K.K., for service transporting crude oil from the Persian Gulf to Japan.

The second vessel, the Aristagoras, built at Mitsui's Fujinagata works, is the second of five sister ships ordered by the M.A. Karageorgis group of Greece. The 17,668-dwt Mitsui-Concord 18 type multipurpose cargo ship was delivered to the Alma del Atlantico Naviera S.A., an affiliate of the group. The ship is capable of carrying grain, coal, ore and containers, in addition to general cargo.



"I KNEW IT WOULD COME TO THIS SOMEDAY!"

Sperry Systems Receives New Development Contract

Sperry Systems Management Division, a unit of the Sperry Rand Corporation's Sperry Division, Great Neck, Long Island, N.Y., has been selected as prime contractor to continue advanced development of an electrically suspended gyroscope navigator. The \$9.5-million contract was awarded by the Naval Ship Systems Command for a navigation system which can be used by submarines or surface ships.

Work on the contract will be performed in Sperry Systems Management Division's Long Island facilities. Principal subcontractors are the Aerospace Division of Honeywell, Inc., St. Petersburg, Fla., and the Autonetics Division of North American Rockwell Corp., Anaheim, Calif.

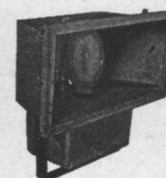
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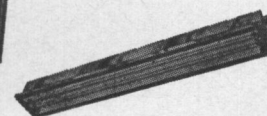
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Sulzer-M.A.N. To Cooperate In Diesel Engine Research

Sulzer Brothers Limited of Winterthur, Switzerland and Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft (M.A.N.) of Augsburg, Federal Republic of Germany, have decided to cooperate in diesel engine research, development and design. An agreement to this effect was signed on August 31, 1971.

For decades, both companies have been leaders in the field of diesel engines. Their designs have attained worldwide renown, in particular in connection with marine applications. Moreover, Sulzer and M.A.N. work closely together with many licensees all over the world. The cooperation between the two companies provides for an extensive exchange of know-how and a joint utilization of the considerable potentials in research and development available to them as regards two-stroke and four-stroke diesel engines for use in ships and in stationary plants.

The two companies are aware of the continuously increasing rate of progress in technical development. By this cooperation, and based on their technical capacities, they aim at making available to their customers and licensees at the right time, a complete range of modern engines incorporating the latest technical achievements. At present, these engines reach outputs of up to 48,000 bhp. Joint efforts will also be undertaken in examining other ship propulsion systems.

Both firms will remain autonomous companies in all respects and will as such, continue their activities in this particular field, especially with regard to manufacture and sale in connection with licensing, independent of each other.

The M.A.N. branch of diesel engines for automotive use, as well as the Motoren-und Turbinen-Union Friedrichshafen GmbH, in which M.A.N. has an equity via MTU-München GmbH, are not affected by this agreement.

Offshore Operators Order New Sewage Disposal Units From Levingston Shipbuilding

Levingston Shipbuilding Company of Orange, Texas, builders of offshore marine drilling equipment, announced the development of a new sewage disposal unit for use on marine vessels and offshore drilling platforms.

The LEVCO Sewage Treatment System, designed by Levingston, is a continuous, controlled, pressurized, aerated-sludge process which produces complete degradation of waste materials by over-saturated waste water with oxygen in the presence of recycled oxidized sludge.

Otho Haunschild, president of Levingston, said that the company recently accepted orders for 20 of these new units for use on offshore drilling vessels and offshore production platforms.

"The new product was developed within the last six months, and there is wide market for this system," Mr. Haunschild said. "During the last 90 days, a pilot plant has been installed and tested and has proven to meet all the specifications and requirements of both the Federal and state governments," he added.

Under the new Federal and state pollution statutes, every vessel (foreign and domestic) will have to have an acceptable method of purifying waste. Such materials can no longer be dumped into the harbors and rivers. Mr. Haunschild pointed out that every offshore production platform and offshore drilling rig would also require acceptable sewage disposal systems.

The results of Levingston's operations for the fiscal year ended June 30, 1971, were also

announced by Mr. Haunschild. Sales were recorded at \$34 million and net income at \$800,000 or 89 cents per share. The comparable figures for the previous year were \$36 million and \$1,600,000, or \$1.77 per share, including an extraordinary item of \$230,000 from the sale of the company's towing division assets. There were no extraordinary items this year.

Mr. Haunschild said: "Sales and earnings for the fiscal year just ended were down principally because of a very slow first half which ended December 31, 1970. But the results of operations had also been affected by an unauthorized work stoppage which has now been entirely settled, and by year-end adjustments to the income statements."

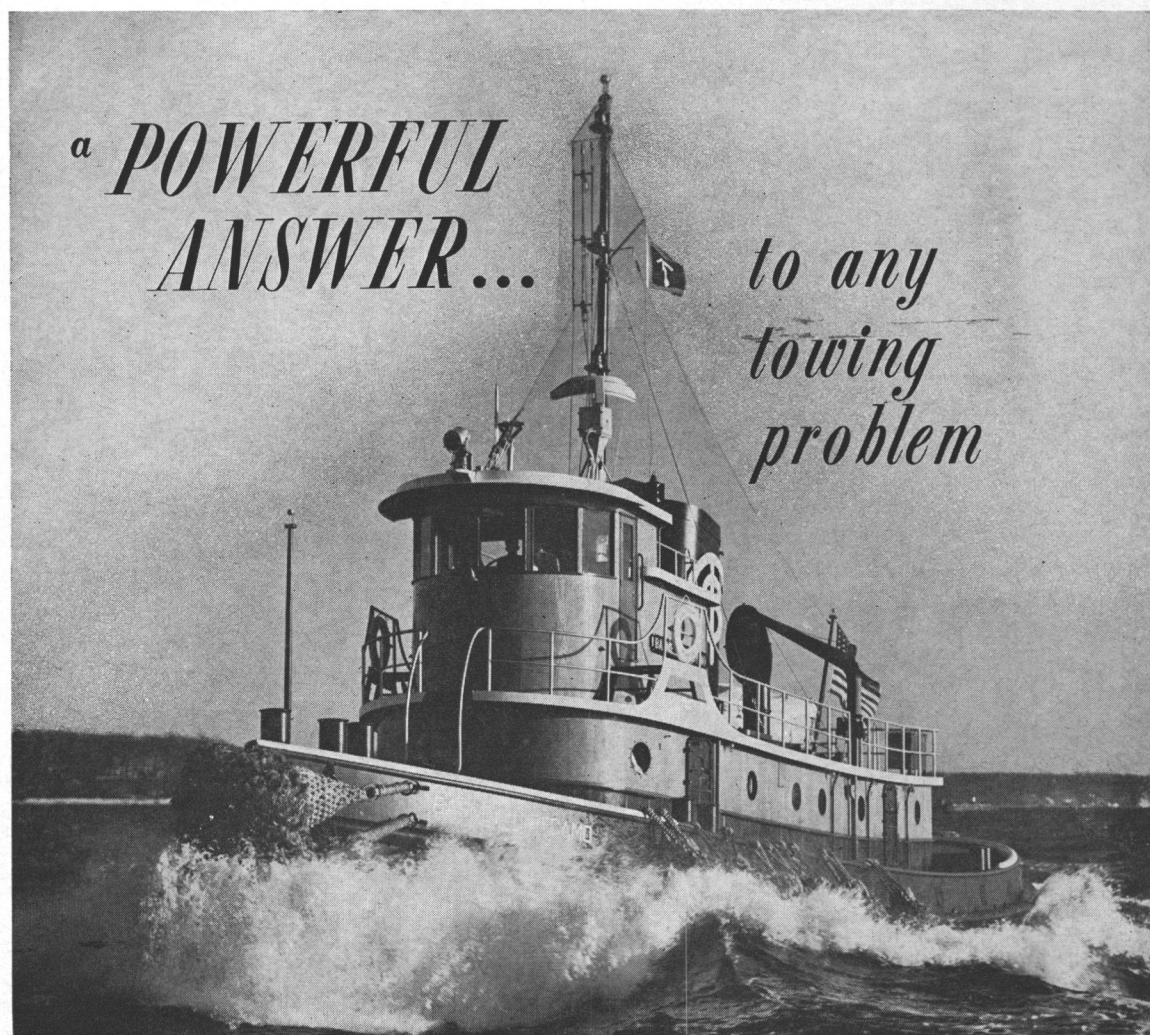
At this time last year, the backlog of construction contracts at Levingston was only \$3 million. The present backlog is in excess of \$50 million. Sales projection for the fiscal year

to end June 30, 1972, indicates that sales will exceed \$50 million.

Levingston's board of directors declared a regular quarterly cash dividend of 10 cents per share payable October 1 to stockholders of record on September 10. The shipbuilding company will have its annual stockholders meeting at its Orange, Texas, offices on Tuesday, October 19.

Levingston recently announced the acquisition of a plant site in Owentown, Texas, just north of Tyler. This is a new manufacturing facility for its wholly-owned subsidiary, Levingston-Armadillo, Inc., which manufactures lightweight reinforced fiberglass buildings for use on offshore production platforms and other severe climate environments.

"The new Tyler plant will more than triple the manufacturing facilities of this subsidiary," Mr. Haunschild stated.



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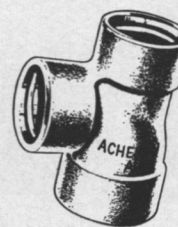
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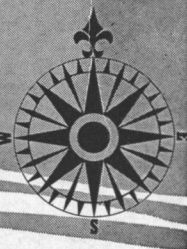
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110' x 30'	150' x 34'	200' x 40'
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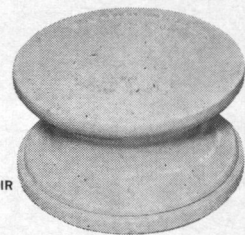
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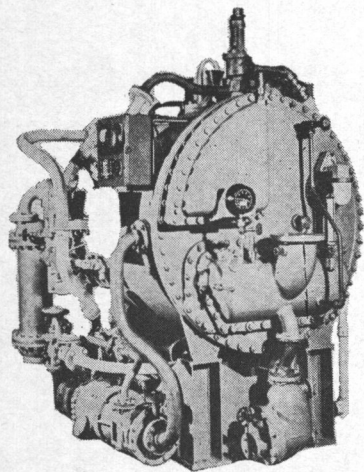
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FIRE - OIL - GENERAL SERVICE, ETC.**

BOILER FEED PUMP



\$1450.00

Pacific type JB—normal 150 GPM—542 lbs—1242". Maximum 185 GPM—600 lbs—1418". Steam turbine 440#—507° TT—3740 RPM. Water rate 35 lbs BHP. Weight complete 3100#. OAL 8' 9 3/8"—OAW 2'. Reconditioned ABS—equal to new. Spares available.

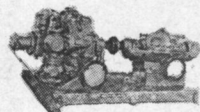
UNUSED CENTRIFUGAL TURBINE DRIVEN BOILER FEED PUMP



Priced to Sell

Worthington pump—5" size—type UFD—capacity 460 GPM @ 750#—test 1000#—impeller 9 3/4"—4900 RPM—305 HP—horizontal 3-stage—5" suction—5" discharge. TURBINE: Sturdivant Div.—type 21—size OC-22. Stem 575#—normal—max. 615#—ex. pressure 15#—test pressure 923#. Originally built for cruisers—CL class—103,104, 105,106,107 vessels. New—unused.

NEW TURBINE DRIVEN FIRE & GENERAL SERVICE PUMP



\$1650.00

Allis-Chalmers 6x5 pump type SKH—1200 GPM—125 PSI—3500 RPM. Coppo turbine type TF-22-2 1/2—3500 RPM. 273#—50° superheat.

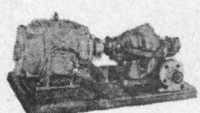
UNUSED FUEL OIL SERVICE PUMP



\$1250.00

Turbine driven rotary pump with reduction gear. Warren vertical rotary—size 3 1/4"—65 GPM @ 350 PSI discharge. Powered by Terry horizontal turbine type Y-w—20 HP—575#—steam—5065 RPM. Pump speed 1025. Suitable for large tankers, ore carriers. Originally for U.S.N. cruisers. Unused.

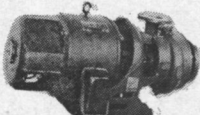
FIRE & GENERAL SERVICE PUMP



\$975.00

Fairbanks-Morse centrifugal pump—300 GPM @ 275' discharge. 3460 RPM—3" suction—2 1/2" discharge. MOTOR: 30 HP—220/440/3/60—3460 RPM. BASE: OAL 52"—OAW 24". UNIT: OAH 24 1/2". Looks new.

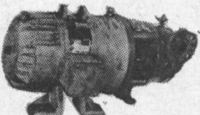
UNUSED CIRCULATING PUMP



\$877.77

Allis-Chalmers—close-coupled—bronze—375 GPM—40' head—size 4x3—5 HP motor—115 VDC—40 amps—1750 RPM—compound wound—continuous.

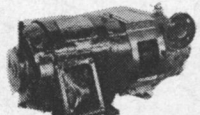
UNUSED REFRIGERATION CONDENSER CIRCULATOR



\$397.66

Frederick Iron & Steel Co.—close coupled—bronze—high head—10 GPM—56' @ 3500 RPM—1"x1 1/4"—test pressure 75#—48" submergence horizontal MOTOR: Barble-Card Electric—1 HP—440/3/60—1.7 amps—3500 RPM. Sprayite enclosure—continuous duty 50-125 degrees F—with magnetic controller—some spares. Motor is high shock non-magnetic.

UNUSED HORIZONTAL DISTILLER FRESH WATER PUMP



\$397.66

Bronze Davidson pump—20 GPM—51' head—submergence 4—3500 RPM. MOTOR: Reliance 1 HP—220/440/3/60—3500 RPM—162 lbs total weight—1 1/4" suction—1" discharge. OAL 22 1/2"—OAW 9 7/8"—OAH 12". Complete with Cutler-Hammer controller.

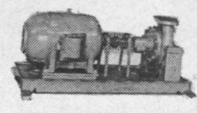
NEW BRONZE FRESH WATER PUMP



\$429.66

Mfg by Allis-Chalmers. 35 GPM @ 43.3 lbs head. MOTOR: 3 HP—440/3/60—with spare parts and control.

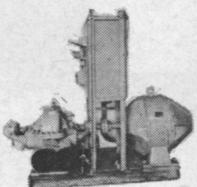
UNUSED HIGH HEAD CENTRIFUGAL PUMP



Priced Right

For butane, fuel oil, hot solvents to 800° max. Ingersoll-Rand HFLA—serial 056-3136—600 GPM—580' head—6" inlet—4" outlet. Flange connection—steel base mounted. Westinghouse motor CS—125 HP—440/3/60—3530 RPM—4200 lbs total weight.

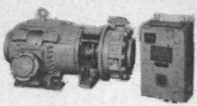
FIRE PUMP



\$1950.00

Reconditioned Worthy fire pump—3"—UBI—450 GPM—125 lbs—1750 RPM. MOTOR: 50 HP—230 VDC—178 amps—type SK—frame 133—compound—1310/1750—with magnetic starter.

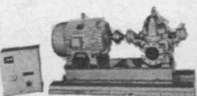
HIGH HEAD DIESEL FRESH WATER SERVICE PUMP



\$475.00

Fairbanks-Morse pump—75 GPM—56.1 ft head—test 110 lbs. MOTOR: Reliance 3 HP—frame 284 UCZ—440/3/60—1750 RPM—with starter.

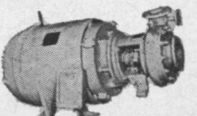
UNUSED BUFFALO PUMPS



\$1495.00

All bronze—model S.L.—750 GPM—50 PSI head—28 BHP. MOTOR: Continental—30 HP—440/3/60—37 amps—1760RPM. 5" Suction—4" discharge. OAL 4' 8 1/2"—OAW 22"—OAH 30"—weight 1200 lbs.

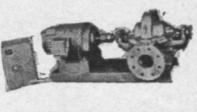
A. C. FIRE PUMPS



\$887.00

250 GPM—160 PSI discharge. Suction 3 1/2"—discharge 2 1/2"—3500 RPM. MOTOR: Reliance—25 HP—440/3/60—35.6 amps. 3 Weil pumps and 3 Aldrich pumps available. Reconditioned pumps and motors.

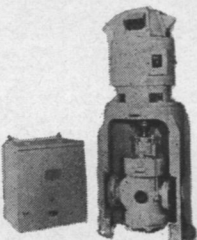
UNUSED AURORA PUMP



\$877.77

300 GPM—37' head—5 HP—120 volts DC Centrifugal Pump. Bronze—size 5 x 4—flanged. MOTOR: Reliance—super T.D.C. Electric Motor—SHP—120 VDC—36.8 amps—1750 RPM—Frame L216A—with control by Cutler-Hammer. Excellent condition. Latest USN surplus.

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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.

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**5 KW — 120/1/60 A.C. — UNUSED
10 HP 115 VDC TO 5 KW 120 VOLTS
SINGLE PHASE AC**



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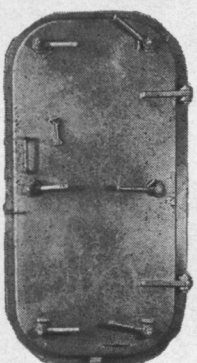
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GEAR BOX: Link Belt—size DM-30—68 RPM output—ratio 25.63:1. MOTOR: Westinghouse type CS—style 7C4894—frame 225Y—class 1—2 HP—1720 RPM—220/440/60/3—5.6/2.8 amps. With push button starter and magnetic controller. Wt. 320 lbs—duty 800 lbs @ 68 FPM.

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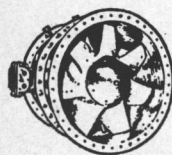
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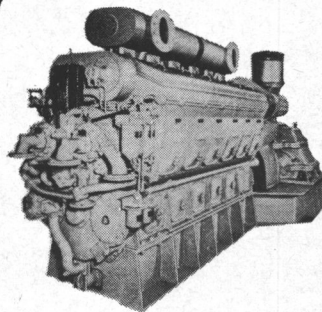
EXAMPLE LISTING:

Size A 1/4	Size A3	Size A8
Size A 1/2	Size A4	Size A10
Size A1	Size A5	Size A12
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SPERRY MARK 14, Model 1 Gyro Compasses, used, good, complete with Master Compass, with Binnacle, Amplifier panel, control panel, carbon pile voltage regulator, motor generator set, alarm panel, and repeaters with mounts.



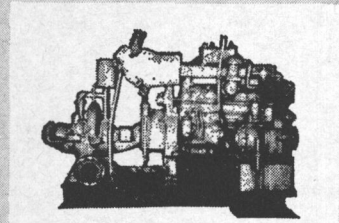
MARINE DIESEL ENGINES

GM 12-567A

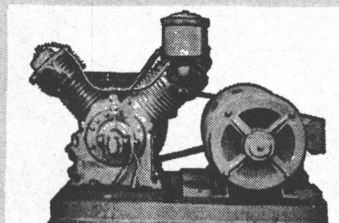
6—GENERAL MOTORS Diesel Engines —Model 12-567A, 900 HP, 744 RPM, 3 port, 3 starboard, each complete with Falk Reverse Reduction Gear, 2.48:1 ratio.

3—COOPER-BESSEMER Diesel Engines . . . Model L S-8-DR, 1300 HP, 277 RPM, direct reversing, turbo charged.

FIRE PUMPS AIR COMPRESSORS



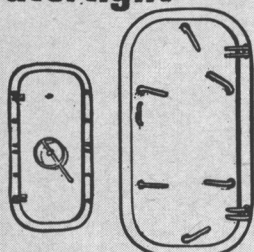
2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver, centrifugal Pumps, Bronze, horizontally split case, 100 GPM, 280' head, 6" suction and 5" discharge.



2—GARDNER-DENVER, 150 CFM, 125 PSI, Class WB, Size 7x5 3/4 x 5, with Diehl Motors, 45 HP, 230 Volts DC, 870 RPM, 167 Amperes.

Steel Watertight DOORS

Used, Good
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Frames.



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

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

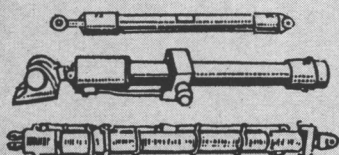
\$34.50 ea. 39.50 each with pull test certificates



Electro - Mechanical STEERING GEAR

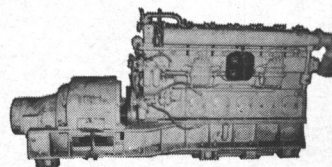
1—SPERRY No. 2, 5 HP, 230 Volts DC, complete with Steering Winch, Controller Panel, Ballast Resistor, Electro-Mechanical Steering Stand —with Steering Wheel (with Pull-out Knob).

HYDRAULIC CYLINDERS



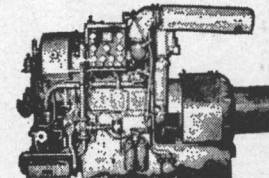
Bore	Overall Stroke	Rod Diameter	retracted length	Action
10"	12"	3.75"	45 1/2"	double
10"	26"	3.75"	58 1/2"	single
2"	8"	1 1/2"	20"	double
2.5"	15"	1.12"	25 1/2"	double
3"	8"	1.37"	15 1/2"	double
6"	8"	4"	144"	double
13"	97"	5 1/2"	14'	double

MARINE DIESEL GENERATORS



40—COOPER-BESSEMER, Marine . . . Model FSN 6, 6 cylinders, 375 HP, 900 RPM with General Electric generators, 250 KW 440/3/60.

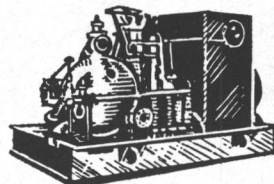
6—SUPERIOR Diesel Engines . . . Model GBD8 Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100 KW, 120/240 DC.



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

3—GENERAL MOTORS, Model 3-268 A, Marine, 150 HP, 1200 RPM, 3 cylinders, with Allis-Chalmers Generators, 100 KW, 120/240 DC.

TURBINE GENERATORS



2—DeLAVAL, 360 HP, 440 PSI, 740°, with Crocker-Wheeler Generators, 250 KW, 240/120 DC, 1200 RPM.

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

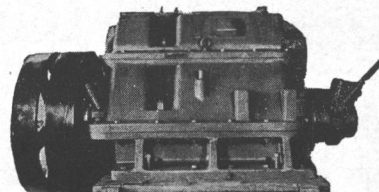
6—WESTINGHOUSE, 200 PSI, with Westinghouse Generators, 60 KW, 120 DC.

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

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

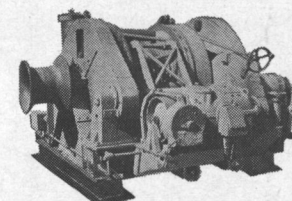
1—GENERAL ELECTRIC, with G.E. Generator, 350 KW, 440/3/60.

FALK REDUCTION GEARS



6—FALK Reverse Reduction Gears, 3 port, 3 starboard, as used with GM 12-567A Engines on LST vessels, ratio 2.48:1 ahead, 2.52:1 astern.

STERN ANCHOR WINCHES

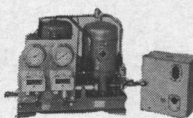


3—ALMON A. JOHNSON Stern Anchor Winches as removed from LST vessels, line pull rating 100,000 pounds at 10 FPM in low gear, complete with Contractor Panels, Resistors, and Master Switches.

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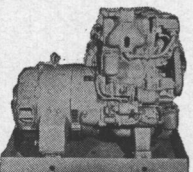
\$375 each

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DIESEL GENERATOR SETS

**20KW — 120 V.D.C.
G.M. 2-71**

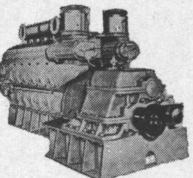


GEN: 20 KW 120 VDC 1200 RPM. ENGINE: GM 2-71 diesel — 2-cycle — 4 1/4 x 5 — 142 cu inch — clockwise — 24 volt start.

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MATCHED PAIR DIESEL ENGINES



**900 H.P.
G.M. 12-567A
with Falk
reverse and
reduction gear**

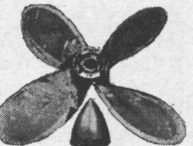
ENGINE: 12-567A — 8 1/2 x 10 — VEE type — 2-cycle — 747 RPM—electric starting—serial Nos. 1041 & 1060. GEAR: Falk Air Flex—reverse & reduction—2.48:1 forward—2.52:1 reverse. Units just removed from Navy LST 551.

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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
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

BURNERS—OIL

Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231

CABLE ELECTRIC MARINE

Anixter-Harbor, Inc., 1050 Aladdin, San Leandro, Calif. 94577
Anixter-Netherlands, Utrecht Gebouw, Coolingsingel 75, Rotterdam 3002, Netherlands
Anixter-New York, 300 Executive Blvd., Elmsford, N.Y. 10523
Anixter-New Orleans, 315 Notre Dame, New Orleans, La. 70130
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150

CLUTCHES, GEARS & BRAKES

Amarillo Gear Co., 517 No. Polk St., Amarillo, Texas 79105
Eaton Corp., Industrial Drive Division, 9919 Clinton Rd., Cleveland, Ohio 44111

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
Devco & Raynolds Co., Inc., Subsidiary Celanese Coatings Co., 414 Wilson Ave., Newark, N.J. 07105
Enjay Chemical Company, 60 West 49th St., New York, N.Y. 10020
Farbail Company, 90 West St., N.Y., N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Spee-Flo Co., 4631 Winfield Rd., Houston, Texas 77039

CONTAINERS—CONTAINER HANDLING SYSTEMS

Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Orleans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98421

CONTAINER LASHINGS & COMPONENTS

American Engineered Products Co., Box 74, McKees Rocks, Pa. 15136
W. W. Patterson Co., 830 Brocket St., Pittsburgh, Pa. 15233

CONTROL SYSTEMS

Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
General Electric Industry Control Dept., Salem, Virginia
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

CORROSION CONTROL

Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Corrosion Dynamics, 1100 Walnut St., Roselle, N.J. 07203
Radiator Specialty Co., 1400 Independence Blvd., Charlotte, N.C. 28205

CRAINES—HOISTS—DERRICKS—WHIRLEYS

ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Conrad-Stork, Div. Stork-Werkspoor, P.O. Box 134, Haarlem, Holland
Hoffman Rigging & Crane Service, 560 Cortlandt St., Belleville, N.J. 07109
Kocks Pittsburgh Corp., Four Gateway Center, Pittsburgh, Pa. 15222
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

Star Iron & Steel Co., 326 Alexander Ave., Tacoma, Wash. 98401

DECK COVERS (METAL)

Lockstadt Co., Inc., 179 W. 5th Street, Bayonne, New Jersey 07002

Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696

DECK MACHINERY—Cargo Handling Equipment

ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Fukushima, Ltd., 4 Yonbon-Cho, Chiyoda-Ku, Tokyo, Japan. (U.S. Rep. Alfred Conhagen, Inc., 172 Lyndhurst Ave., Staten Island, N.Y. 10305)

Garrett Corp., 9851 Sepulveda Blvd., Los Angeles, Calif. 90009
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202
Pacific Pipe Co., 49 Fremont St., San Francisco, Calif. 94080
Red Fox Machine & Supply Co., P.O. Drawer 640, New Iberia, La. 70560

A. G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany
Western Gear Corp., Heavy Machinery Div., Everett, Wash. 98201

DIESEL ACCESSORIES

Golden Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
Kiene Diesel Accessories, Inc., P.O. Box 216, Franklin Park, Ill. 60131
United Filtration Corp., 9600 John St., Santa Fe Springs, Calif. 90670

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
Electro-Motive Division General Motors, La Grange, Illinois 60525
Fiat, Turin, Italy, U.S.A. 375 Park Ave., New York, N.Y. 10022
Golden Marine Co., Inc., 160 Van Brunt St., Brooklyn, N.Y. 11231
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany

H. O. Penn Machinery Co., 1561 Stewart Ave., Westbury, N.Y. 11590

DIESEL ENGINE MUFFLERS

Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOORS—Watertight—Bulkhead

Overbeke-Kain Co., 209 Aurora Rd., Bedford, Ohio 44014

Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT

Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Galbraith-Pilot Marine Corp., 600 4th Ave., Brooklyn, N.Y. 11215
L. F. Gaubert & Co., 700 So. Broad St., New Orleans, La. 70150
Marine Industrial Products Co., 195 Paterson Ave., Little Falls, N.J. 07424

Merrin Electric, 162 Chambers St., New York, N.Y. 10007

Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

Poulsen Electric Mfg. Co., Inc., P.O. Box 12805, Houston, Texas. 77017

EVAPORATORS

Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004

Mechanical Equipment Co., Inc., 861 Carondelet St., New Orleans, La. 70130

FITTINGS & HARDWARE

Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202

Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FLOATING EQUIPMENT—Steel—Aluminum Pontoons

Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

GALLEY RANGES

S. Blackman, Inc., 536 Gregory Ave., Weehawken, N.J. 07087
Elisha Webb & Son Co., 136 So. Front St., Philadelphia, Pa. 19106

HEATERS—Ship

Todd Products, Div. of Todd Shipyards Corp., Brooklyn, N.Y. 11231

HULL CLEANING & BLASTING

Key Engineering, 12502 Woodthorpe Lane, Houston, Texas 77024
Trident Marine, 533 East 24th St., Brooklyn, N.Y. 11210
Vacu-Blast Corp., Box 885, Belmont, Calif. 94002

HYDRAULICS

Bird Johnson Co., 883 Main St., Walpole, Mass. 02081
Bond Hydraulic Equip. Service, Inc., 117 Monroe St., Hoboken, N.J. 07030

Universal Hydraulics, Div. of Ohio Brass Co., 4500 Beidler Road, Willoughby, Ohio 44094

Vickers, M&O Div., Troy, Mich. 48084

INSULATION—Marine

Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Bklyn, N.Y. 11231

LININGS

Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144

MACHINERY MONITORS

IRD Mechanalysis, Inc., 6150 Huntley Rd., Columbus, Ohio 43229

MARINE DRIVES—GEARS

Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

Western Gear Corp., Industrial Products Div., P.O. Box 126, Belmont, Calif. 94003

MARINE NAVIGATION EQUIPMENT & AIDS

American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530

Edo Western Corp., 2645 So. 2nd St., W. Salt Lake City, Utah 84115

Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016

ITT Mackay Marine, 133 Terminal Ave., Clark, N.J. 07066

Marquardt Corp., 16555 Saticoy St., Van Nuys, Calif. 91406

National Marine Service, 1750 So. Brentwood Blvd., St. Louis, Mo.

Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701

RCA Service Co., A Division of RCA, Marine Communications and

Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101

Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of

Sperry Rand Corp.

Star Lifeline, Ltd., 1148 W. 15th St., No. Vancouver, B.C., Canada

Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721

MARINE EQUIPMENT

Adco Div., 34 Milburn St., Buffalo, N.Y. 14212

Nicola Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080

Kearfoot Marine (Div. of The Singer Co.) 21 West St., New York, N.Y. 10006

Merrin Electric, 162 Chambers St., New York, N.Y. 10007

Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742

Stow Mfg. Co., 225 Shear St., Binghamton, N.Y. 13902

Vokes Filter Div., (Cardwell Machine Co.), Cardwell and Castle-

wood Rd., Richmond, Va. 23221

MARINE FURNITURE

Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231

MARINE INSURANCE

Adams & Porter, Cotton Exchange Bldg., Houston, Texas

MARINE PROPULSION

Buehler Corp., 9000 Precision Drive, Indianapolis, Ind. 46236

Combustion Engineering, Inc., Windsor, Connecticut 06095

General Electric Co., Marine Turbine & Gear Dept., Lynn, Mass. 01910

General Electric Co., Gas Turbine Dept., Schenectady, N.Y. 12305

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

Western Gear Corp., Precision Products Div., P.O. Box 190, Lyn-

wood, Calif. 90262

MARINE RADIO COMMUNICATIONS EQUIPMENT

Collins Radio Co., M/S 407-321, Dallas, Texas 75207

Communication Associates, Inc., 200 McKay Road, Huntington Sta-

tion, N.Y. 11746

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

Radiomarine Corp., 20 Bridge Avenue, Red Bank, N.J. 07701

Raytheon Co. Marine Products, 676 Island Pond Rd., Manchester,

N.H. 03103

RCA Service Co., A Division of RCA, Marine Communications and

Navigation Equipment Service, Bldg. CHIC-225, Camden, N.J. 08101

RF Communications, Inc., 1676 University Ave., Rochester, N.Y. 14610

NAVAL ARCHITECTS AND MARINE ENGINEERS

J. L. Bludworth, 4030 Wynne St., Houston, Texas

Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130

Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517

Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142

Cushing & Nordstrom, 50 Trinity Place, New York, N.Y. 10006

Arthur D. Darden, Inc., 1040 International Trade Mart, New

Orleans, La. 70130

Sharp DeLong, 29 Broadway, New York, N.Y. 10006

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., 21 West St., New York, N.Y. 10006

John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston,

Mass. 02110

Morris Guralnick, Associates, Inc., 583 Market St., San Francisco,

R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 44 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006

OIL PURIFIERS—Repair
Peck Equipment Co., 3500 Elm Avenue, Portsmouth, Virginia 23704

OILS—Marine—Additives
Esso International Inc., 15 West 51 St., New York, N.Y. 10019
Ethyl Corp. Marine Div. Perolin Co., New York, N.Y. 10001
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Humble Oil & Refining Co., Humble Building, Houston, Texas 77002
Mobil Oil Corp., 26 Broadway, New York, N.Y. 10004
Refineria Panama, S. A., 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 328 Hanley Industrial Court, St. Louis, Mo. 63144
Devco & Reynolds Co., Inc., Subsidiary Celanese Coatings Co., 414 Wilson Ave., Newark, N.J. 07105
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
Farboil Company, 90 West St., New York, N.Y. 10006
International Paint Co., 21 West St., New York, N.Y. 10006
Mobil Chemical Company, Metuchen, N.J. 08840
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Woolsey Marine Industries Inc., 201 E. 42nd St., New York, N.Y. 10017

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Refineria Panama, S. A. 277 Park Ave., New York, N.Y. 10017
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc., 135 E. 42nd St., New York, N.Y. 10017
The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

PLASTICS—Marine Applications
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
Rotocast Plastic Products, Inc., 6700 N.W. 36th Ave., Miami, Florida 33147

POLLUTION CONTROL
Enjay Chemical Co., 60 West 49th St., New York, N.Y. 10020
Uniroyal, Inc., 10 Eagle St., Providence, R.I. 02901

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
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bird-Johnson Co., 883 Main Street, Wapole, Mass. 02081
Coolidge Propeller Co., 1608 Fairview Ave. E., Seattle, Wash. 98102
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502
Ferguson Propeller, 1132 Clinton St., Hoboken, N.J. 07030

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Goulds Pumps, Seneca Falls, N.Y. 13148
Houttlin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Worthington Corporation, Harrison, New Jersey 07029

RATCHETS
American Engineered Products Co., Box 74, McKees Rocks, Pa. 15136
W. W. Patterson Co., 830 Brockett St., Pittsburgh, Pa. 15233

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
York Corp., Grantley Road, York, Pa. 17405

ROPE—Manila—Nylon—Hawes—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Caring Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Columbian Rope Co., 309 Genesee St., Auburn, N.Y. 13022
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Samson Cordage Works, 470 Atlantic Ave., Boston, Mass. 02210
Tubbs Cordage Company, P.O. Box 709, Orange, Calif. 92669
Wall Rope Works, Inc., Beverly, N. J. 08010

RUBBER PRODUCTS—Dock Fenders, Hose, Life Preservers
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Schuyler's Engineered Products Co., Box 87, Staten Island, N.Y.
Yokohama Rubber Co. Ltd., P.O. Box 46, Shiba, Tokyo 105, Japan

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland Sts., Phila., Pa. 19142
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.

SCAFFOLDING
Patent Scaffolding Co., 11-11 - 34th Ave., Long Island City, N.Y. 11106

SEALS
Syntron, Div. FMC Corp., 398 Lexington Ave., Homer City, Pa. 15748

SEARCHLIGHTS
Snelson Oilfield Lighting Co., 1201 E. Doggett St., Fort Worth, Texas 76104

SEWAGE DISPOSAL
Seapox, Inc., 3645 Warrensville Center Rd., Cleveland, Ohio 44122

SHAFT REVOLUTION INDICATOR EQUIP.
Electric Tachometer Corp., 68th & Upland Sts., Phila., Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913

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
Northern Metal Co., Minor & Bleigh Sts., Philadelphia, Pa. 19136
Zideil Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
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
Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh, Pa. 15219
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
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Astilleros Espanoles, S.A. Zurbarano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Bellard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Blount Marine Corp., P.O. Box 360, Warren, Rhode Island 02885
Brodogradiliste "SPLIT", P.O. Box 107, Split, Yugoslavia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Dillingham Corp., P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Equitable Equipment Co., Inc., 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
Gotaverken American Corp., 39 Broadway, New York, N.Y. 10006

Grafton Boat Co., Inc., Grafton, Ill. 62037
Graigard Shipyards, P.O. Box 829 Colbert, Marseilles, France
Gundersen Bros. Engrg. Corp., 4700 N.W. Front St., Portland, Oregon 97208
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
Industrial Steel & Mach. Works, Inc., P.O. Box 2217, Gulfport, Miss. 39501

Ishikawajima-Harima Heavy Industries Co., Ltd., 15 William St., New York, N.Y. 10005
Jacksonville Shipyards, 644 E. Bay St., Jacksonville, Fla. 32203
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
Kockums Malmo, Fack, Malmo, Sweden
Levingston Shipbuilding Co., P.O. Box 968, Orange, Texas 77630
LISNAY, P.O. Box 2138, Lisbon, Portugal
Littion Industries, 9920 W. Jefferson Blvd., Culver City, Calif. 90230
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134

Maryland Shipbuilding & Drydock, P.O. Box 537, Baltimore, Md. 21203
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mitsui Shipbuilding & Eng. Co., Ltd., Nihonbashi-Muromachi, Chuo-ku, Tokyo, Japan
Mitsubishi Heavy Industries, Ltd., 5-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan

Nashville Bridge Co., P.O. Box 239, Nashville, Tenn. 37202
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Northwest Marine Iron Works, P.O. Box 3109, Swan Island, Portland, Oregon 97208
Nuclear Service & Construction Co., Inc., 9296 Warwick Blvd., Newport News, Va. 23607
O.A.R.N. (officine Allestimento e Riparazioni Navi) Genoa, Italy
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

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
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Star Shipyards, Ltd., 61 Duncan St., New Westminster, Vancouver, B.C., Canada
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Teledyne Seawatt Seacraft, P.O. Box 108, Berwick, La. 70342
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP ROUTING
Weather Routing, Inc., 90 Broad Street, New York, N.Y. 10004

SHIP STABILIZERS
Maritech, Inc., 38 Union Sq., Somerville, Mass. 02143
John J. McMullen Associates, Inc., 110 Wall St., N.Y., N.Y. 10005
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEVEDORING
Luckenbach Steamship Co., 120 Wall Street, New York, N.Y. 10004
M. J. Rudolph Corp., 8 Sackett St., Brooklyn, N.Y. 11231

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 West 23 St., N.Y., N.Y. 10011

TOWING—Lighterage, Transportation, Barge Chartering
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002

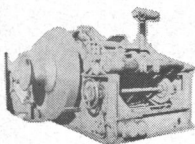
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
Jackson Marine Corp., P.O. Box 1087, Aransas Pass, Texas 78336
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., 17 Battery Place, New York, N.Y. 10004
L. Smit & Co., 11 Broadway, New York, N.Y. 10004
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Tidewater Marine Service, Inc., 3308 Tylane Ave., New Orleans, La. 70119
M. & J. Tracy, Inc., 1 Broadway, New York, N.Y. 10004
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Bettis Corp., 3100 Fall at Grand Blvd., Houston, Texas 77021
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., Inc., 900 Fairmount Ave., Elizabeth, N.J. 07207

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18018
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

ZINC
Smith & McCorken, 153 Franklin St., New York, N.Y. 10013

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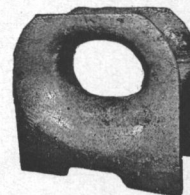
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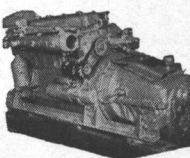
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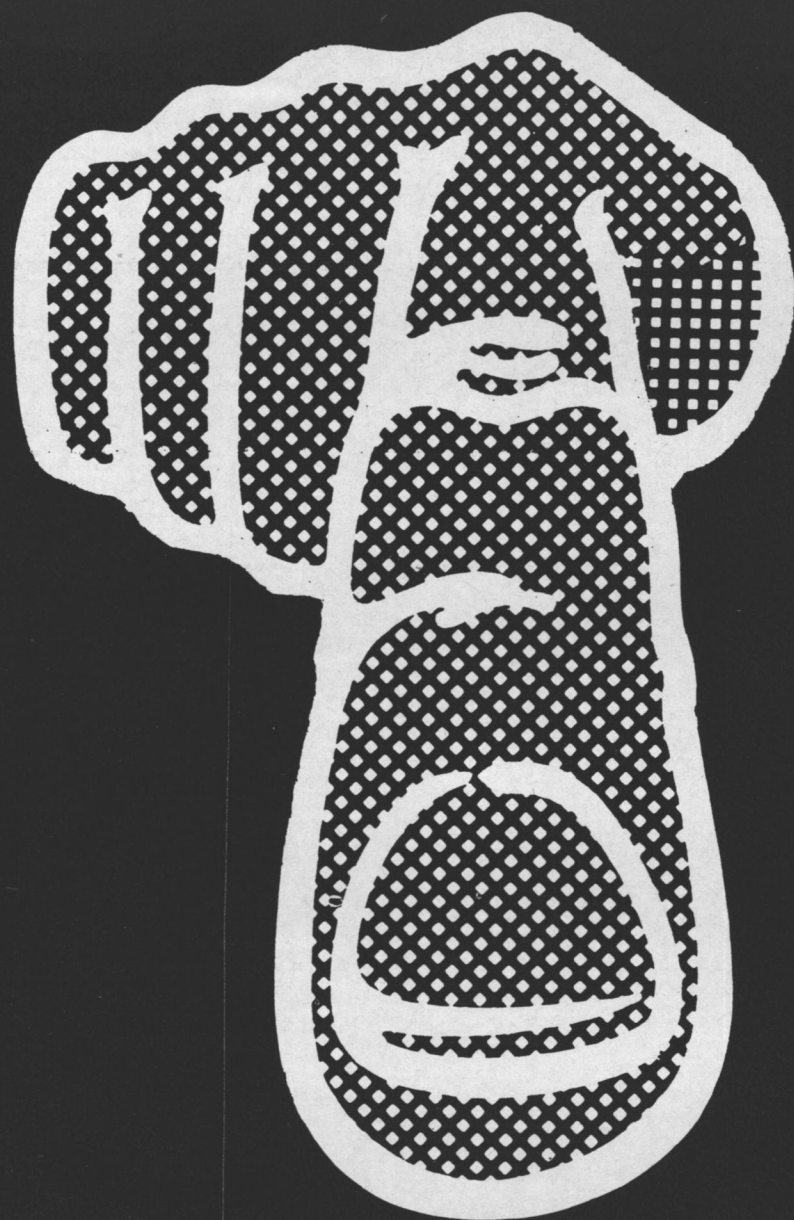


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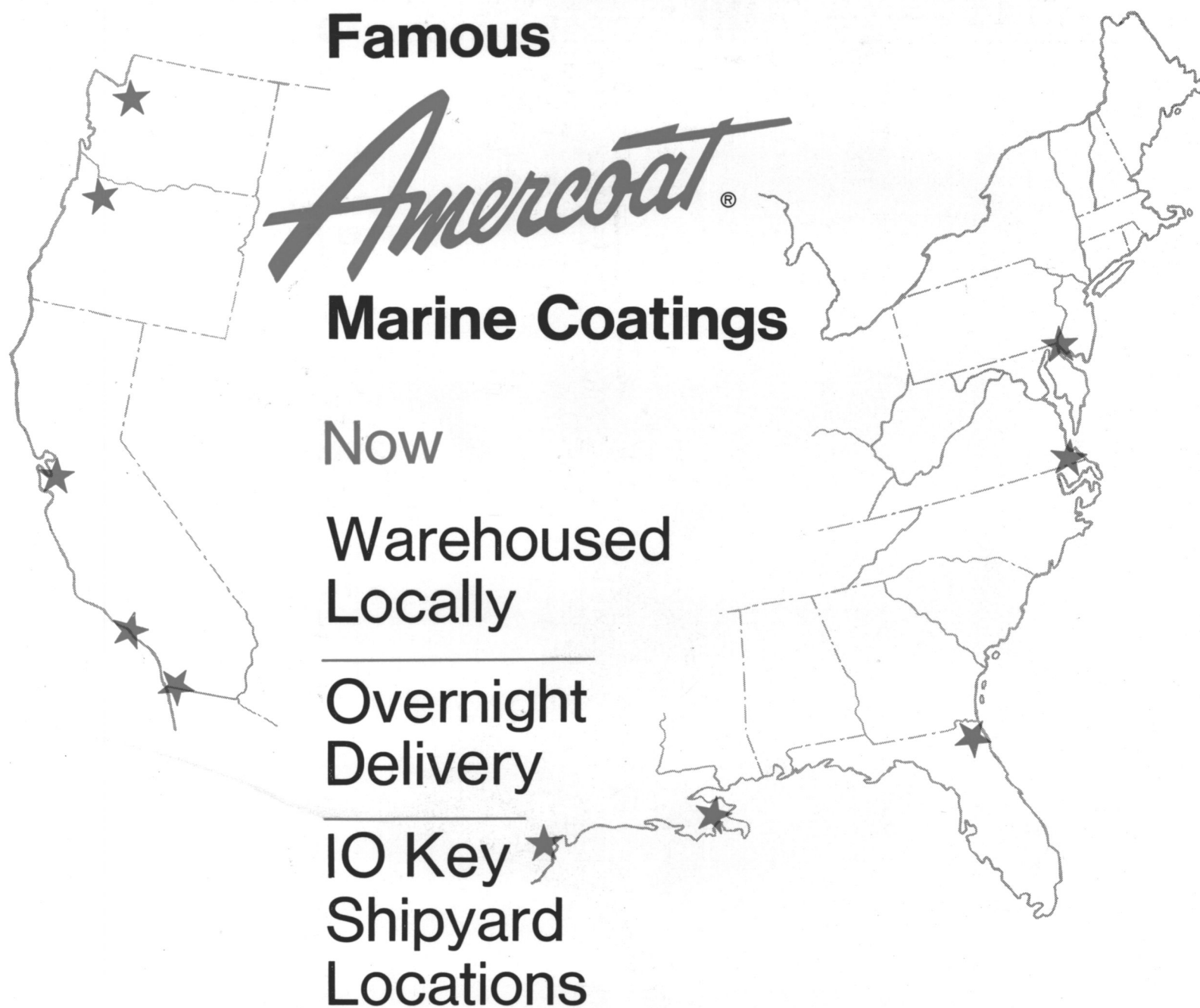
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