MARITIME REPORTER
AND
ENGINEERING NEWS

USS Carl Vinson

Newport News Shipbuilding Launches Aircraft Carrier 'Carl Vinson'—First U.S. Navy Ship Named For A Living American

(SEE PAGE 12)

APRIL 15, 1980

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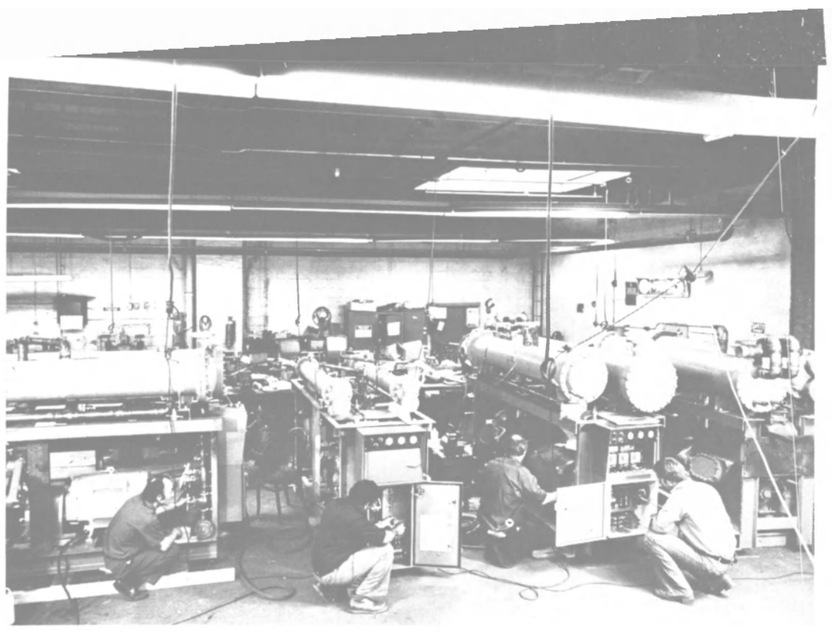

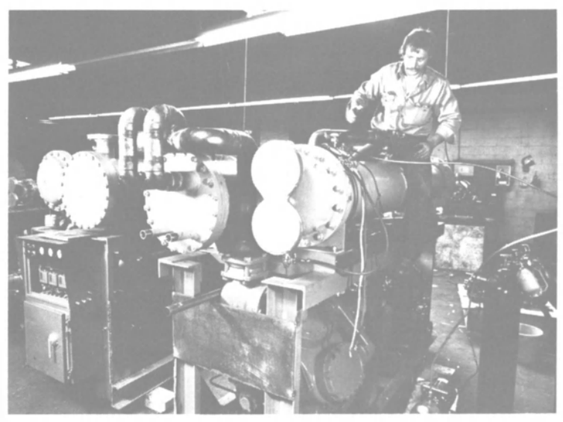

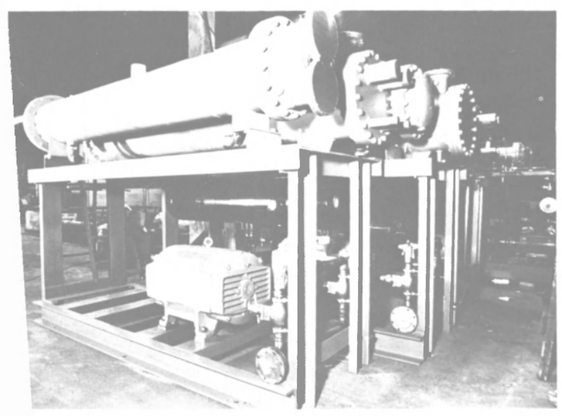

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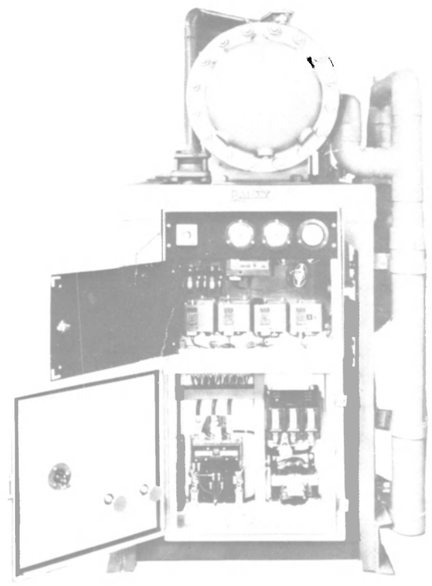

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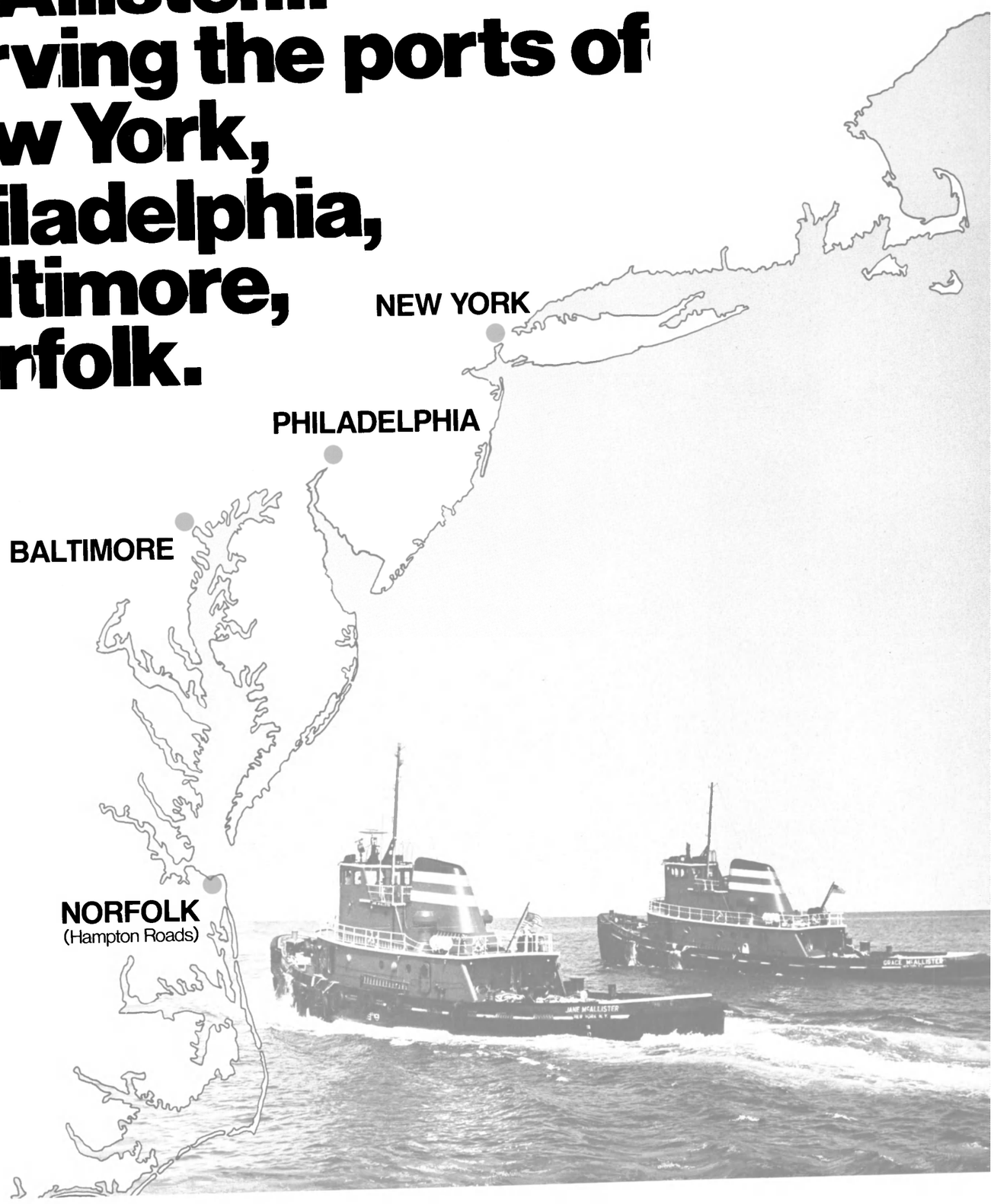

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Bob Ware Named Editor Of Maritime Reporter

Bob Ware

The appointment of **Bob Ware** as editor of Maritime Reporter and Engineering News has been announced by the publisher. Mr. **Ware** was previously editor of Marine Engineering/Log, and was on the editorial staff of that publication from 1956 to March 1980.

From 1953 to 1956 he worked on several publications for McGraw-Hill Publishing Company, and prior to that was marine superintendent for Hughes Bros., Inc. He is a 1950 graduate of Purdue University, and from 1943 to 1946 served in the U.S. Navy as a naval aviator.

U.S., Canada To Conduct Marine Transport Study

An agreement has been signed recently by representatives of the Transportation Departments of the U.S. and Canadian Governments for cooperation in the field of marine transportation systems and technology research.

The two initial areas of investigation will be marine fire hazards, and propeller protection techniques for ships navigating in ice.

The new accord will provide for an exchange of personnel and information, joint projects, and assessment of marine transportation systems and technology. The agreement is in the form of an addendum to a Memorandum of Understanding signed in 1970 by the U.S. Secretary of Transportation and the Canadian Minister of Transportation concerning research and development in transportation.

MARITIME REPORTER AND ENGINEERING NEWS

(USPS 016-750)

No. 8 Volume 42

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

ESTABLISHED 1939

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

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

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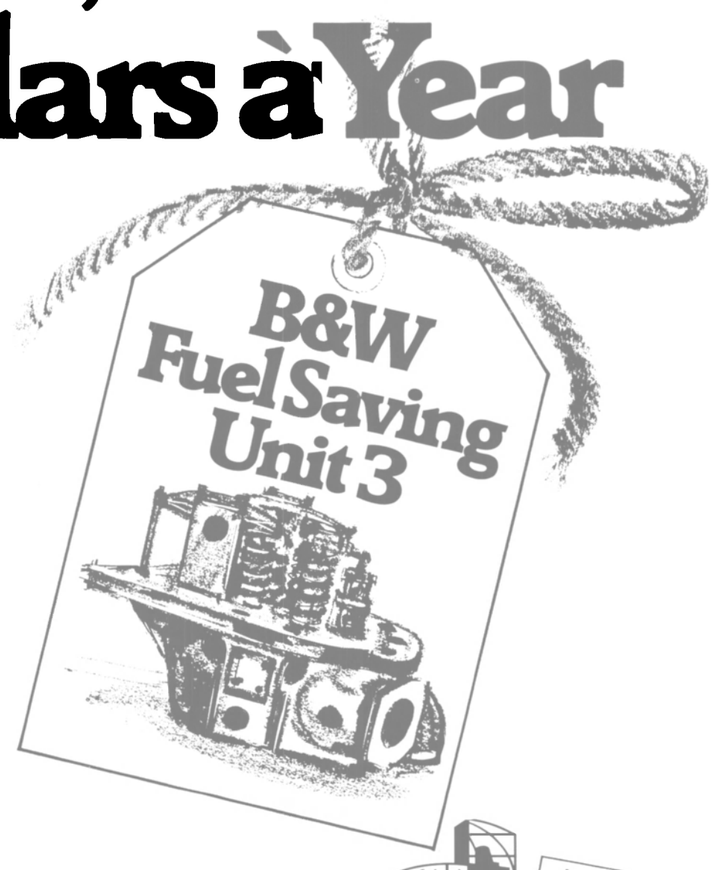

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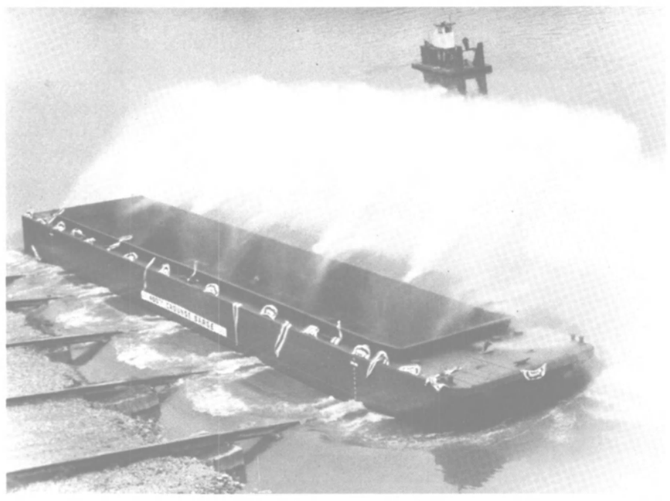
French Group Receives $110-Million Offshore Rig Order From Soviet Union

The Soviet Union awarded a major offshore oil-drilling contract to a French consortium. The two Paris-based firms that won the contract are E.T.P.M. and U.I.E.

The $110-million contract for the first Soviet attempt at deepwater oil drilling went to a French group that has never before supplied the kind of equipment needed for the project.

The equipment covered in the contract will be used to set up a deepwater oil-drilling unit in the Caspian Sea.

The contract is one of the last to be awarded under the current 10th Five-Year Plan. During the 11th Five-Year Plan, 1981 to 1985, the Soviets hope to make the Caspian Sea their major offshore drilling area.



The 400th coal barge built by Hillman Barge & Construction Company for the Crounse Corporation splashes into the waters of the Monongahela River.

Hillman Launches 400th Barge For Crounse Corporation

Hillman Barge & Construction Company of Brownsville, Pa., has announced the launching of the 400th barge the company has built for the Crounse Corporation of Paducah, Ky. Like the first barge Hillman built for Crounse in 1964, this 195-foot by 35-foot by 11-foot coal barge was designed and constructed to meet the specific operating and maintenance procedures required by Crounse.

This 400th barge is part of an order of 32 barges being completed for Crounse at this time. All of the barges feature a specially reinforced radius-designed coaming that will deflect buckets during unloading operations, thus reducing maintenance requirements. Other features include additional bulkheads in the rake and stern sections for increased buoyancy, and heavy plating for added barge life.

Hillman Barge is a leading inland barge builder. The company specializes in custom-designed barges that are constructed to meet specific operating requirements and overcome unique problems for its customers. In addition to standard, jumbo and stumbo barges for coal, grain and other commodities, Hillman also constructs tank barges, sand and gravel barges, deck barges, as well as other specialty marine equipment.

If you've had it up to here with USL&H Workmen's Compensation costs, give us a call.

To: Presidents, Chief Financial officers and Risk Managers of major maritime companies:

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Or, if you'd like to really get at the roots of your problems, let us arrange for you to join the other companies in your industry, who are part of Bayly, Martin & Fay's Workmen's Compensation Program, one of the unique services of the nation's 7th largest insurance broker. This program tailors a plan precisely to your objectives. It gives you the leanest possible program, with the closest attention to your cash flow needs.

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If your company is sick and tired of those incredibly high claim costs, give us a call. I've been in your shoes, so I know how painful the insurance pinch can be.

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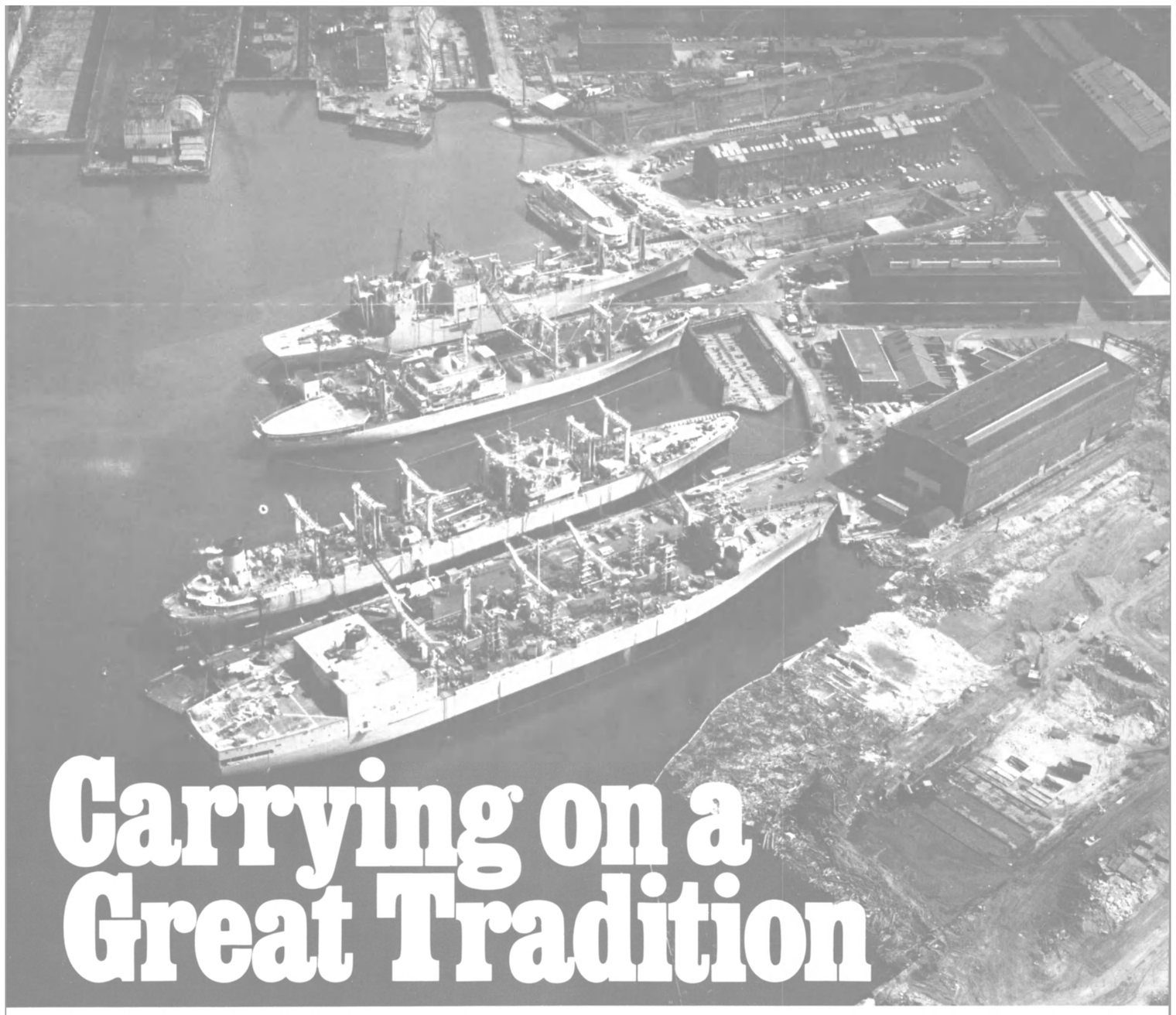

Carrying on a Great Tradition

This is the ex-Brooklyn Navy Yard. This is where the 28-gun frigate, the John Adams, was built in 1798. This is where the Monitor-Class vessels were ironclad. This is where the great wounded ships in the course of our country's many conflicts were brought after battles to be refurbished and sent out to fight again.

Today this is where Coastal Dry Dock and Repair Corporation offers a unique combination of ship repair expertise and solid concrete and granit piers, docks and buildings.

Coastal Dry Dock has the following facilities at its disposal:

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Gulf Presents $2,000 Donation To Merchant Marine Academy Fund

U.S. Merchant Marine Academy Acting Superintendent **Howard Casey** (right) accepts Gulf's contribution from **Richard Hoskins,** vice president of marine operations, Gulf Trading & Transportation Co.

Gulf Trading and Transportation Company of Bala-Cynwyd, Pa., continued its support of midshipman programs at the U.S. Merchant Marine Academy with a recent $2,000 donation to the nonprofit Kings Point Fund.

Richard I. Hoskins, vice president of Gulf's Marine Department, presented his company's contribution to Acting Superintendent of the federal academy **Howard F. Casey.**

Gulf's donation helps underwrite programs which receive no appropriated federal funds, such as athletics and cultural events.

The academy is operated by the Maritime Administration of the U.S. Department of Commerce.

122-Foot Trawler/Catcher Built By MARCO For Swasand-Mannes

The 198-ton, 12-knot, combination boat Starward is 122 feet in overall length, with a beam of 31 feet 4 inches and a 14-foot 6-inch draft.

The Starward, the second 122-foot combination boat built by MARCO Seattle for owners **Henry** and **Cory Swasand** and **Borge Mannes,** was christened recently. **Dian Swasand,** wife of skipper/owner **Cory Swasand,** performed the champagne honors in ceremonies on the Seattle (Wash.) Ship Canal.

The Starward carries a complete array of fishing equipment and machinery for operation as a trawler/catcher, and as a herring and salmon packer in the Bering Sea and North Pacific fisheries.

Mr. **Swasand,** veteran captain of the MARCO-built crabber Aleutian Spray, will skipper the new vessel in northern Pacific waters. The Starward will deliver her crab catches to Akutan, Alaska, and will pack salmon and herring later in the year.

The vessel features a raised pilothouse, above the skipper's quarters on the bridge deck, which provides a 360-degree field of vision. The trawl console is installed in the pilothouse, facing the stern, allowing full observation and control of the fishing machinery on the deck below.

Pilothouse electronics include two Furuno radars, two Simrad and one North Star Loran C, a Polaris ADF, Simrad recording depth sounder, Raytheon depth indicator, Raytheon weather facsimile receiver, Sperry gyrocompass with autopilot, plus a full complement of Northern SSB, Triton VHF, and SBE SSB/CB radios.

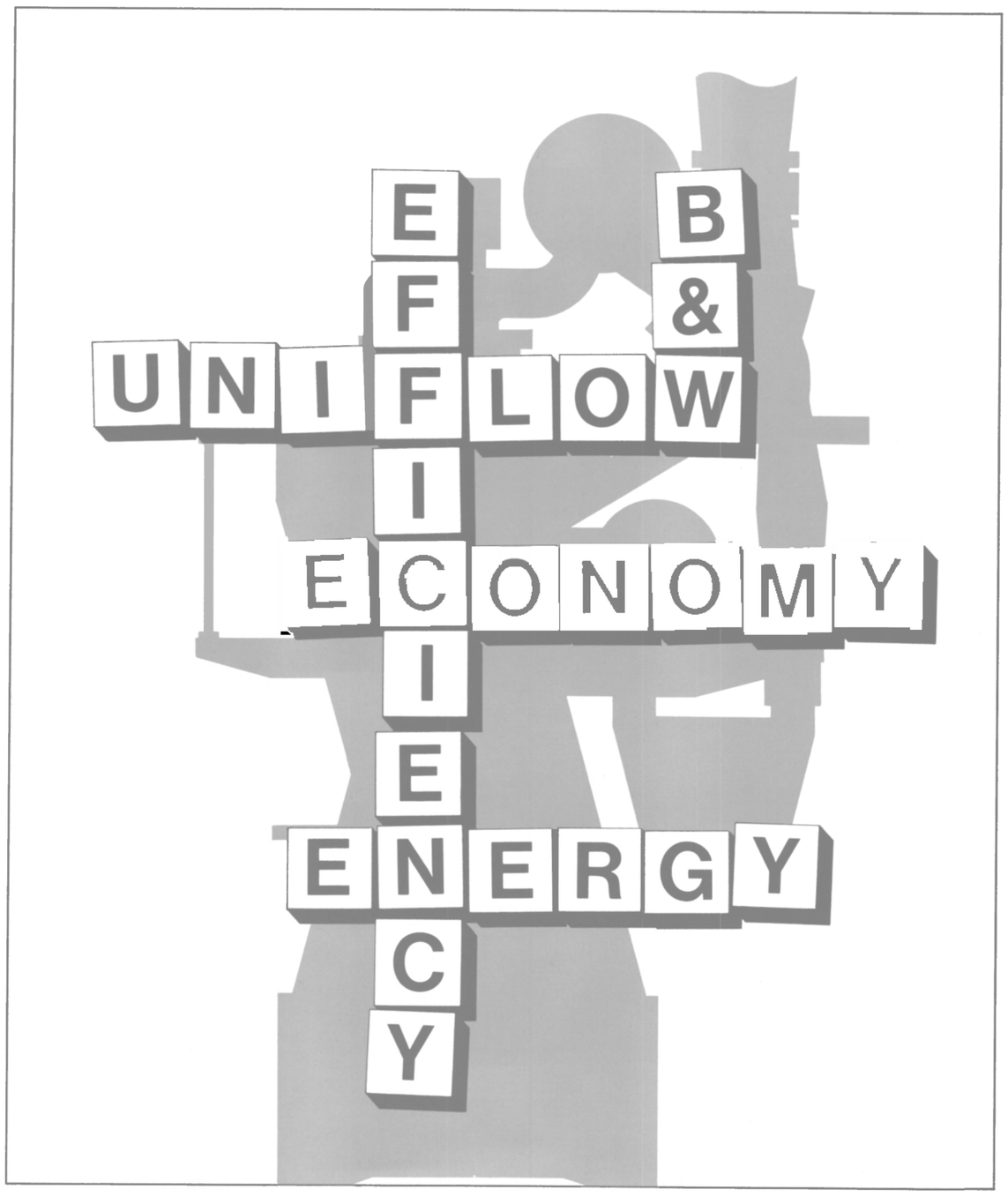
Hydraulic deck fishing machinery includes a MARCO "KingHauler" for hauling pots, a MARCO "KingCoiler" for line handling, a Hansen double-acting pot dumping rack, a Cook bait chopper, an 11-ton Rowe crane, and two MARCO boom winches. Machinery for trawling operations includes two Rowe trawl winches using Hagglund motors and a MARCO trawl reel. The boat also has 9,500 cubic feet of hold space and two 30-ton seawater chillers for salmon and herring packing.

The Starward is powered by a Caterpillar D399 turbocharged and aftercooled diesel rated at 1,125 bhp. It drives a 90-inch, four-blade Coolidge stainless-steel propeller through a Caterpillar 7271 hydraulic reduction and reversing gear. Steering is accomplished by a Wagner T19 hydraulic system with two jog stations.

Auxiliary power is provided by three Caterpillar diesels, including a turbocharged Model 3304T coupled to a 90-kw generator and two turbocharged 3408TA engines coupled to two 250-kw generators and two MARCO DP37 hydraulic pump drives.

The **Swasands** are also part owners of four other MARCO boats — the 94-foot Aleutian Spray, the 108-foot Starfish, the 108-foot Nordic Star, and the 122-foot Starlite, all engaged in crabbing.

Solving the puzzle



Gus Ruetenik Promoted To Environmental Products Manager At Seaward

Seaward International, Inc. of Falls Church, Va., recently announced the promotion of **Gus Ruetenik** to the position of environmental products manager.

Gus Ruetenik

In his new capacity, Mr. **Ruetenik** will have overall business responsibility for Seaward International's environmental products. These responsibilities include sales and marketing, administration, equipment design and engineering, liaison with production, and product promotion activities of the company.

Mr. **Ruetenik** is a graduate of the University of New Hampshire with a B.S. degree in mechanical engineering and a minor in ocean engineering. He joined Seaward International in 1977 as an ocean engineer and was project engineer prior to his promotion.

Seaward International's pollution control products include the SEA FENCE oil containment boom. Mr. **Ruetenik** was instrumental in the design and initial production of the SEA FENCE, which was originally designed for the U.S. Navy. Seaward also manufactures the SLURP, floating weir-type oil skimmer, and SEA CUSHION® foam-filled marine fenders.

Information Is Available On Three New Doppler Speed Logs By Raytheon

Literature is now available describing three new Doppler speed logs that use bottom-reflected sound to provide accurate speed data from 0.01 knot to 40 knots, from Raytheon Marine Company.

The Raytheon Doppler systems track the bottom to depths of 1,000 feet using acoustic beams directed ahead, astern, and to each side of the vessel. In deeper water, the system automatically shifts from bottom-tracking to watermass-tracking. In addition to calculating speed, the Raytheon Doppler speed logs also provide a digital depth display to a maximum of 1,000 feet and can be read in feet, fathoms, or meters.

The model DSL-250, simplest in the Raytheon line, is a single-axis, dual-beam system designed for providing continuous accurate speed and depth resolution in the ship's fore/aft axis.

In the "normal" operating mode, at speeds less than 9.99 knots, speed is displayed in hundredths of a knot. This ensures that the system will sense movement of as little as one foot per minute when approaching anchorage, moorings, or berths. Other features include an adjustable depth alarm, built-in self-test circuitry, and a mechanical distance-run log.

The model DSL-350 is a dual-axis, dual-beam system for selectable resolution of the ship's fore/aft and port/starboard speed. The port/starboard or athwartships speed feature is especially useful in determining set and drift from the steered course.

The model DSN-450 is a dual-axis, four-beam sonar navigator that provides continuous, simultaneous readout of the fore/aft and athwartships speed.

On all three models, data is processed for digital display on an easily read 11-inch by 14-inch bridge display/control unit and for input to radars, other shipboard electronic equipment, and integrated navigation systems. Weatherproof digital and analog repeater displays are also available for use in exposed locations.

Additional information and complete specifications can be obtained by writing to **Stanley Clark**, Raytheon Marine Company, 676 Island Pond Road, Manchester, N.H. 03103.

Newport News Launches Nuclear-Powered Aircraft Carrier 'Carl Vinson'

The Carl Vinson (CVN-70), third Nimitz-class, nuclear-powered aircraft carrier, was launched recently during ceremonies at Newport News Shipbuilding in Virginia.

Not only was the launch a major step in the U.S. Navy's shipbuilding program, but also **Carl Vinson** is the first living American to have a Navy ship named in his honor. Former Georgia Congressman and champion of Naval superiority, Mr. **Vinson** is now 96 years old.

Mrs. C. Tillman Snead, whose husband served as Mr. **Vinson's** administrative aide for 25 years, christened the ship by smashing the traditional bottle of champagne against the vessel's bow. **Mrs. Bernard William Frese** of Chevy Chase, Md., was the matron of honor.

Senator **Sam Nunn** (D-Ga.), who is Mr. **Vinson's** great-nephew, delivered the principal address.

Former Georgia Congressman and champion of Naval superiority **Carl Vinson** tips his hat to the 25,000 persons who attended the launch of the nuclear-powered aircraft carrier Carl Vinson (CVN 70) at Newport News Shipbuilding. **Mrs. Molly Snead**, the sponsor, and **Edward J. Campbell**, president and chief executive officer of Newport News, joined Mr. **Vinson** at the launch stand.

Known as a staunch supporter of military preparedness, Mr. **Vinson** holds the record for having served in Congress longer than any other individual—50 years, one month and two days. In Congress he served on the Naval Affairs Committee for 31 years, and chaired the committee for 15 years until it merged with the Military Affairs Committee to form the House Armed Services Committee. With the exception of one term when the Republicans were in office, Mr. **Vinson** also was chairman of the House Armed Services Committee for 17 years before his retirement in 1964 at the age of 80.

The keel for the Vinson was laid on October 11, 1975, when her sister ship, the Dwight David Eisenhower, was launched at Newport News. The Vinson is expected to be delivered to the Navy in 1982.

The Vinson will have substantially better military characteristics than conventionally powered carriers, including:

Nuclear fuel for 13 years of normal carrier operations — the equivalent of 346.5 million gallons of propulsion fuel oil;

Essentially unlimited high-speed steaming endurance with the resulting increase in offensive and defensive capabilities;

Over 70 percent more aviation and escort fuel capacity;

Fifty percent more aviation ammunition capacity;

Four long catapults with greater energy capability and with less strain on the aircraft; and

Berthing and ship facilities to support 50 percent more air wing personnel.

When completed, the Vinson will become a floating city for more than 6,000 Navy personnel.

One of the largest shipyards in the world, Newport News Shipbuilding is the only shipyard capable of building and servicing the full range of nuclear-powered surface ships and attack submarines for the U.S. Navy. The Virginia yard has produced 14 of the 22 nuclear ships that have joined the fleet since 1974.

Newport News built the first aircraft carrier (USS Ranger) in 1934, and since then — with only one exception — has been the lead yard in the design and construction of every class of aircraft carrier.

The yard currently has 10 Navy ships under contract or construction: the Vinson, the Arkansas (a nuclear-powered, guided missile cruiser) and eight nuclear-powered, high-speed attack submarines.

More than 700 Naval and commercial ships have been built by Newport News Shipbuilding since the company was founded in 1886. A subsidiary of Tenneco Inc., the yard employs 23,000 men and women who work in 300 occupations and 25 skilled trades. The 475-acre shipyard stretches along two miles on the James River near the Virginia port of Hampton Roads.

Top Officers Named At Bird-Johnson Company

Howard H. Scott, president of Bird-Johnson Company, has been elected chairman of the board of directors and continues as chief executive officer. He replaces **Frederick K. Becker**, who is retiring.

The board also announced the promotion of **Charles A. Orem** from executive vice president to president and chief operating officer.

Mr. **Scott** joined A. Johnson in 1953, and became vice president of Bird-Johnson when it was founded in 1958. He served in that capacity until 1964, when he was named president.

Mr. **Scott** earned a Bachelor of Science degree in marine engineering from the Massachusetts Institute of Technology, and attended the Sloan School for senior management studies.

Mr. **Orem** was director of corporate planning and development for Babcock & Wilcox before joining Bird-Johnson in 1979. He previously served in the U.S. Navy and retired at the rank of commander in 1970.

Mr. **Orem** holds a B.S. degree in engineering from the U.S. Naval Academy and a master's degree in engineering from the U.S. Naval Postgraduate School.

Bird-Johnson Company, Walpole, Mass., a wholly owned subsidiary of A. Johnson & Co., Inc., New York, N.Y., serves both the marine and industrial markets. Its marine division manufactures, sells and services KaMeWa controllable-pitch propellers and steering devices. The fluid power division manufactures and markets hydraulic motors and proprietary rotary products marketed under the Bird-Johnson Hyd-Ro-Ac name.

Houston Offshore Appoints Stephen M. Preus Director Of Safety And Personnel

Houston Offshore International, Inc. has announced the appointment of **Stephen M. Preus** to director of safety and personnel.

Mr. **Preus** joins Houston Offshore with seven years' experience in the field of personnel, safety and training, having worked with Penrod Drilling Company and Zapata Offshore Company. Mr. **Preus** will be assigned to the field office in Beaumont, Texas.

Powered by twin GM16V-149TI main engines, the 180-foot supply vessel Lillian Pelham was built by Halter Marine for Pelham Marine.

Halter Delivers 180-Foot Offshore Supply Boat To Pelham Marine

Halter Marine, Inc., New Orleans, La., recently delivered the 180-foot supply vessel Lillian Pelham to her owners Pelham Marine, Inc. of New Orleans, La.

The all-steel supply boat carries 3,600 cubic feet of dry bulk mud in four Smatco vertical tanks and 73,000 gallons of liquid mud in two additional tanks.

The Lillian Pelham measures 180 feet in length, 40 feet in beam and 14 feet in depth. She is under 300 gross tons.

The vessel has a speed of 12 knots powered by her two GM16V-149TI diesel engines driving through Reintjes WAV800 reverse reduction gears with a ratio of 6:1. Maneuverability is enhanced by a 300-hp Murray and Tregurtha bowthruster driven by a GM8V-71N diesel engine.

The steering system is electro-hydraulic with five control stations. Two 125-kw generators driven by GM8V-71 diesels provide ample electric power for ship's services.

The wheelhouse is equipped with Decca RM914c radar, Drake TRM-1 SSB radio, Drake VHF radio, Raytheon DE731 depth sounder, Epsco model 5070 Loran C, Sperry MK37 gyrocompass and a Ritchie 6-inch magnetic compass.

The Lillian Pelham has capacities for 100,000 gallons of fuel oil, 2,800 gallons of lube oil, 13,000 gallons of potable water and 125,000 gallons of ballast water.

The vessel is ABS classed, A-1, Maltese Cross, AMS full ocean towing, Circle E and is U.S. Public Health approved.

She was built by Halter Marine's Moss Point, Miss., Division, one of 10 shipyards owned and operated by Halter in the Southeastern United States.

New England Section SNAME Hosts Student Section Guests

The New England Section of The Society of Naval Architects and Marine Engineers held its fifth meeting of the 1979-80 program year recently at the United States Coast Guard Academy in New London, Conn. Over 90 members and guests were in attendance, including a large contingent of cadets from both the Coast Guard Academy and the Maine Maritime Academy Student Sections. The establishment of these Student Sections was formally recognized by the presentation of cerificates to Student Section officers by the chairman **David Zoller**.

The technical program for the evening included the presentation of a paper and a demonstration of the U.S. Coast Guard Academy's Circulating Water Channel. This new test facility has a test section 12 feet long by 4 feet wide by 2 feet deep. The paper was authored by Lt. Comdr. **Warren Colburn**, USCG, Comdr. **William Simpson**, USCG, and **Vernon Phelps** of the University of Michigan.

Commander **Simpson** discussed the formation of the preliminary design requirements and establishment of the basic characteristics for the water channel. The objective was to design and construct a free surface circulating water channel to help meet the basic educational need of undergraduate level cadets in the Marine and Ocean Engineering Program at the Academy. The primary use of the facility was to be in the area of ship model testing, fluid mechanics, and special projects such as qualitative research in the areas of buoy testing and ship maneuverability studies. A general description, including slides, was given of the as-built facility.

Lt. Comdr. **Colburn** described present uses of the facility. He discussed the channel flow characteristics and presented slides showing the velocity distributions at various cross sections. Cadets **Mark Steinhilber** and **Richard Burt** were next introduced to describe the Sailing Yacht Hydrodynamics Test Apparatus which was demonstrated in the Circulating Water Channel.

The free surface circulating water channel has proven to be a valuable addition to the undergraduate program at the Coast Guard Academy. One of the best features of the channel is the straightforward, easy operation of the channel, which allows unsupervised operation by the students.

Schroder Bellows Offers Propulsion Control Systems Brochure

Schrader Bellows Division of Scoville, Inc. recently published a new four-color brochure on their Propulsion Control Systems.

Their Mariner Speed King Controls and Systems promise smooth power transmission, non-stalling engine operation, and extremely fast response time.

The control valves used in the clutch control panel employ the time-tested and reliable Valvaire Speed King Valve components. The heart of the system is a tape machined manifold providing programmable pneumatic circuitry.

For complete details and a free copy of the Mariner Speed King Catalog, write **John L. Smith**, Schrader Bellows, Dept. MR, 200 West Exchange Street, Akron, Ohio 44309.

Carroll Named Manager-Manufacturing Projects At Rockwell International

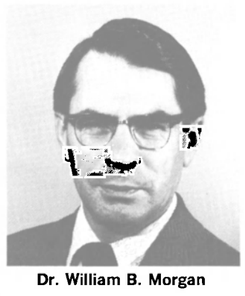
W.J. Carroll has been appointed manager-Manufacturing Projects for Rockwell International's Flow Control Division, Pittsburgh, Pa., reporting to **R.A. Carlson**, director-Manufacturing Operations. In this position, Mr. **Carroll** will be responsible for manufacturing projects, including capital expenditure programs, cost improvement and capacity planning. Mr. **Carroll** was previously assigned to Rockwell International's Corporate Office as a senior auditor.

Oceaneering International Relocates Headquarters To Houston, Texas

Oceaneering International, Inc., has announced the relocation of its worldwide corporate headquarters from Santa Barbara, Calif., to 10575 Katy Freeway, Suite 400, Houston, Texas 77024; Telephone (713) 461-4477; Telex 775181/OCEANEERING HOU.

One of Oceaneering's divisions, Underwater Technology Services (UTS), will remain in its present Santa Barbara facilities. Underwater Technology Services provides logistic and technical services support to Oceaneering's operating personnel worldwide.

Wm. B. Morgan To Head Ship Performance Dept., Taylor Research Center



Dr. William B. Morgan

Dr. **William B. Morgan**, ship hydrodynamicist and international authority on the theory and design of all types of propellers, cavitation, and propeller noise, has been named Associate Technical Director for Ship Performance, and Head of the Ship Performance Department of the David W. Taylor Naval Ship R&D Center (DTNSRDC), Bethesda, Md.

Dr. **Morgan** has been with the Center for 29 years, starting in 1951 as a hydraulic engineer in the Propeller Branch of the (then) David Taylor Model Basin (DTMB). He has served as Acting Head of the Ship Performance Department since January 1979, following the retirement of Dr. **William Cummins**.

He is a member of the International Towing Tank Conference, American Society of Mechanical Engineers, The Society of Naval Architects and Marine Engineers, and The American Society of Naval Engineers.

Dr. **Morgan** has received numerous awards including the U.S. Merchant Marine Academy (USMMA) Award for Outstanding Professional Achievement, and USMMA Marine Man of the Year; the Navy Meritorius Civilian Service Award; the David Taylor Award for Scientific Achievement; the Navy Superior Civilian Service Award; and Recognition of Achievement, Senior Executive Award.

Dr. **Morgan** holds a B.S. degree in marine engineering, USMMA; M.S. degree in hydraulic engineering, State University of Iowa, and Doctor of Engineering, Naval Architecture degree, University of California, Berkeley.

$80-Million Order To GD For Trident Work

General Dynamics, Electric Boat Division, Groton, Conn., is being awarded a $80,000,000 cost-plus-fixed-fee contract for design agent services in support of Trident follow ships (SSBN 727-732). The Naval Sea Systems Command is the contracting activity. (N00024-80-C-2075)

Joint North Sea Service Operation Formed By Brostrom And Tor Line

Sweden's Brostrom, and Tor Line shipping groups have launched a new joint company to manage their cargo traffic in the North and Baltic Seas and to develop feeder traffic for transocean services. Called Tor Lloyd AB, the company will deploy modern ro/ro ships serving mainly its own terminals and agency network.

The agreement will serve to coordinate their North Sea traffic, with Tor Lloyd assuming responsibility for existing services between Sweden and Denmark, Britain, and North European and Baltic ports, as well as for traffic between Britain and North Europe.

Tor Lloyd will offer a total of 50 sailings a week, with a freight volume of over 2 million tons per year.

Zidell Receives Army Dredge Repair Contract

The Marine Repair Division of Zidell Explorations, Inc., was the successful bidder for the extensive repair and refitting of the seagoing hopper dredge Biddle, operated by the U.S. Army Corps of Engineers. The dredge contract involves one of the largest repair jobs ever bid by Zidell.

Charles Puch, contracting officer representative, said the bid stipulated that the Biddle be ready to go to sea no later than 25 calendar days after the ship tied up at the Zidell dock.

Repairs to or replacement of over 73 parts of nine systems make this a highly detailed job, with all repairs carried out to exacting specifications, said Mr. **Puch**. Among the systems to be worked on are the hull architectural system, including liferaft replacement and lifeboat repairs, the navigation and communication system, drag hoisting and rigging equipment, dredge pumps, discharge and distribution system, the hopper area and its operating gear, steam plant, generator plant and mechanical services systems.

About 35 tons of steel will be replaced in the hopper area. The steam system will require replacement of 1,868 condenser tubes of 70/30 copper nickel. Much of the work on the Biddle will involve checking and, usually, replacement of worn parts of the dredge's dragarms and dragheads.

Zidell Explorations, Inc. is a Portland, Ore.-based company engaged in the repair of ships and barges and the manufacture of barges. Two other divisions manufacture fittings and valves extensively used in the petrochemical and pipeline industries.

Barry A. Miller Appointed Managing Director For APL Southern Region

Barry A. Miller has been appointed managing director, Southern region, by American President Lines, according to **B.I. Henriksen**, vice president for North America. The region includes 11 states, extending from Florida to Texas.

Mr. **Miller** joined APL in 1978 as operational manager, Atlantic region. His offices will be in Houston, Texas.

Wind And Sun-Powered Cargo Vessel Being Built For The South Pacific

A revival of sailing ships as cargo carriers is underway in the South Pacific. The 112-foot-long, 146-metric-ton steel-hulled schooner Manutes is nearing completion for **Michael Morehart** and a group of other Americans living in New Zealand.

The vessel will be equipped with the latest mechanical labor-saving equipment which will allow a crew of six or eight to handle the 5,500 square feet of sail and the 5,000 cubic feet of cargo which she is designed to carry. Most of the electronic navigation and auxiliary gear will receive power from wind-driven generators and/or solar-powered batteries.

Mr. **Morehart** is planning another even larger sailing cargo vessel, possibly 150 feet long, to be built after the Manutes is completed and tested.

Introducing the new TI 9900 from Texas Instruments. A fully automatic, computer controlled Loran C Navigator, at an affordable price. Only $3495.

Finding a navigator that costs more is easy. Finding one that'll *do* more is hard.

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The TI 9000A Loran C is an extremely affordable, computer controlled receiver with TD storage function and four internal notch filters. New steer-computed-course option ($295 plus installation) helps keep you on course and signals your arrival.

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It's affordable, versatile and compact, yet simple to use, and it draws only 16 watts.

See your nearest Texas Instruments dealer for a demonstration. He is factory-supported to provide you with installation, operating assistance and service. Ask for a detailed brochure, or write: Texas Instruments Incorporated, Marine Products, P.O. Box 226080, M/S 3107, Dept. MR, Dallas, Texas 75266.

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ARKANSAS: Little Rock, Tergh Communications, (501) 374-3160

CALIFORNIA: Bethel Island, Sipes Electronics, (415) 684-3238. **Bodega Bay**, Peterson Marine Electronics, (707) 875-3371. **Crescent City**, Crescent City Radio & TV, (707) 464-4186. **Eureka**, Carranza Marine Electronics, (707) 442-4179. **Ft. Bragg**, Seatronix, (707) 914-3500. **Half Moon Bay**, Essex Co., (415) 728-3264. **Long Beach**, Long Beach Marine Electronics, Inc., (213) 594-8888. **Marina Del Rey**, Maritime Communications, (213) 821-4958. **Morro Bay**, Marine Service & Equipment Co., (805) 772-7337. **Newport Beach**, Bartell Corporation, (714) 645-7040. **Oakland**, Baytronics Corp., (415) 261-0100, Electro-Nav, Inc., (415) 533-1840, Western Marine Electronics, (415) 465-6677. **Oxnard**, Coast Chandlery, (805) 985-0541. **Sacramento**, A-1 Marine Electronics, (916) 488-4655. **San Diego**, Keltenburg Marine, (714) 224-8211, Marine Co-Op, (716) 226-1294, Marine Electric Co. International, (714) 239-2247, Sea-Tronics, (714) 224-6959. **San Francisco**, Cal-Marine, (415) 673-2552, Collins Marine Corp., (415) 957-1300. **San Pedro**, Collins Marine Corp., (213) 831-8008. **Santa Barbara**, Coastal Marine Electronics, (805) 963-3815. **Santa Cruz**, Marine Electronics, Monterey Bay, (408) 476-2551. **Sausalito**, Maritime Electronics of Sausalito, (415) 332-5086. **Wilmington**, Marine Radio Service, (213) 835-6646

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FLORIDA: Crystal River, George's Marine Electronics, (905) 795-6861. **Daytona Beach**, At-Lan-Tech Marine Electronics, (904) 258-5066. **Destin**, Destin Electronics, (904) 837-6391. **Ft. Lauderdale**, Electronics for Yachting, (305) 525-3478. Rich Electronics, Inc., (305) 463-0477. **Ft. Myers Beach**, Marine Electronic Service, Inc. (813) 463-4451. **Jacksonville**, Nautilus Electronics, (904) 398-5333. Southern Electronics Marine, Inc. (904) 398-7246. **Key West**, Marine Electronics and Hardware (305) 294-3519. **Melbourne**, Marelco "99," (305) 254-8855. **Miami**, Rich Electronics, Inc., (305) 635-1351. **Orlando**, Radcom, Inc., (305) 894-1801. **Panama City**, Harbor Communications, (904) 785-9679. **Pensacola**, Two-Way Radio & Electronics, Inc., (904) 432-7716. **Pinellas Park**, Sea or Shore, (813) 546-5626. **Pompano Beach**, Jerry's Marine Electronics, (305) 782-2213. **Port Canaveral Station**, Beacon Marine Corp., (305) 784-2242. **Riviera Beach**, Larry Smith Electronics, (305) 844-3592. **Sarasota**, Tradyne, Inc., (813) 366-6759. **Stuart**, Coral Reef Electronics, (305) 283-3340. **Tampa**, Tampa Marine Radio, Inc., (813) 299-0080. **West Palm Beach**, Gene Sykes & Co., Inc., (305) 833-5298

GEORGIA: Brunswick, Maricom Electronics, Inc., (912) 265-4650. **Savannah**, Maricom Electronics, Inc., (912) 354-4542

HAWAII: Honolulu, Kems, Inc., (808) 845-6402

ILLINOIS: Alton, (St. Louis), Electromcs Services, Inc.,, (618) 462-6813. Rivertronics, (618) 462-1440. **Chicago**, A. G. Busch Co., Inc., (312) 631-6216. A. G. B.-Port, (312) 842-2704, Lorain Electronics. See Jefferson, La., Listing. **Hartford**, Specialized Electronics, See Memphis, Tennessee, Listing. **Waukegan**, A. G. B.-Larsen, (312) 336-5456

INDIANA: New Albany, D. T. Marine Electronics, (812) 948-1005

IOWA: Clinton, Lectronics Inc., (319) 242-1223

KENTUCKY: Paducah, Electronic Maintenance, (502) 554-3561. Specialized Electronics, See: Memphis, Tennessee Listing

LOUISIANA: Baton Rouge, Eagle Electronics, (504) 343-7138. Specialized Electronics, See: Memphis, Tennessee, Listing. **Harvey**, Bibbins & Rice, (504) 362-4820. **Houma**, Bibbins & Rice, (504) 876-6870. **Jefferson**, Lorain Electronics, (504) 733-5540. **Lafayette**, Bibbins & Rice, (318) 232-7039. **Lake Charles**, Bibbins & Rice, (318) 433-1079. **Morgan City**, Bibbins & Rice, (504) 384-2456. Electronic Services, Inc., (504) 384-5500. Gulf Radiotelephone & Electronics, (504) 384-8433. **New Iberia**, Bibbins & Rice, (318) 365-5430. **Port Sulphur**, Bibbins & Rice, (504) 564-3936. **Westwego**, Electronic Services, Inc., (504) 347-1561

MAINE: Kittery, Communications, Inc., (207) 439-4203. **Portland**, Communications, Inc., (207) 772-8335. **Rockland**, Coastal Electronics, (207) 594-7777. Communications, Inc., (207) 594-5535

MARYLAND: Annapolis, Electronic Marine, Inc., (301) 268-8101. **Baltimore**, Maretco (Middle River Electronics), (301) 687-6474. **Glen Burnie**, United Radio Service, (3011 761-8090. **Lexington Park**, Pax-Tronics Corp., (301) 863-5084

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MINNESOTA: Duluth, Lorain Electronics. See Jefferson, La., Listing. **St. Paul**, K-R Communications, Inc., (612) 645-6471

MISSISSIPPI: Biloxi, Patterson Communications & Electronics, (601) 374-3744. Southeastern Electronics, (601) 436-6943. **Greenville**, Electronic Services, Inc., (601) 332-0936. Specialized Electronics, See: Memphis, Tennessee Listing. **Ocean Springs**, Marine Electronics Corp., Inc., (601) 875-9353. **Pascagoula**, Bibbins & Rice, (601) 762-6030. Southeastern Electronics, (601) 762-1069

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NEW JERSEY: Absecon, Larry Smith Electronics, Inc., (609) 652-7800. **Belmar**, R. D. Rue Inc., (201) 681-9330. **Cape May**, Larry Smith Electronics, Inc., (609) 884-7400. E. **Rutherford**, The Radio Man, (201) 939-6290. **Elizabeth**, Electro Nav., Inc. (201) 527-0099. **Point Pleasant**, Larry Smith Electronics, (201) 899-4711. **Seaville**, Martex, Inc., (609) 398-6366

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NORTH CAROLINA: Clinton, O-Boy-Wil Marine Sales, Inc., (919) 592-7043. **New Bern**, Ensley's Radio Co., Inc., (919) 638-6119. **Wrightsville Beach**, Sea Coast Communications, Inc., (919) 256-4848

OHIO: Ashtabula, Lorain Electronics. See Jefferson, La., Listing. **Grand River**, Holbrook Industries, (216) 352-2411. **Holland**, Lorain Electronics. See Jefferson, La., Listing. **Lorain**, Lorain Electronics. See Jefferson, La., Listing. **Milbury**, Lorain Electronics. See Jefferson, La., Listing. **Proctorville** (Huntington, W. Va.), La Fon Electronics, (614) 886-6863. **Sandusky**, Monroe Service, Inc., (419) 625-5215. **Toledo**, Lorain Electronics. See: Jefferson, La., Listing

OREGON: Astoria, Jensen Communications, Inc., (503) 325-5917. **Charleston**, George's Marine Electronics, (503) 888-5209. **Newport**, Radio Center, Inc., (503) 265-2731. **Portland**, Rodgers Marine Electronics, (503) 287-1101.

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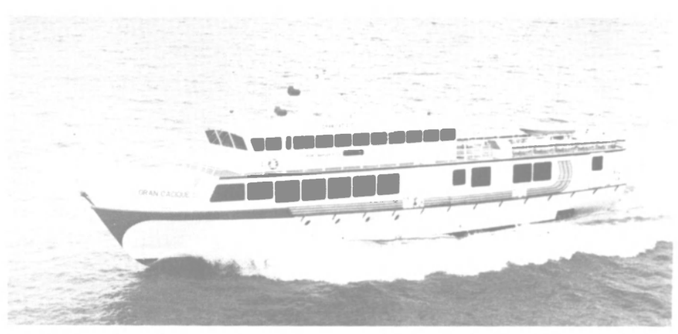
WASHINGTON: Anacortes, Whatcom Marine Electronics, (206) 293-6100. **Bellingham**, Whatcom Marine Electronics, (206) 676-1990. **Blaine**, Whatcom Marine Electronics, (206) 332-6323. **Ilmaco**, Whatcom Marine Electronics, (206) 642-2650. **Port Angeles**, Pride Electronics, (206) 452-2922. **Seattle**, Collins Marine, (206) 284-7473. Northern Marine Electronics, (206) 782-3780. Sound Marine Electronics, (206) 784-7444. Whatcom Marine Electronics, (206) 285-2740

WEST VIRGINIA: Huntington, Specialized Electronics. See: Memphis, Tennessee Listing

WISCONSIN: Green Bay, Wilson Electronics, (414) 499-0490. **Port Washington**, Lakeshore Electronics, (414) 284-6061. **Sturgeon Bay**, Bay Electronics, (414) 743-9693

CANADA: British Columbia, Vancouver, Spilsbury & Tindall Ltd., (604) 684-4131, Telex 04-55482. Cable "SPILTIN". **Nova Scotia, Halifax**, Gabriel Aero-Marine Instruments Ltd., (902) 423-6627



The Gran Cacique II shown above is the second of its kind ordered from Swiftships by Turista Margarita. Each of the three 28-knot ferries ordered by the Venezuelan firm will be powered by three 1,360-hp MTU 12V331TC71 diesel engines.

Swiftships, Inc. Receives Contract For Two Additional MTU-Powered Ferries

Swiftships, Inc., Morgan City, La., has contracted to deliver two additional passenger ferries to Turista Margarita of Porta La Cruz, Venezuela. A similar vessel was previously purchased from Swiftships and is now in operation from the Venezuelan mainland to the coastal islands of Santa Margarita.

The new 125-foot passenger ferries will be all-aluminum and seat 300 persons aircraft style. Speeds to 28 knots are provided by three MTU 12V331TC71 engines with 1,360 horsepower each. Fuel capacity is 5,500 gallons, and the craft carries approximately 475 gallons of fresh water.

The vessels are climate-controlled throughout, and feature galleys for fast-food service. Each is equipped with a video tape projection system, and the latest in radar, navigation, and lifesaving equipment.

According to Swiftships' **Jerry Hoffpauir,** "The success of the first Swiftships-built passenger ferry, the Gran Cacique, led directly to the new contract. The Venezuelan people and the South American public in general are extremely fond of weekend travel," he said."Specifically," he continued, "a number of islands off the coast, including Curacao and Margarita, are very popular tourist spots."

A spokesman for Turista Margarita explained that recent increases in business have come mainly from visitors traveling to the coastal islands, mostly popular free ports. Even with local air service, full-capacity ferry trips four times daily, seven days a week, are expected. With this business potential, he continued, we fully expect our fleet of passenger ferries to grow. The current Swiftships-built vessel has proven to be ideal in every way for us, including passenger comfort, overall speed, and ease of maintenance.

ASNE So. New England Section Meeting Features Discussion Of Polar-Class Icebreakers

Shown left to right at the recent ASNE Southern New England Section are: Capt. **Don Kern,** USN (ret.), chairman; Capt. **Dick Goode,** USCG (ret.); Lt. Comdr. **Mike Goodwin,** USCG speaker; **Martin Wilson,** Unidyne; Capt. **Vernon Honsinger,** USN; Comdr. **Oliver Porter,** USN; and **John Leonard,** Shearwater.

The quarterly meeting of the American Society of Naval Engineers, Southern New England Section, was held recently at the U.S. Submarine Base in Groton, Conn. Chairman Capt. **Don Kern,** USN (ret.), presided over the meeting.

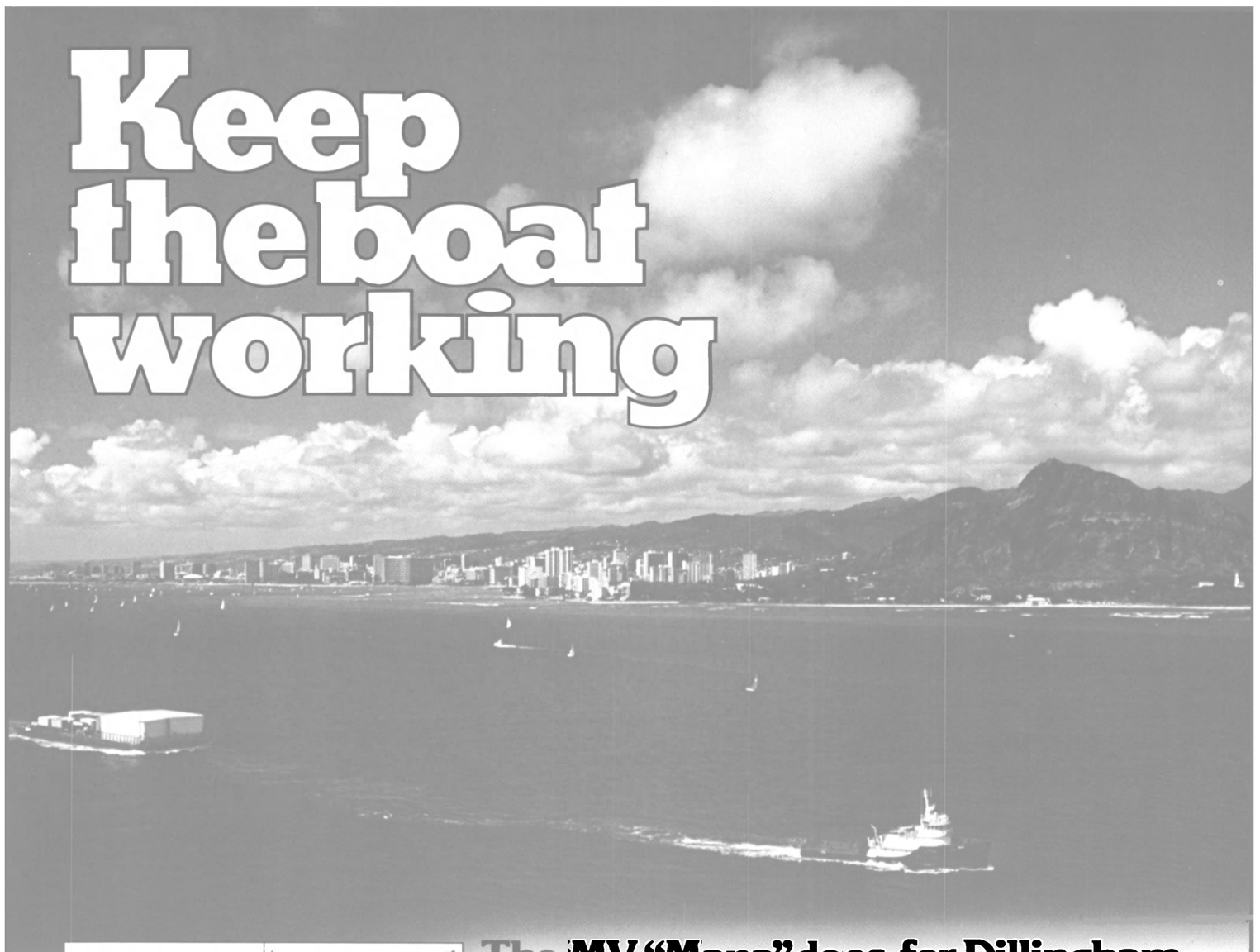
Lt. Comdr. **Michael Goodwin,** USCG, presented a discussion accompanied by slides and a video tape of the Polar-class icebreakers. These icebreakers are 399 feet long, 83-foot 6-inch beam, and 13,190 tons, and are equipped with three reversible-pitch propellers. A video tape was shown of one of the icebreakers breaking 7-foot-thick ice in the Antarctic area. Commander **Goodwin** is a graduate of Webb Institute of Naval Architecture, and he holds a master's degree from M.I.T.

Kutzleb Forms New Company—Steadfast Marine Consulting, Inc.

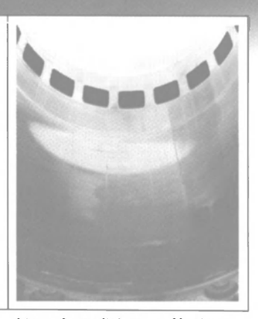
A new marine services company, Steadfast Marine Consulting, Inc., has recently been formed. Headed by **R.E. (Bob) Kutzleb,** formerly of Seaward, Inc., Steadfast provides underwater search expertise to customers on a worldwide basis. The Steadfast team has enjoyed an enviable success rate during the past five years, while conducting sonar operations in water depths ranging from 10 to 7,000 feet.

In addition to their innovations in the field of aircraft search and recovery, Steadfast personnel possess expertise in the fields of salvage, towing, marine casualty investigation and sea-floor surveying.

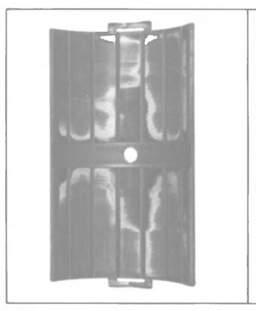
For further information on how Steadfast Marine can assist you on your marine projects, contact **Bob Kutzleb** at Steadfast Marine Consulting, Inc., 6311 Beachway Drive, Falls Church, Va. 22044, or call (703) 379-2122. Cable address: STEADFAST, Telex: 899-455.



Ring groove fill normal. Number 3 and 4 lands clean.



Liner shows little wear. Honing marks still visible.



Silver trunnion bearing shows normal wear of lead flashing.

Valve deck illustrates cleanliness typical of both engines.

The MV "Mana" does-for Dillingham. Her 12 645 E6 engines, overhauled at 16,753 hours, looked good for many more-on Caprinus® Oil.

During late 1976, the then new MV Mana's engines were filled with high alkalinity *Caprinus** T Oil. Then, in 1978, the switch was made to the even more improved *Caprinus* R Oil. Since 1976 the engines have racked up 16,753 hours before *scheduled* overhaul — without a *single* powerpack replacement. The consensus? The engines looked good enough for 20,000 hours — probably even longer.

Dillingham Tug & Barge Corporation *needs* reliability — there are no repair stations between the Hawaiian islands and the "mainland" or throughout the South Pacific where they operate. Dillingham Tug & Barge runs a top-notch maintenance program with *Caprinus* R to keep the boats working.

Both engines were exceptionally clean. Top ring side clearance averaged 0.013" and the top rings were rated at 2 to 2A — which means the grooves were visible on the top ring on about half the pistons. Silver trunnion bearings were good. Overall engine reliability as shown by maintenance records was excellent.

Low wear rates were especially evident in the top ring side clearances, ring gap clearances, ring faces, piston ring groove widths (pistons were reusable without machining for oversize rings), liners and piston skirts. Shell's premium MVI base oil keeps ring groove deposits soft, friable so deposits are worked out by ring action. Rings compress into the grooves and traverse the ports without breaking or chipping. The result is low ring and liner wear rates.

In addition, Dillingham's use of *Caprinus* R in its Fairbanks Morse engines has eliminated the former expensive task of intake and exhaust port cleaning of those engines three times a year.

Caprinus R Oil is Shell's one oil for big medium-speed marine diesels. Its high alkalinity reserve and dispersancy with Shell's premium MVI base oil fight corrosive wear, keep engines clean and deposits soft — so that normal engine operation keeps deposits from building up. It's been proven — in ALCO, EMD and Fairbanks Morse, as well as other engines.

For more information write: Shell Oil Company, Manager, Commercial Communications, One Shell Plaza, Houston, TX 77002.

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

Come to Shell for answers

Low Pressure Tubeaxial Fan Bulletin Available From Industrial Air, Inc.

A new bulletin, "Low Pressure Tubeaxial Fans," is now available from Industrial Air, Inc., Amelia, Ohio. Four fan models are illustrated and described. These include direct-drive or belt-driven fans with cast aluminum or steel fixed-pitch propellers. Adjustable-pitch cast aluminum propellers are available as an option.

The fans are specifically designed to move large volumes of air at static pressures of 1 inch or less, and are particularly efficient in this range. Economical in first cost, they are also economical to operate.

As is typical of other Industrial Air fans, the bulletin reports, these low-pressure tubeaxial models have unusually heavy-duty shafts and bearings for long and trouble-free life. All have solid-welded construction. In belt-driven models, bearings, belts, and motors are out of the airstream.

The fans range in size from 15 inches to 96 inches, with capacities from 1,000 to 100,000 cfm.

Copies of the new bulletin, "Low Pressure Tubeaxial Fans," are available on request from **Tom Kanis**, Industrial Air, Inc., P.O. Box 215, Amelia, Ohio 45102.

Bell-Halter Delivers Surface Effect Ship To Corps Of Engineers

The Rodolf, a 48-foot surface-effect ship built by Bell-Halter, New Orleans, La., for the Portland (Oregon) District of the U.S. Army Corps of Engineers, has begun a Gulf and Atlantic Coast tour to demonstrate its operational and hydrographic surveying capabilities.

The Bell-Halter built surface-effect ship Rodolf, shown demonstrating her high speed and minimal wake, is powered by two Detroit 8V-92N engines. Her lift fan is driven by a Detroit Diesel 4-53N.

As a result of the surface-effect ship's (SES) unique design, the Rodolf is expected to significantly improve hydrographic and surveying technology through its higher speed capabilities and minimal wake. The boat rides on a cushion of air contained by catamaran-style sidehulls and flexible bow and stern seals. When cruising, the center portion of the hull is clear of the water and supported by the air cushion, thereby reducing resistance, enabling higher speed and improving ride and stability qualities.

The hull, fabricated of all-welded marine alloy 5086 aluminum, was designed with special attention given to the hydrodynamic/acoustic effects on the scientific survey equipment. Liberal use was made of sound-dampening materials and vibration absorbing mounts. The basic craft design is quite flexible, making it suitable for other applications such as a pilot boat, a search and rescue craft, or a harbor patrol boat.

Two 350-hp Detroit Diesel 8V-92N marine engines power twin four-bladed propellers, and a Detroit 105-hp 4-53N marine diesel drives the 30-inch-diameter Bell centrifugal lift fan. The widely spaced propellers make the craft highly maneuverable at all speeds, both cushionborne and hullborne.

The 35-mph all-weather survey boat was named for **Frederick W. Rodolf**, former Chief, Hydrographic Survey, Portland District.

Bell-Halter is a joint venture formed by Bell Aerospace Textron, division of Textron, Inc., and Halter Marine, Inc. to design, build, and market air-cushion assisted craft for commercial service.

When it comes to protecting ships, the Vikings have a world of experience.

FOSTER WHEELER AND MOSS ROSENBERG OF NORWAY OFFER TWO INERT GAS SYSTEMS.

Moss Rosenberg has 60 years of shipbuilding experience, plus over 150 inert gas plants aboard ships around the world. Foster Wheeler has 50 years of marine experience, including a leadership role in boiler design and manufacture.

Now our combined experience is working together to bring you inert gas protection. Because Foster Wheeler is manufacturing two proven, reliable systems in the U.S. under license from Moss:

1. A flue gas scrubber system that provides inert gas by utilizing boiler stack gas output.

2. A compact gas generator system for ships with unsuitable or insufficient stack gas output.

That means we're not locked into one system or the other. We can deliver the inert gas protection you need, in a wide range of output capacities—for retrofitting or for new vessels.

We'll be glad to review your ship's requirements and evaluate your inert gas needs—as only marine and combustion experts can.

For details on this service, and a copy of our new brochure on inert gas systems, write or call Mr. Arthur Christenson.

We'll respond quickly and decisively. In the best Viking tradition.

Foster Wheeler Boiler Corporation, 110 South Orange Ave., Livingston, NJ 07039
(201) 533-2275

FOSTER WHEELER

Carved animal head post from a 9th century Viking ship—designed to protect against evil spirits.

Levingston To Build A $28.6-Million Jackup Rig For Dixilyn-Field

Ed Paden, president of Levingston Shipbuilding Company, Orange, Texas, a wholly owned subsidiary of Ashland Oil, Inc., announced the signing of a $28.6-million contract to build a Levingston-designed Class 111-C jackup drilling rig for Dixilyn-Field of Houston, Texas. Delivery is set for April 1981.

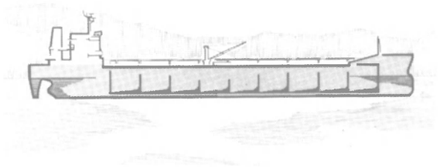
Contract signing for Levingston Class 111-C jackup with Dixilyn-Field of Houston. Left, **Ed Paden,** Levingston Shipbuilding Co.; right, **L.A.J. Monroe,** Dixilyn-Field.

Dixilyn-Field, a major operator of land rigs and offshore vessels, has been in business over 25 years. This worldwide company, based in Houston, is a subsidiary of Panhandle Eastern Pipe Line Company with headquarters also in Houston.

The three-legged drilling rig, which will be identified as the Dixilyn-Field Rig 87, measures 200 feet by 186 feet by 23 feet and has independent four chord square truss legs that will be 414 feet long. One of the customer requirements of this particular rig is that it be capable of operating in temperatures of minus 20 degrees centigrade, and withstand winds of up to 125 mph and seas of 50 feet. Drilling depth is 25,000 feet in a maximum of 300 feet of water.

Three EMD engines will provide the power to the rig; two of these ship service generators are 1,400 kw and one is rated at 1,050 kw. The emergency generator is a Caterpillar which supplies 395 kw. Accommodations are available for 80 persons, and the rig is equipped with two galleys and two mess rooms. The construction of the rig will meet requirements of the U.S. Coast Guard and the American Bureau of Shipping.

Wartsila Receives Order For 45,200-Ton Product Tanker



An artist's drawing of the 45,200-ton, 13,600-hp product tanker to be built by Wartsila Turku Shipyards.

The Finnish owner Oy Gustav Paulig Ab has ordered a 45,200-dwt product tanker from Wartsila Turku Shipyards. Work will begin in late 1980, and the vessel will be delivered about a year later. The value of the order is about 140 million Finnish marks (approximately $35 million). The hull will be built at the Perno Shipyard, and the outfitting will be done at the Turku Shipyard.

The double bottom hull will be 185 meters in length (about 607 feet), with a 32.2-meter beam (about 106 feet). Her design draft will be 11.58 meters (about 38 feet) at 45,200 dwt. Cargo tanks will be equipped with an inert gas system, and pumps which will allow handling four different cargoes simultaneously.

A 13,600-hp Wartsila-Sulzer 4RLA90 slow-speed diesel engine will give the vessel a speed of 15.3 knots. Auxiliary power will be provided by three Wartsila-Vaasa 624TS diesel engines totaling 3,150 hp.

The vessel is designed to carry petroleum distillates, molasses, and caustic soda. She will be built to Lloyd's +100 A-1 Oil Tanker, LMC, UMS, IGS, and the Finnish regulations concerning safety at work, as well as all environmental protection regulations.

Simrad. A trusted name at sea.

The Navigation Computer that started it all... from Simrad, naturally.

Simrad's CC 2 Navigation Computer gives complete position, steering and piloting information in an easy-to-use system. It is still the only separately packaged Loran C navigation computer, and can accept input data from any Simrad Loran C receiver.

The CC 2 can repeat Loran C time difference numbers, convert Loran C position to latitude longitude, and will store up to nine "waypoints" or destinations. It continuously computes distance, time to destination and bearing from your present position to any of the nine selected destinations or waypoints. It also computes speed over the ground, course made good and off-course "cross track error" for steering adjustments. Lat Long position is read out to tenths of seconds (0.6 nautical mile) and off-track deviations can be read out in hundredths of a nautical mile. The computer is so flexible, you can even use it to solve separate time course distance problems while it continues to update actual navigation data internally.

New digital recording sounders meet IMCO requirements.

Simrad now offers two economical navigation recording echosounders that meet IMCO recommendations for merchant vessels. In addition to showing a well defined bottom on recording paper, the systems have independent digital depth indicators and depth alarms. The Simrad ED 161 has four recording ranges from 0-25 to 550 fathoms. The ED 162 has 0-30, 0-75, and 0-150 foot recording ranges for navigating in shallower waters, plus a 0-1500 foot deep range. The optional IR 201 Remote Digital Analog Indicator displays depth in feet, meters and fathoms.

These systems are also designed as replacements for existing older systems. Due to Simrad's special engineering, some vessels can be retrofitted from *inside* the hull without having to dry dock.

Ship's radar from Simrad.

Ten and twenty KW radar models from Simrad are building a reputation for extra fine resolution that you can count on. It is natural to think about long range use, and they do have six ranges from ¼n.m. to 48 n.m., with an additional 30 to 78 n.m. setting on the 20 KW model. However, they really outperform competition at extremely close distances. At the ¼ n.m. range, they provide the unusual resolution you need to pick out small boats and channel markers in a dense fog. And that's the most critical test for any radar. Choice of four or six foot antenna. Variable range marker (VRM) with digital readout, and early warning target alarm options are available. For smaller vessels, Simrad's ONX 6 (5KW) with choice of 3 or 4 foot slotted array antenna, and all electronic scope sweep, is recommended.

Loran C means Simrad.

Throughout the world, skippers have learned to trust Simrad's Loran C reliability and accuracy... and to rely on Simrad's sales, installation and service network in more than 450 ports throughout the world.

Our "New Generation" LC-123 now has many more advanced features, including signal integration that sets a new standard in readout accuracy. With its "touch pad" keyboard, our new LC-112 provides high performance at an economical price. Both models have been designed and manufactured to meet or exceed all Minimum Performance Standards (MPS) of the Radio Technical Commission for Marine Services (RTCM), adopted 12/20/77, including Addendum #1 dated 7/19/79, as endorsed by the U.S. Coast Guard for use aboard vessels over 1600 gross tons when calling at ports in the Continental U.S. This is a legal requirement for ship operation in U.S. waters.

Simrad's Loran was recently tested against eleven other receivers by an independent testing laboratory under contract to the Canadian Department of Fisheries and Oceans. Since the LC-112 had not been introduced yet, it couldn't be included in the test. However, in long range tracking tests, three units were judged superior... Simrad's LC-123, Simrad's older LC-204 and another manufacturer's receiver that costs over $2,000 more than an LC-123. Several competitors complimented Simrad by copying our LC-123, but evidently they still couldn't match Simrad's performance and reliability. Our ten years of experience in developing Loran C technology is important to you. A cheap loran could be costly.

SIMRAD

Simrad Inc., One Labriola Court,
Armonk, NY 10504 (914) 273-9410

Brooksby And Tavrow Elected Senior Vice Presidents Of APL

W. Brandt Brooksby and **Richard L. Tavrow** have been elected senior vice presidents of American President Lines, Ltd. (APL), it was announced recently.

W.B. Seaton, president of APL, said that Mr. **Brooksby** will be responsible for the finance and administration areas, including the company's financial and accounting functions, as well as its systems, personnel, purchasing and tax operations.

Mr. **Tavrow** will serve as secretary and general counsel of APL and will be responsible for all legal matters, Mr. **Seaton** said.

Mr. **Brooksby** moves to the transportation subsidiary from the parent Natomas Company, where he was vice president and controller. In addition to his new duties, he will continue to serve as a Natomas vice president. Mr. **Brooksby** joined Natomas as controller in 1971. He was named a vice president of Natomas in 1979.

Prior to Mr. **Tavrow's** election as senior vice president, he was vice president, secretary, and general counsel of American President Lines. Mr. **Tavrow** joined APL in 1978, having previously served as vice president, secretary and general counsel for Prudential Lines, Inc. He was graduated magna cum laude in economics from Harvard College and he holds both bachelor's and master's degrees in law from Harvard Law School.

Ship Operations Symposium Set For Sept. 23-25 In NYC

A three-day International Symposium on Ship Operations (ISOSO) will be held at the Downtown Athletic Club in New York City, September 23, 24, 25, 1980. This conference will examine those problems relating to navigation, weather forecasting and communications aspects in the maritime industry. Running concurrently with the symposium will be an exhibit of the latest equipment from international manufacturers in those three areas. The sponsors of the symposium are the Maritime Association of the Port of New York, the Council of American Master Mariners, the American Institute of Merchant Shipping, and the Council of American Flag Ship Operators. Conference chairman Capt. **Alfred E. Fiore** of MaraTime Marine Service had this comment: "Tremendous strides have been made in the 'new technology' areas of navigation, communications, and weather adaptive processes of ship operations.

"At the same time, there has been a large growth in the size of the world's merchant fleets, along with an increase in vessel casualties. The latter development has caused international reaction in the form of severe regulatory requirements. The vessel operators are presently concerned about effecting compliance with these new regulations. We feel that the solution of this problem, along with the concommitant interest in saving fuel and safeguarding the marine environment, implies an urgent need to spread the word on how this 'new technology' can assist vessel operators in attaining improved safety records, and hence stay within the spirit and constraints of the new laws. The Symposium on Ship Operations is dedicated to this precept."

For more information, contact International Symposium on Ship Operations, 80 Broad Street, 34th Floor, New York, N.Y. 10004, telephone (212) 425-5704.

$7.4-Million Navy Order To Ingersoll Rand

Ingersoll Rand Company, Painted Post, N.Y., is being awarded a $7,457,914 firm fixed price contract for air compressors which are to be used as replacement for obsolete units onboard surface vessels under the DART Program. The Naval Sea Systems Command is the contracting activity. (N00024-80-C-4181)

Northwest Towboat Association Elects Board Of Directors

Jerry Russell, Foss Launch and Tug Company, was elected president of the Northwest Towboat Association at its recent Fourteenth Annual Membership Meeting in Seattle, Wash. **Bill Wood**, Marine Leasing Corporation, was elected vice president, and **Don Lusk**, Crowley Maritime Corporation, was elected secretary-treasurer.

Other members of the board of directors elected to serve until March 1981 were **James L. Dunlap** of Dunlap Towing Company; **Bill Epping** of General Construction Company; **Don Foss** of Puget Sound Freight Lines; **Fred Meyer** of Washington Tug and Barge Company, and **Jack Minkler** of Foss Launch and Tug Company.

Member companies of the Northwest Towboat Association are engaged in worldwide towing operations in addition to performing a full range of tug, barge, ship assist, log towing, and marine construction services within the Puget Sound and Alaska areas.

$514,000 Fireboat Contract Received By Technical Marine, Inc.

Technical Marine, Inc. has submitted a successful bid to the South Louisiana Port Commission for construction of a fireboat. The fireboat will patrol the Commission's 52-mile jurisdiction along the Mississippi River between New Orleans and Baton Rouge. The lone bid for $514,000 was accepted with the stipulation that the company post a performance bond.

New Bergeron Brochure Describes Firm's Barge Building Capabilities

Bergeron Industries, Inc. recently published a full-color brochure that highlights the company's barge-building capabilities.

The eight-page, six-color, illustrated brochure pictures various barges constructed by Bergeron with a description of each barge, including load and design factors. The brochure also includes information about facilities, engineering and production. Bergeron Industries, Inc., a leading builder of barges, has general offices at St. Bernard, La., and marine facilities at Braithwaite, La., on the Mississippi River near the Port of New Orleans, and at Port Bienville, Miss.

To obtain a free copy of the new brochure, write **George J. Schiro**, Bergeron Industries, Inc., P.O. Box 38, St. Bernard, La. 70085.

Literature Available On Master Clock System

Henschel Corporation of Amesbury, Mass., recently published literature describing their new Ship's Master Clock System. The Henschel Digital Master Clock System provides a synchronized display of time in various shipboard locations.

The master clock displays both local time and Greenwich Mean Time (GMT). The crystal-controlled, microcomputer-based master clock transmits multiplexed time (hours, minutes and seconds) and date (month, day and year) to a maximum of 40 remote repeater clocks and/or data and bell loggers. The remote repeater clocks show either local time or GMT in various mounting configurations suitable for most applications.

Battery back-up is provided to maintain both time and date in the master clock and in a few selected repeater clocks during any loss of input power.

For further information and a free copy of literature on the Master Clock System, write **John Landers**, Henschel Corporation, Dept. MR, 14 Cedar Street, Amesbury, Mass. 01913.

McDERMOTT SHIPYARDS

McDermott Shipyards Group, of J. Ray McDermott & Co., Inc., offers complete engineering construction and repair services to the marine industry, offshore oil and gas industry and the fishing industry.

Since the beginning in 1959, McDermott Shipyards have become recognized leaders in the construction of large ocean-going tugs, offshore supply vessels, jack-up and packaged drilling rigs, inland drill barges, dredges, oceanographic research and exploration vessels, fishing vessels, derrick and pipe-laying barges, crane boats, ferries, and ocean-going work vessels of all types.

McDermott Shipyards offer complete drydock and efficient under-roof construction facilities in both Morgan City and New Iberia, Louisiana, with direct access to the Gulf of Mexico and the waters of the world.

For a truly professional solution to your inland and offshore marine needs, look to the full service shipyards. Look to McDermott.

McDermott Shipyard Group
Divisions of
J. Ray McDermott & Co., Inc.

Morgan City, Louisiana, P.O. Box 188, Morgan City, 70380, 504/631-2561 • New Iberia, Louisiana, P.O. Box 128 New Iberia 70560, 318/365-8121 • New Orleans, Louisiana, P.O. Box 60035, New Orleans 70160, 504/587-4411

Gulf Fleet Marine Completes First Phase Of $61-Million Expansion

Gulf Fleet Marine Corporation, New Orleans, La., has completed the first phase of a $61-million expansion program and expects to complete the second phase by the first quarter of 1981, according to **Richard M. Currence,** president.

Mr. **Currence** said that during 1979, Gulf Fleet acquired a total of 15 new vessels with an aggregate cost of approximately $35 million to service the offshore petroleum industry on a worldwide basis. These included three tugs, six towing/supply, three supply vessels and three utility vessels. Eleven of the vessels were newly constructed, and four were acquired as existing equipment purchased to accommodate specific and immediate customer requirements. Of the 11 vessels constructed in 1979, six were built at shipyards affiliated with Gulf Fleet, and five were acquired from other shipyards.

Another 11 vessels with an aggregate cost of approximately $26 million will be constructed during 1980, with the final vessel due for delivery in early 1981. These include two towing/supply vessels, six supply vessels, one utility boat, one crewboat, and one ocean-going barge. At that point, Gulf Fleet will have more than 100 vessels — towing/supply, supply, tugs, crew/utility/launch, and barges — at work around the world.

Gulf Fleet vessels include tugs of up to 9,000 horsepower for movement of floating drilling rigs, derrick or pipelaying barges, supply vessels for movement of crew and cargo with up to 7,000 horsepower and 205 feet long, and cargo barges capable of accommodating up to 10,000 tons on deck. This equipment is now in operation on the African West Coast, the North Sea, the Arabian Gulf, Gulf of Suez, South and Central America and all coastal waters of the United States.

THIRTY-TWO FOR SCNO—Another 200-foot Rake Open Hopper barge hits the water at Nashville Bridge Company (NABRICO), Ashland City, Tenn., facility where 32 of the barges were recently constructed for SCNO Barge Lines, Inc. of St. Louis, Mo. The barges were built to American Bureau of Shipping specifications. They will be used to carry regulated and unregulated freight on the Mississippi and its tributaries. Headquartered in Nashville, Tenn., NABRICO is a wholly owned subsidiary of The American Ship Building Company, Cleveland, Ohio. The company, which has been in the marine field for more than 60 years, pioneered the design and building of much of the modern equipment used on rivers today.

17 New Vessels On Order For Sweden's Expanding Ferry Traffic

Swedish ferry companies plying international routes have placed orders for 11 new ships worth a total of Kr.2.4 billion ($545,000,000), all scheduled for delivery in the next three years. An additional six vessels worth Kr.1.5 billion are being built for the Finnish co-owners of two Finno-Swedish lines.

Sweden's international ferry fleet consisted of only 19 ships aggregating 20,000 gross tons in 1960. Today, it comprises 43 ships with a combined tonnage of 240,000. In 1978, the fleet transported 36-million passengers, and loaded 7.2 million tons of cargo.

Sweden's inland ferries, which form part of the national road network, carry some 10-million cars yearly across 70 lakes and waterways. A total of 109 ferries are now in operation.

With Mobil engine oil analysis, the object is to save you money.

Mobil's oil analysis is called EM/PA (Engine Maintenance through Progressive Analysis).

But it's not just another oil analysis program.

What makes ours different is the personal, on-board attention we provide to make the program a *dollar-saving device.*

We don't just give you a sheet full of "lab numbers" and leave you with an engine problem that's costing you money. We help spot trouble, then we work with you to correct it.

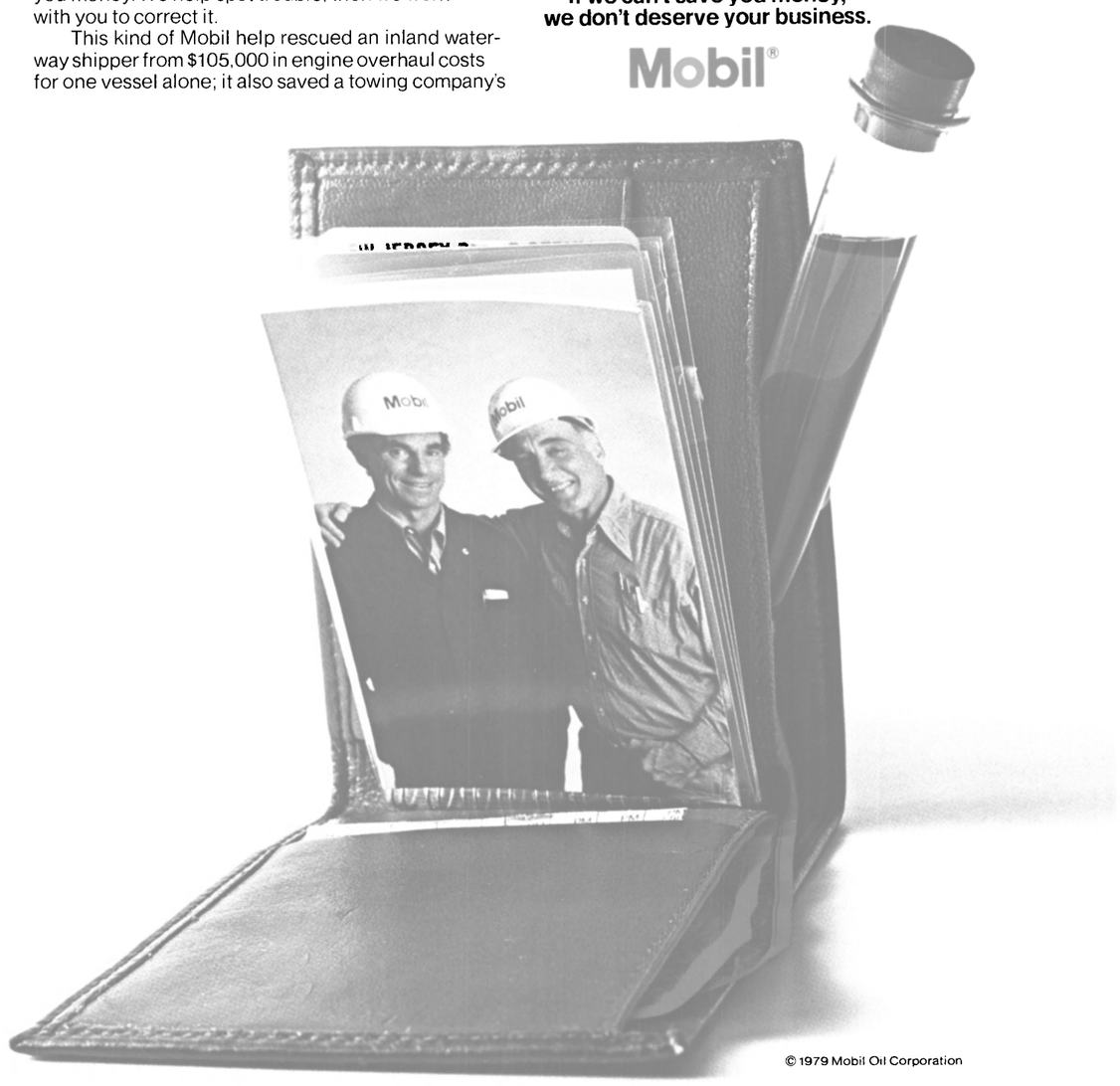
This kind of Mobil help rescued an inland waterway shipper from $105,000 in engine overhaul costs for one vessel alone; it also saved a towing company's fleet operations $153,000 on two vessels.

There are plenty of other cases where Mobil EM/PA spotted engine troubles before they got out of hand and cost the owners big dollars for repairs.

With Mobil engine oil analysis, you can bank on a lot of savings.

If we can't save you money, we don't deserve your business.

Mobil®



Free Bulletin Gives Data On Heavy Duty Heating Coils

Bulletin 104-43, a new 18-page catalog published by American-Standard Heat Transfer Division, contains complete design and installation information for heavy-duty heating coils.

Type H, Type HA and double-tube Type HD1 coils are used for heating air with steam, at pressures to 350 psi and temperatures to 600°F. Type HW and HW1 coils are used for heating air with water at pressures to 350 psi and temperatures to 400°F. All types are available in single-row or multi-row configurations, and are widely used in power generation facilities and processing plants.

All coils feature air-tight 10-gauge steel casings and solder-bonded, L foot tension wrapped, or imbedded smooth-tapered fins for better heat transfer.

Bulletin 104-43 contains full specifications, design data, steam coil piping information, with typical schematic diagrams for installation, and ordering information. Copies are available free on request from **Frank Wukovits**, American-Standard Heat Transfer Division, P.O. Box 1102, Buffalo, N.Y. 14240.

Scientific-Atlanta Receives $1-Million Satellite Terminal Contract From Exxon

Scientific-Atlanta, Inc. has been awarded an order for over $1 million from Exxon International Company for 20 MARISAT shipboard terminals. The satellite communications terminals will be installed on ships of Exxon's worldwide tanker fleet.

Dr. **Allen Ecker**, vice president-telecommunications of Scientific-Atlanta, indicated that this order would bring the company's current MARISAT production level to over 220 terminals. "The use of MARISAT has become very attractive to owners and captains of tankers which must efficiently transport and discharge their expensive cargo of fuel," said Dr. **Ecker**.

Exxon will receive the improved modular design MARISAT terminal that allows for rapid installation while the vessel is at a regular call at a major seaport.

New Brochure Describes Free Fall Lifeboat System

A new full-color brochure is available describing a free fall survival system for larger vessels and drilling rigs. The system consists of a fully covered lifeboat which can be lowered into the sea, or slid off a specially designed ramp and dropped into the water from heights of up to 20 meters (about 66 feet).

One of the main advantages of this system is that it virtually eliminates the risk of the lifeboat being thrown against the ship's side during or after launching. The boat is clear of the disabled vessel as soon as it has slid off the ramp. Its dive momentum gives it a speed of approximately 8 knots, enabling it to get further away from the ship with a minimum of time.

Testing of the free fall survival system has shown that the system can be ready in two minutes, and the lifeboat can be launched by free fall and waterborne within 20 seconds.

To minimize the stress on passengers during free fall launching, all passengers are seated in padded seats, and strapped in six-point safety belts, with their backs against the direction of travel.

The free fall lifeboat is totally self-righting, with good stability and seaworthiness. The boat is equipped with a steering nozzle which gives increased maneuverability, protects the propeller; and if people are in the water, will prevent them from being struck by the propeller.

A sprinkler system with a capacity in excess of 210 gallons/

min. enables the boat to pass through an oil blaze of more than 1 nautical mile. Three air flasks will supply passengers and engine with air for 15 minutes and create an overpressure to prevent entry of toxic fumes and gases. The steering tower is equipped with windows on all four sides, giving full 360° vision.

For a copy of the brochure "Free Fall Survival System," contact **Fredrik Sundbye,** The Export Council of Norway, 800 Third Avenue, New York, N.Y. 10022.

Charles R. Ashcraft Joins Alliance Marine Services

Alliance Marine Services, New Orleans, La., recently announced that **Charles R. Ashcraft** has joined the company as manager of personnel, purchasing and insurance.

In this position, Mr. **Ashcraft** will be responsible for employment, crew changes, employee benefits, purchasing of parts and supplies, and will share dispatching duties with **K.E. (Kip) Cochran**. He will report to **H.L. (Pat) Patton,** vice president for all operations for Alliance Marine Services.

Mr. **Ashcraft** was previously employed as superintendent of operations for Cooper Stevedores, New Orleans, and prior to that was superintendent of barge and rail operations for Riceland Foods, Helena, Ark.

New Catalog Available From Comfort-Mate

Comfort-Mate has just released their new comprehensive catalog of maintenance-free marine furniture. This catalog features their full furniture line consisting of deck chairs, sitting chairs, deck tables, etc., all engineered and manufactured to exacting high standards necessary to withstand the rigors of marine use.

Catalog and additional information may be obtained by writing **James Reiter,** Comfort-Mate, Inc., P.O. Box 160845, Miami, Fla. 33116.

McDermott And Protexa Form Joint Venture— Buy Three Large Barges

J. Ray McDermott & Co., Inc. announced that it has formed a joint venture company with Protexa, the leading offshore construction company of Mexico. The new company, Construcciones Maritimas Mexicanas, S.A. de C.V. (CMM), will conduct offshore marine construction and pipelaying activities in Mexican waters.

CMM is owned 51 percent by Inversiones Industriales de Monterrey, S.A., the parent company of Protexa, and 49 percent by McDermott Trade Corporation, a subsidiary of J. Ray McDermott. The joint venture will be headquartered in Monterrey, with offices in Mexico City and Ciudad del Carmen, Mexico.

The new venture has purchased three large combination derrick-and-lay barges from a McDermott subsidiary. The vessels, the Orca, the Sea Lion and the Tolteca, were obtained when the assets of Netherlands Offshore Company were purchased last year.

The Orca is equipped with an 800-ton crane and can lay pipe in depths up to 600 feet. The Sea Lion and Tolteca are each equipped with 2,000-ton cranes and equipment that can lay up to 48-inch (outside diameter) pipe. The three vessels are currently performing offshore construction services for Pemex, the national petroleum company of Mexico.

Inversiones Industriales de Monterrey, S.A. is one of the leading industrial companies of Mexico. In the petroleum field it is involved in drilling, pipelaying and construction operations onshore and offshore.

McDermott is a leading international energy services company. The company and its subsidiaries provide engineering and construction services to the offshore oil and gas industry and manufacture steam generating equipment, tubular products, refractories, and automated machine tools.

New MARCO Oil Recovery System Used In Gulf

A new type of offshore oil-spill skimmer built by MARCO was assigned to recover oil when a 72,000-dwt Liberian tanker started spilling oil on November 1, 1979, following a collision at sea five miles south of Galveston Bay, Texas.

MARCO reported its Class XI oil recovery system was shipped to the spill site with encouragement from the U.S. Navy Supervisor of Salvage and the U.S. Coast Guard. It was put into service on the Bering Seal, a 200-foot rig-supply boat chartered for the cleanup project. The Class XI was utilized for 49 days, recovering oil and sludge. When recovery operations were halted in mid-January, MARCO skimmers had recovered more than 340,000 gallons of oil.

The new MARCO system readily converts any available vessel with adequate tank capacity into an oil-spill recovery vessel. It consists of an unmanned, high-capacity skimmer attached to containment booms in a funnel-like configuration. The booms are deployed behind a 50-foot outrigger spar and support mast secured aboard the available vessel. The oil diversion booms "sweep" a 50-foot swath, channeling pollutants to the skimmer module, where a MARCO "Filterbelt" system recovers oil and debris from the water surface. Oil and debris are gravity-fed through a macerator, then pumped to the vessel's storage tanks through an integral, hydraulically driven offload pump and four-inch flexible hose. The 19-foot skimming module incorporates inflatable pontoons which provide a high degree of buoyancy and fendering, and also permit compaction for storage and transportation in a standard 20-foot container van.

Actual use, as with the tanker spill and last summer's defense of the Texas coast from Mexican oil, demonstrated a high degree of effectiveness with the MARCO Filterbelt system.

In addition to oil-spill recovery equipment, MARCO Seattle (Wash.) is also a leading manufacturer of large commercial fishing vessels, hydraulic pump drive equipment, and oilfield separation products.

Belgium Firm Buys Two Jetfoils From Boeing Marine Systems

Regie Voor Maritiem Transport (RMT), the state-owned ferry company of Belgium, has purchased two Jetfoils for passenger service between Ostend, Belgium, and Dover, England, from Boeing Marine Systems, Seattle, Wash.

The Jetfoil Model 929-115s are scheduled for delivery in time to begin operation for the 1981 tourist season. The purchase is valued at approximately $27.5 million including spares, operational and maintenance training, and shipment of the Jetfoils to Belgium.

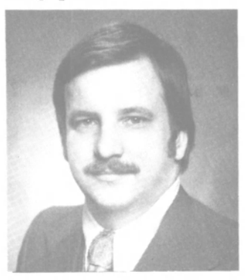
The crossing between Ostend and Dover will take about 1 hour and 40 minutes. Each Jetfoil will carry 316 passengers and hand luggage.

Intercity-type trains will insure direct connections to the Jetfoil services at both ends—at Dover toward London, England, and in Ostend toward Brussels, Belgium and Cologne, Germany. The total time required to cover the distance between London and Ostend, including customs and security formalities in the English port of Dover, will be approximately 3½ hours. RMT will build a special Jetfoil terminal alongside the railway stations in Ostend and in Dover.

Fourteen Boeing Jetfoils are now in service worldwide, including a new service by P & O Jet Ferries from London to Ostend, inaugurated February 29, and B + I Lines Jetfoil service between Dublin, Ireland, and Liverpool, England, which is scheduled to begin April 25. The British Royal Navy will begin North Sea patrol with a Jetfoil derivative, HMS Speedy, this summer.

Executive Changes At Energy Transportation Corp.

Energy Transportation Corporation, New York, N.Y., has announced the appointment of **Gregory J. Masaitis** to the position of vice president, Operations, where he will assume overall administrative and operating responsibility for the company's fleet, as well as supervision of the company's operations offices in Japan and Singapore.



Gregory J. Masaitis

Mr. **Masaitis** has been with Energy Transportation Corporation since July 1976, when he joined the firm as a manager engineer in the New Construction Department. Mr. **Masaitis** brings to his new position extensive marine experience at John J. McMullen Associates, Inc.; Kvaerner-Moss, Inc., New York; General Dynamics Corporation; and the U.S. Coast Guard.

Energy Transportation has also announced the promotion of **Edmund G. Tornay** to vice president, Engineering; **George A. Gilmore,** vice president, Administration; **Albert E. Pagano,** vice president, Finance; **David R. Rodger,** technical manager; **Nicola F. Pergola,** guarantee claims manager; **James M. Huvane,** assistant controller, and **Alan N. Donkin,** manager, New Business.

Energy Transportation operates a fleet of eight 125,000-cubic-meter LNG vessels recently built at General Dynamics Corporation, Quincy Shipbuilding Division, and time chartered to subsidiaries of Burmah Oil Shipping Inc., New York.

Hoffert Marine Named National Sales Rep For Tait Co. Products

Hoffert Marine Inc., headquartered in Jacksonville, Fla., has been named national sales representative for The Tait Company's deepwell and vertical turbine pumps, according to **Paul E. Hoffert,** president of the marine equipment supply firm.

Hoffert's Jacksonville office will handle the Tait products in Florida and Georgia, its Norfolk office will handle the Virginia, Maryland and North Carolina area, the Nutley, N.J., office will handle the New York and New Jersey area, and its Houston branch will handle the Texas region.

COMSAT General Offers Free Color Brochure On Marisat Terminal

COMSAT General Corporation's new 16-page color brochure describes its modular terminal, Model 3055M, for communications via the Marisat satellite system. Marisat provides modern high-quality communications from ships and offshore rigs or construction barges, to shore points anywhere in the world. The terminal includes telex and telephone, and jacks to interconnect onboard modems for facsimile and data of up to 2,400 bits per second. The brochure has a brief history of maritime satellite communications (Marisat), and contains dimensions and specifications for the modular 3055M terminal.

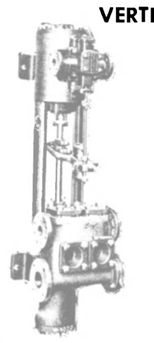
For a free copy of the new brochure, write **Hale Montgomery,** COMSAT General Corporation, Marisat Terminal Marketing, 950 L'Enfant Plaza, SW, Washington, D.C. 20024.

$80-Million Navy Contract To General Dynamics

General Dynamics Corp. has received an $80-million Navy contract for design services on Trident submarines.

PUMPS

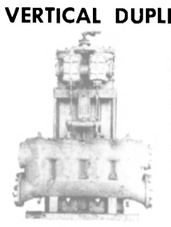
UNUSED WORTHINGTON VERTICAL SIMPLEX PUMPS



8 to 20 GPM—up to 350#. Also suitable for small boiler feed service. Steam WP 220# and 10# exhaust.
for Liberty Ships EC-2 & Victory Ships VC2, AP2 & AP3. (Fuel oil service) Liquid capacity from 7½ x 4 x 10—3" suction—2" discharge—1¼" steam—1½" exhaust. OAH 5'2"; OA depth 23"; OAW over air dome 2'2". Weight about 800#. Suitable

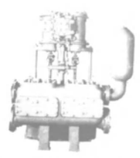
$1195

WORTHINGTON 16" X 14" X 18" VERTICAL DUPLEX STRIPPING PUMP



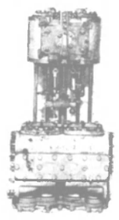
1400 GPM @ 110 PSI — suction lift 11.5 ft. — steam back pressure 15 lbs. 14" Suction — 10" discharge — 2½" steam — 4" exhaust. Overall width 6'8" — overall height 9'1½" — depth 3'9½". Wt. approx. 10,000 lbs.

STEAM DRIVEN VERTICAL DUPLEX FIRE & GENERAL SERVICE PUMPS



10 X 11 X 12 — Worthington — 560 GPM @ 125# G. 8" Suction — 6" discharge pumps bronze fitted.

8" X 8" X 10" VERTICAL DUPLEX PUMP



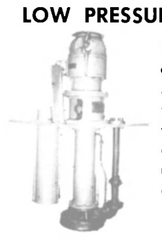
Hendy design Suction 8" — discharge 6" — 160 GPM @ 100 PSI.

PRACTICALLY NEW

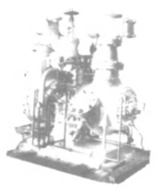
LIDGERWOOD STEAM CAPSTAN

8 X 8—125 lb. working pressure. Reversible.

4 NEW UNUSED SUMP OR LOW PRESSURE DRAIN PUMPS



Bronze—40 GPM @ 40 PSI. 2" discharge—single impeller—CW rotation—32" from deck plate to base. Complete with flotation equipment. Totally enclosed 5HP 440/3/60 1725 RPM motor. Repair parts for motor & pump included.

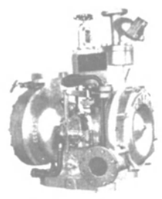


COFFIN FEED PUMPS — ALL SIZES —

TYPE DE

3 TYPE DE-2
540 GPM 1870' NET HEAD

8450 RPM — 585 PSIG — 0°-200° superheat — exhaust pressure 15 lbs — NSPH 30 — typical serial 4683DE



TYPE CG

2 TYPE CG 350 GPM 1880' NET HEAD

7220 RPM—311 HP. Steam pressure 580 PSIG—0°-100° superheat. Exhaust 15 lbs—typical serial #5437-CG-8-8-33

DAVIT – WINCH

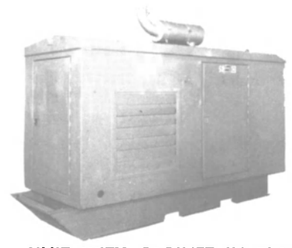
Mfg. by Skagit
Rated 4000 lbs. @ 80 FPM

6500 LBS OF BOAT & MAN AT 40 F.P.M.

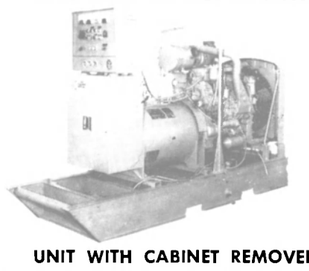
Motor: 13.5 HP — 440/3/60. Designed for ½" 6x37 wire rope. Divided drum with 2 spooling areas. Drum 8½ wide — 4" flange — 10" diameter. Complete with level wind. Also capable of manual operation by crank in case of motor failure. Hand brake & speed limiting brake are provided for holding & lowering boat by gravity. Non-magnetic.

GM 4-71-T TURBO-CHARGED 100 KW 440/220/3/60 10 WIRE DIESEL GENERATOR SET

ALL VOLTAGES POSSIBLE



UNIT WITH CABINET IN PLACE

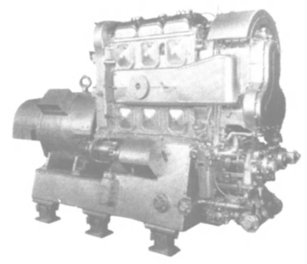


UNIT WITH CABINET REMOVED

100 KW 440/220/3/60 generator driven by GM 4-71-T radiator cooled turbo charged diesel. P.F. 0.80—for T-2, etc. 1800 RPM. With switchgear. Generator is 10 wire—all voltages possible.

WITH SWITCHGEAR / ALARMS / DISCONNECT

G. M. 3-268A 100 KW A.C. DIESEL GENERATOR SETS



ENGINE: GM 3-268A — 6½ x 7 — 1200 RPM — 80% power factor — electric starting. GENERATOR: 100 KW — 440/3/60/1200 RPM — 161 amps. Dripproof — open — self-ventilated. (Class "A" insulation stator — Class "B" insulation on field). EXCITATION: 2 KW DC unit — 9' 1¾" long — 37" wide.

FOR C4-SA1-VESSELS

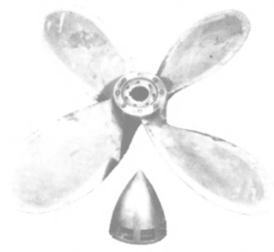
"General" Class — like-new condition

2 MAIN CF2V
CONDENSATE PUMPS
Size 6X3 — 175 GPM
185 Ft. Head — 1750 RPM

ALSO AVAILABLE

Turbine rotors — transfer pumps — complete Turbo Generators, etc.

4-BLADE LST BRONZE PROPELLERS



Starboard — 7' diameter — pitch constant 4.699: Bore tapers from 6⅛" to 4$\frac{33}{64}$". 14½" taper equal to 1" 'foot on diameter. U.S. Navy reconditioned. Average weight 1760 lbs.

PLEASE NOTE:

Our Marine Dept. & Warehouse is nr
250 Scott St. at McHenry — Baltimor

KNOWN 'ROUND TH WORLD

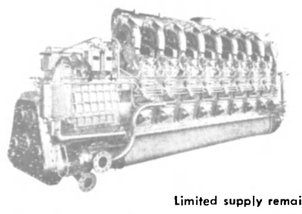
THE BOSTO

313 E. BALTIMOR

Marine

CABLE: BOSIRON—BALTIMOR

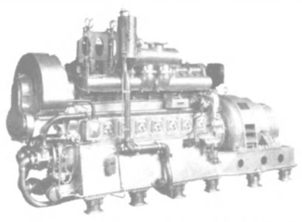
G. M. 16-278A 1700 H. P. DIESEL ENGINES



Limited supply remaining

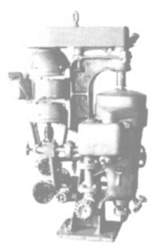
Complete, clean and in very good condition. As removed from U.S. Naval vessels. 1700 HP @ 750 R.P.M. Your inspection invited.

G. M. 8-268A 200 KW A.C. DIESEL GENERATOR SETS



ENGINE: 8-268A — 6½" bore — 7" stroke — 1200 RPM — driving Westinghouse generator — 200 KW — 440 volts — 3-phase — 60 cycle — 321 amps — 80% power factor at 1200 RPM. Switchgear available.

SHARPLES OIL PURIFIER



Ex. U.S.N. As removed from vessel. For lube or fuel oil. 225 GPH — viscosity 45, SSU @ 100°F fuel oil. 225 GPH — viscosity 180-200 SSU—130° lube oil. For lube oil models M-85-34-5-23BM-44 — for fuel oil M-85-35-5-8CA-13. Bowl speed 17,000 RPM—1" oil inlet & outlet. Vertical 2 HP 440/4/3400 RPM motor. Many units with stainless steel bowls.

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, Md. 21230

NEW PHONE
(301) 752-1077

ON METALS CO.

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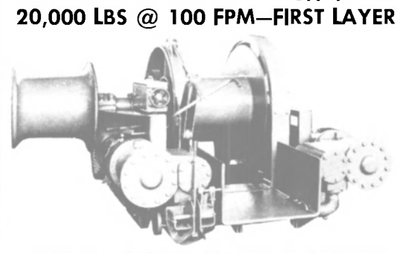
E, MD. U.S.A. TWX 710-234-1637

STEAM MOORING WINCHES

12" x 14" — AUTOMATIC TENSIONING with foot brake & declutchable gypsy head

20,000 LBS @ 100 FPM—FIRST LAYER



ALSO HANDLES 16,000 LBS @ 150 FPM OR 50,000 LBS @ 8 FPM

Drum will show 1500 ft of 1½" wire in 9 layers. Steam inlet 3½" — 4" exhaust — 171 PSI working pressure. BASE DIMENSIONS: 6' x 6' 3½" — overall 8' 4½" wide x 9' long. Mfg by Friedrich Kocks — Bremen, Germany. Recently removed from ARCO "Challenger".

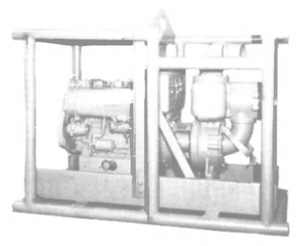
ALSO IN STOCK

12" x 14" Double Gypsy Unit

ALL UNITS CAN BE DEMONSTRATED RUNNING

MARLOW

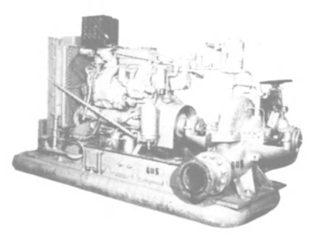
6" Self-Priming Salvage Pump



Marlow model 6EF18—driven by VM air-cooled 3-cylinder 52 HP diesel engine. 96,000 GPH at 40 ft. Maximum heads to 70 feet.

GARDNER-DENVER 6" X 5"

BRONZE CENTRIFUGAL FIRE or JETTING PUMP



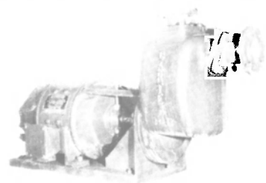
Driven by GM 3-71 diesel engine. PUMP: 1000 GPM @ 150 PSI/1500 GPM @ 100 PSI — 1750/2000 RPM. Maximum 175 PSI. Self-contained fuel tank in base. Automatic self-priming optional.

IMMEDIATE DELIVERY

2 3/4" STUD LINK CHAIN

10 Shots — with connecting links. ABS certificate. Practically New

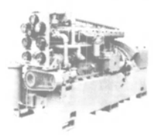
CARTER BRONZE SELF-PRIMING BILGE & GEN. SERVICE PUMP



85 GPM @ 50 lbs. — 3500 RPM — 2" X 2". 5 HP — 115 VDC — 1750 RPM motor.

$1466

100 KW GBD-8 DIESEL GENS.



From LST vessels. 120/240 VDC — 417 amps — stab shunt — 1200 RPM —Delco gen.—self-excited. ENGINE: Superior GBD-8 — 8 cyl — 5½x7 — 150 HP — 30 volt electric starting. Reconditioned to ABS. Dry wt 10,000 lbs — DAL 124" — 65-11/16" high — 42" wide. Ht necessary to pull piston 68". Fuel consumption 0.620 lbs/hr

T-2 EQUIPMENT

Selected Items Listed

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

10 Stage — 435# — 720°T.T.

Turbine complete with rotor — serial No. 109166 — 4925/5400 KW — 3600/3720 RPM — 10-stage — 435# — 720°TT — 28.5" VAC.

WESTINGHOUSE MAIN PROPULSION GENERATOR STATOR

From Ex-Pecos — in like-new condition. With A.B.S.

5-SPEED FORCED DRAFT FAN MOTOR

For T-2 Tanker. MOTOR: Totally enclosed—frame 505-S—440/3/60 —1770 RPM—typical serial #673-1807. CONTROLLER: 50 HP — CR-5333-820 — Cat. 932-1485. Max. amps 60.

WESTINGHOUSE 538KW TURBINE ROTORS

WESTINGHOUSE 538 KW AUX. GENERATOR EXCITER ARMATURE 400 KW REVOLVING FIELDS

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

FOR G.E. 525 KW T-2 TURBO GENS.

- G.E. DORV-325M TURBINE ROTORS
- 400 KW 450/3/60/1200 A.C. 6-POLE REVOLVING FIELDS
- D.C. EXCITERS — 75KW/55KW
- AMPLIDYNE GENERATORS — NEW STYLE — LY-148

Officers and guests shown above at the recent meeting are, left to right: **Wolfgang Reuter,** NAVSEA, membership chairman; Rear Adm. **Alfred Manning,** U.S. Coast Guard, author/speaker; Dr. **James Lisnyk,** MarAd, Section chairman; and **James Higgins,** MarAd, moderator.

SNAME Chesapeake Section Hears Paper On U.S. Coast Guard R&D Program

The Chesapeake Section of The Society of Naval Architects and Marine Engineers met recently at the Washington Navy Yard Officers' Club to hear Rear Adm. **A.P. Manning** describe "The U.S. Coast Guard Research and Development Program."

The Coast Guard's area of responsibility has been significantly broadened over the last decade, especially in the area of maritime law enforcement, marine pollution control, vessel traffic management, and navigation services. Many of these expanded activities are technology-intensive, requiring the strengthening of the technological efforts within the Coast Guard through manpower and funding for research and development.

The importance of R&D activities within the Coast Guard was recognized through the creation of an office of Research and Development in 1968, and the creation of the R&D Center in 1972. Since then, the new office has grown from 38 personnel and a one-million-dollar budget to 232 military and civilian personnel with a 22-million-dollar budget.

Current R&D activity involves scientific investigations, studies of new technological advances, transfer of existing technologies, and test and evaluation of new products in the areas of search and rescue, enforcement of laws and treaties, polar and domestic icebreaking, support for marine science, aids to navigation systems, marine environmental protection, commercial vessel safety, recreational boating safety, and military readiness. Significant results from these activities include the development and improvement of the Airborne Oil Surveillance System (ADSS), the Emergency Position Indication and Reporting Beacon (EPIRB), oil-spill identification system, Loran-C navigation system, Vessel Traffic System (VTS), and a variety of vessel safety features. Future R&D efforts will be directed at new and improved surveillance technology, advanced navigation systems, command, control and communications, advanced vehicles, ice research, pollution response technology, and underwater technology.

Capital Expenditure Survey For U.S. Ports Published

The Maritime Administration has released a report, "United States Port Development Expenditure Survey." The study analyzes 1973-78 capital expenditure data for marine terminal facilities in principal ports of the United States and includes projections through 1983.

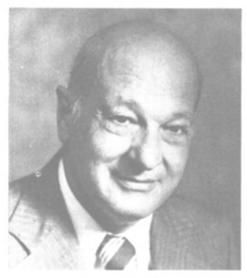
By using data from previous studies, the new survey provides a 38-year picture of past and future capital requirements for such facilities in the American port industry.

Among its major findings, the study showed that: (1) Approximately $5 billion has been invested in the construction and modernization of pier and wharf facilities in U.S. ports since the end of World War II; (2) U.S. ports expended approximately $1.6 billion to expand and improve marine terminal capacity between 1973-78; (3) A large portion of the increase in port development can be attributed to increasing use of containerization and other utilized forms of cargo handling which have transformed a traditionally labor-intensive industry into a capital-intensive one; (4) Large investments in bulk cargo facilities are projected between 1979 and 1983, with particular emphasis on offshore crude oil receiving facilities off the Gulf Coast.

The 45-page publication updates a 1973 study. Copies of the new survey are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The stock number is 003-007-00100-2; the cost $3.25.

Todd Shipyards Name Ben C. Martino General Manager At Galveston

The appointment of **Ben C. Martino** as general manager of the Galveston Division of Todd Shipyards Corporation was announced recently by **John Meghrian,** vice president. Mr. **Martino** succeeds **Robert D. Hesley,** who is retiring.



Ben C. Martino

Mr. **Martino,** presently assistant general manager at Galveston, Texas, has over 30 years of executive experience in the maritime, shipbuilding/repair and associated industries; and has previously held positions of general manager at Perth Amboy Shipyard, as well as at McAllister Tug & Barge Drydocks, Inc. He was appointed assistant general manager in November 1979.

Mr. **Hesley** has agreed to remain in a consulting capacity to the corporation.

Your only...Number 1 Marine Magazine

TWICE EACH MONTH
THE CURRENT MAGAZINE

Here are the reasons MARITIME REPORTER is NUMBER ONE... the best magazine for your marine advertising... all are powerful, sales building advantages not provided by any other marine publication.

REQUESTED BY THOUSANDS MORE BUYERS WORLDWIDE—
MARITIME REPORTER is requested, in writing, by thousands more marine men who specify and buy than *any* other marine magazine in the entire world.

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Throughout the entire United States... MARITIME REPORTER is requested by thousands more shoreside buyers than *any* other U.S. magazine.

REQUESTED BY THOUSANDS MORE FOREIGN BUYERS—
Than the second magazine, ME/Log.

MOST ADVERTISING PAGES—
In 1979, MARITIME REPORTER carried more pages of advertising (7 x 10) than No. 2, ME/Log.

400,000 FREE DIRECTORY LISTINGS—
Regular display advertisers in MARITIME REPORTER receive a free listing — company name and address — in the buyers directory section in all 24 issues for one entire year... whether an ad appears in every issue or not. No other marine magazine gives you this continuous sales-building exposure.

LOWEST COST—
Why pay more...MARITIME REPORTER's advertising rates are lower, cost per buying reader, than any other marine magazine.

TOTAL CIRCULATION OVER 99% REQUESTED...IN WRITING ...BY EACH INDIVIDUAL READER

FIRST CHOICE OF MARINE BUYING READERS AND MARINE ADVERTISERS

MARITIME REPORTER AND ENGINEERING NEWS

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FAST TURN

C-E follow-on capabilities help speed boiler repairs and reduce downtime.

Every minute a ship spends out of service means lost earnings for its owners.

At C-E, we offer a wide range of follow-on services and fast access to many spare parts to help speed turnaround and reduce maintenance requirements.

Starting with the actual installation of the boiler, we provide a level of assembly and start-up assistance geared to the needs of individual shipyards. In fact, we offer our boilers knocked-down, subassembled or fully assembled.

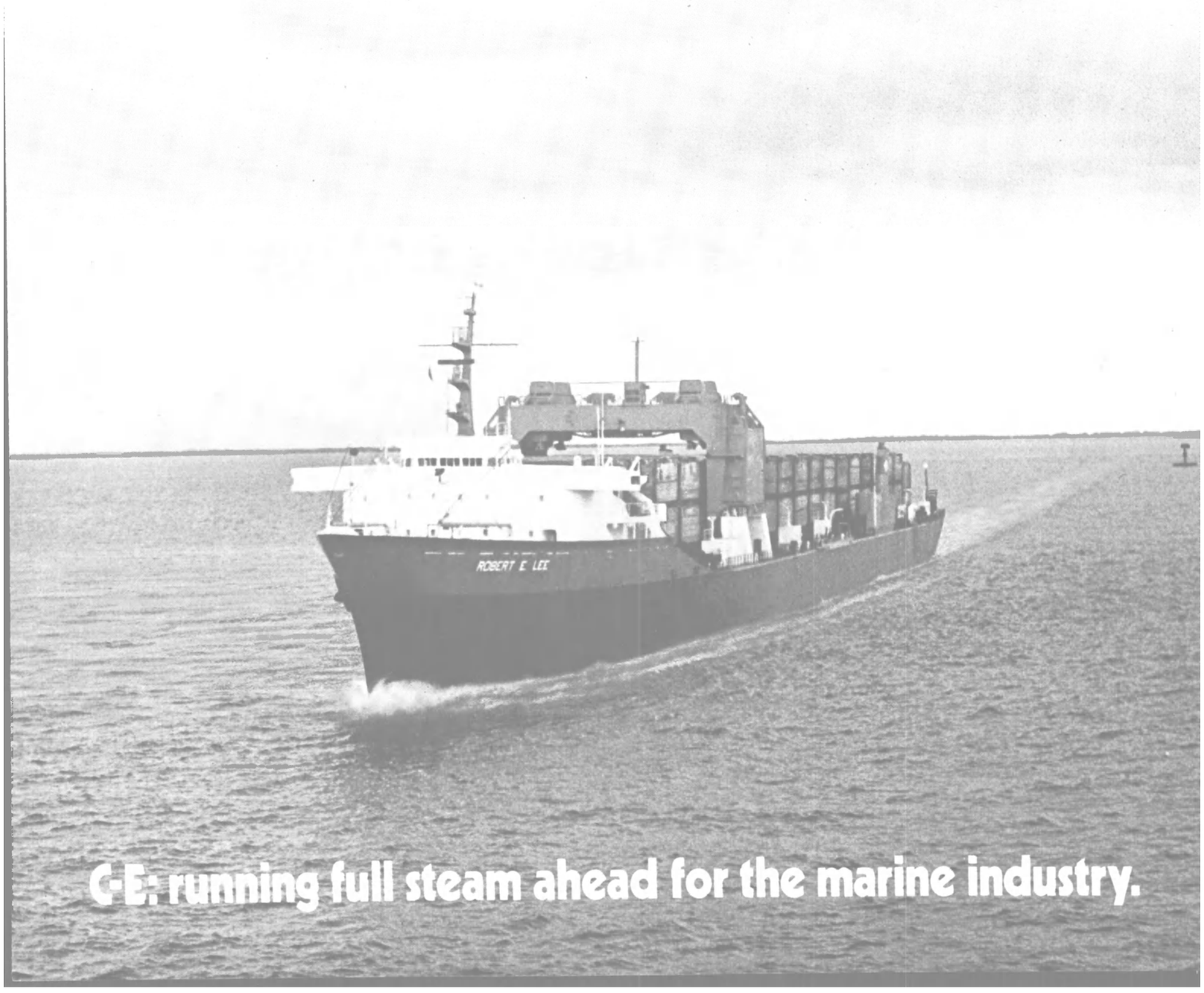
When it comes to spare parts, we stock replacements on the East and West Coasts. And every C-E replacement part is engineered to meet or exceed the original in design and performance.

In the area of follow-on services, we can survey and monitor boilers for signs of trouble, provide technical support and feasibility studies aimed at modifications that will reduce maintenance requirements and assist in the actual maintenance and repair work.

For more information on our wide scope of services and spare parts availability, contact C-E Marine Power Systems, Combustion Engineering, Inc., Windsor, CT 06095. Telephone (203) 688-1911, extension 2027 (Service) or 2501 (Parts).

CE POWER SYSTEMS
COMBUSTION ENGINEERING, INC.

AROUND.



C-E: running full steam ahead for the marine industry.

The Halter-built 14-knot survey boat Recon III is powered by two GM6-V71N engines driving Mariner 120H steerable Z-drive propulsion units.

Halter Delivers First U.S. Survey Boat With Z-Drives

Recon III, the first hydrographic survey boat in the United States to be fitted with Maritime Industries' steerable Z-drives, was recently delivered to Eagle Dredging Corp. by builder Halter Marine, Inc.

The 44-foot vessel utilizes two Mariner 120H propulsion units for steering and propulsion. The underwater drive legs rotate 360 degrees to give the aluminum boat extremely high maneuverability even at slow speeds in strong currents and winds.

Recon III will handle the surveying chores for Eagle Dredging's split-hull hopper dredge Eagle I, now under construction. Eagle Dredging is a company owned by C.F. Bean Corporation of New Orleans, La., and Royal Volker-Stevin Group, Rotterdam, the Netherlands.

The survey boat has a speed of more than 14 knots, and is powered by two GM6-V71N diesel engines rated at 210 hp each. She has a 13½-foot beam, 6½-foot depth, and draws 4 feet of water with her Mariner units. Steering, clutch and propulsion are controlled by a single joystick for each unit. The electronic full-follow-up steering system is also by Maritime Industries Ltd., Vancouver, British Columbia.

Recon III is outfitted with a Decca 110 radar and STR-25 VHF radio. Her survey gear includes a Raytheon PDD-200c precision depth digitizer, Raytheon DE-719B-RRT depth sounder and a Motorola Mini-Ranger III positioning system.

The vessel was built by Halter Marine's Chalmette, La., division, one of 10 shipyards owned and operated by Halter in the Southeastern United States.

Tracor, Inc. Receives $5-Million Navy Contract

The Naval Sea Systems Command, Department of the Navy, Washington, D.C., has awarded Tracor, Inc. a new contract of $5 million to continue supporting design, production, installation, and operational phases of mine and mine countermeasures programs, sonar technology programs, and sonar and fire-control systems for the Navy's nuclear submarines and surface ships.

William C. Mover, Ph.D., group vice president of Tracor Applied Sciences, said that approximately 85 Tracor sonar scientists, engineers, and managers located in Maryland, Virginia, Connecticut, California, and Texas are involved in the program, providing engineering analysis and technical engineering in support of these systems.

Contract work includes continuous monitoring of sonar performance, equipment installation and checkout procedures, field engineering and configuration management activities, reliability and logistics management support, and technical documentation review. Additionally, Tracor will provide assistance to Navy personnel in solving general problems associated with procurement and installation of sonar and fire-control systems.

Headquarters for the contract work is Tracor's facility in Rockville, Md., under the general management of **William F. Thompson,** division vice president and manager of the Systems Technology Division. Reporting to Mr. **Thompson** on the program are **William M. Pugh,** director, Ship Systems Directorate, and **Edgar V. Davis,** director, Tactical Systems Department.

Tracor, Inc. is an international technological products and services company headquartered in Austin, Texas. The company is a major technical contractor in sonar and health programs, and a leading manufacturer of scientific and electronic instruments, advanced electronic systems, and electrical and electromechanical components.

Krabacher Named Exec. VP, General Manager At Hydranautics, Inc.

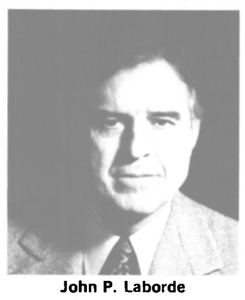
Ed Krabacher

Ed Krabacher has been promoted to executive vice president and general manager of Hydranautics, Inc., according to **Jim Bartlett,** president.

Mr. **Krabacher** joined the firm in 1970 as manager of sales and was vice president of sales before being appointed to the newly created position of executive vice president and general manager.

Hydranautics, Inc. is headquartered in Goleta, Calif. The company designs and manufactures mechanical, hydromechanical and electromechanical systems, subsystems and components for material handling and transfer. In addition to the headquarters in California, Hydranautics has engineering and sales offices and representatives around the world.

Laborde And Wardwell Elected To Lead NOIA



John P. Laborde

John P. Laborde of Tidewater, Inc. is the new chairman of the National Ocean Industries Association. He was elected by the board of directors during the NOIA Eighth Annual Meeting, March 1980. Mr. **Laborde**, whose office is in New Orleans, La., has been active in the Association since its founding in 1972, and was an original member of the NOIA board of directors. In addition to his responsibilities as chairman, president, and CEO of Tidewater, Inc., he is a past president of the Louisiana State University Alumni Federation. He holds board memberships in various international business and trade organizations, industrial associations, and civic, charitable, and cultural organizations.

Edward A. Wardwell

Joining Mr. **Laborde** is **Edward A. Wardwell**, NOIA's new vice chairman. He is chairman, president, and CEO of the world's largest diving company, Oceaneering International Inc., Houston, Texas. He has served as a member of the NOIA board of directors for five years and as NOIA treasurer for the past two years. Prior to joining Oceaneering in July 1979, Mr. **Wardwell** was majority owner and president of The Seaward Companies, Falls Church, Va.

Charles D. Matthews continues as president of NOIA.

Replacing Mr. **Wardwell** as treasurer is **C.D. Paget-Clarke**, president of Decca Survey Systems, Inc. (Houston, Texas). **Dana Larson**, Exxon Company, U.S.A. (Houston, Texas) and **Ardon Judd**, Dresser Industries (Washington, D.C.) were reelected to their respective positions as secretary and assistant treasurer of the organization.

The NOIA membership also elected a new group to the board of directors for a term expiring in 1983. These 15 directors will join the 30 remaining members on the board. Newly elected or reelected board members include: **Floyd E. Bigelow Jr.**, president and chairman of Porta-Kamp Manufacturing (Houston, Texas); **Robert G. Burke**, editor of Offshore Magazine (Houston, Texas); **Otto Candies Sr.**, president of Otto Candies, Inc. (Des Allemands, La.); **R. Nelson Crews**, president and COO, Raymond International, Inc. (Houston, Texas); **Andre Galerne**, president, International Underwater Contractors, Inc. (New York, N.Y.); **William E. Gipson**, president, Pogo Producing Company (Houston, Texas); **Frederick Hazard**, executive vice president of Great Lakes International (Oak Brook, Ill.); **James R. Lesch**, president and CEO, Hughes Tool Company (Houston, Texas); **J.R. (Rad) Maumenee**, president, Alabama Dry Dock and Shipbuilding Company (Mobile, Ala.); **Hugh Morgan Jr.**, senior vice president of Southern Natural Resources, Inc. (Birmingham, Ala.); **D. Gale Reese**, president, chairman, and CEO of Seiscom Delta Inc. (Houston, Texas); **Walter B. Reinhold**, chairman, president, and CEO, Varco International, Inc. (Orange, Calif.); **Theodore C. (Ted) Rogers**, president, National Supply Company (Houston, Texas); and **Gene M. Woodfin**, chairman and CEO, Marathon Manufacturing Company (Houston, Texas).

The board elected **Charles F. Red**, senior vice president-Planning and Rates, United Gas Pipe Line Company (Houston, Texas), to fill the unexpired term of a board member who resigned.

Omega Navigation Group To Hold Annual Meeting August 5-7

The International Omega Association will hold its Fifth Annual Meeting August 5-7, 1980, at the Chr. Michelsen Institutt in Bergen, Norway. Topic of the meeting will be "Omega Growth." Papers are planned to emphasize Information Processing, Special Applications, and Operational Problems and Procedures. A system review including current status and plans will also be presented.

Formed in 1975, the International Omega Association exists for the benefit of individuals and organizations having a common interest in the art of navigation by means of the International Omega system.

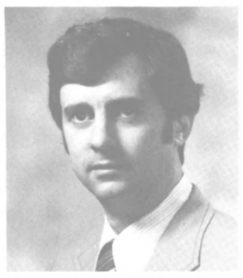
Further information is available from the International Omega Association, P.O. Box 2324, 1720 South Eads Street, Arlington, Va. 22202 or **John Veastad**, Norwegian Telecommunications Administration, Universitetsgata 2, Oslo, Norway.

Robert L. Olson Joins Liberian Shipowners' Council

Robert L. Olson has joined the Liberian Shipowners' Council as executive assistant. Mr. **Olson** was formerly the director of research with the New York State Assembly Subcommittee on Ports and Terminals.

The Liberian Shipowners' Council is an organization representing the worldwide interests of owners of Liberian-flag ships.

Steve Scalzo Promoted To General Manager— Marine Operations At Foss



Steve Scalzo

Steve Scalzo, former port captain for Foss Launch & Tug Company, Seattle, Wash., has been promoted to general manager of marine operations. As part of his new assignment, Mr. **Scalzo** will be in charge of all Puget Sound marine operations for Foss as well as marine operations of Dillingham's Ocean Division, and will report to **Jack D. Minkler,** senior vice president of Operations.

In announcing the appointment, **Bruce Robeson,** Foss president, said the new position was created to provide more overall coordination of the company's equipment and services. According to Mr. **Robeson,** the company is adding new tugboats, chip barges and petroleum barges to its fleet and this new equipment coming on-stream, together with concern for energy supplies, made necessary the consolidation of marine operations into one department. "Having Foss and Ocean Division operations under one roof gives us more flexibility in vessel utilization," he added.

The managers of marine operations for both Foss Launch & Tug Company and the Ocean Division will report to Mr. **Scalzo** in his new position. In addition, Mr. **Scalzo** will be responsible for overall dispatching functions in the Puget Sound region.

As port captain for Puget Sound operations, Mr. **Scalzo** supervised vessel crews, and coordinated vessel scheduling and use of bunker barges. For the time being, Mr. **Scalzo** will continue with his port captain responsibilities in addition to his new duties as general manager of marine operations.

No newcomer to the maritime business, Mr. **Scalzo** has been with Foss since 1975. He graduated from the U.S. Merchant Marine Academy at Kings Point, N.Y., in 1970, with a Bachelor of Science degree in marine transportation. He holds degrees in both law and in business and commerce from Gonzaga University, and served as a deck officer for Standard Oil's Chevron Shipping Company.

Mr. **Scalzo** is a vice chairman of the Maritime Committee of the Seattle Chamber of Commerce, and a member of The Propeller Club.

Rockwell International Receives $5.2-Million U.S. Navy Contract

The Naval Electronics Systems Command, Washington, D.C., has awarded a contract to the Collins Telecommunications Products Division of Rockwell International Corporation for AN/SRA-33 multicouplers.

The contract has a value not to exceed $5.2 million. Deliveries are scheduled to begin in mid-1981.

The AN/SRA-33 antenna coupler provides isolation between as many as four shipboard transmitter and/or receiver combinations operating simultaneously into a common UHF antenna.

The current contract includes an option for an additional 77 multicouplers. The AN/SRA-33 was most recently procured by the Navy for its Spruance-class destroyer program.

Tidelands Ltd. II Receives $22.8-Million Title XI For Jackup Rig

Assistant Secretary of Commerce for Maritime Affairs **Samuel B. Nemirow** has approved in principle an application from Tidelands Limited II, 625 Capital National Bank Building, 1300 Main Street, Houston, Texas, for a Title XI guarantee to aid in financing one mat-supported jackup drilling rig.

The self-elevating rig is designed to drill in water depths from 11½ feet to 150 feet and to drill to 25,000 feet. It is expected to be employed mainly in the Gulf of Mexico.

Estimated actual cost of the rig is $22,812,000, with the guarantee approved for a maximum of 75 percent of that amount, or $17,109,000. Bethlehem Steel Corporation, Beaumont, Texas, is the builder, with delivery scheduled for October 1980.

Satellite Communications Cost Benefit Study Offered By Maritel

Maritel, Inc., Annapolis, Md., has recently published a 14-page maritime satellite communication study titled "MARISAT—A Cost-Benefit Perspective."

The study contains an examination of the performance, availability, and reliability, compared with conventional means of maritime communications; a cost comparison; and new operational benefits.

The study, with its supporting statistics and tables, provides a good basis for review of the benefits of equipping vessels with MARISAT mobile satellite communications terminals.

Maritel and its shipboard terminal supplier, Japan Radio Co., Ltd., offers the JUE-5A for sale or lease to vessel owners. Maritel has also developed a cost benefit evaluation method that can be used by companies to compare the financial merits of MARISAT's use.

Requests for copies of the study, specifics on individual fleet cost benefit evaluation methods, or equipment information can be obtained by writing **David King,** Maritel, Inc., Dept. MR, 2510 Riva Road, Annapolis, Md. 21401.

Wm. R. LeCorgne Joins Halter Marine As VP-Engineering

William R. LeCorgne has joined Halter Marine, Inc. as vice president, Engineering, according to **Floyd J. Naquin,** president of Halter Marine.

In his new position, Mr. **LeCorgne** will be responsible for naval architecture, marine engineering, and all aspects of engineering and administration within the department.

Salvadore J. Guarino, who formerly held the position, will direct Halter's expanding research and development programs.

Mr. **Naquin** said the appointments were made to keep ahead of the company's increasing demands on engineering, and research and development which were formerly under the same department.

Prior to joining Halter, Mr. **LeCorgne** had been an associate of Guillot-Vogt Associates, New Orleans, La., since June 1976. He holds a B.S. degree in civil engineering from Tulane University.

Free Brochure Describes New Decca Radars

A free brochure is now available introducing the new 48/96 mile radars from Decca which, the manufacturer reports, incorporate two interesting developments. First, VP3 which clears the screen of visible radar interference, validates and enlarges real targets, is built into both units. The second is the VRM/VRD, variable range marker, variable range delay. Standard on the 150 and optional on the 125 radar, this feature acts as a zoom lens or scale expander—enlarging selected targets many times their normal size, revealing important additional details. It also allows the operator to select any distant target and zoom in for a closer look, gaining clarity and detail.

For a free copy of the new brochure, write **John Smith,** ITT Decca Marine, Inc., P.O. Box "G", Palm Coast, Fla. 32037.

Japan's NKK Building Two 60,000-DWT Tankers For Chief Shipping Co.

The Tsu Shipyard of Japan's NKK (Nippon Kokan) is building two 60,000-dwt tankers for the Chief Shipping Company, with delivery scheduled for the fall of 1980. Chief Shipping Company is a joint venture of Anders Jahre of Norway and Coral Navigation Inc., a wholly owned subsidiary of Dow Chemical Company.

Masato Hiraki, NKK New York general manager, said the two vessels will feature a high level of safety measures in compliance with the latest international rules, such as the IMCO-MARPOLE PROTOCOL of 1978.

Each cargo tank will be provided with a submerged pump for highly efficient cargo handling. The tankers will have extensive remote control systems for operation of the engine room, cargo handling, mooring winches and cargo oil tank level monitoring. The high level of automation will enable the ships to be operated and the cargo handled by a minimal crew.

Main particulars of the two tankers will be: length overall, 228.6 meters (about 750 feet); breadth molded, 32.2 meters (106 feet); designed load draft (molded), 12.19 meters (40 feet); main engine, Sulzer 6RND76M, 14,400 hp at 112 rpm; and designed speed, approximately 15.1 knots.

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Three Key Promotions Announced At Seaworthy Engine Systems, Inc.

Three senior level promotions have been announced at Seaworthy Engine Systems, Inc., Essex, Conn. The promotion of **Thomas J. Pakula** to vice president / secretary, **William L. McCarthy** to vice president, and **Martin Toyen** to treasurer were made to reflect their increased responsibility levels, according to **David O'Neil,** Seaworthy's president.

Mr. **Pakula** is responsible for pre-sales engineering and marketing, advanced marine systems design, and the propulsion system designs for the "Security Class" mobilization ship sponsored by the Maritime Administration. Mr. **Pakula** has been associated with Seaworthy since its formation in 1973. He is a graduate of the U.S. Merchant Marine Academy, Kings Point, N.Y., and served as a Marine Engineer aboard various U.S.-flag vessels. He is a member of The Society of Naval Architects and Marine Engineers and the Society of Marine Port Engineers.

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Among the participants at the keel-laying ceremony were, left to right: **K.K. Christensen,** vice president, Planning & Programs, NASSCO; **John M. Murphy,** vice president, Corporate Relations, NASSCO; **V. Julianel, American Bureau of Shipping; Richard H. Vortmann,** executive vice president, NASSCO; **William T. Nickerson,** Union Oil Company; **Mariano Morena,** NASSCO welding foreman; Capt. **C.S. Wetherell,** U.S. Coast Guard, Officer in Charge, Marine Inspection, San Diego; and **John W. Smith,** vice president, Yard Operations, NASSCO.

Keel Laid At NASSCO For First Of Three 37,500-Ton Product Carriers

A keel-laying ceremony at National Steel and Shipbuilding Company (NASSCO), San Diego, Calif., initiated construction of the first of three 37,500-dwt product carriers being built by NASSCO for Union Oil Company of California.

William T. Nickerson, assistant manager of new construction for West Coast Shipping, Los Angeles, a wholly owned subsidiary of Union Oil, laid the keel, signaling the beginning of construction. **Richard H. Vortmann,** executive vice president, represented NASSCO in the keel-laying ceremony.

The product carriers are a new NASSCO design, designated the Carlsbad Class. They will be 658 feet in length, 100 feet in beam, have a 33-foot draft, and will carry 250,000 barrels of refined petroleum and petrochemical products from refineries to distribution centers.

The vessels will incorporate the most modern features available, including double bottoms, a clean segregated ballast system, an inert gas system, a sewage treatment plant, collision avoidance radar, and a backup steering system to meet the latest safety and environmental protection standards. They will have steam turbine engines.

The first product carrier is scheduled for delivery in April 1981. It will be used to transport oil products from Union Oil's Beaumont, Texas, refinery to terminals on the Gulf and Atlantic Coasts.

NASSCO currently has under contract five Navy ships, an oil tanker and four product carriers. The company is a wholly owned subsidiary of Morrison-Knudsen Company, Inc., Boise, Idaho.

Maritime Radio Technical Commission To Meet April 28-May 1

The 1980 General Assembly of the Radio Technical Commission for Maritime Services will be held April 28-May 1 at the Key Bridge Commandant, is scheduled to speak at a luncheon on April 29.

The meeting agenda includes the presentation of numerous papers on current maritime communications and navigation issues, and a panel session on federal activities in this area. The technical papers will present the work of

at the 1979 World Administrative Conference at Geneva, Switzerland.

The meeting will include an all-day tour of the Goddard Space Flight Center and a banquet at which Rear Adm. **William B. Benkert,** USCG (ret.), president of the American Institute of Merchant Shipping, is scheduled to speak.

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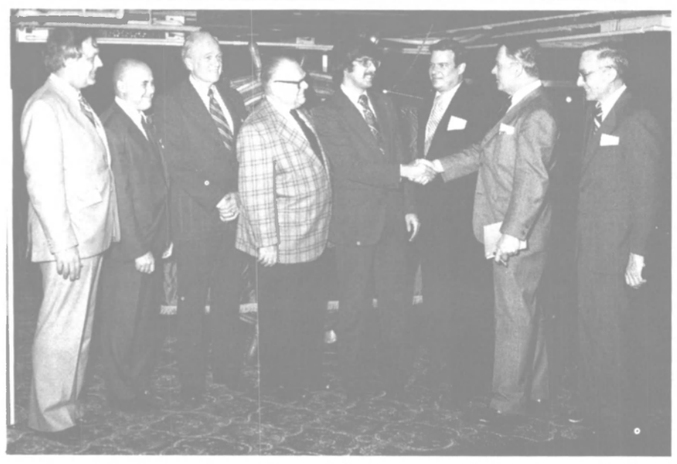
The vessel, to be 180 feet in length with a beam of 40 feet, is designed primarily for commercial use in the coastwise or foreign trade in support of the petroleum industry's offshore exploration for and production of oil and gas fields.

Halter Marine, Inc., Lockport, La., is the builder, with delivery expected in September 1980.

The estimated actual cost of the vessel is $3,390,231, with the approved guarantee at $2,966,000 to be 87½ percent of the cost.



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Also among those present were two prominent professors from Cal Poly Pomona's department of electrical engineering, **John C. McMillan** and Capt. **James A. McAllister,** USN (ret.), both specialists in ocean engineering. Their enthusiasm and support of student interests were evident and they, in turn, stimulated considerable conversation among those attending.

Another special guest at the meeting was Dr. **T. Francis Ogilvie,** chairman of the department

R.C. Kaminska And S.A. Wenk Join Bultema Dock & Dredge

ven A. Wenk as manager of administrative services. Bultema, a Muskegon, Mich.-based firm, specializes in marine-related work on the Great Lakes, inland waterways, and the East Coast.

Mr. **Kaminska** comes to Bultema with a strong background in construction. Most recently, he was marine construction superintendent and project contracts administrator for the construction company of Town-

manager of petroleum supply and marketing operations for the U.S. Gulf Coast.

The board also announced the election of **Waylon Boles** as executive vice president. Mr. **Boles** was formerly vice president of CCMS.

Corpus Christi Marine Services is one of the Gulf Coast's largest firms providing marine transportation and bunker fuels from Brownsville, Texas, to New Orleans, La.

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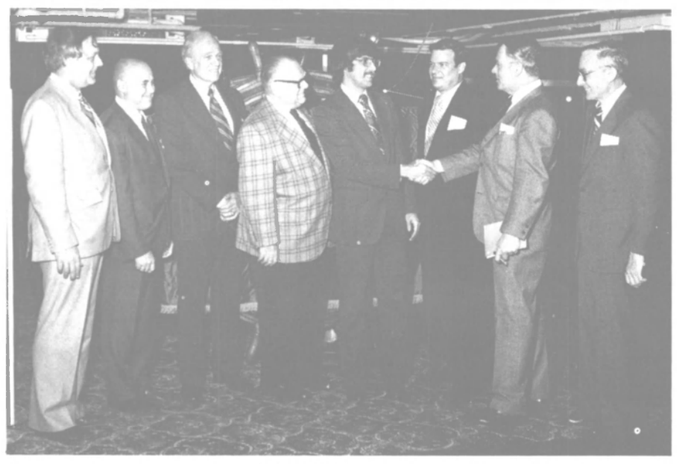

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Graduate Student Paper Presented To SNAME L.A. Metropolitan Section

At the regular monthly meeting of the Los Angeles Metropolitan Section of The Society of Naval Architects and Marine Engineers, the attention of the members was directed toward student activities. This has been a special concern of the Section, and every year at least one paper session is devoted to it. **Nathan Friedland,** member of the Section's Executive Committee and professor of ocean electrical engineering at the California State Polytechnic University, Pomona, was the sponsor for the presentation. The guest speaker was **John Stumm,** a graduate student of Cal Poly. His paper was titled "Manganese Sea Nodules: Ocean Mining & Chemical Processing." The paper was well received as demonstrated by the lively discussion afterward.

Also among those present were two prominent professors from Cal Poly Pomona's department of electrical engineering, **John C. McMillan** and Capt. **James A. McAllister,** USN (ret.), both specialists in ocean engineering. Their enthusiasm and support of student interests were evident and they, in turn, stimulated considerable conversation among those attending.

Another special guest at the meeting was Dr. **T. Francis Ogilvie,** chairman of the department of naval architecture and marine engineering, The University of Michigan. He had been in the southern California area on business and was invited to attend the meeting by a Section member.

Terry L. Smith Appointed Vice President Of Northwest Marine Services

Robert J. Heavey, president of Northwest Marine Services Corp., has announced the appointment of **Terry L. Smith** as vice president.

Mr. **Smith** comes to Northwest Marine from Propulsion Systems, Inc., where he was Service Department manager. He has an extensive background in controllable-pitch propellers, thrusters, rotary steering gear, marine controls and hydraulic systems. Mr. **Smith** will join the executive staff at Northwest Marine's home office in Seattle, Wash.

NWMSC is a marine consulting and manufacturing firm, specializing in propulsion control systems and technical consulting services.

Three Appointed To Engineering Department Posts At Trus Joist Corp.

Sherman A. Nelson has been appointed chief corporate engineer at Trus Joist Corporation, according to a recent announcement by president **Walter C. Minnick**.

Mr. **Nelson,** a 15-year Trus Joist employee, will be responsible for supervising activities of the company's chief structural engineer and the systems performance engineer. He will have final responsibility for establishing design values and performance criteria for all products manufactured and sold by Trus Joist Corporation.

Mr. **Minnick** also announced two other changes within Trus Joist's corporate engineering department. **Joe Piscione** has been appointed chief structural engineer and **Don Sharp** has been named systems performance engineer.

Mr. **Piscione** will monitor all plant quality control procedures and will be the principal corporate technical advisor to division senior engineers. He will also monitor the performance and staffing adequacy of the company's engineering departments.

As systems performance engineer, Mr. **Sharp** will be the principal research evaluator of Trus Joist products and materials. He will also support the company's product development function.

Trus Joist Corporation is a $100-million Boise, Idaho-based manufacturer of structural building materials.

Literature Available On New Motorola 100-Watt Marine SSB Transceiver

Motorola is offering free literature on its new Triton 20 SSB marine transceiver which has 20 crystal positions, allowing up to 20 simplex or 10 duplex channels. All marine frequencies between 2 and 9 MHz are available, and the international distress frequency (2,182 KHz) is built into each unit. Peak envelope power output is 100 watts.

This unit is more compact than previous Triton SSB models. The length is 14 inches; width, 10¾ inches; height, 3⅝ inches; and weight is 17 pounds. Along with its small size, the unit has a low price, about two-thirds the price of the 24-channel Triton radio.

The Triton 20 SSB's broadband design allows full output and maximum receive sensitivity with no tuning. Electronic channel switching is another convenience, and a dimmer switch helps the operator see the channel selector at night. The constant SINAD squelch, which shuts out noise between messages, does not have to be readjusted as noise levels increase or decrease.

The Triton 20 SSB is modular, with plug-in connections for rapid servicing. Its metal housing is splash-resistant. Transmitter mode and frequency range setup are easily accomplished, during installation, with internal switches. Frequency stability is + 20 Hz from −20°C to +50°C. The Transceiver is FCC and DOC approved.

For complete literature, contact **Dick Haberkorn,** Motorola Distribution Center, 1303 East Algonquin Road, Schaumburg, Ill. 60196.

R.C. Kaminska And S.A. Wenk Join Bultema Dock & Dredge

Richard C. Kaminska Jr.

Steven A. Wenk

Bultema Dock & Dredge Company has announced the appointment of **Richard C. Kaminska Jr.** as projects manager and **Steven A. Wenk** as manager of administrative services. Bultema, a Muskegon, Mich.-based firm, specializes in marine-related work on the Great Lakes, inland waterways, and the East Coast.

Mr. **Kaminska** comes to Bultema with a strong background in construction. Most recently, he was marine construction superintendent and project contracts administrator for the construction company of Townsend & Bottum, Inc.

Steven A. Wenk comes to Bultema with experience in the areas of personnel and administration. He is a graduate of Michigan State University with Bachelor of Science and Master of Public Administration degrees. Most recently, he served as Director of Parks, Recreation and Property Management for the City of Portage, Mich.

Since 1976, Bultema Dock & Dredge Company has been a subsidiary of the Canonie Companies, Inc.

Central Marine Adds Two Large 'A.B.S. All Ocean' Deck Barges

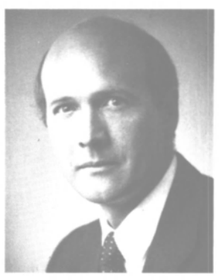
One of Central Marine's new "A.B.S. All Ocean" deck cargo barges recently put into service by the company in New Orleans.

Central Marine Service, Inc., New Orleans, La., has announced the completion of two new "A.B.S. All Ocean" flat deck cargo barges. The new CMS-1262 and her sister barge measure 260 feet by 72 feet by 16 feet, and at A.B.S. loadline have a cargo-carrying capacity of 5,147 long tons.

Each barge is of heavy construction, with deck load capacity of 2,000 pounds per square foot. They are designed for heavy concentrated loading, and will be used primarily for offshore marine construction worldwide. One of the many interesting features of the new CMS barges is the fact that they are designed for high-speed towing.

These barges are part of an ever-expanding fleet for Central Marine in order to serve the many requirements of the oilfield and construction industries. CMS specializes in supplying new, modern, rental barges to meet most inland and offshore demands.

Corpus Christi Marine Announces Two Top Executive Appointments



Wayne D. Smithers

Waylon Boles

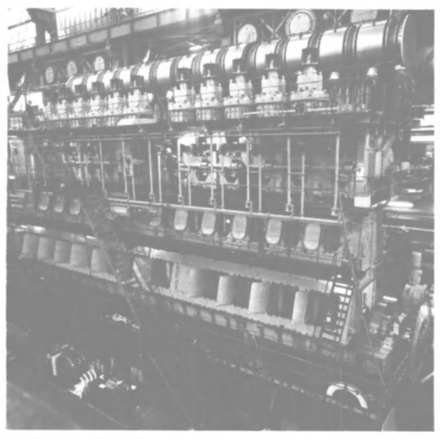
The board of directors of Corpus Christi Marine Services announced the election of **Wayne D. Smithers** as president.

Mr. **Smithers** joins CCMS after serving 11 years with the Scallop Corporation, a subsidiary of Royal Dutch Shell, where he was manager of petroleum supply and marketing operations for the U.S. Gulf Coast.

The board also announced the election of **Waylon Boles** as executive vice president. Mr. **Boles** was formerly vice president of CCMS.

Corpus Christi Marine Services is one of the Gulf Coast's largest firms providing marine transportation and bunker fuels from Brownsville, Texas, to New Orleans, La.

World's Largest Diesel Engine Delivered By Burmeister & Wain



The 12L90GFCA engine, shown being erected in the B&W shop at Copenhagen, has an output of 47,300 bhp at 97 rpm.

The largest diesel engine in the world, the Burmeister & Wain type 12L90GFCA, was recently delivered to the Lindoe Shipyard of the A.P. Moller Group. This engine is for the first of a series of six ships being built by the Lindoe Shipyard for A.P. Moller.

The 12L90GFCA engine has an output of 47,300 bhp (34,800 kw) at 97 rpm, and a maximum cylinder pressure of 89 bar.

During testing in Copenhagen, the L-GFCA engine demonstrated high thermal efficiency when a specific fuel oil consumption of 134.5 g/Bhph was obtained at maximum continuous output. The engine showed a specific fuel oil consumption of 129.8 g/Bhph for the derated condition at 36,000 bhp.

For further information and results of performance tests, write **Clause Windelev,** Burmeister & Wain American Corp., One State Street Plaza, New York, N.Y. 10004.

Improved Marine Boiler Reliability — Phase II

Recommendations Are Presented Which Will Enable The Boiler Purchaser Or Designer To Specify Materials, Design Features, And Operating Guidelines Which Should Assist In Establishing Boiler Reliability

Carl F. Horlitz and Arthur L. Plumley*

In an attempt to investigate the phenomena which affect marine boiler reliability, the Maritime Administration (MarAd) in early 1975 funded the first phase of a program entitled "Improved Marine Boiler Reliability." The objective of this initial effort was to investigate the main problem areas encountered in the design and operation of marine boilers and, to identify and research certain basic concepts and parameters and to explore their effect upon boiler reliability.

As a result of the investigations carried out in the initial phase, several items relating to specific areas of marine boiler reliability were chosen for additional analytical investigations as well as laboratory-type testing, both onboard ship and in land-based facilities. This second phase, also funded by MarAd, began in July 1976 and will continue into 1980.

This second phase consisted of six task areas. A comparison of wastage potential of several superheater materials over a selected temperature range, approximating metal temperatures encountered in the hot end of a 950°F (510°C) marine superheater, was accomplished in Task 1. In Task 2, the wastage potential of various economizer metals operating at normal temperature and below the sulfuric acid dewpoint was determined.

In Task 3, by means of a three-dimensional cold-flow model, flow distribution in marine superheaters was determined as a function of physical characteristics and load conditions. Results of the fourth task on shipboard stack gas analyses allow characterization of the conversion of SO_2 to SO_3 as it relates to acid dewpoint.

The fifth task outlines thermocouple development and current design in boiler applications based on Combustion Engineering (C-E) experience. In the final task of the initial second-phase effort, a report was prepared with the cooperation of shipowners, fleet operators, boiler manufacturers, and boiler water chemical vendor-consultants which reviews the current boiler water treatment practice of the U.S. merchant marine and describes the fundamental treatment programs needed for boiler water and evaporator control.

Task 1: Superheater Corrosion Rates

Through the cooperation of Waterman Steamship Corporation and the outstanding assistance of the vessel's crew, the port boiler of the LASH vessel Stonewall Jackson was made available. The boiler is a C-E V2M8 welded-wall boiler equipped with two downward-firing C-E HX550 steam atomizing marine oil burners. The two-boiler propulsion plant is rated at 32,000 shp.

While the absolute values of the parameters monitored were specifically applicable to the type of boiler used for the test, the general trends exhibited over a range of boiler loads should be characteristic of other types and sizes of marine boilers.

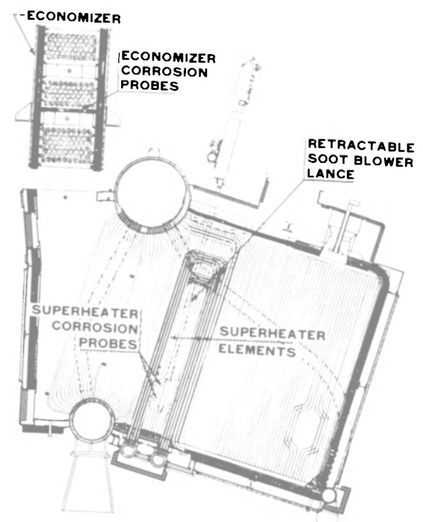


Figure 1 — Sketch of V2M8 welded-wall boiler test probe location in relation to soot blower.

Corrosion potential in the superheater area of the boiler was evaluated by controlled temperature probes. The location of these test probes was fixed by the design of the boiler. The high-temperature test probes were installed in the access port of the superheater section of the boiler, as shown in Figure 1.

Probes were removed after 4,080 and 8,390 hours (six months and 12 months) of sailing time. These probes generated data that established the resistance of commercially available materials of fabrication.

Recommendations: 1. On the basis of this test work it is suggested that, in a marine boiler superheater designed for an outlet steam temperature of 950°F, the use of T-9 in the higher-temperature passes could provide significantly extended superheater life over the currently used T-11 or T-22 material at a reasonable cost increase.

2. Continued evaluation of Tp-347-H stainless steel, T-9, and chromium diffusion-coated T-22 material at elevated temperatures is recommended.

3. Other materials which have the potential to resist corrosion, due to chromium content, should be tested. These materials would include Incoloy 800, a material comparable to Inconel 600, and a clad material such as Inconel 671, which has a 50 percent chromium/50 percent nickel composition of the clad layer.

Task 2: Economizer Corrosion Rates

This study was aimed at quantifying corrosion potential in marine boiler economizers with regard to acid dewpoint. The test plan called for operation of one probe below the acid dewpoint for the flue gas of the tested boiler, while the second probe was operated at about 100°F (55°C) above the acid dewpoint to provide an indication of gas phase oxidation or erosion or both.

Economizer cold-end corrosion is caused principally by condensed sulfuric acid from the flue gas, and the quantity of condensible vapor formed (as well as the dewpoint) is a function of type of fuel burned, burner design, furnace design, amount of excess air, etc.

The economizer probes generated corrosion data that corroborated the effect of

*Mr. **Horlitz**, assistant manager-engineering, Marine Power Systems, and Mr. **Plumley**, chemical process consultant, Kreisinger Development Laboratory, Fossil Power Systems, both with Combustion Engineering Inc., presented the paper abstracted here before the recent Annual Meeting of The Society of Naval Architects and Marine Engineers. Copies of the full paper may be obtained from the Society, One World Trade Center, Suite 1369, New York, N.Y. 10048.

acid dewpoint corrosion. The wastage rate demonstrated on the economizer surface operating below the acid dewpoint, while firing approximately three percent sulfur oil, is three times that found at the ambient temperature of the economizer.

Recommendations: 1. All test materials can be recommended for service in both the hot and cold ends of a marine economizer. A prolonged service life may be expected provided significant changes in fuel type and excess air levels do not occur.

2. The use of Corten tubing and fins for marine economizers is recommended where extended tube life, particularly in the low-temperature cold end, is desirable. In this test program the Corten was somewhat superior to carbon steel and cast iron, and no advantage was gained by use of aluminized surface on the carbon steel.

3. Additional testing at lower metal temperature in the range of 240° to 250°F (116° to 121°C) is desirable since this represents the economizer cold-end temperature on older vessels employing lower-pressure (25 psia) deaerators. This would allow for a quantitative assessment of the life of replacement economizer elements on older ships.

Task 3: Superheater Airflow Model Tests

A three-dimensional cold-flow model was built and tested to determine the flow distribution in a marine boiler superheater as a function of physical characteristics and load conditions. An analytical model also was developed to determine flow distribution in marine superheaters for simple one-dimensional flow. A heat-transfer program was developed and used to predict superheater tube metal temperatures as a function of steam flow distribution. Superheater arrangements having low flow and high temperature in certain tubes were identified. A design procedure was developed to take into account the effect of flow distribution on tube metal temperature.

Recommendations: 1. The results of this study and the design procedure developed should be used to predict tube metal temperatures in proposed marine superheater designs. Those designs which have predicted tube metal temperatures above desired limits can then be modified to achieve lower temperatures.

2. General methods which should be used to control tube metal temperatures are as follows: (a) The number of tube columns in a pass should be kept to a minimum, especially in downstream passes, to maintain an optimum balance of pressure drop and tube metal temperatures; (b) If it is necessary to omit or remove any tubes in a pass for pressure-drop or heat-transfer considerations, the tubes immediately after the partition plate should be the ones omitted or removed, and (c) If it is desired to determine flow distribution for geometries other than those already modeled, work should be done to develop an analytical model which will predict flow distribution with two- and three-dimensional header flows. This will eliminate the need for physically modeling every geometry of interest.

Task 4: Boiler Stack Gas Testing

In order to define more clearly a typical corrosion environment for cold-end heat exchangers in modern marine boilers, a program of stack-gas analysis was undertaken on an operating LASH vessel. The major thrust of the investigation was to obtain sufficient information to permit the calcu-

(continued on page 52)

Boiler Reliability

(continued from page 51)

lation of sulfuric acid dewpoints at various boiler loadings and excess air levels.

Over the course of five days, extensive testing and shipboard analyses were conducted at a variety of boiler loads and excess air levels, including a series of tests during minimum-load conditions in port.

The results of this testing effort have been extensively presented to the Society in 1977 and are not repeated in this paper.

Task 5: Thermocouple Modernization

The application and use of thermocouples in modern utility, industrial, or marine boiler technology classify into three broad areas: Operating data readout and recording; equipment and safety monitoring and alarms, and research and development. The first two areas make use of rugged instrumentation well engineered to offer maximum life, accuracy, and protection. This equipment, except for subtle modification to adapt it to boiler or operating-room installations, will be no different than applications in other industries. It may be expected that a long, useful life is designed into these thermocouples.

The third area usually requires unique special applications to produce the desired results. Techniques have been evolved to install the thermocouples in relatively inaccessable areas and hostile environments. These designs assure that the thermocouples will have a useful life.

The sheathed thermocouple, Figure 2, or the marine sheathed thermocouple, Figure 3, because of the environment they are exposed to, will have a short life expectancy. The sheathed thermocouple is recommended over the marine sheathed thermocouple for general boiler use.

A combination of good features in both the sheathed and marine sheathed thermocouple should provide, in marine applications, both accuracy of measurement and increased service life. By covering the exposed length of the sheathed thermocouple with a properly installed cover plate as used with the two-element marine sheathed thermocouple, vastly improved operating life of such thermocouples may be expected.

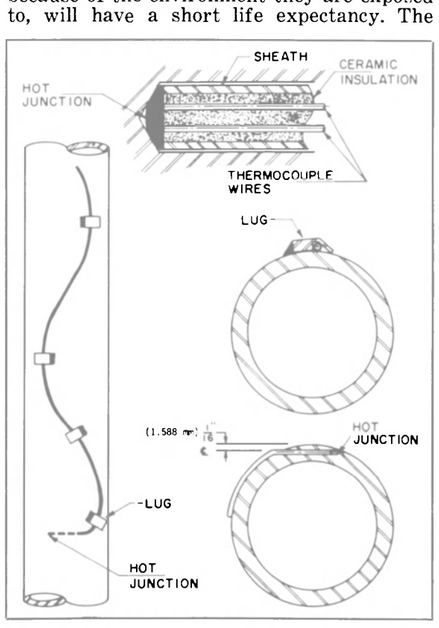


Figure 2 — Sheathed thermocouple.

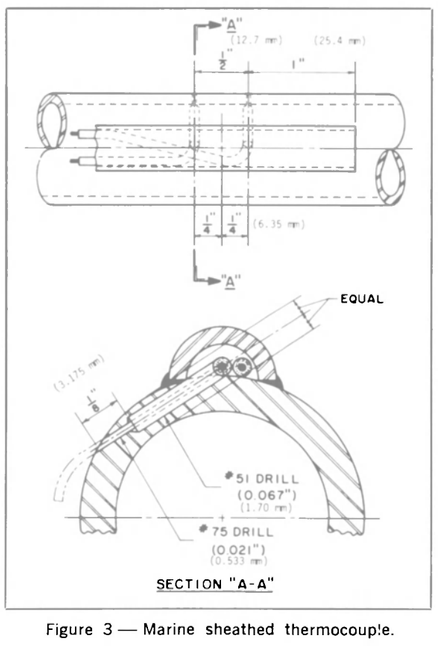


Figure 3 — Marine sheathed thermocouple.

Task 6: Boiler Water And Feedwater

As a result of this study, several items have been identified which require particular attention in order to maintain the plant such that routine feedwater maintenance procedures will be effective. These areas are as follows:

Makeup-water preparation: If dissolved salts were permitted in boiler water, the internal surfaces would quickly scale up and the boiler would suffer severe overheating damage due to the scale interfering with normal heat transfer. Heavy scale can form in evaporators, adversely affecting heat-transfer capacity and purity of the distillate. Various chemical additives are available which permit higher saline concentrations. These include antisealants, dispersants, and foaming agents which are effective in controlling scale and foaming. By permitting higher concentrations of seawater, heat losses are reduced, while at the same time limiting scaling and carryover.

Thermal deaerators: A properly maintained deaerating feed heater will lower dissolved oxygen levels to the five to seven parts per billion range, thereby allowing final oxygen removal to be accomplished by use of normal amounts of sodium sulfite or hydrazine feed. It is recommended that deaerators be inspected regularly (not less than once every two years) for proper mechanical condition and that instructions for their proper use be strictly adhered to.

It should be further noted that, while virtually all steam-propelled vessels are fitted with deaerators, many nonsteam vessels which contain auxiliary steam systems are not so equipped. A thermal deaerator is the simplest and perhaps least expensive means of effective oxygen removal and its use in all marine steam systems, main or auxiliary, is highly recommended.

Condenser tube leakage: This is a widely encountered problem within the marine industry. In general, normal chemical feed additives and boiler water treatment can handle saline concentrations below 1.0 grains per gallon (17.1 ppm) and hence most salinity alarms are set at this value. Once excessive salinity is detected, it is imperative that corrective action be taken as soon as possible.

Condensate cycle materials: Although the majority of vessels have been equipped with only 90-10 copper-nickel, occasional reports indicated that there is some aluminum-bronze and aluminum-brass remaining on the older vessels. This should be removed as soon as economically feasible. In the case of condenser tubing, 90-10 and 70-30 copper-nickel will give substantially longer life, particularly if a vessel is forced to spend a large portion of its time in polluted coastal waters. A good economic choice is 90-10, which several recent studies have shown to be more resistant than 70-30 in polluted, brackish waters.

The higher cost of the 70-30 has been a significant deterrent in the past, but the changing economics with regard to fuel ver-

sus downtime should justify a review of these factors.

Use of hydrazine: The use of hydrazine in the preboiler system for oxygen control imposes certain restrictions on the proper handling of the components at the low-pressure end of the system. Hydrazine is completely broken down in passing through the superheater, the reaction products being nitrogen, hydrogen, and ammonia.

When it is realized that analysis of a boiler deposit specimen often reveals a content of 25 to 50 percent copper, it is apparent that corrosion in the low-pressure end of the system is a significant contributor to the total amount of foreign material which interferes with heat transfer. If it is found that both oxygen and ammonia are in high concentrations, it may be desirable to modify the amount of hydrazine injected, as well as where it is added to the cycle.

Carryover: If deposits of sodium salts are found in the superheater, boiler water carryover in the steam is indicated. If only an oxide buildup is found, an iron-steam reaction is the probable cause. Pitting of tubes occurs during outages due to the ingress of oxygen. Strict attention must be given, therefore, to proper layup procedures during outages.

Acadian Awarded Multi-ship Contract For Offshore Mexico

The Acadian Victory shown above is one of Acadian Marine Services' 176-foot, 3,100-hp "Freedom" class offshore supply vessels.

Acadian Offshore Services, Inc., one of the Acadian group of companies based in New Orleans, La., has been awarded long-term contracts for three of its 176-foot, 3,100-horsepower, "Freedom" class offshore supply vessels. The vessels will operate on behalf of PEMEX, the Mexican state-owned oil company, in the Bay of Campeche, supporting PEMEX's exploration and production platforms.

The Acadian group operates a fleet of offshore supply vessels, containerships, and seismograph/research ships in various parts of the world, including the Gulf of Mexico, the Caribbean Sea, the North Atlantic Ocean, and off the coast of West Africa.

Northwest Marine Services To Market PSI Mini-Thruster

Northwest Marine Services Corp., a propulsion controls specialist and marine consultant firm, has recently signed a distributorship agreement with Propulsion Systems, Inc. to market the PSI mini-thruster.

Bow and stern thrusters have long provided convenience, safety, and cost savings for large vessels. PSI 16- and 24-inch-diameter mini-thrusters now offer the small craft operator much greater maneuverability in tight spots and in adverse weather. PSI mini-thrusters help a working boat take a position faster and permit it to maintain a required position and heading. The 16-inch-diameter is rated from 10 hp to 56 hp. The 24-inch-diameter is rated from 40 hp to 112 hp.

Northwest Marine Services Corp., which provides the mini-thrusters as part of a complete package, including the hydraulics, controls, and the installation assistance, is located at 4413 Leary Way N.W., Seattle, Wash. 98107.

Globe Engineering Repairs First Big Containership In South Africa

The 51,000-dwt containership S/A Winterberg in Cape Town's Sturrock drydock, with Globe Engineering workshops visible at the left.

Repairs have recently been completed on Safmarine's 51,000-dwt twin-screw container vessel S/A Winterberg. This was the first time that a containership of this size was drydocked and refitted in South Africa.

The year-old French-built vessel was brought to Cape Town for drydocking and completion of builders guarantee items. The contract undertaken by Globe Engineering Works included pipework, insulation, steel work, and miscellaneous mechanical repairs. Globe was also requested to modify the vessel's rudder pintle. The job required removal of the rudder pintle and replacement of the stainless-steel pintle liner with one of bronze. In addition, a new stainless-steel gudgeon bush was machined and fitted.

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Mr. Emory Kerr, Sea Operations

SEA-LAND INDUSTRIES, INC.

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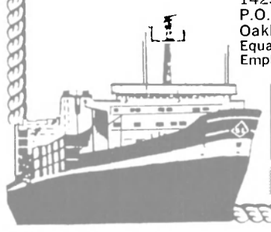

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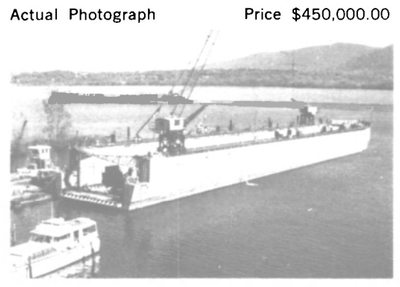

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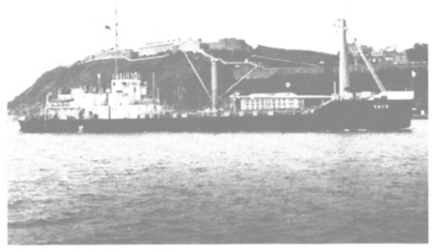

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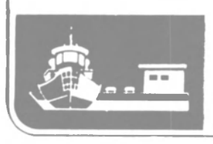

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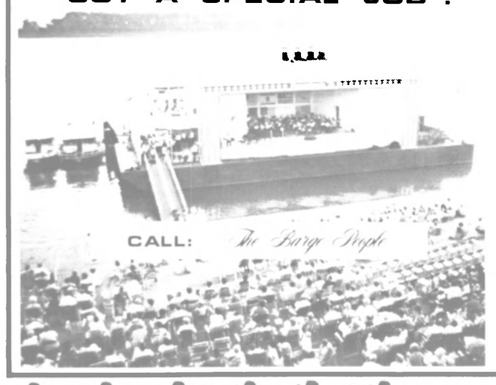

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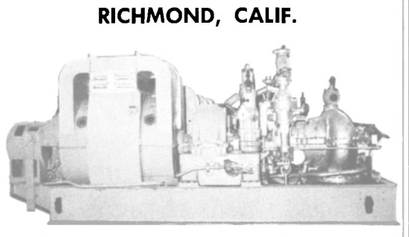

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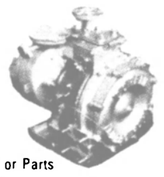

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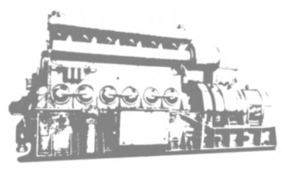

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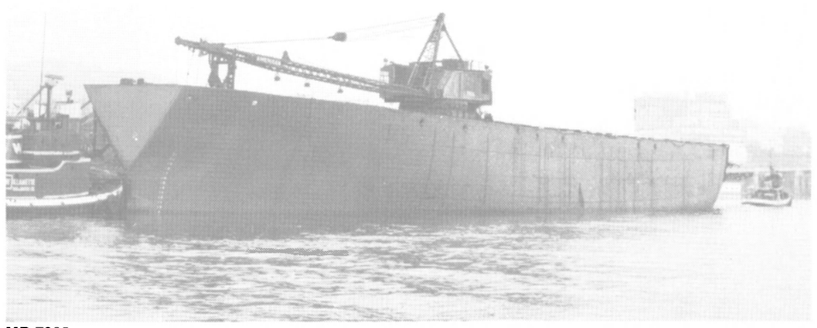

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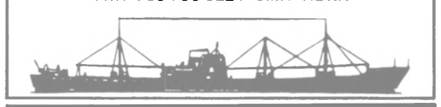

GEAR UNITS

THREE — New double reduction in line gear units with the following features,

- Manufactured by Lufkin
- A.B.S. Certified
- 14,000 & 15,000 H.P. continuous load rating
- Clutches and brakes included
- **Immediate availability**
- Engineering changes — on request
- Guarantee available

For further information write or telephone:

Watts Enterprises, Inc.
20 Church Hill Road
P. O. Box 269
Newtown, Connecticut 06470

Telephone: 203/426-8107

Coast Guard & Navy Approved
Marine Valves & Fittings 1/8" to 72"
"When you need it yesterday"
IRON • STEEL • ALUMINUM • BRONZE • STAINLESS • ALLOYS

VALVES

Cross, Angle, Manifold, Cargo, Scupper, Inverted vent, Globe, Angle, Gate, Indicator, Stop Checks, Check, Cleanouts . . . . .

"We got it", "We'll get it", or "We'll make it"

Free Phone: 800-221-9672 In New York State 212-EM 1-2111

Metropolitan Plb. Supply Corp., 5000 2nd St., L.I.C., N.Y. 11101

SPECIAL OFFER

Large quantity galvanized towline shackles. Threaded safety pin, nut and cotter — $9.50 ea.

BOW DIAM.	BOW INSIDE	PIN DIAM.
15/8"	51/8" x 21/4"	15/8"

Deck pads for securing cargo — $5.00 ea.

BASE PLATE	BOW DIAM.	BOW INSIDE
11" x 4" x 5/8"	1"	4 1/2" x 4"

QUANTITY DISCOUNTS

10% for 50 or more — 15% for 100 or more

STRIEGEL SUPPLY & EQUIPMENT CORP.
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301-355-7922

SYNCRO LIFT® DRYDOCKS AND TRANSFER SYSTEMS

Estimates at no cost or obligation
PEARLSON ENGINEERING CO., INC.
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TELEX 051-9340/CABLE: SYNCROLIFT

15½" & 16" CLEAN BRASS 4-DOG MARINE

PORTLIGHTS

15½" CLEAR OPENING
16" CLEAR OPENING

Recently carefully hand removed from ocean vessels. Suitable for re-use on shipyard conversions or for marine ornamental use. Heavy marine standard glass . . . clear or can be furnished frosted for use in special locations.

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313 E. Baltimore St. Baltimore, Md. 21202
Marine Warehouse (301) 752-1077

FROM OUR QUICK DELIVERY DEPARTMENT

FOR T-2 TANKERS

- Rotors for G.E. 525KW DORV-325M aux. turbo-gen. sets. Also rotors for Westinghouse 538KW turbo-gen. sets.

- G.E. Main Turbine Rotors — Lynn and Schenectady
- 75/55 KW Excitation Armatures for auxiliary generators

- G.E. Revolving Field — August 1979 Certificate — for immediate delivery
- 1 Main circulating pump — complete — Ingersoll-Rand 24CVM. New certif. 1979 — completely rebuilt.
- Forced Draft Fan Motors — Westinghouse
- Cargo Pumps — 6GTM — 2000 GPM @ 280' head

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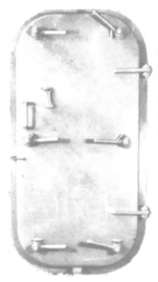
FOR SALE

NEW WATERTIGHT DOORS



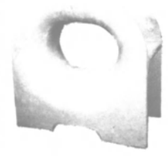
6-Dog* right and left hand hinged doors with frames. Constructed of 1/4" steel plate and meet Coast Guard regulations for above deck as well as below deck use. All dogs are bronze bushed.

SIZE

26"x48" 26"x66"
26"x60" 30"x60"

EACH DOOR

IMMEDIATE DELIVERY



NEW 7" RADIUS PANAMA CHOCKS
(MEET PANAMA REGULATIONS)
14" X 10" CLEAR OPENING

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

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313 E. Baltimore St. Baltimore, Md. 21202
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NEW — UNUSED

MOTOR DRIVEN ROTARY HORIZONTAL PUMPS

700 GPM @ 150 PSI. Inlet 8" — outlet 6". Powered by 4-speed 440/3/60 motor. 100/75/50/37.5 HP — 1200/900/600/450 RPM — with Cutler-Hammer control. Weight 10,000 lbs.

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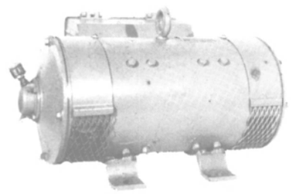
M. G. SETS

FOR GENERAL RADIO AND ELECTRONICS USE



1/4 KVA OUTPUT

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

$225 each

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The BIG ONES at ZIDELL

FOR SALE—RENT—CHARTER

Ready To Go To Work NOW

200-TON FLOATING CRANE

Diesel Electric

MR 7601

VESSEL CHARACTERISTICS
200-TON LIFTING CAPACITY

LENGTH OVERALL ..... 140 FT.
BEAM ..... 84 FT.
DRAFT ..... 7 FT.
LIGHT DISPLACEMENT ..... 2,334 TONS
ALL STEEL CONSTRUCTION
ELECTRIC REVOLVING TYPE — FULL 360°
WEB BOOM ..... 146 FT.
MAIN HOIST: 200-Ton—By 2 only, 8 part blocks. Each block carries 2,050 ft. of 1½", 6 x 37 I.P.S. wire rope (New).
AUX. HOIST: 25-Ton—By 1 only 4 part block. Block carries 1,110 ft. of 1⅜", 6 x 37 I.P.S. wire rope (New).

ADDED FEATURES

1. Diesel Electric Powered with G.M. 8-278A diesel engine (engine just majored) and 300 KW, 230 volt Generators. Both in A-1 first class condition.
2. All New Wire Rope Throughout.
3. All sheaves, bushings and sheave pins have been removed, inspected and replaced in Good Condition.
4. All Electrical systems and controls have been placed in good operating condition.
5. Large Fuel Tank Capacity.
6. 25 Ton auxiliary hoist has full 140 ft. of boom travel.
7. Two main hoist drums can be operated independently.

AVAILABLE FOR INSPECTION AND DEMONSTRATION AT OUR PIER — PORTLAND, OREGON

Contact: Hugh Sturdivant
Sales Manager
Phone: 503/228-8691

and 2 FLOATING DOCKS

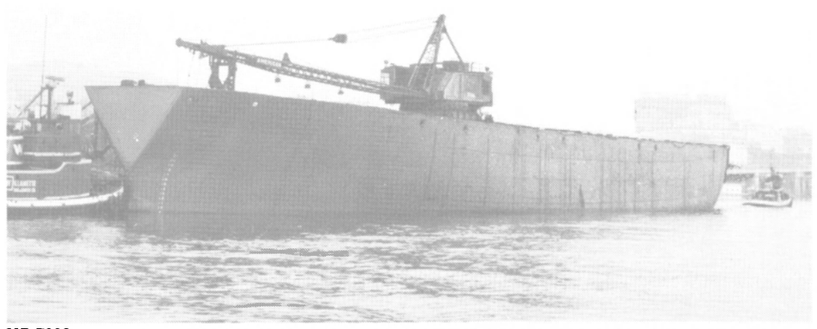
with 50-Ton Whirley Cranes

VESSEL CHARACTERISTICS

LENGTH OVERALL ..... 442 FT.
BEAM ..... 57 FT.
DRAFT ..... (Light Displ.) 14 FT.
CRANES: Main Hoist 50 Tons
Whip Hoist 10 Tons
Boom 105 Ft.

Check these ADDED FEATURES

- 400 ft. Whirley Track on deck.
- 564,000 Cubic ft. of inside storage—5 Holds
- YES—IMMEDIATELY Available for Use.
- 3 Units in One—A Dock, A Whirley Crane and Large Dry Storage Facility.



MR 7602

Available for inspection and demonstration at our pier—Portland, Oregon

Contact: **Hugh Sturdivant**
or A. D. Canulette, Jr.
Phone: 503/228-8691
Telex: 36-0503 • Cable "ZIDELL"

ZIDELL EXPLORATIONS, INC.
3121 S.W. Moody Avenue
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Phones: Hoboken (201) 792-0500

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TWX 710-730-5224 CMH HBKN

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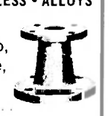

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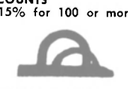

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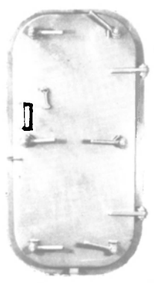

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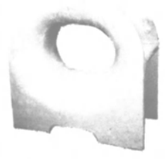

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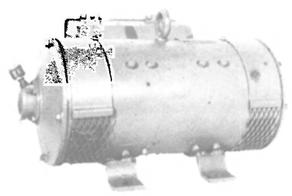

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$225 each

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Marine Warehouse (301) 752-1077

Is your company name & address listed on the next two pages?

(Are your competitors listed?)

BUYERS DIRECTORY

AIR & GAS PURIFICATION
Robbins Aviation, Inc., 3817 Santa Fe Ave., Vernon, CA 90058

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Adrick Cooling Corp., 30 B. Remington Blvd., Ronkonkomo, N.Y. 11779
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
R.W. Fernstrum & Company, 1716 Eleventh Avenue, Menominee, MI 49858
James D. Nall Co., Inc., 3195 NW 20th Street, Miami, FL 33142
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101
York Division (Borg-Warner Corp.), P.O. Box 1592, York, PA 17405

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

BLASTING—Cleaning—Equipment
GMMC/Porta-Shotblast, 1112 Davidson Road, Nashville, Tenn. 37205
Pepper Industries, Inc., P.O. Box 11367, San Diego, CA 92111

BOILERS—Tube Cleaning
Combustion Engineering, Inc., Windsor, Connecticut 06095
Way-Wolff Associates Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

BRAKES
Goodyear Aerospace (Industrial Brakes Division), Box 477, Berea, KY 40403

BROKERS
Capt. Astad Company, Inc., P.O. Box 53434, New Orleans, La. 70153
Crown Assets Disposal Corp., 300 Notre Dame St., Ville St.-Pierre, Quebec, Canada H8R 3Z6
Daniel Yacht & Ship Brokerage Ltd., 1300 S.E. 17th St., Ft. Lauderdale, FL 33316
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
Max Rouse & Sons, Inc., P.O. Box 5250, Beverly Hills, CA 90213

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

CARGO TRANSFER & ACCESS EQUIPMENT
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, N.J. 07016

CHOCKING SYSTEMS
Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa. 18936

CLOCKS
Wempe Chronometerwerke Germany, Stubbenhulk 25 2000 Hamburg 11, Germany

COILS—Cooling, Heating, Ventilating
Colmac Coil, Inc., Colville, Wash. 99114

CONTAINERS—Cargo Container Handling
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CONTROL SYSTEMS—Monitoring
Arnessen Marine Systems, Inc., One Battery Plaza, New York, NY 10004
Foxboro Marine Operations, P.O. Box 435, Burlington, Mass. 01803
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Megasystems, Inc., 5909 West 130th Street, Cleveland, OH 44130
Seatronic Engineering & Mfg. Co., 1230 E. Joppa Rd., Towson, MD 21204
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
Transamerica Delaval, Inc., Gem Sensors Div., Spring Lane, Farmington, CT 06032

COUPLINGS
Bird-Johnson Co., 110 Norfolk St., Walpole, MA 02081

CRANES—HOISTS—DERRICKS—WHIRLEYS
Clyde Iron, a unit of AMCA International Corp., Suite 102, 2300 West Loop South, Houston, TX 77027
M. P. Howlett, Inc., 410 32nd St., Union City, N.J. 07087
J.D. Neuhaus, Witten-Heven, Hebezeuge, D 5810 Witten-Heven, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

DECK COATINGS—Non-skid
Selby, Battersby & Co., 5220 Whiby Ave., Philadelphia, PA 19143

DECK MACHINERY—Cargo Handling Equipment
Appleton Machine Co., Marine Division, 618 S. Oneida St., Appleton, WI 54911
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
New England Trawler Equipment Co., 291 Eastern Ave., Chelsea, MA 02150

DIESEL ACCESSORIES
B & W Marine Service, One State Street Plaza, New York, N.Y. 10004
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360
Golten Marine Company, Inc., 162 Van Brunt Street, Brooklyn, NY 11231

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

DRAFTING EQUIPMENT
AM Bruning, 1834 Walden Office Square, Schaumburg, IL 60196

ELECTRICAL EQUIPMENT
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N.Y. 10013
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014
Port Electric Supply, 157 Perry Street, N.Y., N.Y. 10014
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS
American United Marine Corp., 575 Madison Ave., New York, NY 10022
Hoffert Marine, Inc., 265 Franklin Ave., Nutley, N.J. 07110

EQUIPMENT—Marine
Argo Marine, Div. of Argo Intl., 140 Franklin St., New York, N.Y. 10013
Baldt, Inc., P.O. Box 350, Chester, PA 19016
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550
Schnitzer-Levin Marine Co., 445 Littlefield Ave., So. San Francisco, CA 94080
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

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

EXPANDED METALS
Washington Iron Works, 1500 Sixth Avenue South, Seattle, WA 98134

FANS—VENTILATORS—BLOWERS
Hartzell Propeller Fan Company, 901 S. Downing Street, Piqua, OH 45356
Joy Manufacturing Co., 338 So. Broadway, New Philadelphia, Ohio 44663
Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Dock & Vessel
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Johnson Rubber Co. (Marine Div.), 16025 Johnson St., Middlefield, Ohio 44062
Morse Chain Company, Div. Borg Warner, So. Aurora St., Ithaca, N.Y. 14850
Seaward International, Inc., 6269 Leesburg Ave., Falls Church, Va. 22044

FINANCING—Leasing
Continental Illinois National Bank, 231 S. LaSalle, Chicago, IL 60693
General Electric Credit Corp., P.O. Box 8300, Stamford, Conn. 06904
Greyhound Leasing & Financial Co., Greyhound Tower, Phoenix, AZ 85077
Kidder, Peabody & Co., Inc., 10 Hanover Square, New York, N.Y. 10005
Salomon Brothers, One New York Plaza, New York, N.Y. 10004
Warburg Paribas Becker, Inc., 2 First National Plaza, Chicago, Ill. 60670

FITTINGS & HARDWARE
Custom Alloy, 2040 N. Loop W., Houston, TX 77018
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

FURNITURE
Bailey Joiner Co., Inc., 74 Sullivan Street, Brooklyn, N.Y. 11231
IDT Corp. (Intersystems Design & Technology Corp.), P.O. Box 1590, Summerville, S.C. 29483

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

HATCH & DECK COVERS—Chain Pipe
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, N.J. 07016
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027
Julius Mack & Sons, Inc., 20 Vesey St., New York, NY 10017

HULL CLEANING
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932
Phosmarin Equipment (Phoceenne Sous-Marine S.A.), 21 Boulevard de Paris, 13002 Marseille, France
Sub Enterprises, Inc., P.O. Box 16531, Irvine, CA 92713

HYDRAULICS
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229

INERT GAS—Generators—Systems
Camar Corporation, P.O. Box 460, Worcester, MA 01613
Foster Wheeler Boiler Corp., 110 So. Orange Ave., Livingston, N.J. 07039
Fredriksstad mek. Verksted, N. American Agents, American United Marine Corp., 575 Madison Ave., New York, N.Y. 10022

INFORMATION—Marine
Maritime Data Network, 300 Broad Street, Stamford, CT 06901

INSULATION—Cloth, Fiberglas
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Dupont Company, Nemours Bldg.-RM C31H6, Centre Rd. Bldg., Wilmington, DE 19898
IDT Corp. (Intersystems Design & Technology Corp.), P.O. Box 1590, Summerville, S.C. 29483

INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Adams & Porter, 5 World Trade Center, Suite 6433, New York, N.Y. 10048
Alexander & Alexander, Inc., 1185 Ave. of the Americas, New York, N.Y. 10036
Midland Insurance Co., 160 Water St., New York, N.Y. 10038
Whitehall Brokerage, Inc., 17 Battery Place, New York, NY 10004

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

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

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Oceanic Electrical Mfg. Co., 157 Perry Street, New York, N.Y. 10014
Oreck Corp., 100 Plantation Rd., New Orleans, LA 70123
Perko Inc., P.O. Box 6400D, Miami, Florida 33164
Phoenix Products Company, 4785 North 27th Street, Milwaukee, WI 53209
Port Electric Supply Corp., 157 Perry Street, New York, N.Y. 10014

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McDonnell Douglas Astronautics Co., 5301 Bolsa Ave., Huntington Beach, CA 92647

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R.N. Templeman, Inc., 3000 Perdido St., New Orleans, LA 70119

MACHINE TOOLS
Climax Manufacturing Company, P.O. Box 230, Newberg, OR 97132
Master Machine Tools, Inc., 1300 East Avenue A, Hutchinson, Kansas 67501

MACHINERY MAINTENANCE, REPAIR, AND OVERHAUL
General Electric Company — Bldg. 2, Rm 216, Schenectady, N.Y. 12345

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

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., Suite 500, 2341 Jefferson Davis Highway, Arlington, Va. 22202
Agemar, Avenida 3E No. 71-51, Edif. Acuario (Planta Baja) Apartado 1465, Maracaibo, Venezuela
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, Md. 20015
J.L. Bludworth, 8207 Glen Loch, Houston, Texas 77061
Del Breit Inc., 326 Picayune Place (Suite 201), New Orleans, LA 70130
CCS Marine Associates Ltd., 2784 Crescentview Drive, N. Vancouver, B.C. Canada V7R2V1
C.D.I. Marine Co., Regency East, Suite 222, 9951 Atlantic Blvd., Jacksonville, Florida 32211
CTS & Associates, 11320 S.W. 108 Court, Miami, Fla. 33176
CADCOM, 107 Ridgely Ave., Annapolis, MD 21401
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
John P. Colletti & Associates, P.O. Box 13378, Pittsburgh, PA 15243
Columbia-Sentinel Engineers Western, Inc., P.O. Box 21542, Seattle, WA 98111
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, Mass. 02026
Crane Consultants Inc., 15301 1st Ave., So. Seattle, Washington 98148
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Norman N. DeJong & Associates, Inc., 1734 Emerson St., Jacksonville, Fla. 32207
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners Inc., One State Street Plaza, New York, N.Y. 10004
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Christopher J. Foster, Inc., 16 Sintsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman, Ltd., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
L.R. Glosten & Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, Wash. 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
Hampton Roads Engineering, Inc., 119 E. Little Creek Rd., Norfolk, VA 23505
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hydronautics, Incorporated, 7210 Pindell School Road, Howard County, Laurel, Maryland 20810
Jantzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Krogen & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
MacLear & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Technical Associates, Inc., 195 Paterson Avenue, Little Falls, NJ 07424
Maritime Service Company, 1357 Rosecrans St., Suite B, San Diego, CA 92106
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
Mechanical Resources Inc., 191 Cambridge Avenue, Jersey City, N.J. 07307
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Harry Meneian, 15 Lakeshore Rd., St. Catharines, Ontario, Canada L2N 2S7
Metritape, Inc., 33 Bradford Street, Concord, MA 01742
Nelson & Associates, Inc., 1405 N.W. 167th Street, Miami, FL 33169
Nickum & Spaulding Associates, Inc., 911 Western Ave., Seattle, WA 98104
Norgaard and Clark, 114 Sansome St., San Francisco, CA 94104
Ocean-Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 SW 57th Ave., Fort Lauderdale, Fla. 33317
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
Sargent & Herkes, Inc., 611 Gravier St., New Orleans, La. 70130
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
Seacor Systems Engineering Associates, Corp., P.O. Box 2030, 19 Cherry Hill Industrial Park, Perina Blvd., Cherry Hill, NJ 08003
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver, Canada V5Y 1N2
The Stanwick Company Maritime Systems Department, 3661 E. Virginia Beach Blvd., Norfolk, VA 23502
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Arne G. Svendsen, 58 Bonniefield Drive, Tiverton, R.I. 02878
Richard R. Taubler Inc., 8 Columbia St., Milford, Del. 19963
Thames Engineering Consultants Inc., P.O. Box 589, New London, Ct. 06320
Timsco, 951 Government St., Suite 2161, Mobile, Alabama 36604
Corning Townsend III, 18 Church St., Georgetown, CT 06829
Undersea Systems, 112 W. Main St., Bay Shore, N.Y. 11706
Wesley D. Wheeler Associates, Ltd., 104 East 40 St., Suite 207, New York, N.Y. 10016
Thomas B. Wilson, 920 North Avalon Blvd., Wilmington, CA 90744

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Collins Marine Corp., Pier 32, San Francisco, CA 94105
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Comsat General Corp., 950 L'Enfant Plaza, S.W., Washington, D.C. 20024
Dantronics Co., P. O. Box 673, Rye, NY 10580
Electro-Nav, Inc., 1201 Corbin St., Elizabeth Marine Terminal, Elizabeth, N.J. 07201
EPSCO, Inc., 411 Providence Highway, Westwood, Mass. 02090
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Galbraith Pilot Marine Division, 166 National Road, Edison, NJ 08817
Harris Communications, RF Communications Division, 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07631
ITT Decca Marine Inc., P.O. Box G, Palm Coast, Fla. 32037
ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Intermarine Electronics, Inc., Flowerfield Bldg. #7, St. James, N.Y. 11780
Iotron Corp., 5 Alfred Circle, Bedford, MA 01730
Krupp Atlas—Elektronik, A Div. of Krupp Intl. Inc., P.O. Box 68218, Houston, Texas 77058
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503
Maritel Inc., 2510 Riva Road, Annapolis, Md. 21401
Motorola Communications & Electronics Inc., 17-22 Whitestone Expressway, Whitestone, NY 11357
Nav-Com, Inc., 2 Hicks Street, North Lindenhurst, N.Y. 11757
Navidyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Navigation Communications Systems, Inc., 20100 Plummer Street, Chatsworth, CA 91311
North American Philips Communication Corp., 91 Mckee Road, Mahwah, N.J. 07430
RCA Service Co., Building 204-2, Camden, N.J. 08101
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Rockwell International, Collins Telecommunications Products Division, Cedar Rapids, IA 52406

Simrad Inc., 1 Labriola Court, Armonk, N.Y. 10504
SI-TEX, P.O. Box 6700, Clearwater, FL 33518
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Texas Instruments Inc., P.O. Box 226080, M/S 3107, Dallas, TX 75265
Tracor, Inc., Industrial Products Div., 6500 Tracor Lane, Austin, Texas 78721

OILS—Marine—Additives
Ferrous Corporation, P.O. Box 1764, Bellevue, WA 98009
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77001
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
A. Margolis & Sons Corp., One World Trade Center, Suite 8751, New York, N.Y. 10048
Mobil Oil Corporation, 150 East 42nd St., New York, N.Y. 10017
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS
Alfa-Laval, Inc., 2115 Lindwood Avenue, Ft. Lee, NJ 07024
Butterworth Systems Inc., 224 Park Ave., Florham Park, N.J. 07932

PAINTS—COATINGS—CORROSION CONTROL
Belzona Molecular Metalife Inc., 224 7th Street, Garden City, NY 11530
"CONSOL" manufactured by Hanline Bros., Inc., 1400 Warner St., Baltimore, MD 21230
Devoe & Raynolds Co., Inc., P.O. Box 7600, Louisville, Ky. 40207
Eureka Chemical Company, 234 Lawrence Ave., So. San Francisco, CA 94080
International Paint Co., 17 Battery Place North, Suite 1150, New York, N.Y. 10004
Mobil Chemical Co., Maintenance & Marine Coatings Dept., P.O. Box 250, Edison, N.J. 08817
The Skybryte Co., 3125 Perkins Ave., Cleveland, OH 44114
Woolsey Marine Industries, Inc., 100 Saw Mill Rd., Danbury, CT 06810

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

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

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

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Alco Power Inc., 100 Orchard St., Auburn, N.Y. 13021
Alsthom-Atlantique, 2 quai de Seine, 93203 Saint-Denis, France
Armco Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Burmeister & Wain, One State Street Plaza, New York, N.Y. 10004
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Tractor Company, Engine Division, Peoria, IL 61629
Colt Industries' Fairbanks Morse Engine Division, Beloit, Wisc. 53511
Combustion Engineering, Inc., Windsor, Connecticut 06095
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Electro-Motive Division, General Motors Corp., LaGrange, III. 60525
Elliott Company, (Div. of Carrier Corp.), Jeanette, PA 15644
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16531
MTU of North America, Inc., 10450 Corporate Drive, Sugar Land, TX 77478
Maritime Industries, Ltd., 6307 Laurel St., Burnaby, B.C. Canada V5B 3B3
Michigan Wheel/Gulf Coast, P.O. Box 1528, Pascagoula, MS 39567
Motive Power Corp., P.O. Box 365, Mineola, NY 11501 70124
Omnithruster Inc., 16837 So. Normandie Ave., Gardena, CA 90247
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Propulsion Systems Inc., 21213 76th Ave., So., Kent, WA 98031
Schottel of America, Inc., 8375 N.W. 56 Street, Miami, Fla. 33166
Tacoma Boatbuilding Co./Escher Wyss, 1840 Marine View Dr., Tacoma, WA 98422
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica Delaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Voith Schneider of America—U.S. Agent: Eli Sharprut, 347 Evelyn St., Paramis, N.J. 07652

PUMPS—Repairs—Drives
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Transamerica Delaval, Inc., IMO Pump Div., P.O. Box 321, Trenton, NJ 08602
Warren Pumps, Inc., Bridges Ave., Warren, Mass. 01083
Worthington Pump Inc., P.O. Box 1250, Mountainside, N.J. 07092

REELS—Coiling Systems
Reel-O-Matic Systems, Inc., 418 Hellman St., Wrightsville, Pa. 17368

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry Street, New York, N.Y. 10014

ROPE—Manila—Nylon—Hawsers—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Jackson Rope Co., Reading, Pa. 19603
Samson Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Tubbs Cordage Co., Orange, CA 92666

RUDDER ANGLE INDICATORS
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
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.

SALVAGE
Levin Metals Corp., 1310 Canal Blvd., Richmond, CA 94807

SANITATION DEVICES—Pollution Control
Argo Marine Pollution Systems Division, 140 Franklin St., New York, N.Y. 10013
Demco, Inc., P.O. Box 94700, Oklahoma City, OK 73109
Envirovac (Division of Dometic Inc.), 1260 Turret Drive, Rockford, IL 61111
Marine Moisture Control Co., Inc., 449 Sheridan Blvd., Inwood, L.I., N.Y. 11696
Marland Environmental Systems, Inc., N. Main Street, Walworth, WI 53184
Microphor, Inc., P.O. Box 490, Willits, CA 95490
Red Fox Industries, P.O. Drawer 640, New Iberia, LA 70560
Research Products/Blankenship, 2639 Andjon, Dallas, Texas 75220
St. Louis Ship FAST Sewage Systems, 611 East Marceau St., St. Louis, Mo. 63111
Sigma Treatment Systems, 2 Davis Ave., Frazer, PA 19355

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

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT
Electric Tachometer Corp., 68th & Upland St., Philadelphia, Pa. 19142
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030

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

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004

SHIPBUILDING—Repairs, Maintenance, Drydocking
A.D.M. (Amsterdam Drydock Mfg.), Maatschappij bv, P.O. Box 3006, 1003 AA, Amsterdam, Holland
Asmar Shipyards Co., Astilleros y Maestranzs de la Armada, Prat 856, Piso 14, Casilla 150-V, Valpariso, Chile, S.A.
Astilleros Unidos de Veracruz, S.A., San Juan de Ulua S/N, Apdo. Postal 647, Veracruz, Ver., Mexico
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La. 70150
Bergeron Industries Inc., P.O. Box 38, St. Bernard, La. 70085
Bethlehem Steel Corp., One State Street Plaza, N.Y. 10004
Blohm + Voss AG, D-2000 Hamburg 1, P.O.B. 10 07 20
Blohm + Voss Co., 55 Morris Ave., Springfield, N.J. 07081
Blount Marine Corp., P.O. Box 368, Warren, RI 02885
Boeing Marine Systems, P.O. Box 3707, Mail Stop 14-11, Seattle, WA 98124
Ira S. Bushey & Sons, Inc., 764 Court Street, Brooklyn, N.Y. 11231
Camden Ship Repair Co., Inc., Point & Erie Streets, Camden, N.J. 08102
Carrington Slipways Pty, Ltd., Old Punt Road, Tomago, N.S.W., Australia 2322
Centromor, One World Trade Center, Suite 3557, New York, N.Y. 10048
China Shipbuilding Corp., c/o Allegro Transportation Supply Co., One Penn Plaza, Room 1606, New York, NY 10001
Coastal Dry Dock & Repair Co., Building 131, Brooklyn Navy Yard, Brooklyn, N.Y. 11205
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Co., Inc., P.O. Box 153, Willemstad, Curacao, Netherlands Antilles
Curacao Drydock, 26 Broadway, Suite 741, New York, N.Y. 10004
Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London Republic of South Africa
Dravo Steelship Corp., R.4, Box 167, Pine Bluff, Ark. 71602
Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, La. 70122
FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
Galveston Shipbuilding Co., P.O. Drawer 2660, Galveston, TX 77553
Halifax Industries, Ltd., P.O. Box 1477, Halifax, Nova Scotia, Canada, B3K 5H7
Halter Marine, Inc., P.O. Box 29266, New Orleans, La. 70189
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., P.O. Box 510, Brownsville, Pa. 15417
Hitachi Shipbuilding & Engrg. Co., Ltd., 47 Edobori 1-Chome, Nishi-Ku, Osaka, Japan
Hongkong United Dockyards Ltd., Kowloon Docks, Hong Kong
Hudson Shipbuilders, Inc., P.O. Box Q, Pascagoula, MS 39567
Ingalls Shipbuilding, P.O. Box 149, Pascagoula, MS 39567
Jackson/New York, 29 45 Richmond Terrace, Staten Island, NY 10303
Jeffboat, Inc., Jeffersonville, Ind. 47130
Keppel Shipyard Ltd., P.O. Box 2169, 325, Telok Blangah Road, Singapore 4
Kockums Shipyard, S-201, 10 Malmo 1, Sweden
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
J. Ray McDermott & Company, Inc., 1010 Common Street, New Orleans, LA 70160
MacGregor Land & Sea, Inc., 135 Dermody Street, Cranford, NJ 07016
Mangone Shipbuilding Co., 819 South 80th Street, P.O. Box 5446, Houston, TX 77012
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marinette Marine, Ely Street, Marinette, WI 54143
Matton Shipyard Co., Inc., P.O. Box 645, Cohoes, New York 12047
J. Ray McDermott & Co., Inc., P.O. Box 60035, New Orleans, LA 70160
Misener Industries, Inc., 5353 Tyson Avenue, P.O. Box 13625, Tampa, Fla. 33681
Mississippi Marine Towboat Corp., P.O. Box 539, Harbor Front Industrial Park, Greenville, MS 38701
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newpark Shipbuilding & Repair, P.O. Box 5426, Houston, TX 77012
Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
Norfolk Shipbuilding & Drydock Corp., P.O. Box 2100, Norfolk, Va. 23501
Northwest Marine Iron Works, P.O. Box 3109, Portland, Oregon 97208
O.A.R.N. (Officine Allestimento-Riprazioni Navi), P.O. Box 1395, Genoa, Italy 16100
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
Port Allen Marine Service, Inc., P.O. Box 108, Port Allen, LA 70767
Port Houston Marine, Inc., 7220 J.W. Peavy Drive, Houston, TX 77012
Port of Portland, P.O. Box 3529, Portland, OR 97208
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
STE Marie Yard & Marine, Inc., 741 East Portage Ave., Sault Ste Marie, MI 49783
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard Ltd., Sembawang, P.O. Box 3, Singapore 9175
Setenave-Estaleiros Navais De Setubal, P.O. Box 135, Setubal, Portugal
Sudoimport, 5 Kalyaevskaya, Moscow K-6, USSR
Sun Shipbuilding, Foot of Morton Ave., Chester, Pa. 19013
Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
Tacoma Boatbuilding Co., Inc., 1840 Marine View Drive, Tacoma, WA 98422
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Total Transportation Systems Inc., 813 Forest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 28, N5201 Oslo, Norway
Tracor Marine, P.O. Box 131087, Port Everglades, Fla. 33316
Tug Barge Systems, Inc., subsidiary of Ingram Corp., 4100 One Shell Square, New Orleans, La. 70139
Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
Valmet OY, Helsinki Shipyard, Laivanrakentajantie 2, P.O. Box 910 SF-00101 Helsinki 10, Finland
Wall Shipyard, P.O. Box 419, Harvey, La. 70058
Wiley Manufacturing, a unit of AMCA International Corp., P.O. Box 97, Port Deposit, MD 21904
Zigler Shipyards, P.O. Box 2607, Morgan City, La. 70380

SHIP STABILIZERS
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

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

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

SURVEYORS AND CONSULTANTS
Hull & Cargo Surveyors, Inc., 99 John St., New York, NY 10038

TANK CLEANING
Butterworth Systems Inc., 224 Park Ave., P.O. Box 352, Florham Park, N.J. 07932
Penco Division/Hudson Engineering Co., 1114 Clinton St., Hoboken, N.J. 07030
Salwico, Inc., 77 River St., Hoboken, N.J. 07030

TANK LEVELING INDICATORS
Transamerica Delaval, Inc., Gem Sensors Div., Spring Lane, Farmington, CT 06032
Vu-Gage System, 150 E. 42nd St. (Room 910), New York, NY 10017

TERMINALS—Oil-Transfer
Delong Corp., 29 Broadway, New York, N.Y. 10006
Transportation Concepts & Techniques, Inc., 551 Fifth Avenue, New York, N.Y. 10017

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Chotin Transportation, Inc., 580 Walnut St., Cincinnati, Ohio 45202
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, 21 West Main St., Oyster Bay, N.Y. 11771
Gulf Fleet Marine Corporation, Canal Place One, Suite 2400, New Orleans, LA 70130
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Suderman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
Turecamo Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305

UNDERWATER SERVICES—Cantracting
SeaTec International Ltd., Blackburn Industrial Center, Gloucester, MA 01930

VALVES AND FITTINGS
American United Marine, Corp., 575 Madison Ave., New York, NY 10022
Dover Corporation, Norris Division, P.O. Box 1739, Tulsa, OK 74101
Demco, Inc., P.O. Box 94700, Oklahoma City, Okla. 73109
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Marland Environmental Systems Inc., N. Main St., Walworth, WI 53184
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027
Rockwell International, Flow Control Division, 400 N. Lexington Avenue, Pittsburgh, PA 15208
Stacey Valve Co., 29 Meserole Ave., Brooklyn, N.Y. 11222
Voss, Inc., Building J, 7029 Huntley Road, Columbus, Ohio 43229
Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186

VIDEO EQUIPMENT
Video Library Systems, 185 Osoer Avenue, Hauppauge, NY 11787

WEATHER FORECASTS
ERT, 696 Virginia Road, Concord, Mass. 01742
Oceanographic Services, P.O. Box 6783, Santa Barbara, CA 93111

WELDING SYSTEMS
MK Products, Inc., 16882 Armstrong Ave., Irvine, CA 92705

WINCHES AND FAIRLEADERS
Bloom Inc., Highway 20, West Four Miles, Independence, IA 50644
Clyde Iron, a unit of AMCA International Corp., Suite 102, 2300 West Loop South, Houston, TX 77027
Gearmatic Co. Ltd., 7400 132nd Street, Surrey, B.C., Canada
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Smith-Berger Manufacturing Corporation, 3236 16th Avenue S.W., Seattle, WA 98134

WINDOWS
Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550

WIRE AND CABLE
Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Olive St., Houston, TX 77007

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

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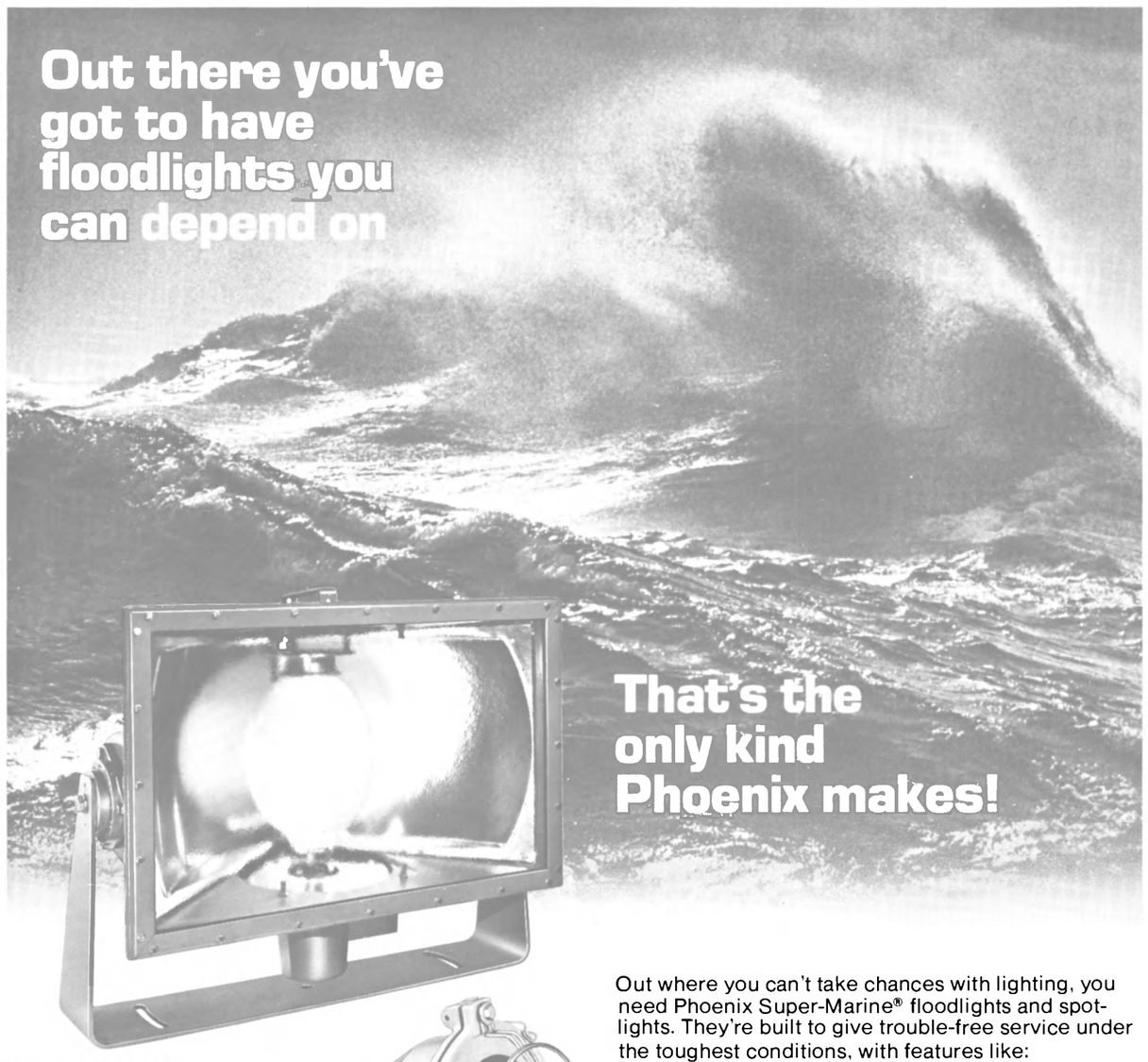

Model SRS-E-1000 wide beam 1000 watt floodlight

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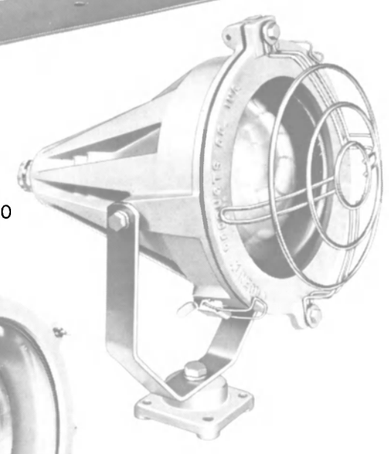

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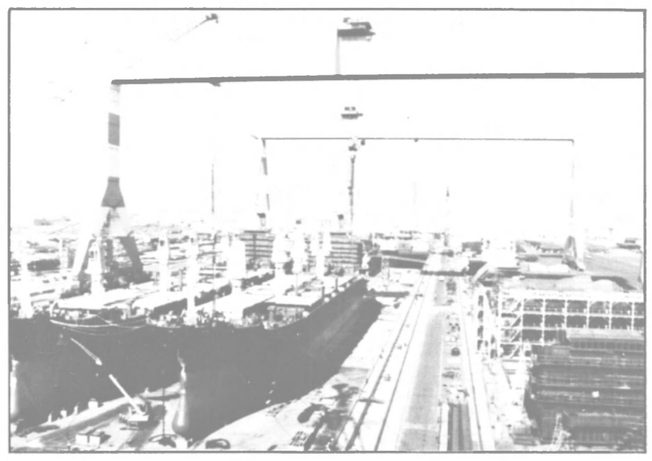

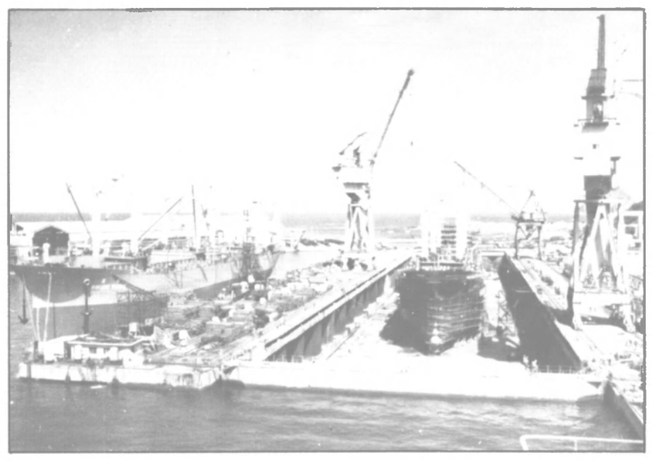

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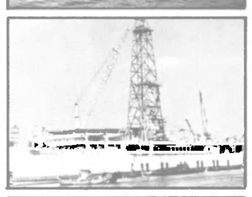

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