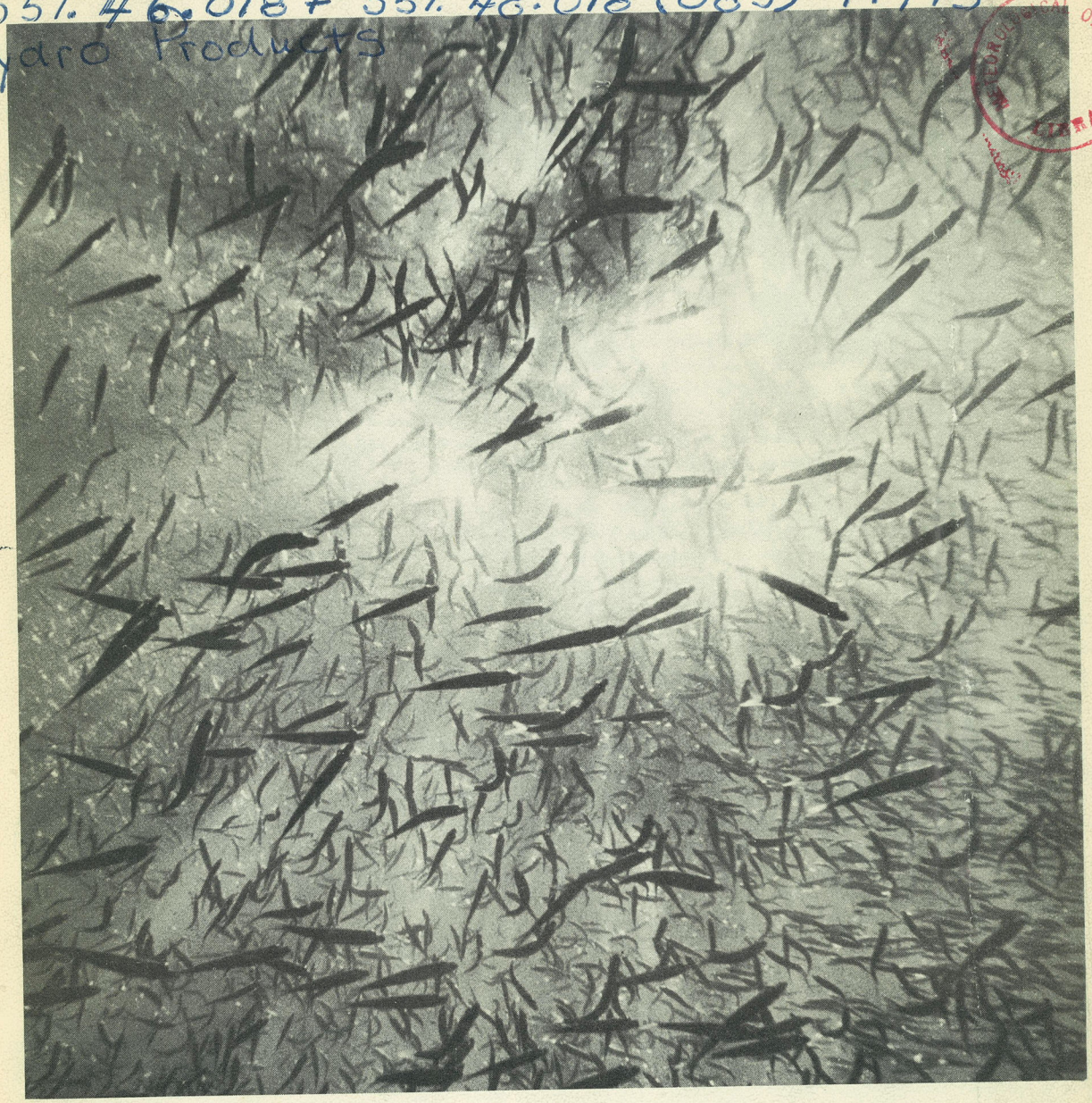
551.46.018 + 551.48.018 (085) H995
Hydro Products



catalog of instruments and equipment for the marine environment

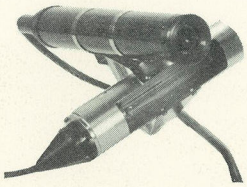
HYDRO PRODUCTS

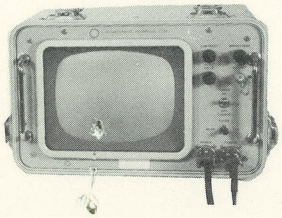
division of Oceanographic Engineering Corporation

P. O. BOX 10766 SAN DIEGO, CALIFORNIA PHONE (714)-453-2345

FEB 15 1965

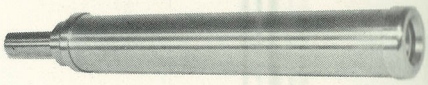
OEC T.V. SYSTEMS FOR



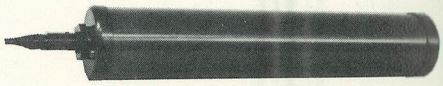


OEC UNDERWATER TELEVISION SYSTEMS have found wide acceptance in an amazingly broad array of underwater vision applications, such as explorations, surveys, salvage operations, mining, pipeline inspection, rescue and police work, offshore drillings, deep submergence vehicle visibility, ship hull inspection, etc. In addition to the obvious value of achieving visibility in places inaccessible to human observers, OEC's research has yielded systems with visibility range considerably in excess of a diver's under adverse turbidity conditions. TURBIDITY PENETRATION is achieved by optimizing optics, illumination, and video signal processing in OEC Underwater Television Systems. All OEC television systems and equipment have been thoroughly engineered and tested by years of field use to achieve simplicity of operation and reliability of performance under the widest and most adverse range of environmental conditions.

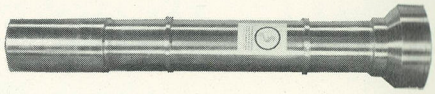
THE MODEL TC-100 UNDERWATER TELEVISION CAMERA is thoroughly field proven and is the most reliable underwater television camera in existence. It produces a clear, high resolution picture of objects at ranges of from three inches to infinity and, over cables up to 12,000 feet in length, is available with housings to meet any depth requirement. Its 10,000 to 1 automatic light compensation assures good pictures in the widest range of light conditions.



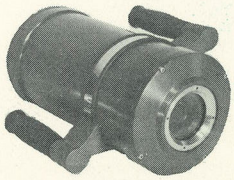
THE TC-200 TELEVISION CAMERA is a smaller camera for shallow depth manual focus use. It has been used extensively for pipeline inspection as well as vehicle and diver operated applications. Its picture quality is equal to that of the Model TC-100, and it is fully as rugged and impervious to the hazards of the marine environment.



THE OEC MODEL TC-140 DEEP EYE CAMERA has operating capability for depths of 7,500 fathoms. If such depths are ever discovered in the ocean, the Deep Eye will probably be the first to see them. Applications include use on the bathyscaph, TRIESTE, and other deep submergence vehicles. It utilizes the circuitry and optical elements of OEC's field proven Model TC-100 Camera.

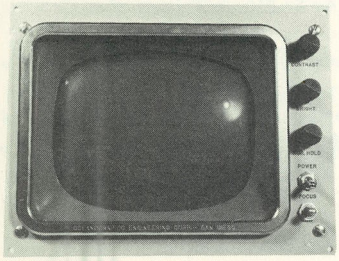


THE TC-300 HYDRO EYE TELEVISION CAMERA was designed to provide an inexpensive camera for applications wherein depth requirements are 1,000 feet or less. It retains all of the reliability and quality of OEC's better known deep cameras; can be used with any of OEC's monitors; operates from 120 volt, 60 cycle, AC voltage; and does not require an external power supply.



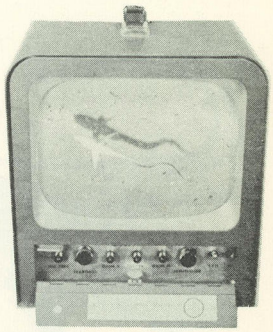
EVERY UNDERWATER APPLICATION

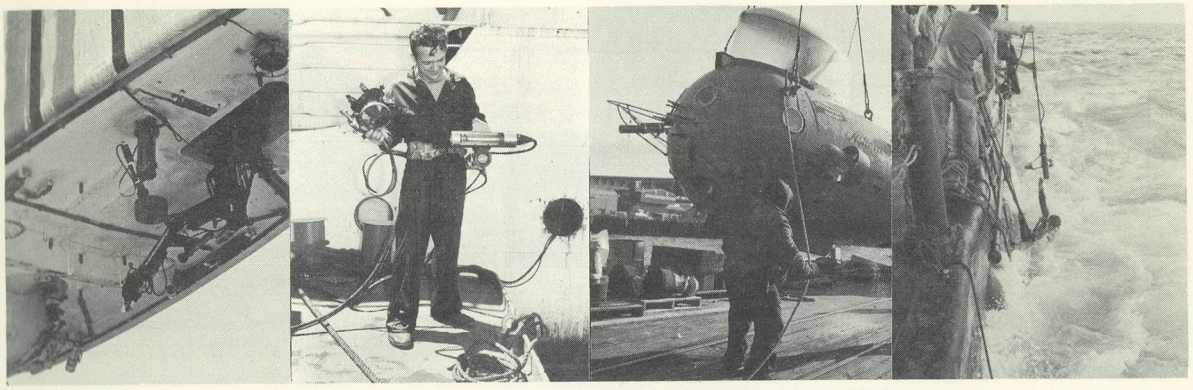
THE OEC MODEL TM-1 PORTABLE TRANSISTORIZED TELEVISION MONITOR is the finest and most reliable monitor ever developed. In addition to its field proven battleship ruggedness, it has numerous performance features unavailable in any other unit, such as ability to run for two hours on its own internal battery while supplying power and remote focus control to an OEC television camera, AC line voltage variation tolerance of 75 volts to 140 volts, and provision for continuous operation from any external 12 volt DC source. It has fewer adjustments and controls than a home television receiver and is housed in an unbreakable, waterproof fiberglass carrying case for easy portability or shipping by common carrier.

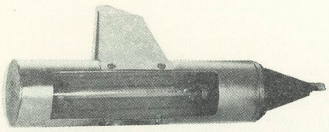


THE MORAY MINIATURE MONITOR is a variation of the Model TM-1 Portable Monitor, adapted for rack or panel mounting in deep submergence vehicles or other applications where space is a premium. It retains all of the features, the reliability, and the performance of the Model TM-1 and occupies the minimum of panel space

THE OEC AUXILIARY MONITORS are useful in many underwater television applications where the observer is in a sheltered area, or if the picture must be presented at more than one location. These high quality AC operated monitors may be connected to the video output jack of the Model TM-1 Monitor in any desired number, or they may be used directly from the output of an OEC underwater television camera. They can be equipped with camera power supply and remote focus control if desired.

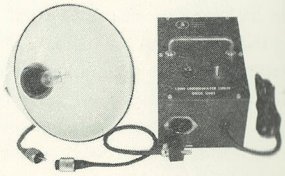


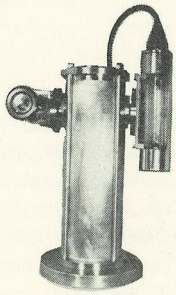




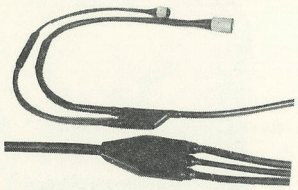
THE OEC MODEL L-2 UNDERWATER MERCURY ARC LIGHT features rugged, compact design that will provide 1000 watts of brilliant subsurface illumination in a wide range of oceanographic applications to depths of 8,000 feet. Its spectral characteristics are carefully chosen for optimum performance with all OEC underwater television cameras.

THE L-250-A UNDERWATER MERCURY ARC LAMP provides 250 watts of illumination with spectral characteristics optimized for use in sea water with OEC Underwater Television Cameras. Its beam angle of ± 40 degrees compliments the field of view of OEC's standard television cameras.



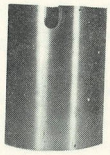


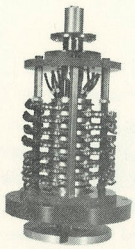
THE OEC MODEL RP-3 PAN AND TILT MECHANISM is a rugged, precision, remote-controlled manipulator for directing an OEC television or photographic camera to any desired orientation at any depth. It is commanded by a surface operator using a simple joy-stick controller. It is made of marine brass and stainless steels, with all exposed parts chrome plated to afford maximum resistance to the corrosive effects of salt water.



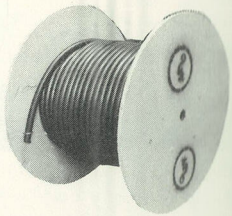
CABLE BREAKOUTS

ARMORED CABLE STOP-OFF

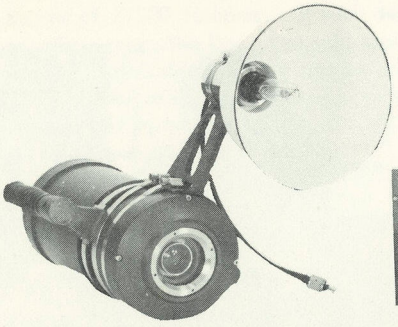


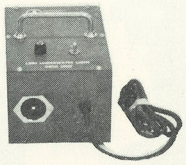


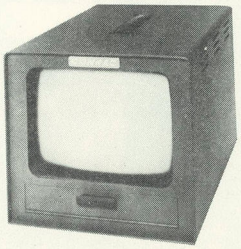
WINCH SLIP RING



U.T.V. CABLE

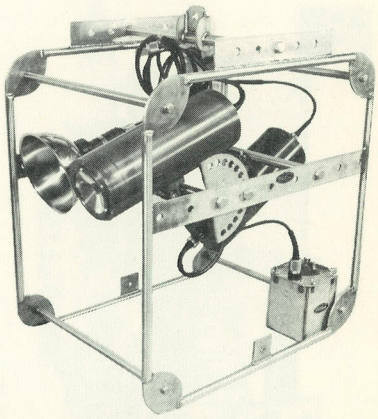




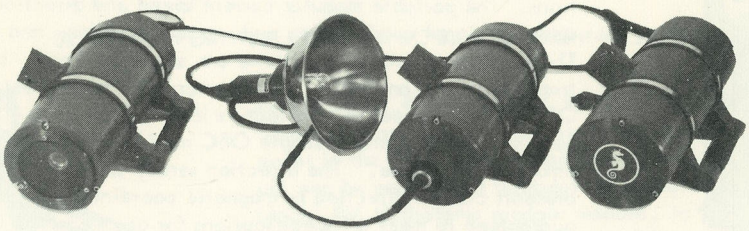


THE HYDRO EYE TELEVISION SYSTEM is the lowest priced complete underwater television system ever offered for sale! This system, which will perform to depths of 1,000 feet, retains the reliability, simplicity of operation, and high performance of the well known OEC UTV line.

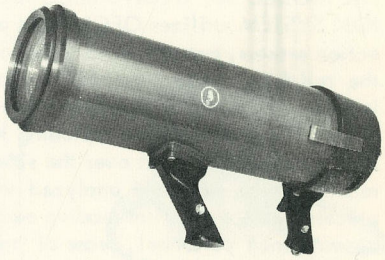
OEC UNDERWATER PHOTOGRAPHIC SYSTEMS



THE PC-700 SHIPEK DEEP-SEA CAMERA SYSTEM was designed by Carl Shipek, oceanographer of the U.S. Navy Electronics Laboratory, to take high resolution still photographs at depths to 20,000 feet. The Shipek camera will take four hundred 2-1/4" x 2-1/4" negatives per 100 foot roll of 70 mm film. This film size is ideal for field use, since enlargements from 70 mm have four times the resolution of 35 mm pictures, and usable contact prints can be made directly from the negatives. The camera uses a Schneider Angulon 65 mm f 6.8 lens and has a simplified high reliability automatic shutter. It is available with either 100 or 200 watt-second strobe light sources, and a full selection of AC or battery power supplies, frames, control panels, etc. to provide systems for all deep-sea photographic missions. The camera is optimized for use in the oceanographic environment, since it can be assembled and disassembled without special tools, all working parts are designed for minimum maintenance, and the film may be loaded in bright daylight.



CAMERA | STROBE LIGHT | STROBE ELECTRONICS | BATTERY PACK



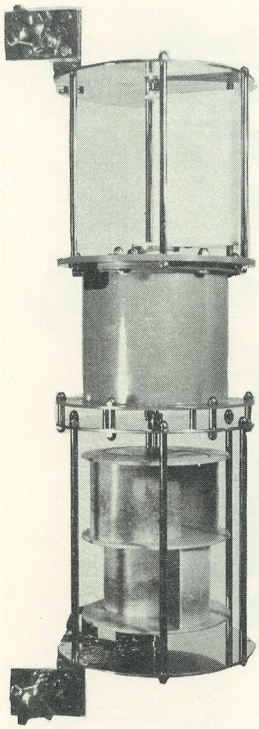
MODEL PC-770 DIVER OPERATED 70 MM STILL CAMERA for use by professional divers performs to depths of 500 feet and takes up to 400 pictures on 2-1/4" x 2-1/4" format. The film transport and shutter mechanism operate from self-contained batteries and are fully automatic.

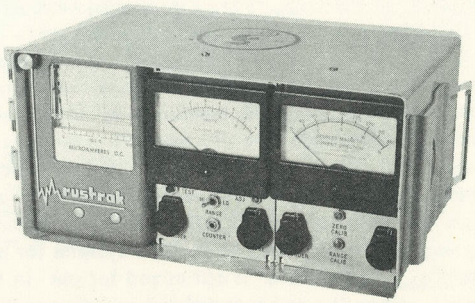
The PC-770 features the outstanding f 3.5, 50 mm Nikkor lens, a shutter speed up to 1/200 seconds, and has all controls and a frame count indicator located on the back panel. Controls are designed to function smoothly at extreme depths.

PLEASE INCLUDE THE WARRANTY TERMS GIVEN BELOW
IN YOUR PURCHASE ORDER OR REQUEST FOR QUOTATION

All Hydro Products' equipment is fully guaranteed FOR A PERIOD OF ONE YEAR from date of shipment against any defects in material and workmanship, under normal use. If any part of our equipment (except fuses, batteries, and expendable meterials) proves to be defective, it will be repaired or replaced without any charge for service or materials. This guarantee applies to all items we manufacture or distribute.

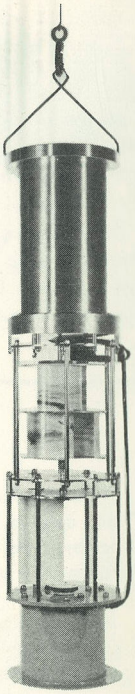
All repairs or replacements under this warranty are FOB our plant or authorized service representative. We are not liable for damages or delays caused by defects beyond making repairs or sending duplicate parts, nor are we liable for material repaired or replaced without the specific consent and permission of the company.

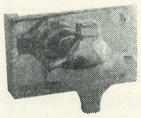




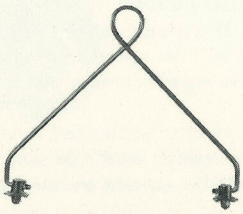
PORTABLE CURRENT SPEED AND DIRECTION MEASURING AND RECORDING SYSTEMS are provided by Hydro Products for a wide range of applications. The portable modular current speed and direction components include sensors, signal conditioning and readout modules, and strip chart recorders. These current measuring systems are self-contained, battery operated, all transistorized, and fully field proven for the highest possible reliability. OEC's current speed sensors feature low friction, long life carbide on carbide bearings, the extremely simple OEC reed switch pickoff, and a low induced error support frame. The direction sensor contains a magnetic compass and presents current direction in magnetic coordinates. OEC current meters are guaranteed to meet all specifications for one year.

THE MODEL 501 IN SITU RECORDING CURRENT SPEED AND DIRECTION SYSTEM utilizes OEC's field proven current speed and current direction sensors, transistorized signal conditioning and readout module, and the reliable Rustrak strip chart recorder to provide a simple, versatile in situ current recording system for recording periods from 12 hours to 31 days. The entire system including the recorder can be checked immediately before putting it over the side, and the permanent, smudge-proof record can be read and analyzed without the necessity of photographic processes or special film reading equipment. Operation and maintenance by untrained personnel, ease of handling and reading records, simple mechanism, and consistent, reliable performance are the key characteristics of the Model 501.





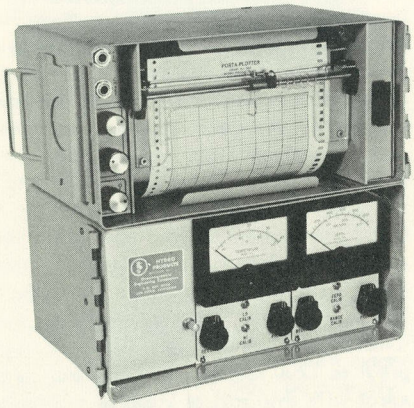
CLAMP

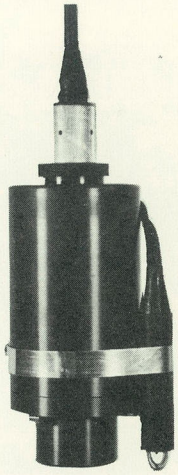


BAIL

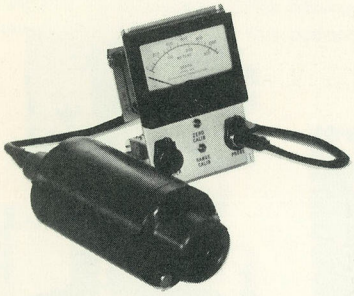
CABLE TERMINATION

AND RECORDING INSTRUMENTS



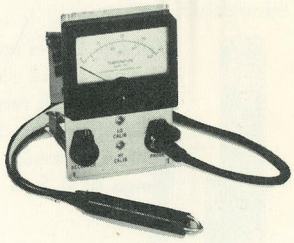


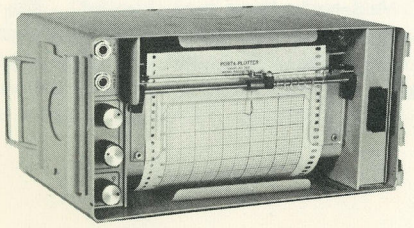
COMPLETE PORTABLE ELECTRONIC B.T. RECORDING SYSTEM



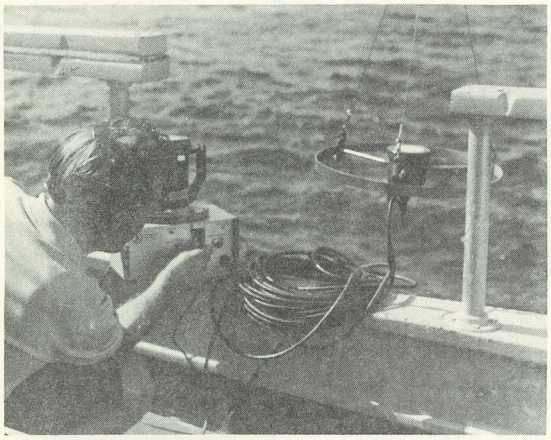
THE MODEL 404 PORTABLE REMOTE DEPTH GAGE uses a potentiometer pressure sensor and indicates depth on a rugged taut band meter in the deck readout module. The battery powered deck module can be mounted in a Model 400-E portable carrying case with a Model 401 Hydrotemp readout module, to provide a complete portable electronic pressure and temperature measuring system. This system can then drive the Model 440 Porta-Plotter to obtain an "X-Y" graph of temperature versus depth, providing a simple, self-contained, portable, reliable electronic bathythermograph.

THE MODEL 401 HYDROTEMP is a portable, remote water temperature indicating instrument of high accuracy, linearity, and stability. The sensing unit is a thermistor mounted in a rugged molded rubber holder. The temperature is indicated on a taut band panel meter graduated in both degrees Fahrenheit and degrees Centigrade. Power for the transistorized circuit is supplied from a single self-contained mercury battery. Input for one axis of the Model 440 Porta-Plotter is provided by a jack on the readout module.

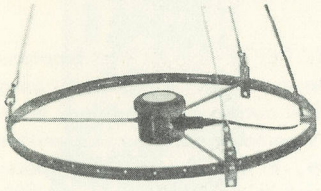




THE MODEL 440 X-Y PORTA-PLOTTER is a fully transistorized, self-contained, battery powered, portable X-Y plotter designed for oceanographic applications such as temperature versus depth recording, sound velocity versus depth profiling, or plotting any two analog variables in an X-Y presentation. Both axes provide 0.5 volt full scale sensitivity with an accuracy of better than 1%. The unit is housed in a waterproof steel housing with a removable cover.

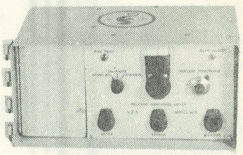


THE MODEL 420 RELATIVE IRRADIANCE METER has become a standard for use in hydro-photometric research and engineering throughout the world. The major elements of the Relative Irradiance Meter are: (1) the underwater sensor; (2) the gimbaled surface sensor; and (3) the deck module. The deck module measures the ratio of lightflux collected by the underwater sensor to light flux similarly collected at the surface. By using an auxiliary reference unit (available from OEC), the system may be used as a hydrophotometer to measure absolute light levels under water. The instrument is useful over illumination range of 10,000 lumens to 1 lumen. Its sensitivity threshold is about .1 lumen. The underwater unit will tolerate depths as great as 1200 meters, and the deck sensor will remain erect with ship roll as great as ± 30 degrees.



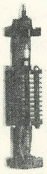
UNDERWATER SENSOR

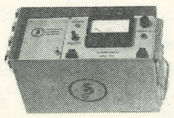
SURFACE SENSOR



READOUT UNIT

THE OEC TRANSMISSOMETER SYSTEM (consisting of the 410-BR DECK READOUT Unit, the 412 ONE METER SENSOR, and the MODEL 411 TEN CENTIMETER SENSOR) is the first truly portable alpha meter to be reduced to practice. It is fully self-contained, and operates continuously for fifteen hours on its own internal batteries. It also has a built-in AC power supply and battery charger, and can be operated from 120 V, 50 or 60 cycle AC. The 412 sensor and the associated 410-BR deck readout unit together weigh only eighteen pounds. The Model 410-BR deck readout unit can be used interchangeably with the ten centimeter transmissometer sensor or the one meter sensor for measurements in water varying from very clear to extremely turbid, covering the alpha range of 0.2 to 22 with a transmissibility measurement accurate to approximately ± 5%. The deck readout unit contains calibration adjustments and an output jack to drive a recorder for continuous strip chart records of alpha versus time, or an "X-Y" plot of alpha versus depth (used in conjunction with a HYDRO PRODUCTS/OEC Model 440 "X-Y Porta Plotter"). The sensors are ruggedly designed to achieve high calibration stability, yet are lightweight and easy to work with on a rolling deck.

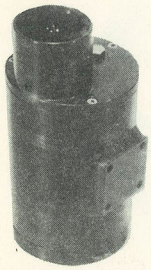


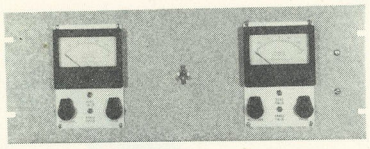


ONE METER SENSOR

10 CM SENSOR

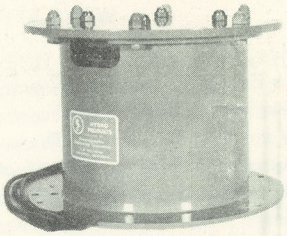
READOUT UNIT

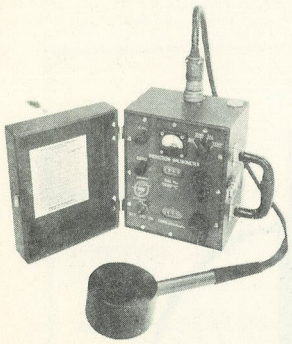


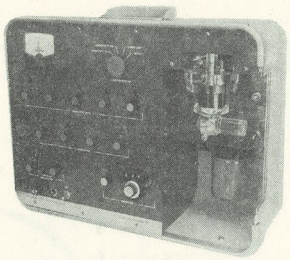


THE OEC MODEL 424 DUAL INCLINOMETER measures the pitch and roll position of a remotely located instrument package, camera, buoy, or vehicle relating the angle of two orthogonal axes to the vertical. It may be read from a remote deck readout indicator, or recorded by any standard strip chart recorder. The oil filled sensor operates to any depth, and the transistorized, battery powered, portable readout unit will operate for 200 hours on a set of self-contained batteries. It is recommended for use as a companion to the Model 405 Deep Submergence Compass.

THE MODEL DSC-465 DEEP SUBMERGENCE COMPASS is a useful device to determine remotely the bearing of an underwater camera, instrument package, or vehicle. It is an oil filled magnetic compass unit with an electrical output which may be directly read on the companion Model 452 Deck Readout Module, or recorded on a strip chart recorder. Used in conjunction with the Model 424 Dual Inclinometer, it provides a complete three axis measurement of the angular orientation of the package. Ruggedness, accuracy, and simplicity characterize this oceanographic instrument.

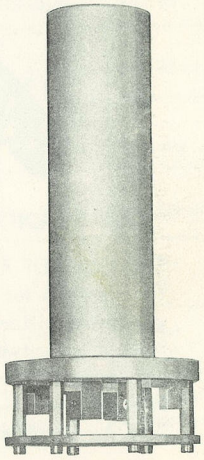


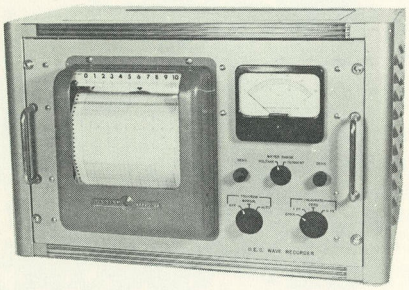




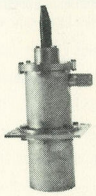
PORTABLE ELECTRODELESS INDUCTION SALINOMETERS for measuring salinity, temperature, conductivity, and depth in situ and of samples are available in several configurations. The electrodeless inductive conductivity cell permits "in-the-field" measurements by unskilled personnel and frees conductometric analysis from the laboratory. Equipment is sturdily constructed and features stable, solid-state electronics for maintenance free operation.

THE MODEL V-10 DEEP SEA VELOCIMETER is a highly precise, transistorized battery powered, portable unit for measuring sound velocity to 22,500 foot depths. It has an overall accuracy of 1 part in 5,000 and a drift of less than 1 part in 15,000. Battery life of better than 250 hours is obtained. The simplicity and reliability of the circuitry and the rugged, highly stable sensor provide a trouble-free working tool for oceanographic sound velocity profiling. Adaptors can be provided to allow the V-10 Velocimeter to be used with a Model 401 Depth Gage and a Model 440 X-Y Porta-Plotter for directly recording velocity versus depth.





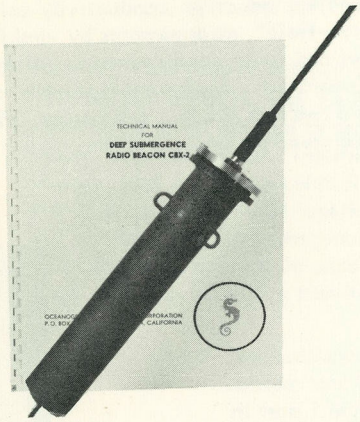
WAVE AND TIDE RECORDER



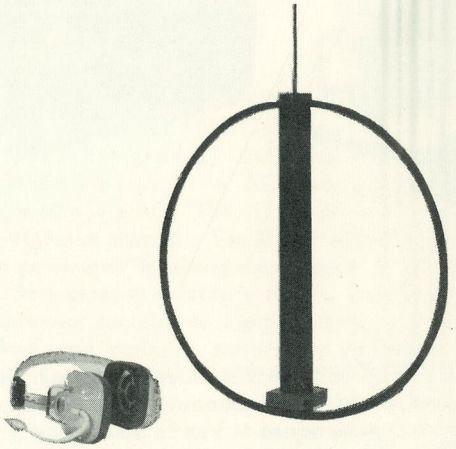
SNODGRASS WAVE SENSOR

SNODGRASS WAVE AND TIDE RECORDING SYSTEMS are available in several configurations from OEC/Hydro Products. These systems are carefully manufactured from designs originated by Frank Snodgrass of the Scripps Institution of Oceanography to measure and record the height versus time of both long period and short period waves. These wave recorders provide a flexible choice of chart speed and chart speed time programs to allow optimization of resolution versus chart capacity by the user. The sensor is a strain gage pressure transducer with a carefully designed hydraulic filter to shape the frequency response appropriately. The sensor may be located up to several thousand feet from the recorder. Both sensors and recorders are designed for long periods of use in remote environments where maintenance facilities are limited. Call or write for full literature and application engineering assistance.

DETECTING AND LOCATING DEVICES

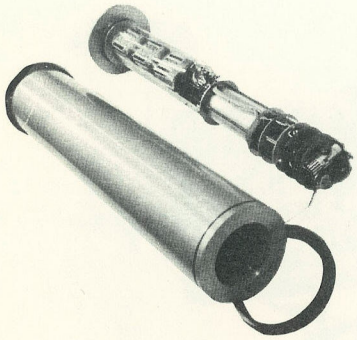


CBX-2 RADIO BEACON TRANSMITTER



RDF-1 LOCATOR

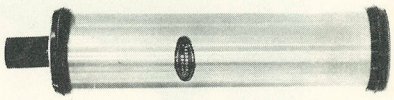
THE CBX-RDF RADIO BEACON LOCATOR SYSTEM can locate a buoy, float, diver, or boat from distances up to ten miles. The all transistorized CBX-1 and CBX-2 RADIO BEACON TRANSMITTERS operate in the citizen's band and can be submerged to 30,000 feet for up to thirty days, then operated continuously for twenty hours after surfacing. The RDF-1 LOCATOR will locate the beacon and guide a recovery party by the most direct course to the beacon's exact position. Both units are transistorized and operate on self-contained batteries. The CBX-RDF systems are built exclusively for HYDRO PRODUCTS/OEC by Seaqual, Inc. of La Jolla, California.



CHRONOMETRIC
ABYSSAL PINGER

EXPENDABLE
PINGER

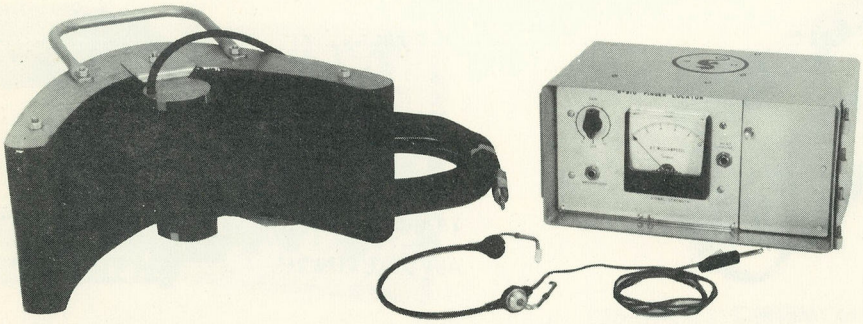
TRANSPONDING
ABYSSAL PINGER



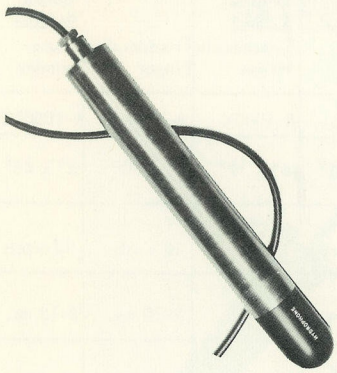
SONIC BEACONS AND PINGERS are provided by OEC/Hydro Products for nearly every application. This line of accoustic devices, designed by Dr. Victor C. Anderson of Scripps Institution of Oceanography, utilizes the most advanced techniques and materials available. These pingers use piezo-electric accoustical transducers and solid state circuitry for the highest possible reliability and efficiency. OEC's standard line of pingers (which is described in the table below) covers a full range of specifications and performance features. All units are covered by OEC's full one year warranty. Call or write for full specifications and prices.

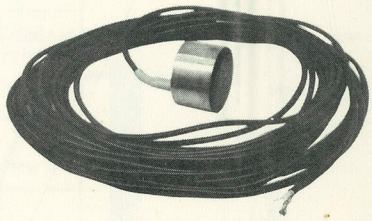
HYDRO PRODUCTS PINGER SPECIFICATIONS CHART

	Long Life Sonar Beacon	Wellhead Beacon	Expendable Pinger	Abyssal Chrono Pinger	Hi-power Chrono Pinger	External Battery Expendable Pinger	Transponding Pinger	Coded Release Trans-ponder
Model Number	B-1062-LL	WHB-12	B-1000	B-1045C	B-1055C	B-1000X	B-1050-T	B-1050TCR
Dimensions	5" x 36"	4" x 40"	5" x 12"	5" x 25"	5" x 25"	6" x 12"	5" x 40"	5" x 43"
Accoustical Power Output	10 watts	5 watts	1 watt	10+ watts	13+ watts	1 watt	10 watts	13 watts
Pulse Lengths Available	2-3 ms.	2 ms.	2 ms.	2 ms.	2-10 ms.	2 ms.	2-10 ms.	2-15 ms.
Frequencies Available	12 or 16 kc	12 to 22 kc	12 to 40kc	12 kc	12 kc	12 to 37 kc	9 to 70 kc	9 to 70 kc
Repetition Rates	1/5 secs.	1/5 secs.	1 pps.	1 pps. & 2 pps.	1 pps. & 2 pps.	1 pps/p5s	To order	To order
Operating Depth	2000+ ft.	7000 ft.	6000 ft.	40,000 ft.	40,000 ft.	6000 ft.	40,000 ft.	30,000 ft.
Operating Ranges	4 to 6 mi.	3+ mi.	1 to 3 mi.	5 mi.	8 mi.	1 to 3 mi.	5 mi.	8 mi.
Battery Life	12 to 18 mos.	16 to 18 mos.	100 hours	10 days	10 days	to 12 mos.	Over 1 yr.	Over 1 yr.
Principal Applications	Salvage Marking	Offshore Marking	Range Marking	Lowering Devices	Bottom Marking	Back up to WHB's	Relocation Ranging	Relocation& Actuation



THE MODEL B-910 PORTABLE PINGER LOCATOR is a unique sonar direction finder which provides an economical means for pinpointing the location of underwater objects that have been marked with a sonar beacon or pinger. The Pinger Locator employs a receiving hydrophone mounted in a directive reflector assembly. When the receiving hydrophone is oriented for maximum signal, the direction of a sonar beacon can be determined to within five degrees. Small size, all transistor circuitry, light weight, and battery operation make the Pinger Locator completely portable and usable from any size boat. The B-910 has been used for relocating submerged wellheads, in situ instrument systems, and underwater pipelines. It can be used with any of our standard pingers; however, is particularly suited for use with the Model WHB-12 Wellhead Beacon, the B-1000 Expendable Pinger, and the B-1062 LL Long Life Sonar Beacon.





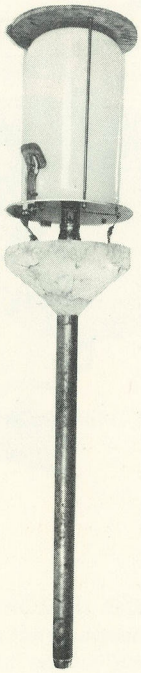
R-100 SERIES HYDROPHONES

DIRECTIONAL HYDROPHONE/PROJECTOR

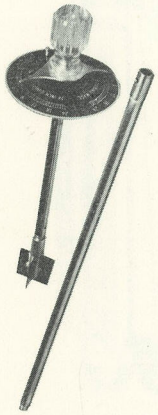
THE R-100 SERIES HYDROPHONES provide a wide variety of high sensitivity, broad frequency response hydrophones to meet a broad range of applications. These units are non-directive and may be obtained with or without a built-in preamplifier. Their small size and weight facilitates installation on vehicles, lowering platforms, and sound arrays.

THE DEA-7 DIRECTIONAL HYDROPHONE/PROJECTOR fills the need for an inexpensive, general purpose directional hydrophone/projector. As a hydrophone, it features excellent sensitivity and directivity. When used as a projector, the DEA-7 will deliver 10 watts through an 80 degree beam. Its small size permits multiple array mountings for highly directive patterns.

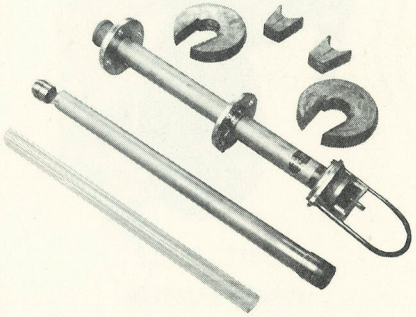
SAMPLERS



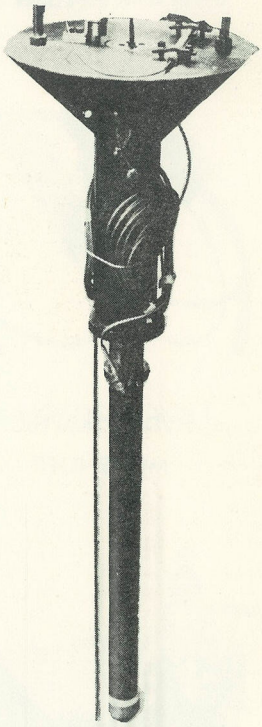
MOORE
FREE CORER



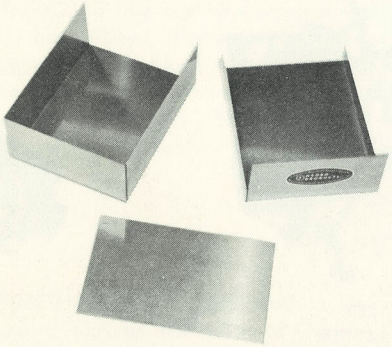
DILL-MOORE
VANE SHEAR METER



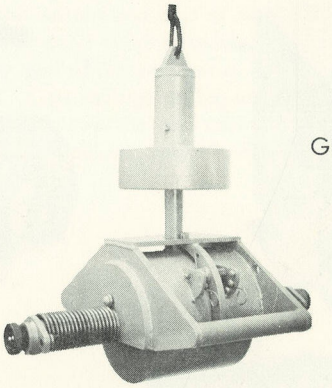
PHLEGER CORER KIT



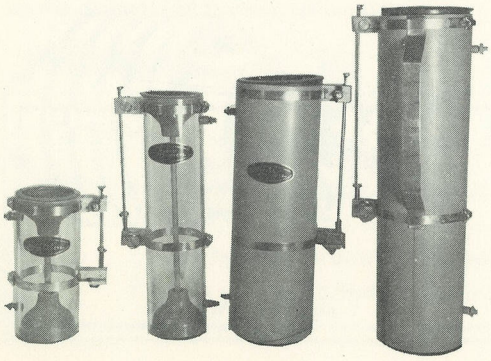
SEA BED
GUN CORER



BOUMA BOX SAMPLER

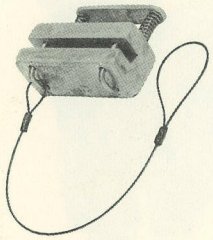


SHIPEK SEDIMENT SAMPLER

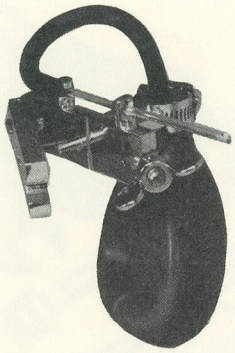


THE VAN DORN WATER SAMPLER was originated by Dr. William G. Van Dorn of the Scripps Institution of Oceanography. These inexpensive improved free-flushing water samplers are available in 1, 2, 4, 6, 8, and 16 liter sizes. The Van Dorn Samplers are constructed of high-impact Plexiglas or PVC tubing, which is inert both chemically and bacterially. No metallic surfaces are presented to the fluid sample. Vent and drain valves are PVC. They are messenger actuated and include a messenger release sequential triggering of a chain of Van Dorn Samplers.

SAMPLERS (Continued)

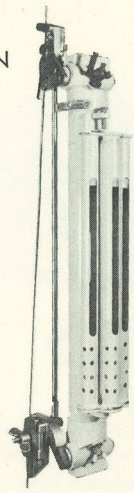


HYDROGRAPHIC MESSENGER

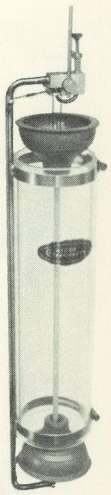


COBET STERILE WATER SAMPLER

NANSEN BOTTLE

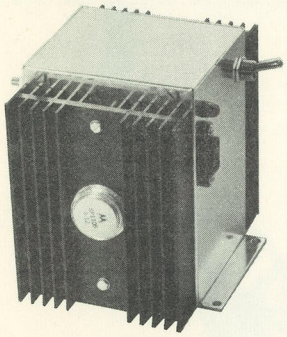


WELL-PIPE SAMPLER

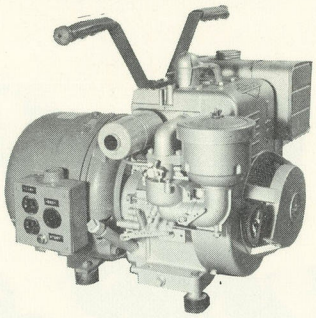


MISCELLANEOUS APPARATUS

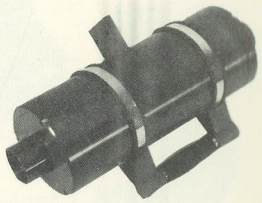
ELECTRICAL POWER SOURCES



DC-AC INVERTER

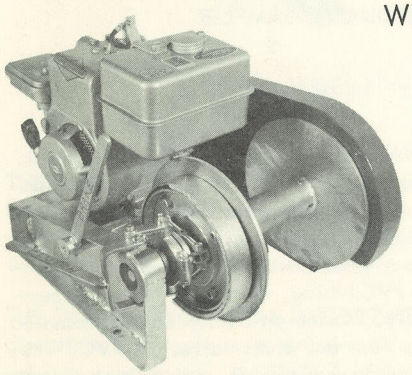


HYDRO GENERATOR

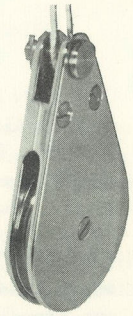


PRESSURE BATTERY PACK

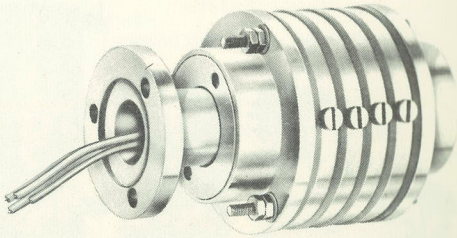
WINCHES AND ACCESSORIES



HYDRO WINCH

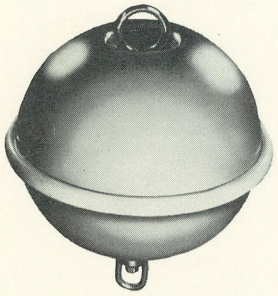


B.T. SHEAVE

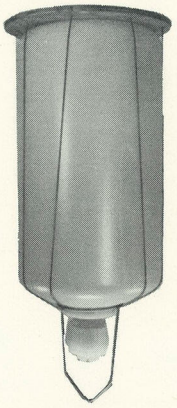


MERCURY WETTED SLIP RING

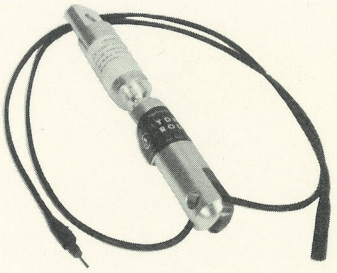
MOORING AND BUOY SYSTEMS AND EQUIPMENT



INSTRUMENT BUOY



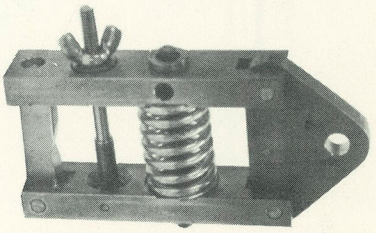
DEEP SUBMERGENCE FLOAT



EXPLOSIVE BOLT

THE HOVE II GUN EMPLACEMENT ANCHOR is the most useful innovation in recent years for permanent moorings. It consists of a simple, safe, reusable gun which fires a special anchor into the sand, mud, rock, or coral bottom. The weight and cost of the anchor are only a fraction of the cost of conventional anchors or dead weight moorings for the same holding capability. For example, an anchor and gun which will serve in place of a 5,000 pound cement block weighs only 38 pounds. Cost savings go beyond the direct cost of the anchor mechanism and become very significant when the cost saving of ship and crew time are considered. Standard 1,000 pound, 5,000 pound, and 10,000 pound vertical pull units are available.

THE VAN DORN TIMED RELEASE, developed by Dr. William G. Van Dorn of Scripps Institution of Oceanography, makes use of the predictable electro-chemical deterioration of a magnesium weak link in sea water. Release delay time can be predicted accurately and can be adjusted for from four to forty hours delay by varying the diameter of the magnesium link.



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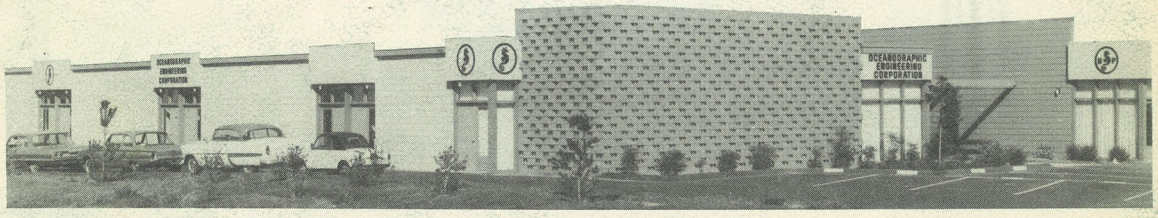

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