KELVIN & HUGHES (MARINE) Ltd.
107, Fenchurch Street, London, E.C.3

The firm of Kelvin & Hughes (Marine) Ltd. produced specially for the Sixth International Hydrographic Conference an account of the most recent hydrographic instruments displayed by them during the course of the Conference,, such as echo sounders, deep-sea research equipment, tide gauges, current meters for local and remote recording, sextants, etc. For purposes of demonstration before Conference delegates, a launch equipped with model MS-21.F Mar 4 Survey Echo Sounder using dry recording paper operated in the Port of Monaco.

MS 21 SURVEY ECHO SOUNDER. An instrument of precision for the hydrographic surveyor.

Hydrographic: Type « A » (Feet Scale).
Type « F » (Metric Scale).

Oceanographic: Type « J » (Fathom Scale).
Type « K » (Metric Scale).

The Survey Echo Sounder consists of the recorder—which initiates the signals and records their return on paper; the oscillators—which convert the electrical impulses into sound impulses and back again; the amplifier—which magnifies the returned signal; the power supply—which can be by battery or mains as convenient.

A sounding rate as high as 533 per minute can be obtained in shallow water. Actual soundings appear as stylus marks on the Recorder chart. The chart itself is driven slowly downwards by rollers so that successive marks appear one above the other to build up into a continuous thick line which follows every undulation of the sea and river bed. A scale is provided against which the depth can be read off at any time.

Recorder and Amplifier are combined in a neat smooth-lined case to provide the Surveyor with a compact, portable and highly efficient surveying instrument.

The equipment is installed on suitable craft, either as a temporary fitting with outboard oscillators or with the oscillator tanks fitted permanently into the hull.

The actual Echo Sounder installation exhibited on the Kelvin Hughes stand at Monaco was an MS-21.A (feetscale) Hydrographic model using moist paper.

The MS-21.F is identical with the model exhibited, except that the Recorder scales are calibrated in metres. A dry paper version of the MS-21.F Echo Sounder was to be seen on the launch which operated in Monaco Harbour.

Photographs of the Oceanographic models, MS-21.J and MS-21.K, were featured in the « Galathea » panel on the Kelvin Hughes stand.

KELVIN HUGHES ECHO SOUNDER MODELS (SURVEY)

Model	Type	Basic scale		Max. range		Phasing		Soundings per min.		Paper speed	
		Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep
Hydrographic		45 ft.	90 ft.	270 ft.	540 ft.	8× 30 ft.	8× 60 ft.	533 1/3	266 2/3	Constant	1 inch
M.S. 21 A/I	Hydrographic Inboard	45 ft.	90 ft.	270 ft.	540 ft.	8× 30 ft.	8× 60 ft.	533 1/3	266 2/3	Constant	1 inch
M.S. 21 A/O	Hydrographic Outboard	15 mts.	30 mts.	90 mts.	180 mts.	8× 10 mts.	8× 20 mts.	500	250	Constant	25 mm.
M.S. 21 F/I	Hydrographic Inboard (Metric)	15 mts.	30 mts.	90 mts.	180 mts.	8× 10 mts.	8× 20 mts.	500	250	Constant	25 mm.
M.S. 21 F/O	Hydrographic Outboard (Metric)										
Oceanographic											
M.S. 21 J	Oceanographic	80 fms.	800 fms.	450 fms.	4500 fms.	8× 50 fms.	8× 500 fms.	53 1/3	5 1/3	Constant	0.25 inch
M.S. 21 K	Oceanographic (Metric)	150 mts.	1500 mts.	900 mts.	9000 mts.	8× 100 mts.	8×1000 mts.	50	5	Constant	6.25 mm.

ROBERTS RADIO CURRENT METER. For recording current velocity and direction in areas remote from the recording station.

A description of this apparatus is to be found in the *International Hydrographic Review* for 1947 (page 210). Essentially the equipment comprises a buoy of special design, equipped with a radio transmitter and its own power supplies. Suspended from the buoy at any pre-arranged depth is the current measuring unit containing a compass element and impeller. This unit is electrically connected by cable to the radio transmitter. At the shore station or aboard the parent ship is a radio receiver coupled to a recording unit.

With this arrangement, current direction and velocity can be recorded with an intervening distance between the transmitter and the receiver of approximately 20 to 25 miles over uninterrupted sea. This range may be modified if high land intervenes, but it is readily obtainable under normal conditions. The meter will operate satisfactorily in current velocities from 0.5 up to 10 knots. Directions are related to magnetic north.

Interpretations of the records can be made with an accuracy of plus or minus 2 % for velocity measurement and within 5° on direction.

The radio receiver has 3 channels and can be tuned to receive signals from 3 separate buoys in rotation. When more than one buoy and meter are required the transmitters will be arranged to transmit on different frequencies.

SELF-CONTAINED METERING—It is sometimes desired to dispense with the radio link and in this case, a larger buoy can be supplied which contains the recorder and paper capable of producing a 14 days' record without attention.

The buoy, when correctly moored, will ride out heavy gales and can be anchored in places where it would be dangerous to moor a ship.

KELVIN HUGHES PRESSURE TYPE TIDE GAUGE. For recording changes in water level at locations remote from the recording station.

The apparatus is portable and transmits the variations in pressure of the head of water above the instrument.

Two models are at present available for recording changes in water level up to 22.5 ft. and 45 ft. respectively, measured with a practical accuracy of within 6 in., when corrections are made according to the calibration chart which is supplied with each instrument. Time scale, 3 in. per day, tide scale 1 in. = 7.5 ft. and 1 in. = 15 ft. The maximum depth of water in which the instrument can be placed is 100 ft. at low water.

The instrument consists of a steel tank with four stabilising legs, upon which is mounted a pressure chamber. The pressure chamber has a rubber diaphragm protected by gauze and a metal plate with a number of holes drilled in it.

Behind the rubber diaphragm is a compartment filled with distilled water, and then comes another compartment, air filled. In this latter compartment is the Desynn transmitter mechanism having the inside of its bellows open to the water-filled compartment mentioned above and the outside of the bellows open to the air of the second compartment mentioned above.

Via an air valve, the pressure in the air compartment can be raised by a hand or foot-operated pump to compensate for the static head of water in which the gauge will be submerged.

An electric cable is brought out from the Desynn transmitter through glass seals from the watertight gland and then taken round a bollard in order to remove any strain on the cable at the gland.

Ashore at the recording station is a Desynn receiver motor which is linked to a bimetallic stylus arm bearing an iridium-tipped pen. The pen makes contact periodically with a strip of teledeltos recording paper which is drawn over rollers under the action of a seven-day clock mechanism. Barometric compenation is automatically applied through linkage to the stylus arm. A small buzzer is incorporated which operates periodically, giving the whole movement a slight vibration. This ensures free movement of all bearings.

The equipment, with its associated power unit, operates from a 12 volt car type battery and can be left unattended for long periods.

PORTABLE WATER LEVEL RECORDER.

Weekly Records are obtained on a drum, 16.8 ins. circumference for the time scale (0.1 in. per hour), and 9 ins. for the height scale. A universal chart has four ranges, viz. : 6-12-18-24 feet. Corresponding interchangeable gears are supplied which can be selected to suit the local conditions.

The clock is of high-grade English manufacture and drives the drum by a friction disc and a hinged slotted spring securing plate. The clock can be wound without removing the drum, and as the charts have a gummed edge there is no chance of damage, either to the clock or the pen if the record overruns seven days.

The pens are adjustable for zero and are of the well-known Dittmar type. They give an excellent trace on the special paper from which the charts are made.

For particular purposes a differential mechanism can be supplied so that the scale is opened at the lower readings and contracted at the upper part of the range.

With each instrument are supplied a 6 in. dia. copper float with counterweight and 100 feet of stranded float cable.

Gross weight packed for export .. 66 lbs. 30 kg.

Weight of Recorder with cover .. 29 lbs. 13 kg.

NANSEN PETERSEN PATTERN INSULATED WATER BOTTLE.

Used in Oceanographic Survey operations for the collection of water samples and temperatures at all depths from surface to 500 fathoms. The bottle is of robust construction in brass with all external parts chromium or nickel plated. Internal surfaces are silver plated to prevent deterioration of the sample. Top and bottom spring-loaded watertight caps close to trap the sample when actuated by messenger weight. Provision is made for a thermometer to be carried in the bottle.

This instrument is supplied with cast-iron base weight attachment.

MUNRO ECKMAN REVERSING WATER BOTTLE.

Used for the collection of sea water samples and temperatures.

Four to six of these bottles, spaced at intervals on a steel wire cord of 4 mm. diameter, are lowered into the ocean. The bottles are reversed, and thereby closed, at the required depths by means of « messengers », i.e. small weights, which are slid down the wire. Temperatures at the point of reversal are recorded by two « protected » deep sea reversing thermometers.

MARINE SURVEY SEXTANTS.

V.E. Marine Sextant (Light Alloy) with decimal micrometer.

A lightweight but sturdy instrument, made from corrosion-resisting alloy. Divided from — 5° to 120° in white graduations on black arc. Radius 7 in. Reading to 2 minute, by means of micrometer. Index mirror: Class « A » rectangular 2 in. × 1.3 in. fully protected. Horizon mirror: Class « A » rectangular 1.6 in. × 1.3 in. fully protected. Mirrors specially treated to resist sea water. Shades: All neutral tinted. Telescopes: Lumex Miniature, magnification 2, field 12°, aperture 1.0 in.; Lumex Collimating Inverting, magnification 5, field 8°, aperture 1.0 in.; Lumex Collimating Inverting (extra power draw), magnification 10, field 4°, aperture 1.0 in. Shade heads: One dark and one light—neutral tinted. Definition shade, electric lighting on index arm. Finish: Anodised black, and treated with lanoline. Certificate: Kelvin Hughes Class « A ». Weight, with Lumex Miniature Telescope: 2 lb. 2 oz.

CHALLENGER MK. 3 MARINE SEXTANT WITH 1 MINUTE MICROMETER.

A lightweight but sturdy instrument made from corrosion-resistant alloy, and specially designed for marine surveying. Divided from — 5° to 140° in white graduations on black arc. Radius 6 in. reading to 1 minute by means of micrometer. Index mirror: Silex Class « A » circular, 2.2 in. diameter, fully protected and hermetically sealed. Horizon mirror: Silex Class « A » circular, 1.4 in. diameter, fully protected and hermetically sealed. Telescope: Magnification 5, field 3 1/2°, with diopter collar and focusing scale. Finish: Anodised black. Certificate: Kelvin Hughes Class « A ». Weight: 2 lb. 6 oz.

MICROMETER STATION POINTER.

The Micrometer Station Pointer is designed to facilitate the plotting work of Hydrographic Surveyors.

Fitted with well-known Hughes Micrometers on the moving arms, which provide a more rapid and convenient setting than verniers. The approximate setting is made instantaneously by slight pressure on the clamps and the fine reading is legibly shown on the micrometer head. Divided on silver. Reading to one minute with micrometers and lengthening arms.