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FIFTY YEARS AGO...

The May 1930 issue of the *Hydrographic Review* carried an interesting report on a recently completed Italian survey. In an era when automated hydrography is in full development it is refreshing to look back at the simplicity that once was hydrography, albeit that long hard days in the sun and long evenings in the chartroom formed an integral part of the work. This concise report on such a traditional type of survey will arouse nostalgia in the hearts of many of the older surveyors.

REPORT OF THE HYDROGRAPHIC EXPEDITION OF "*AMMIRAGLIO MAGNAGHI*" IN THE RED SEA.

(29 October 1928 - 6 July 1929)

by

COMMANDER L. RUBARTELLI, R. I. N., IN COMMAND.

SURVEYS

A complete survey was made of the channel to the N. E. of Massaua, across the archipelago of the Dahalak Islands.

In joining up the surveys previously made in 1892 and in 1924, the work was extended as far as the central deep of the Red Sea.

On the whole, the bathymetric survey embraces a zone of more than 1,000 square miles and the topographic survey embraces 24 islands having a total coast line of about 250 kilometres.

An examination was made of all of the approaches leading to the good anchorage of Gubbet-Entatu.

The survey was made with the greatest possible accuracy. A base of 1,224 metres in length on the Island of Harmil was measured with four invar wires, and this was extended in accordance with BESSEL's standard method.

The azimuth of the base was determined by means of observations of Polaris.

The triangulation was made with 6 repetitions. It includes 29 main stations.

Out of the 43 triangles, practically all close to within 5 seconds and half of the remaining close to within 3 seconds.

The detail points were determined by direct intersection or by the subtended angle method.

In the course of the expedition great use was made of a large number of special floating beacons. These certainly answered very well for the purpose intended. For the topographic survey use was made of the tacheometer and stadia rods, or else the tacheometer and the ZEISS telemeter.

The survey of the bottom was made on a very large scale.

More than 200,000 soundings were taken at the stations and between them. The vessel made use of the LANGEVIN apparatus throughout, checked at frequent intervals by the LUCAS sounding machine or the MAGNAGHI sounding machine. The boats employed a modified type of the MAGNAGHI sounding machine to which a fish lead was fitted.

For determining the datum for the reduction of soundings, three tide-gauges were placed successively on the islands of Nora (Sahelia), Isratu and Harmil.

An astronomical observing station with a prismatic astrolabe was established at Harmil on one of the pillars of the base.

Following this several permanent beacons were erected to facilitate navigation in the channel.

Among the beacons may be mentioned:

2 large iron quadrangular pyramids 15 metres high;

2 cement beacons equipped with top-marks, 6 metres high;

3 iron cylindrical barrel beacons filled with sand, having an overall height of 7 metres.

SCIENTIFIC RESEARCH

Terrestrial magnetism measurements:

Three complete magnetic stations were made at Massaua, Isratu and Harmil.

One station was made for the determination of magnetic variation only at Ras Antalo (Dahalak Chebir).

Relative Gravity measurements:

Complete gravimetric stations were made at Massaua, Asmara and Harmil.

On the island of Harmil a base was measured, the azimuth determined, and astronomical and gravimetric stations made at the same time.

Meteorological observations:

Systematic meteorological observations were carried out during the entire duration of the expedition; an abundance of data was collected relative to a zone exposed to entirely maritime atmospheric conditions which make a very interesting study and will provide information useful to Mariners.

Thalassographic research:

The investigation of the seasonal currents in winter in the central and northern parts of the Red Sea was completed. Some interesting research was carried out during the summer season in the central region and along the shores of the Strait of Bab-el-Mandeb.

Thalasso-Biological research:

On behalf of the Ministry of National Economics, a great deal of biological material was collected and an examination of numerous samples of sea-water was made.

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THE TAVISTOCK THEODOLITES

A meeting of British instrument-makers and surveyors was held at Tavistock in 1926, and at this meeting were drawn up specifications concerning the actual design of new instruments. A specification for a British theodolite was drawn

up, which should combine the latest ideas in design with the well-known qualities of strength and reliability possessed by the existing types of British make. The chief difficulty the makers had to contend with was in producing an instrument that would not transgress existing patents. Messrs. COOKE, TROUGHTON & SIMMS, Ltd., have succeeded in doing this, the optical arrangements of their model and the method of reading it being different in every respect from existing patterns. Messrs. E. R. WATTS & Son, Ltd. on the other hand, came to an agreement with the firm of ZEISS and have incorporated in their model several of the ZEISS patents; thus it can hardly be said that theirs is an all-British instrument. So far nothing has materialized from the third firm of instrument-makers, Messrs. C. F. CASELLA & Co, Ltd.

The new patterns are intended to meet the following requirements: (1) Smallest possible dimensions and weight in order among other advantages to increase stability in high winds; (2) convenient manipulation and increased speed in manipulations; (3) greater insensibility in respect of transport, rain and dust; (4) combination of images, from two opposite parts of the circle, on one dividing line, for observation in one eyepiece; (5) images of opposite points of the circle to be reproduced through the hollow axis, so that the circles might be completely enclosed; (6) use of a highly sensitive micrometer for adjustment of coincidence to allow of direct reading of the arithmetical mean; (7) use of glass circles to ensure a symmetrical type of graduation; (8) reduced surface dimensions for temperature change disturbances.

By the early 1930s surveying officers in British surveying ships were extremely happy with their lightweight Cooke, Troughton & Simms Tavistock theodolites, replacing as they did the extremely cumbersome and weighty instruments of earlier years.

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NOCTURNAL VISION BY MEANS OF THE "NOCTOVISOR"

(Extract from "*De Zee*", *The Helder*, September 1929, page 613).

A demonstration took place before press representatives, at Box Hill, Surrey, of a new invention intended to enable vessels to see the lights of the aids to navigation as well as those of ships during fog.

This is a special application of the "Noctovisor" discovered by L. BAIRD and presented by him before the British Association in 1927.

The preparations for this experiment were made on the highest point of Box Hill, in a Swiss chalet to which BAIRD retired latterly.

The "Noctovisor" is a very simple apparatus resembling a large photographic camera; it can be mounted on board any vessel. BAIRD had placed the "Noctovisor" in his garden, at the top of the hill which commands a magnificent view on the neighbouring valley.

At nightfall, a motorcar left the cottage & descended into the valley. The onlookers could follow the head-lights of the car running on the high road with the naked eye for about 3 miles. At a signal given by the operator placed on the top of the hill, the head-lights were put out and complete darkness ensued. The car's head-lights had been obscured by ebonite plates, as an artificial substitute for fog.

The operator invited us to cast our eyes on the small screen placed behind the "Noctovisor", whilst he explored the valley to detect the obscured light. All of a sudden, a slight trace of the obscured light appeared on the edge of the screen, and, as soon as the apparatus had been focussed, this trace was transformed into a bright spot of orange-coloured light. The operator adjusted the apparatus so as to get the spot in the middle of the screen, and, by means of a fixed bearing-plate he was able accurately to determine the position of the fog-concealed light.

In the "Noctovisor" use is made of the invisible infra-red rays. The apparatus comprises a television sender and receiver mechanically coupled. It is constructed so as to be very sensitive to infra-red rays instead of to

ordinary light. The objective of the "Noctovisor" projects a small invisible image, formed of infra-red rays, onto the disc of the television sender, and this image is instantaneously reproduced and made visible by the mechanically coupled receiver.

A viewer based on this same principle was used to take bearings at night during certain clandestine hydrographic surveys during World War II, and to facilitate the recovery of the small survey craft by a mother ship or submarine.

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