

focus of the paraboloid a contact microphone was mounted, and the mouth of the paraboloid was protected from wind by a perforated screen. Microphone adjustments were such that the noises of the ship on which it was erected and disturbances from wind produced little effect, but it would respond to horns and sirens up to ranges of three miles. The axis of the drum carried a commutator, and brushes were arranged so that, for sixteen positions of the drum, currents generated by sound in the microphone could light a lamp through the agency of a relay. Sixteen of these lamps were arranged in a dial to give the points of the compass against which any sound disturbance could be anticipated. For near foghorns, a group of lights might be shown on a definite arc, the centre of which would give the bearing. This instrument was used for a period on the Mersey pilot-service and on the Holyhead-Dublin mail service. A later pattern, where a much larger drum was used, avoided the operation of rotating the drum, the same effect being achieved by using a number of radial paraboloid receivers, each with its own light indicator. This was installed on S.S. *Victorian* of the Allan Line on the Liverpool-Montreal service. The instrument, though successful, was not brought into general use.

THE EAST AFRICAN ARC

by

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(Extract from an article published in *The Empire Survey Review*,
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This account deals with the geodetic triangulation carried along the eastern side of Lake Tanganyika during 1932 and 1933, under the direction of the author, Major HOTINE.

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The section on observation deals with instruments, methods of observation and records. The Tavistock theodolite is highly commended; the Wild, on the other hand, developed axis trouble. The interesting point is raised why surveyors in different parts of the world differ so widely in the number of measures considered necessary — varying from eight in South Africa to thirty in India. The author considers that the two essentials in observing are symmetry and speed. In order to ensure the former he recommends that observations should be made in such a manner that, if interrupted before completion, there shall always be a symmetrical set available; thus zeros should be taken 0° , 90° , 45° , 135° , $22^{\circ} 1/2$, $112^{\circ} 1/2$, etc. The second principle is based on the assumption that, whatever care is taken, the instrument, atmosphere, ground are all moving to some extent, and that the quicker the observations are taken the less movement there will be. All surveyors of experience will be disposed to agree.

Most of the observing was done at night, on lamps; and it is noteworthy that these were electric, the power being obtained from batteries. In discussing daylight work, Major HOTINE advocates observing (on helios) during the two hours after sunrise and the two before sunset. The recollection of the writer is that experience on the 30th Meridian Arc in Uganda was against this. It is true that lights appear clear and steady when the sun is low; but after some experience these conditions were viewed with suspicion, as there seemed to be a tendency to lateral refraction. On the other hand, although when the sun is high signals become very unsteady and observation much more difficult (necessitating a greatly increased number of pointings), the results appeared to be more reliable.
