

# ON AN APPARATUS FOR LOCATING SOURCES OF ATMOSPHERICS

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For several years, we have observed the directions of arrival of atmospheric waves at three stations. Cathode ray direction finders of instantaneous type with photographic recorders were employed.

The films recorded were magnified by a projector and readings of direction were taken approximately within 0.5 degrees by a protractor. Origins of atmospheric waves were determined on a Gnomonic chart by triangulation based upon observed directions of arrival,

This process has compelled us to make great efforts.

In order to reduce this trouble, we devised a new apparatus which is outlined as follows.

A block-diagram of this system is shown in Fig. 1. The film recorded is magnified by a projector, and the direction of an enlarged image reflected on a graduated screen of the projector is measured in approximation within 0.5 degree by means of rotating the screen and laying a carrol line of it upon the image of the film. This graduated screen is mechanically geared to a goniometer by which the rotating angle of the screen is automatically transformed into two electrical angles differing at right angle to each other, *i.e.*  $\sin \theta$  and  $\cos \theta$ , where  $\theta$  is the rotating angle. Three identical processes mentioned above are performed in parallel in order to afford conveniences for triangulation by three direction finding stations. In the next stage of a time division system, three pair of output signals from three goniometers are switched electronically by turns. Then, the output signal from the switching circuit is amplified to apply to the deflection coil used to indicate the directions of arrival. At the same time, the position signals corresponding to three direction finding stations are superposed on the direction signals, being synchronized to the direction switching.

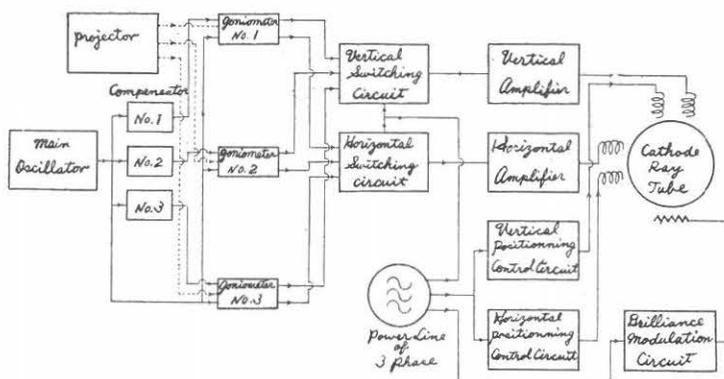


FIG. 1. Block diagram of this apparatus.

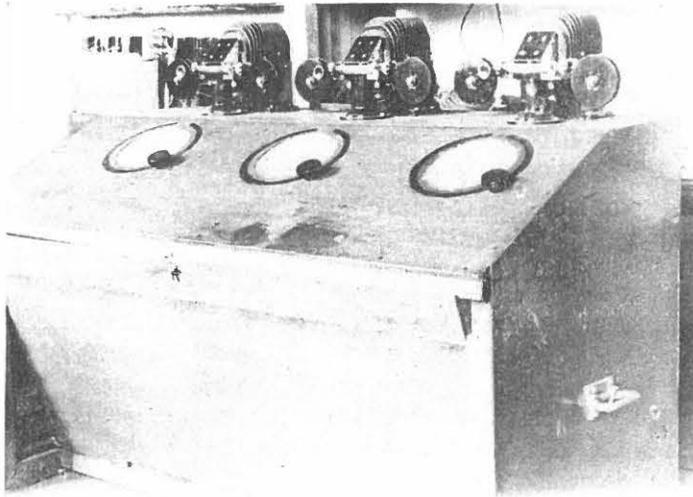


PHOTO. 1. Projection unit of this apparatus.

Thus, three straight lines for which directions and centres correspond to ones obtained at three direction finding stations respectively, are drawn on the fluorescent screen of the cathode ray tube, and triangulation based upon observed directions of arrival will be possible.

Moreover, accessories such as a brilliance modulator, a main oscillator, compensators of the error of triangle, and power supplies, *etc.*, are added to operate this apparatus satisfactorily.

This apparatus is under construction and details will be reported in the next paper.

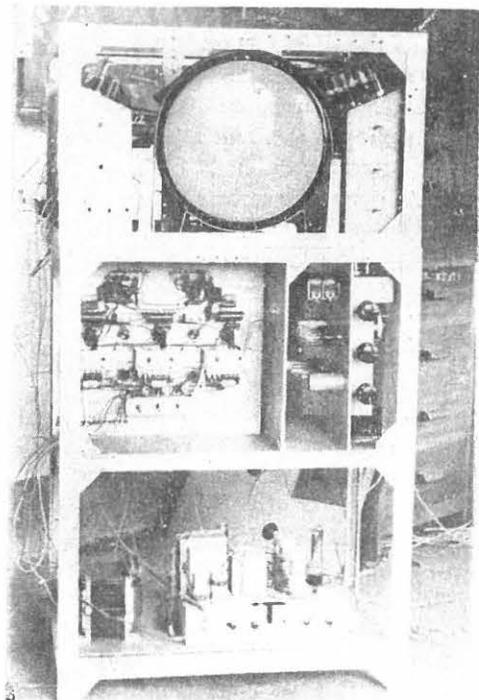


PHOTO. 2. Display unit of this apparatus.