Date (1949)	Huancayo storms Start*	Cessation*	Activity†	50·0 Mc./s. propagation Start	Cessation	Areas (see map)
Oct. 13	2013	..	*s*	—	—	—
Oct. 16	..	0800	*s*	1426	2005	*A* and *B* to *C*, *D* and *E*
Oct. 27	0450	..	*m*	—	—	—
Oct. 28	..	0600	*m*	1306	1745	*A* and *B* to *D* and *E*
Nov. 1	0953	..	*ms*	—	—	—
Nov. 2	..	..	*ms*	1740	1900	*A* to *C*
Nov. 3	..	0500	*ms*	1747	1857	*A* to *C*
Nov. 19	0604	..	*s*	—	—	—
Nov. 20	..	0700	*s*	1353	1630	*B* to *C*, *D* and *E*

* (..) represents continuing storm.
†, storms are described by three degrees of activity : *m* for moderate, *ms* for moderately severe, *s* for severe.

quently affected during, or shortly after, moderately severe, or severe geomagnetic storms.

The accompanying table shows the reported geomagnetic storms at Huancayo and the periods when 50·0-Mc./s. communication was possible. The periods of possible communication during the storm dates represent approximately 70 per cent of the total time when communication was possible between the areas indicated.

It would appear, from these observations, that the enhancement of radio propagation conditions may possibly exist at all longitudes throughout the entire equatorial region.

The 'opening' of frequencies in excess of 50·0 Mc./s. for oblique incidence F_2-layer propagation strongly suggests that the 'positive phase' described by Appleton and Piggott may continue for 12–18 hr. after cessation of the geomagnetic storm. More evidence and further study on this effect are desirable.

This study was made possible by the whole-hearted co-operation of a large number of radio amateurs scattered throughout twelve countries of the western hemisphere. Their interest and assistance in providing the observational material are gratefully acknowledged. The evaluation of the data was performed by the staff of this organization.

The investigations resulting in this work have been sponsored in part by the Geophysical Research Directorate of the Air Force Cambridge Research Laboratories.

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Absolute Measurement of Microwave Power in Terms of Mechanical Forces

A LOW-LOSS cavity having input and output wave guides, and containing a movable element, can, in principle, be used for measuring microwave power absolutely.

It is necessary that in at least one position of the moving element the cavity acts as a reflexionless transition between input and output wave-guides. The force acting on the element in this position is a measure of the power flow.

Let the position of the movable element be specified by a co-ordinate x_2, and let the matching position of x_2 be x_{20}. The component of generalized force acting in the direction of increasing x_2 under these conditions we denote by F_2, defined so that $F_2 dx_2$ is an infinitesimal energy change.

If the output wave-guide is matched, and the power flow is P, we have

$$F_2 = \frac{P}{2c} \cdot \frac{\lambda}{\lambda_{g_3}} \left[- \frac{\partial x_3^{(1)}}{\partial x_2} - \frac{\partial x_3^{(2)}}{\partial x_2} \right].$$

In this expression, c is the velocity of light, λ is the transverse electromagnetic wave-length and λ_{g_3} is the wave-length in the output wave-guide.

The bracketed factor is determined by two auxiliary experiments (distinguished by the superscripts) in which the matched load is replaced by a perfectly reflecting piston at x_3, and a standing-wave indicator is used to locate nodes in the input wave-guide. In the first experiment $x_3^{(1)}$ is given any arbitrary value $x_{30}^{(1)}$, and, with x_2 equal to x_{20}, a node is located by the standing-wave indicator, say at $x_1^{(1)}$. Then x_2 and $x_3^{(1)}$ are adjusted in such a way that the node remains at $x_1^{(1)}$, and from the resulting set of values $\partial x_3^{(1)}/\partial x_2$ is determined at $x_2 = x_{20}$.

The second experiment is similar to the first, except that we take $x_{30}^{(2)} = x_{30}^{(1)} + \lambda_{g_3}/4$.

The general relationship between force and power quoted above can be deduced from the adiabatic invariance of action in a loss-free cavity[1]. It has given satisfactory agreement with other methods in calibrating the radiation-pressure power-measuring apparatus previously described[2].

An interesting special case is the rotary phase shifter described by Fox[3]. If the central 'half-wave plate' section is allowed to rotate on its axis from a suitable suspension of known specific couple, the torque T exerted on it could be measured and would give the power flow according to the formula $P = \frac{1}{2}\omega T$, where P is the power flow and ω the angular frequency. Moreover, there would be no reflexion of power for any deflexion of the movable part in principle, and angles of deflexion exceeding 2π are not excluded.

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Preparation of Photoconducting Cadmium Sulphide

CADMIUM sulphide, when suitably prepared and in the form of relatively large crystals, is an interesting and important photoconducting material, with high sensitivity to many forms of radiation, including visible and ultra-violet light, X-rays, gamma- and beta-rays, etc.[1].

The usual method of preparation is by a vapour-phase reaction at a temperature of 1,000°–1,100° C., between hydrogen sulphide and cadmium in the presence of hydrogen[2]. Yellow hexagonal crystals are obtained in the form of flat plates 0·1 mm. thick and 1 cm. long when the furnace used is 10 cm. in diameter.

A new method has been developed for the preparation of photoconducting cadmium sulphide surfaces, the process possessing considerable advantages over that outlined above. Cadmium sulphide is precipitated from an aqueous solution of cadmium sulphate