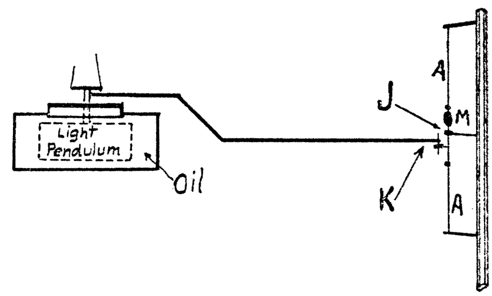
ing which ignores the objectionable slow wanderings of the heavy mass, and yet records displacements directly, retaining the flat magnification curve of the best seismographs, and permitting the use of very long-period instruments. The essential feature of this recording system is that the (apparent) motion of the heavy mass is transmitted through a viscous medium to a light system having a shorter period of its own: the viscous coupling amounting to direct connection for the seismic motion of a period up to that of the pendulum, but permitting the light system to avoid the very slow changes.

This method of recording may be explained by describing the system as applied to a certain horizontal pendulum at the College of Hawaii. The adaptation to vertical-motion instruments will suggest itself.

Attached to the seventy-pound mass of a suitably damped horizontal pendulum is a horizontal cylindrical vessel of heavy oil, the axis of the cylinder being in the direction of motion of the pendulum. The cylinder is two inches in diameter, and has an opening in the form of a longitudinal slit one half inch wide at the top, around which there is a rim, to allow the surface of the oil to be somewhat higher than the top of the cylinder. In the cylinder, immersed in the oil, is the mass (about one pound) of a second horizontal pendulum. This mass is itself cylindrical and forms a piston within the larger vessel, though not touching it. The axis of rotation of this light pendulum coincides approximately with that of the heavy pendulum, but is sufficiently inclined to give a free period short enough to allow of registration, and it is the motion of this light pendulum which is recorded. It will be seen that for ordinary seismic motion the two pendulums form a single mass, but that the oil can flow so as to allow the light pendulum to retain approximately its own equilibrium position.

Registration is accomplished photographically as follows: A piece of no. 36 nickel wire two inches long is soldered at its ends to pieces of galvanometer suspension ribbon *AA* (see figure) each three inches long, and stretched between spring supports in a vertical position. At its middle this nickel wire passes through the hole of a watch jewel *J* of suitable size held by an arm fastened to the support, preventing transverse vibration. Fixed to the nickel wire just below the jewel is an arm of wire, one fourth inch long, holding at its other end a similar jewel. Through the hole of this jewel passes a short piece of no. 36



wire *K* attached to the end of an aluminum wire which is itself attached to the light pendulum by a flexible connection. The motion of the pendulum is thus transmitted to the mirror *M* which is cemented to the nickel wire at another point. The rocking of the mirror is recorded in the usual way on bromide paper.

This system succeeds with a magnification of 75 on a pendulum moving sometimes half an inch in the course of the twenty-four hours, with a lateral drum-motion of an eighth inch per (hourly) revolution.

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