

*ON A DUPLEX PENDULUM WITH  
A SINGLE BOB.*

BY

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This instrument is a modification of the Duplex Pendulum exhibited and described to the Society at its last meeting. It is a seismometer capable of recording motion in any azimuth ; and its novel feature lies in the method by which a state of neutral equilibrium is produced in a heavy mass free to move in a horizontal plane.

The heavy mass or bob is supported partly by a vertical strut pivotted in a socket which is fixed to the earth, and partly by a stretched tie attached to another fixed point vertically above the first, and above the bob. The tie, which may conveniently be a spiral spring, is stretched to a considerable extent when the bob is undisturbed, and hence any small horizontal displacement does not sensibly increase the tension of the tie. To secure neutral equilibrium the three forces acting on the bob, namely (1) its own weight, (2) the pull of the tie, (3) the thrust of the strut, must balance each other when the bob is slightly displaced out of the vertical line joining the supports. This condition is fulfilled by making the pull of the tie bear to the thrust of the strut the same ratio as the length of the tie bears to the length of the strut. In other words, the weight of the bob must be shared between the tie and the strut in proportion to their respective lengths.

The instrument is, in fact, a vertical pendulum, single with respect to its bob, but duplex with respect to its suspension. Its relation to the duplex pendulum referred to above is made obvious by conceiving the bob to consist of two parts, of which one has its weight borne by the strut and the other

by the tie. This separation into two parts was actual in the instrument formerly described; here it is imaginary, and in this respect the new instrument has the advantage of greater simplicity in construction and a more complete absence of friction.