

be founded upon its errors, determined from time to time through a period of not less than a year. These errors should be exhibited in connection with the mean temperature of the clock-room, and if the clock is not in an air-tight case the height of the barometer should also be given. A calculated error should then be carried through the whole period, in which the corrections for temperature and height of the barometer should be introduced. A clock which stands this test well may be presumed beyond doubt to keep its rate during short intervals, which is generally the important point.

It is very common to present as sufficient data for judging of a clock an exhibit of its daily rates from time to time. If these rates were really determined with the last degree of accuracy they might be sufficient for the purpose. But as found in practice they will be the result, not merely of the actual rates of the clock, but of various personal differences among the observers and changes in the pointing of the instrument as well as the accidental errors of observation. From these causes, although the clock were perfect, we might expect an apparent difference of several hundredths of a second between its apparent rate on successive days.

The barometric change in the rates of all clocks of the usual construction is so important a drawback that it should no longer be tolerated in work of the first class. Two methods have been proposed: the one, that already mentioned, of inclosing the clock in an air-tight case; the other, to supply it with a barometric compensation. The latter method is undoubtedly the easiest, but where the necessary perfection of arrangements can be secured the former must be considered greatly preferable. The grounds of preference are that the air can be exhausted from the case to any extent, thus diminishing its resistance to the motion of the pendulum and permitting a diminution in the driving power. Again, if, instead of air, the case be filled with some gas which does not act on the oil, the slow oxidation of the latter may be prevented. It may therefore be expected that under this system a clock could be allowed to remain undisturbed for a longer period than under any other.

Very respectfully, your obedient servant,

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