only the minutes, but also the seconds, with an uncertainty not exceeding 15 seconds. (3) It must have been obtained from a clock kept running with accuracy upon standard time or equally reliable local time, or from a clock or watch compared with such time within a few hours of the occurrence. There are five observations besides that of Charleston which meet these requirements.

The second group will consist of those which fulfill the same conditions as the first, except that they will be required to give only the minute or half minute nearest to the beginning. There are eleven which answer to these requirements.

The third group will include all that remain after taking out groups I, II, and the stopped clocks. Some of these state that the time is that of the beginning, but fail to show that any attempt was made to ascertain the error of the time-piece. Some give a satisfactory account of the time-piece, but fail to state the phase to which the reported time refers. Many do neither the one nor the other. The number of reports in this group is 125.

The fourth group consists of accepted reports of clocks stopped by the first great shock. The clocks, however, must be stated to have been regulated carefully by standard time or by local time known to be equally accurate.

In all the groups there is more or less discordance among the several observations, no two giving the same speed. As the errors of the first two groups are believed to be mainly of the accidental class, the best method seems to be to submit them to the process of least squares. The equations of condition may be formed very simply in the following manner: The computed time of the beginning at the centrum (which has already been given) must be presumed to have some error, which may be designated by x. If t_0 be the computed time at the centrum (9:51:06) and t the reported time at any other locality, then $(t-t_0)$ = the number of seconds in the observed time-interval taken by the wave to travel from the centrum to the place of observation. If D be the distance in statute miles, and y the number of seconds or fraction of a second required to travel one mile, we may form the following equation: $x+Dy=t-t_0$, in which there are only two unknown quantities, x and y. This implies that the speed is uniform. If this implication differs widely from the truth, indications of it may be expected to appear in the residuals. It is necessary to put the equations of condition into a form in which a time and not a speed shall be the unknown quantity, because the times and not the distances are the data into which the greatest uncertainty enters. If, putting v for the speed of transmission, we put our equations into the form of $v(t-t_0)=D$, they would be subject to the objection that their uncertain quantities would be the coeffi-