

run down to thirty or less, depending on the period of your earth particle. So in reading the seismogram we have to use different magnifications. I mentioned we have our seismograph connected with our mean time clock, so that fortunately with our seismograms there is absolutely no time correction. It would only be a very small fraction of a second in any case. As far as I know, and I have visited very many stations, it is the only seismograph directly connected with an observatory mean time clock. The others have all separate clocks connected with their seismographs, necessitating a daily comparison between the seismograph clock and a standard clock, which is certainly an inconvenience. This question of time is one which affects the seismograms and is most unsatisfactory in the records from some stations. Some of the records of the earthquake on the tenth of February last, were accompanied by a note saying that they did not know whether their time was correct or not. I have one record where the time is recorded before the earthquake took place. (Laughter). That shows that the time is not very satisfactory. We are getting over this difficulty of time, however, by the wireless time signals from the Eiffel Tower, Norddeich and Arlington. These time signals are sent out daily and at present it is very easy and cheap to get a receiving apparatus, and by that means one is able to get time readily within a second.

When we have our seismogram, the question is to read it. We have first to find what the instrument was doing. If we had a perfect one we would only read what the earth was doing. But we cannot have the seismograph held by an invisible hand out in space. You will see that if all is well and no quake, the record continues in a straight line. When the earthquake comes we have an offset. When we examine that we try to see from where the earthquake comes. Now we have learned to recognize that there are three distinct kinds of waves. There are the longitudinal waves, there are the transverse waves, and the undulatory or those on the surface of the earth. The first or longitudinal waves travel the fastest, the next with less velocity and the last with still less. With regard to velocity we know it bears a relation to the substance and its density and elasticity. We have found, as I said, the different velocities, and we know that the surface waves which are the last, are confined to the surface of the earth, and travel with a constant velocity of about 200 km. a minute, whereas the others travel through the earth and with differing velocities dependent upon the depth. The San Francisco earthquake was distant about three thousand eight hundred kilometers, and the propagating ray dipped about 300 kilometers down into the earth. The place in the earth where the earthquake occurs we call the hypocentre. We know that the earthquake does not take place