rate is taken to be 200 per second. The pulse amplifiers have a good response within the frequency range from several tens Kc./sec. to about a few Mc./sec.

The transmitting transducer is a cylinder, made of barium titanate, whose thickness is 1 mm. and effective diameter 6 mm. The receiving transducer is a rectangular slice, also made of barium titanate whose dimension is $4 \times 2 \times 1$ in mm. unit.

A plastic plate is used as a model for a semi-infinite solid. The measurements are carried out at each 2 cm. interval within the range of distance 30 cm. from the transmitter. An example will be seen in Fig. 3.

As shown in these two figures, two predominent phases are found. For the identification of these phases, travel-times of the initial motion of these phases are taken as shown in Fig. 4. The curve of travel-times of each phase are well expressed by a straight line crossing the ordinate at the origin. After examining the hodographs for the orbit of the pulses, obtained from the seismograms of two components, the first and second arrivals are ascertained as P and S waves, respectively.

We are now carrying on many models on two-layered earth, fault effect and others. These results will be published in the near future in Japan.

Finally, it may be added that this equipment is also utilized for the direct measurement of seismic wave velocity transmitted through rock samples.

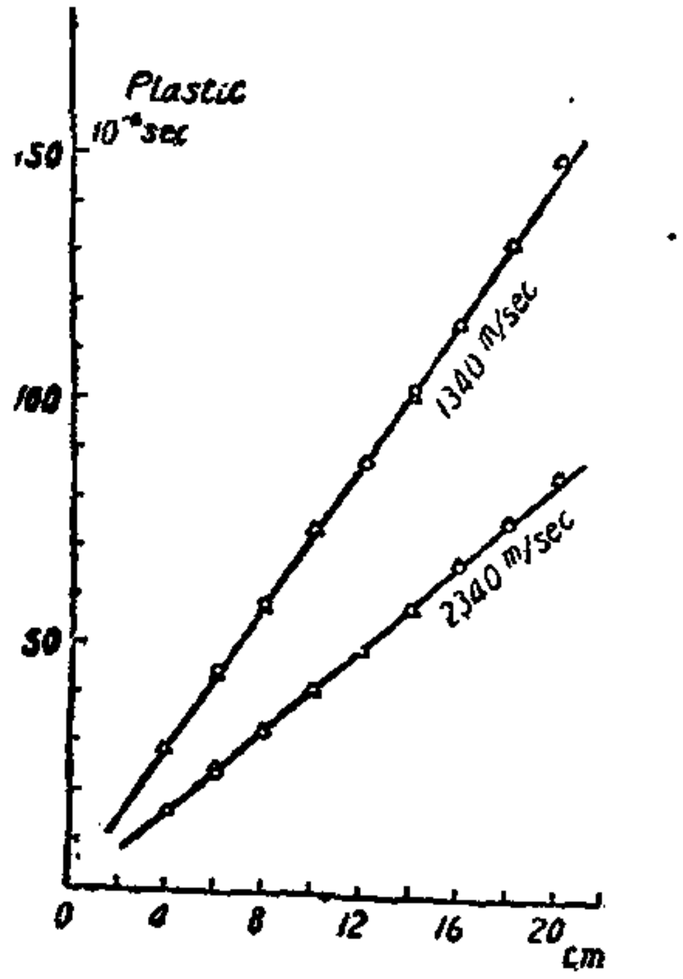

FIG. 4. Travel-time curve for semi-infinite model.

IONIZATION INDUCED BY ARTIFICIAL EARTH SATELLITES

ARTIFICIAL earth satellites at the times of their near approach encountering regions of high particle density or colliding with fast corpuscular streams, scatter the material into ionized clouds. These ionized clouds travelling earthwards eventually act as reflectors or back-scattering medium for radio waves and produce significant changes in the intensity of reception of radio signals.

In a recent issue of *Nature* (1960, **185**, 520), J. D. Kraus *et al.* have reported the results of observations at the Radio Observatory, Columbus, Ohio, on the enhancements of monitored signals recorded at the times of near approach of Sputnik III. In these observations it was found convenient to monitor the WWV signals **(20 Mc./s.) of the time service station of the National Bureau of Standards, Washington D. C., 330 miles from Columbus. Enhancements of signals were recorded between January 9 and February 7, 1959, on successive nights during the passes of Sputnik III (3-4 passes per night).**

Analysis of the results shows that at each approach of the satellite there occurred three large enhancement peaks, *viz.*, (1) a precursor enhancement peak about 15 min. before near approach, (2) a peak at near approach and (3) a post-enhancement peak about 8 min. after near approach. It is significant that these times corresponded to the times the satellite was in the auroral zone. This suggests that the satellite encountering regions of high particle density in the auroral zone scattered material into ionized clouds or streams which travelling closer to Columbus affected the monitored signals causing many of the observed signal enhancements.

Radar reflection studies have also confirmed this hypothesis of induced ionization by earth satellites. It was observed that at the time radar signals were reflected, the signals from the Sputnik III transmitter, which had been very strong, dropped for a minute or so to a low level after which they became strong again. The conclusion may be drawn that the ionized clouds while they acted as reflectors for radar signals also acted as the absorbing medium for the satellite transmitter signal.