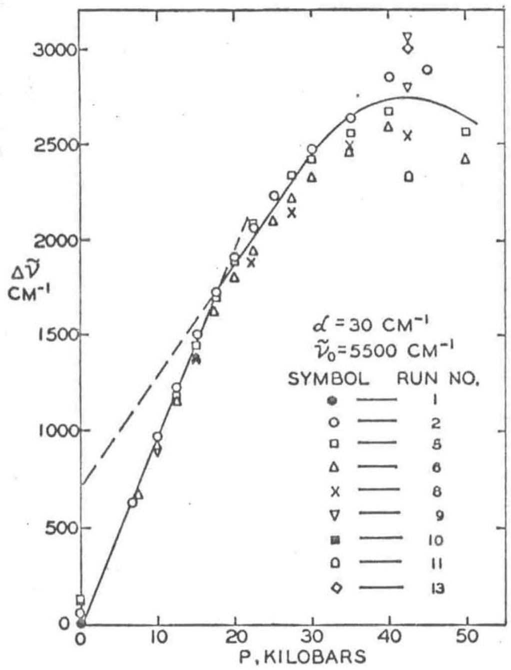

FIG. 2. Shift of GaSb absorption edge with pressure.

in intensity and location, as if the motion of the absorption edge itself were exposing it, allowing it to be observed. The spectra from a typical run are shown in Fig. 3. The peak in this case is centered at 6750 cm^{-1} and has an absorption coefficient of 12 cm^{-1}. In other runs, the absorption coefficient at this wave number varied from 6 to 35 cm^{-1} at a pressure of 42.5 kilobars. From 45 to 50 kilobars, in two runs, the intensity of the peak appeared to increase slightly, and remained more intense as the pressure was lowered.

To help identify the source of the absorption peak, samples were subjected to various treatments before loading and running in the $\frac{1}{8}$-in. bomb. A 4 mil sample was heated in air for 40 hr at a temperature of 450°C, and cooled slowly. In the bomb at 42.5 kilobars, the absorption peak height was 32 cm^{-1}. The reflection correction was about normal, and the long-wavelength transmission of the sample decreased only slightly at the highest pressure. Another 4-mil sample was given the same heat treatment in an evacuated Vycor tube. In this case, the peak height was about 9 cm^{-1}, and was not affected by reducing the pressure from 42.5 kilobars to 1 atm, letting the bomb sit overnight and then increasing the pressure again to 42.5 kilobars. The long-wavelength transmission of the sample changed little under pressure, but the reflection correction had a slope about twice the normal value. In two separate experiments, 7 mil samples were bent to about 0.2% strain in the outer fibers, and spectra taken while bent, and after repeated flexing in opposite directions. The only apparent effect is an insignificant red shift on the edge, less than 100 wave numbers. One of these samples was then subjected to pressure, and at 42.5 kilobars, the absorption peak height was 18 cm^{-1}. The reflection correction and long-wavelength transmission were normal. Finally, an 11 mil sample was cold-rolled by rolling a $\frac{5}{16}$ in. glass rod over it in one direction about 50 times with a downward force of 5 lb. A second sample mounted next to the first one crushed and broke up under this treatment. In the $\frac{1}{8}$-in. bomb at 42.5 kilobars, the peak height was 7 cm^{-1}, and repeated cycling of the pressure between 42.5 kilobars and 1 atm had no effect on the peak. Also, a change in the intensity of the light passing through the sample, by a factor of 25, had no significant effect on the peak height.

Two x-ray powder diffraction patterns were obtained for crushed GaSb samples which had been placed under 100 kilobars pressure for five minutes. No extra lines were found in these patterns. The lattice spacings indicate a cube edge dimension of 6.10 angstrom units, and a Ga-Sb separation of 2.645 angstrom units.

InP was obtained in the form of small irregularly shaped pieces of single crystal material, from Dr. A. A. Giardini, of the U. S. Army Signal Research and Development Laboratory. Spectra were obtained on the infrared spectrometer, with a tungsten lamp source and a PbS detector, with a slit of 2.0 mm in the monochromator, for several unpolished samples in the $\frac{1}{8}$-in. bomb and a polished sample in the $\frac{1}{2}$-in bomb. Several loadings were unsuccessful due to crushing of the samples, which appear to be extremely brittle. For the successful runs, the shift of the absorption edge with pressure was measured from an initial value of 11 100 wave numbers at an absorption coefficient of 30 cm^{-1}. The results are shown in Fig. 4. There is an initial blue shift with pressure up to about 40 kilobars, with a slope of 0.0046 ev/kilobar. Above 40 kilobars, a long tail develops on

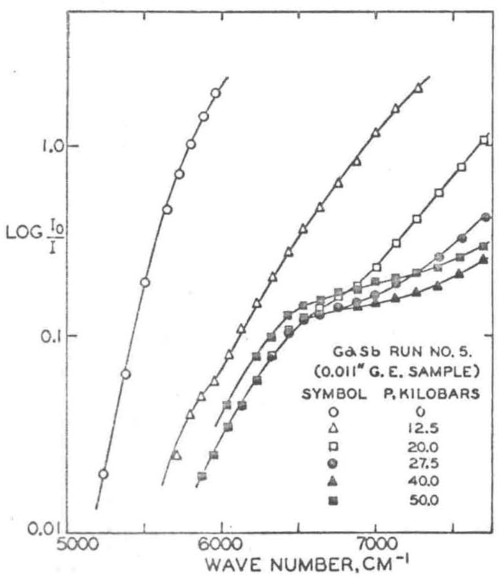

FIG. 3. GaSb absorption spectra at various pressures.