successive impact of two flying plates, and this work has led to the detection of the lateral splitting ('scabbing' or 'spalling') of an explosively accelerated tin plate. In addition two pressure waves, the first showing a gradual rise in pressure rather than a step, have been recorded in glass and granite. Further investigation of the wave propagation effects in glass have shown that the high pressure elements of the first compression wave travel slower than the low pressure elements, and that for a large range of pressures this wave may be followed by a shock (Duvall 1962 p. 337).

In all the above examples the pressure recorded is that induced by the particular explosive system in a block of epoxy resin cast round the transducer. The pressure profile in the epoxy resin qualitatively follows the profile in any preceding material in contact with it. To yield quantitative information about this material it is necessary to know its equation of state, so that pressures in it can be calculated from those in the resin. However, even in the absence of such information polymorphic transitions or unusual compressibilities are qualitatively recognizable from the pressure profiles observed.

For materials such as granite and glass, which remain adequate electrical insulators at high pressures, the technique can be extended to measure the actual pressure in the material and to deduce pressure–volume relationships.

3.2. *Pressure–volume measurements*

Glass has been used to illustrate the technique because it is obtainable in a suitable form and is more homogeneous than granite. Manganin wires were sealed between glass plates with epoxy resin. As glass is still a good insulator at high pressures, the manganin wire was placed in contact with the glass. The maximum thickness of the resin layers was therefore the diameter of the wires, about 0·0046 cm. It is assumed that pressure reverberations in this space quickly change its pressure to that in the glass, so that the transducer moves at the particle velocity of the glass and the profile recorded is at the true glass pressure. The velocities of pressure elements of the first simple compression wave were measured from pressure profiles taken at successive points as the waves passed through a glass block. Typical records are shown in figure 5 and the results in figure 6.

The wave velocity at zero pressure D_0 calculated from these experiments is $5\cdot 5$ km sec^{-1} which agrees with the velocity of sound measured with an ultrasonic tester at $5\cdot 47$ km sec^{-1}.

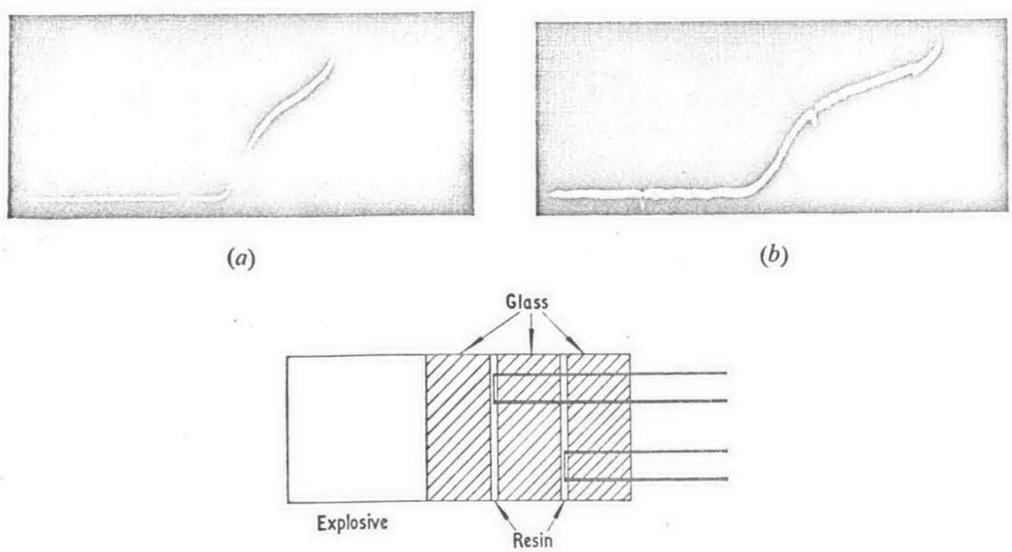

Figure 5. Pressure profiles of a simple compression wave of 100 kb peak pressure, followed by a shock (not shown), produced and recorded in glass. (*a*) After 0·846 cm, (*b*) after 1·48 cm travel, (*c*) arrangement of transducer (not to scale).