

The tetrahedral-anvil press was machined to an accuracy consistent with the precision of an X-ray diffractometer. This accuracy was necessary since the diffractometer is an integral part of the press. All of the geometry critical to the X-ray analysis lies in a plane which contains the axes of two of the tetrahedral rams. A sectional drawing of such a plane is shown in Fig. 7. This plane contains the scanning tracks (not shown in section), the sample, the X-ray tube target, the axis of one of the tie bars, and the compressible gasket which forms between the two tetrahedral anvils whose axes are not in this plane. The two rams not shown and the other tie bars never pass through this plane.

The X-ray tube is mounted in a cylindrical cross-axis hole in one of the hydraulic rams as indicated. This ram is referred to as the X-ray tube ram. When the X-ray tube is excited, an X-ray beam passes through a collimator along the axis of this ram and emerges through a small hole in the center of the carboloy piston. The hole in the piston face is plugged with beryllium to prevent excessive extrusion of the material of the pressure cell down the collimator. The details of this construction and geometry are indicated in an enlarged drawing (Fig. 8) of the sample region. The tetrahedral sample chamber is made of solid LiH to reduce X-ray absorption. These tetrahedra are formed by pressing polycrystalline LiH in an appropriate die. The size of the individual crystals of LiH is approximately .030" in average dimension. This large crystal size reduces the X-ray absorption and also the chance of proper orientation for X-ray diffraction from LiH near the sample which would be recorded as a peak by the counters. After striking the sample, the diffracted X-rays pass out of the pressure chamber through the thin gasket and are detected by scintillation counters mounted on a motor-driven, geared carriage. The width of the diffracted X-ray