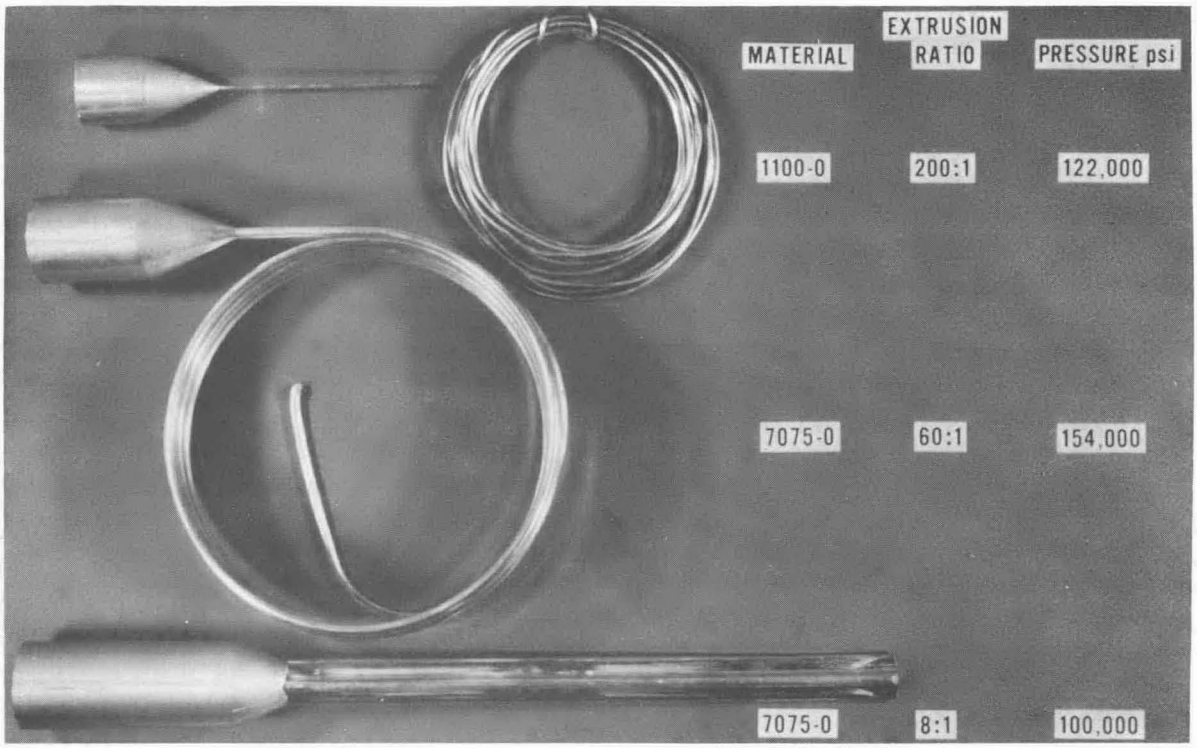

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FIGURE 1. HYDROSTATIC EXTRUSIONS OF ALUMINUM ALLOYS

7075-0 aluminum billets 1-3/4 inch-diameter.

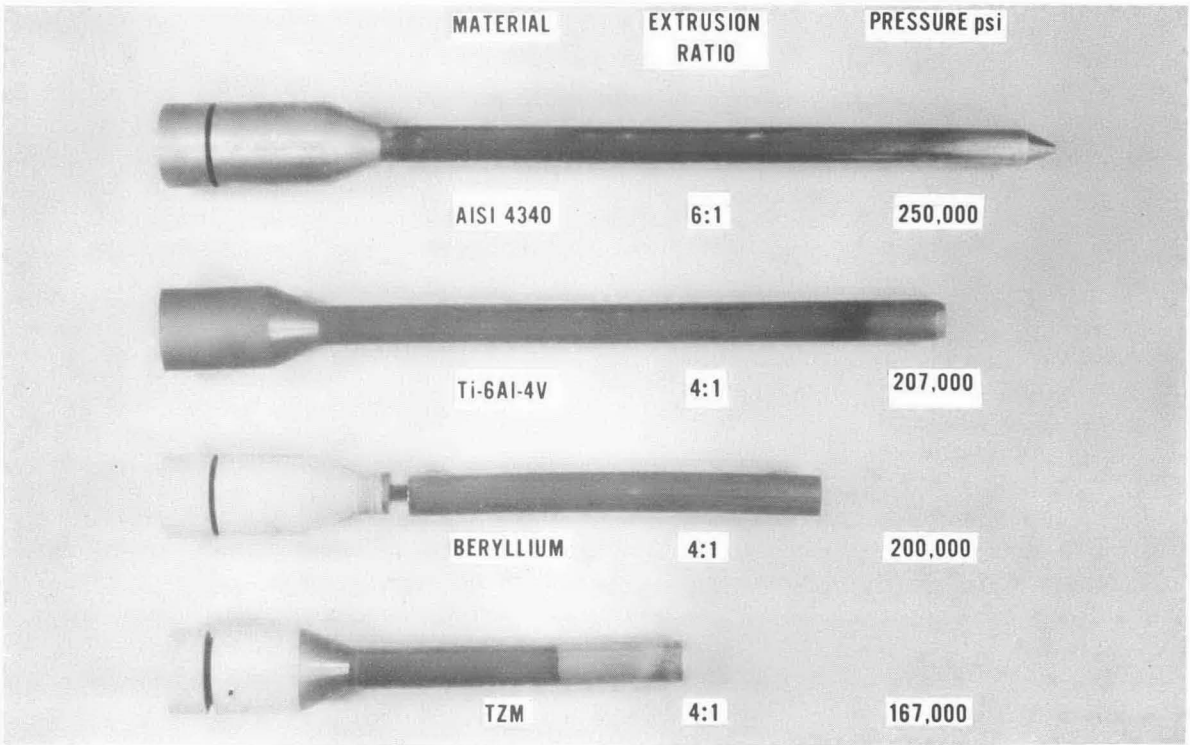

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FIGURE 2. HYDROSTATIC EXTRUSIONS OF HIGH STRENGTH AND BRITTLE MATERIALS

All billet diameters 1-3/4 inches.

these extrusions were in lubrication for the aluminum, steel, and Ti-6Al-4V alloys and in die design for the brittle materials such as beryllium and TZM. Details of these developments are given in Section 1.

Figure 3 shows examples of the tubing produced by hydrostatic extrusion in this program. In the process, the wall thickness of the tube blank was reduced only, the bore remaining essentially constant. The floating-mandrel arrangement used to produce the tubing provided a pressure assistance additional to the fluid pressure. This enabled a capacity for higher ratios with tubing than could be obtained for solid rounds. An analysis for the extrusion of tubing is given in Section 2.

T-sections were produced from round billets and from T-section billets of a variety of materials. Figure 1 shows a T-section extrusion from 7075-0 aluminum round.

Section 2 also describes the hydrostatic extrusion-drawing process, known as HYDRAW, used in this program to produce T-sections and wire the HYDRAW process was developed at Battelle and the results obtained with the process show considerable promise for its application in a commercial production operation. Whereas in conventional wire drawing, reductions up to about 30 percent are taken per pass (12 percent maximum for beryllium wire), reductions of 50 percent and more were obtained for Ti-6Al-4V alloy, TZM, and beryllium wire. In addition, experiments were conducted in the HYDRAW of T-sections of 7075-0 aluminum. The results showed that problems such as sealing a T-billet in the die could be solved and indicated that finishing of extruded shapes to thin cross sections is another potential application of HYDRAW.