Average values of $h_1 - h_2 = 2.53$ mm and $h_2 - h_5 = 0.47$ mm were found for a 190-kbar shock in 12-mm-thick samples of iron.[25] If $U_2' = 3.578$ mm/μsec, $R_2' = 5.69$ mm/μsec, and $R_1' = 6.58$ mm/μsec, then $h_2 - h_3 = .98$ mm which is equivalent to a rise time of 0.27 μsec for the plastic II wave front. This value is within the range of observed values of rise time described in the preceding section, but near the high side.

6.2. Slow Decay of the Stress Behind the Plastic I Shock

It was noted in Chapter 4 that P^{TL} diminishes slowly with propagation distance; but that if stress jump across the plastic I front is considered, this slow decay disappears. Therefore, one can reasonably infer that the slow decay of P^{TL} is due to precursor decay. The situation can be complicated by wave interactions so the inference is not conclusive.

The situation can be clarified by describing possible bounds of stress-particle velocity states at the impact boundary when an iron sample is impacted by an aluminum projectile. Figure 6.4 illustrates the pressure-particle velocity plane; dashed lines represent metastable extensions of lower pressure states and the solid lines represent equilibrium Hugoniots. The aluminum cross curve represents possible states at the impact boundary. Point A represents the maximum attainable stress at the instant of impact, and C represents the equilibrium stress obtained when all time effects have disappeared. The problem of kinetics at the impact surface is to describe how fast the stress gets from A to C. The time required for stress to decay from

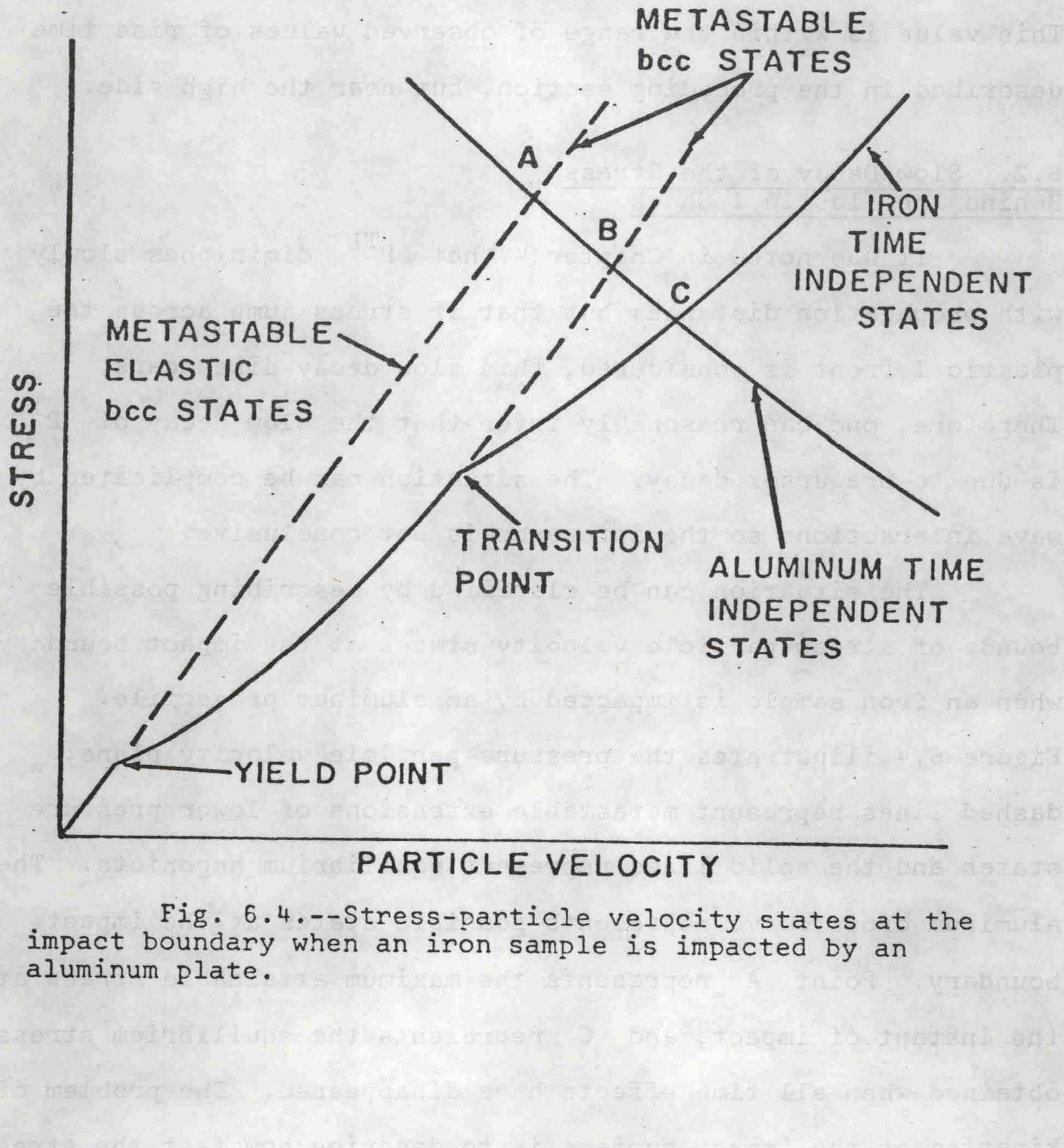

Fig. 6.4.--Stress-particle velocity states at the impact boundary when an iron sample is impacted by an aluminum plate.