

equation of state of matter.* The Russians have published results up to ten million atmospheres.** At these pressures remarkable changes occur in common materials. Iodine becomes an electronic conductor. Carbon can be compressed into a state of considerably higher density than diamond in which a carbon atom has presumably 8 or 12 neighbors rather than just 4. We have attempted to use Plowshare for high-pressure experiments, but found that more planning and instrumentation will be needed before this field can come to full fruition. In the end it is likely that Plowshare will yield much higher pressures and much more extensive results than could be obtained by using chemical energies.

Scientific experimentation in space using Plowshare has the quality of a dream within a dream. One obvious use of a nuclear explosion in space would be to measure the lifetime of neutrons.*** At present this lifetime has been measured to an accuracy of a few percent. There can be no doubt that with the help of nuclear explosions and of detectors placed at various distances

*R. G. McQueen, S. P. Marsh, Journal of Applied Physics, Vol. 31, pp 1253, 1269, 1960, Equation of State for Nineteen Metallic Elements from Shock Wave Measurements to Two Megatons. B. Alder, R. H. Christian, Behavior of Strongly Shocked Carbon, Phys. Rev. Letters, Vol. 7, p 367, 1961.

**S. B. Kormer, A. I. Funtikov, V. D. Urlin, A. N. Kolesnikova, Dynamic Compression of Porous Metal and the Equation of State with Variable Specific Heat at High Temperatures., Soviet Physics, JETP Vol 15, p 447, 1962.

***F. J. Dyson, Proposal for an Experiment to Measure the Lifetime of the Neutron, GA, D-957, General Atomics Div. of General Dynamics Corp., San Diego, Aug. 25, 1959.