JOURNAL NOTES

Cosmic Ray Bursts

During a period of over a year a number of experiments have been carried out, partly on the ground and partly aboard a B-29 aircraft. Simultaneous pulses were observed in an ionization chamber and in a tray of Geiger-Mueller counters placed vertically above the chamber and separated from it by a lead absorber. The purpose of the experiments was to separate the various cosmic ray phenomena that can give rise to coincidences and to learn more of the nature of these phenomena. The results show that most coincidences observed with ten or more centimeters of lead between the chamber and the Geiger-Mueller counters are caused by cascade showers initiated by high energy electrons or photons which, in turn, are produced in the lead by penetrating particles. The variation of the coincidence rate with altitude indicates that at high altitude most of these penetrating particles are different from ordinary mesons. They are probably high energy protons and their interaction with lead nuclei produces electrons or photons.

The interest of the present experiments lies mainly in new information they provide on the production of electronic radiation by nuclear interactions, a phenomenon which had been previously detected by the same authors and for which a satisfactory theoretical explanation is still lacking. The same experiments also provide direct information on the absorption in the atmosphere of high energy nucleons, which is important both for a better understanding of the properties of these particles and for the general analysis of cosmic ray phenomena. B.R.

Further Experiments on Cosmic Ray Bursts. By H. Bridge and B. Rossi, *Phys. Rev. 75: 810, March 1, 1949.*

Creeping Crystals

Ordinary metals consist of an aggregate of individual crystals. Previous work has shown that the intercrystalline boundaries of these individual crystals or grains behave in a viscous manner. The viscous slip along grain boundaries is thus a major factor contributing to the creep (a slow but continuous yielding to small applied stress) of metals at elevated temperatures. To facilitate development of creep-resistant metals for high-temperature uses, as in turbines and boilers, understanding of the origin of the viscous behavior of grain boundaries and a systematic study of the factors influencing this behavior are desirable.

It has been found that a small amount of certain impurities at the grain boundaries, among other factors, is able to block the viscous intercrystalline slip. Based on this and other experimental facts, a working model is proposed concerning grain boundary structure which can-