THE HYDROGEN BOMB*

LITTLE is known publicly about the construction of the hyrdogen bomb; but most probably it is based on the fusion of hydrogen nuclei into helium nuclei, taking place at very high temperatures. The temperatures necessary for such reaction are of the order of millions of degrees and can only be produced by a fission bomb; the hydrogen bomb must thus be triggered by a fission bomb. It is fairly certain that hydrogen is the main material for thermonuclear bomb, for the fusion of heavier elements requires much higher temperatures and produces less energy; but ordinary hydrogen is not suitable, and either deuterium or tritium has to be used.

The main advantage of the hydrogen bomb is that there is no essential limit to its size. It is a very safe explosive, for it will never go off unless fired by the fission bomb. The latter, on the other hand, is by nature unsafe and goes off the instant it is assembled, which puts a practical limit to its size. The load capacity of modern aircraft would, however, limit the explosive power of the hydrogen bomb to about a thousand times that of the fission bomb. The radius of damage of such explosive would thus be ten times greater than that of a fission bomb, that is, about ten miles for severe damage

Against the background of Nature, atomic weapons are small. An average local thunderstorm releases as much energy as a plutonium bomb; a hurricane or an earthquake, a million times as much. Nevertheless, they are frightful weapons, capable of inflicting terrible destruction and wholesale death.

* From a lecture on Atomic Weapons by Prof. O. R. Frisch reported in *Nature*, March 10, p. 477, 1954.

SYMPOSIUM ON NON-FERROUS METAL INDUSTRY IN INDIA

WITH the object of focussing attention on the present state of Indian non-ferrous metal industry and discussing ways and means for stimulating its growth to meet present and future requirements, a symposium on the above subject was held during 1-3 February 1954, under the auspices of the National Metallurgical Laboratory of India, Jamshedpur. 36 technical papers received from India and abroad were presented and discussed in the 3-day session by the participating delegates, which represented industrial organisations, Government and educational institutions, C.S.I.R., besides foreign delegates from abroad.

Dr. N. P. Allen, of the Metallurgy Division, National Physical Laboratory, Teddington, England, also participated in the symposium and gave an illuminating lecture on "Titanium and Zirconium" on the opening day of the technical session, wherein he discussed at considerable length Indian resources of these metals in the general context of world reserves, their physical characteristics in relation to their multifarious applications and indicated the trends of researches under way in U.K. on these two important metals and their alloys.

Mr E H Bucknall, Director, National Metallurgical Laboratory, delivered an address on "High Temperature Materials" in the course of which he discussed the phenomenon of creep and referred to his researches at the National Physical Laboratory (U.K.) on age-hardening alloys with improved creep resistances. He further put forth the requirements of high temperature materials required in gas turbines, combustion chambers, stator blades or nozzle guide vanes, turbine discs and rotor blades, etc. The lecture was profusely illustrated with slides.

The industrial data and technical know-how gained and discussed at the symposium, should no doubt serve to bring into lime-light our valuable non-ferrous mineral reserves and requirements, and to develop possible lines of expansion of this vitally important national industry in many fields.