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THE EXPANDING UNIVERSE¹

By Dr. H. P. ROBERTSON

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THE considerations on which I am to address you this evening deal with questions which have long been of interest to the more inquisitive of mankind, questions to which answers must have been sought in that dim past in which man became the first animal capable of extended thought. The structure and meaning of that vaster world of heavenly objects gave rise to speculations, many of which have played decisive rôles in the development of civilizations and cultures. The unaided eye of the ancients limited them essentially to conjectures concerning our immediate neighbors, the other members of the solar system, and those less immediate neighbors, principally stars and configurations of stars and nebulosities, which constitute our galactic system. Only within the few centuries characterized by modern science has the telescope enabled

man to explore more thoroughly that larger universe of which our own stellar system is but a member and, together with the still more recent development of the spectroscope, enabled him to bring order into apparent chaos. But the final proof that the great nebulae which have been the subject of speculation for three centuries do in fact constitute island universes comparable with our own galaxy has only been obtained within our own age, and the proof of the regularity of their distribution in space and of their relative motions is a result of the research of the past decade. These discoveries have revived old questions in a new form, and I propose this evening to set forth the partial answers which are offered by relativistic cosmology, that offshoot of the general theory of relativity which deals with the structure of the universe as a whole. But let us first briefly review the facts with which we can start and which are to be brought into order.

¹ An address delivered before the ninth annual meeting of the West Virginia Academy of Science at Athens, West Virginia, April 29, 1932.

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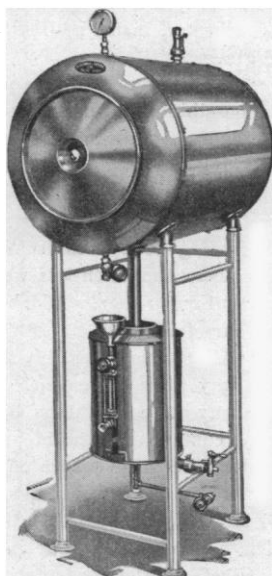
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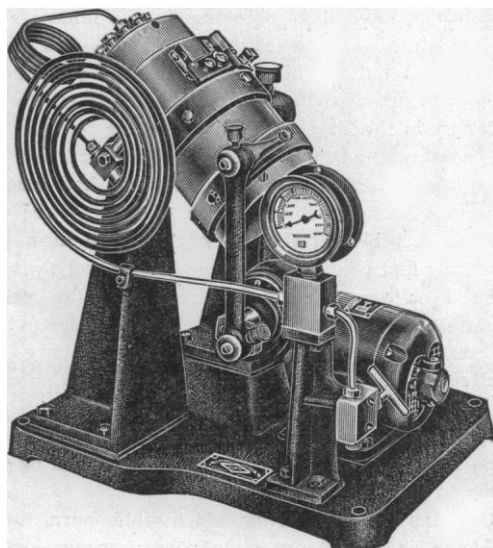
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