PHYSICS

XXVII. PRESENT DAY OBJECTIVES IN PHYSICS

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(Abstract)

The primary interest of Physicists is to discover the ultimate nature of matter and the laws describing the activities of matter. At present much investigation is concerned with the internal structure of the atom. In the nineties, evidence rapidly accumulated showing that there was a vast unexplored region within the atom. The isolation of the electron, or negative unit of electricity, opened the way. A little later, radioactivity was discovered and its phenomona found to be intimately connected with atomic structure.

It is now known that the ninety odd elements contain nothing but electricity. Each atom is made up of a nucleus of closely packed particles of positive and negative electricity, called protons and electrons respectively. Around this core there revolve other electrons. Physicists are at present very much concerned with the study of the arrangement and motion of the electric charges which for the present may be regarded as the ultimate units of which all matter is composed.

One of the results of this simplification of ideas about matter is a unification of many of the fields of physics. Conduction of electricity in gases, radioactivity, X-rays and spectroscopy, to name a few apparently different fields, all meet upon common ground. The phenomena of all are based upon the activities of protons and electrons.

Each field however has its own peculiar problems and each field makes its contributions for the benefit of mankind. Radioactive substances and X-rays as curative agents, the X-ray as a powerful aid in diagnosis, radio communication, the modern electric light and many other appliactions of modern physics illustrate the fact that a part of the energy of physicists is directed to so-called practical applications. The increasingly important demands of industry for men with an understanding of modern physics and an ability to apply this knowledge in commercial enterprises is creating the new profession of engineering physics. Within a few decades applied physics is likely to give us new sources of energy by placing at our disposal the enormous stores of energy which exist

within the atoms. Already the dreams of the alchemists are coming true, for nitrogen has been pounded to pieces by electrically charged atomic hammers, yielding simpler forms. When the heavier elements can simularly be broken up the production of gold from lead may be commonplace.

It is interesting to recall that at that while the most minute divisions of matter are being studied by certain physicists, others are measuring the diameters of the stars and Einstein is asking us to rearrange some of our most cherished ideas concerning time and space.