

erty of the eye is the principal cause of the nighttime nearsightedness which many persons experience.

The problem was approached by examining the aberrations of the eye in much the same way as one does an ordinary lens. A resolution target was observed through a series of annular artificial pupils centered over the eye. Spectacle lenses were introduced directly in front of the eye and the lens power was determined which gave the greatest resolution for the various sized annular apertures. Accommodation was controlled by reflecting a second target into the field of view over a separate path through a three millimeter centered circular pupil.

It was found that the eyes of all three observers showed under-corrected spherical aberration; when the eye was forced to accommodate, the aberration was reduced for all eyes examined and in one case became reversed in sign. This indicates that the center of the eye lens is more responsive than the outer region to the accommodation process. In further experiments the accommodation of the subjects' eyes was paralyzed and the pupils dilated with homatropine. Under these conditions the spherical aberration for two of three subjects was reduced. It is clear from these results that the spherical aberration of the eye should be measured for the particular subject used for vision research and that cycloplegia should be used with caution whenever this aberration is involved in the vision phenomenon under investigation. R.T.

Spherical Aberration of the Eye. By M. Koomen, R. Tousey, and R. Scolnik. *J. Opt. Soc. Am.* 39: 370, May, 1949.

Origin of Chemical Elements

In the last ten years, physicists and astronomers from all over the world have been trying to account for the observed relative abundances of the chemical elements. Most authors believe that the chemical elements were formed in a statistical equilibrium at extremely high temperatures and densities. These extreme conditions can be found in the interior of stars belonging to special categories. The papers on the subject mostly deal only with some particular aspect of the problem. The present paper attempts to give a unified picture. It turns out that this is well possible and also that the origin of the chemical elements can well be considered to be a part of the picture given by von Weizsäcker in his general cosmogony. There are still a number of difficulties which have to be overcome before such an equilibrium theory can be generally accepted. The same, however, is also true for the recent theory proposed by Gamow and Alpher who wish to account for the chemical elements by a building up process which should have taken place in the first seconds of the existence of our universe, when the expansion of the universe had only just started. D.T.H.

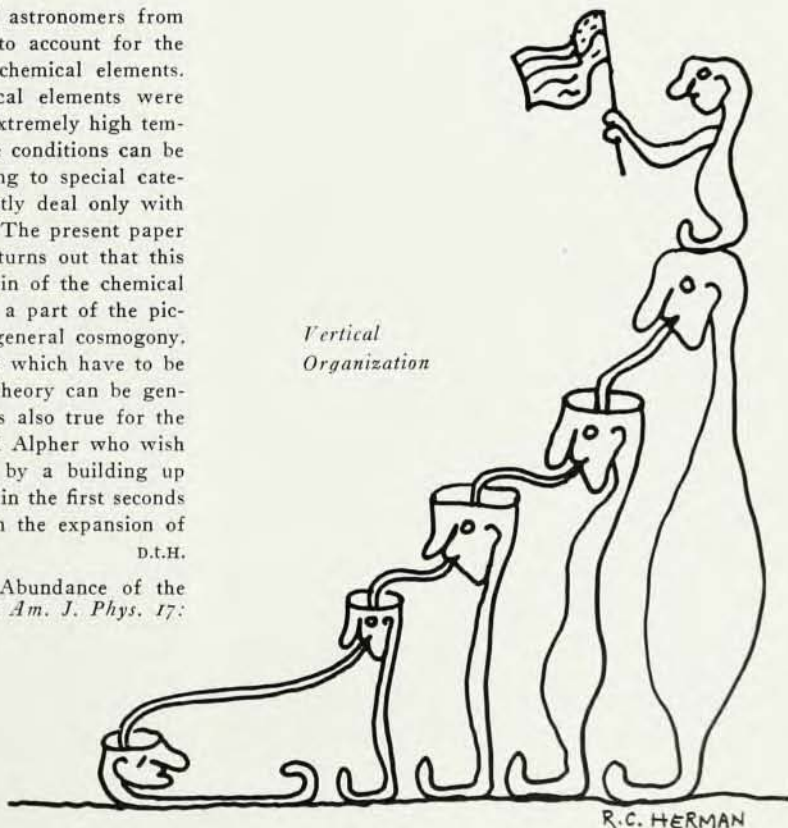
Can We Account for the Observed Abundance of the Chemical Elements? By D. ter Haar. *Am. J. Phys.* 17: 282, May, 1949.

High Current Carbon Arc

The most powerful and one of the most interesting known sources of high brightness and highest temperature, the high current carbon arc, is treated here both experimentally and theoretically. A rising current-voltage characteristic, an anodic vapor stream which causes its excellent radiation features, and a contracted arc stream of high current density, distinguish the high current carbon arc from the well known low current carbon arc. The paper presents a general discussion and theoretical explanation of the more prominent features of the high current carbon arc. Starting from the anodic mechanism of the low current carbon arc, the anodic mechanism of the high current arc is developed. Its distinguishing characteristics are explained as a consequence of a potential drop in front of the anode which increases with increased current density and is caused by a very rapid evaporation of the anodic material. It is pointed out that the magnetic field of the arc current plays an important role in the stabilization of all high current arcs. The author believes that this unique high temperature arc has bearing on other arc and spark discharges, and also will play an important role in future developments of high temperature physics and chemistry. W.F.

The High Current Carbon Arc and Its Mechanism. By W. Finkelburg. *J. App. Phys.* 20: 468, May, 1949.

Vertical
Organization



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