L. TRANSMUTATION OF ELEMENTS

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(Abstract)*

The interpretation of the radio-active phenomena by Rutherford and Soddy made it very probable that the dream of the alchemists would come true some day. Rutherford himself succeeded in disintegrating some of the lighter elements by alpha-ray bombardment. The amounts of new elements formed in this way were exceedingly small, and the transmutation could be detected only in an indirect way. In the last year and a half, however, the German chemist and astrophysicist Miethe and, independently, the Japanese physicist Nagaoka have reported experiments by which mercury has been changed into gold on a comparatively large scale. Miethe discovered that gold was formed if a new high pressure mercury lamp, constructed by Jaenicke, was run with a voltage of 170 volts between electrodes. Nagoaka employed a condensed electric discharge through paraffin oil between an electrode of mercury and one of iron. Gold was detected in the pasty mass formed of mercury and oil through the action of the spark. The small amount of gold so far obtained in these experiments, though sufficient for chemical detection, has not yet permitted a determination of atomic weight.

A discussion was given of these results in the light of our

*Paper read before the General Session.

present knowledge of atomic structure. The gold is probably formed by the capture of an extra electron by the mercury nucleus rather than by the disruption of a proton from the mercury nucleus, as suggested by Nagaoka.