THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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NEW EVIDENCE THAT CHEMISTS CAN TRANSMUTE ELEMENTS

Elements can actually be transmuted and one metal can be converted into another. This seems to be demonstrated by experiments reported to the British scientific journal, "Nature", by Dr. Arthur Smits and Dr. A. Karssen, of the University of Amsterdam. Base lead has, under the influence of electric current in a quartz lamp, been changed into mercury and perhaps into thallium, according to the claims of these two scientists.

The Dutch experiments tend to support the claims of Prof. A. Miethe of the University of Berlin and Prof. Hantaro Nagaoka, of the Tokyo Imperial University, that they have changed mercury into gold. When their claims were first made, many scientists doubted that such a change could be effected without the use of vast amounts of energy, far more than any of these modern alchemists have used.

One of the first to claim that he had solved this ancient puzzle was Prof. Miethe, who, in 1924, announced the result of experiments with a mercury vapor lamp, similar to that giving the violet light often used in photographic and movie studies, and in which an electric arc operates in a vapor of mercury. He was assisted in this work by Dr. H. Stammreich, and in one series of experiments the lamp was operated for 197 hours with an electrical force of about 160 volts at 12.6 amperes, a current of about the same order as that used in lighting our homes. Though the mercury was shown free from gold at the beginning, slight traces of yellow metal, less than three ten-millionths of an ounce, were found at the end. Minute as such an amount is, delicate chemical tests can detect it, and the tests in this case were made by Dr. Fritz Haber, considered one of the greatest of German chemists. In later experiments, Dr. Miethe claimed that he had obtained the gold in much larger quantities, enough to test by the ordinary laboratory methods, but not enoughto make the method commercially practicable.

According to modern conceptions, the atoms of which all matter is made consist of a nucleus made up of what are called protons, around which revolve a number of electrons, much as the planets revolve around the sun. The outer electrons, in fact, are referred to as "planetary electrons". The difference between elements, according to this theory, is due only to the electrical charge of the nucleus and the number and arrangement of the planets. In the case of elements like radium, the atoms break apart spontaneously with the liberation of helium, whose atom is the simplest known next to hydrogen.

Theoretically then, it seems easy to change the atoms, by merely knocking out some of the planets, but this does not affect the nucleus. Dr. R. A. Millikan, of

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the California Institute of Technology, has thus obtained what he calls "stripped atoms" of some elements, in which the outer ring of planets has been removed, but this does not radically alter the elements.

To break into the nucleus, the central "sun" of the atomic solar system, would require, in the opinion of many scientists, vast amounts of energy. Since mercury is next to gold in the processionof the elements, the removal of a single charge, corresponding to the complete nucleus of hydrogen, which is the simplest of the elements, would convert mercury to gold. But the nuclei of other elements have been bombarded with an energy corresponding to five million volts, with no sign of disintegration.

Now it seems, however, that comparatively small amounts of energy are able to get in where larger amounts have failed, and the work at Amsterdam is taken as confirming the atomic theories. The method of the Dutch scientists, however, was slightly different from that used by Miethe and Nagaoka, for instead of mercury they used lead, its close relative. The lead was melted and the tube filled with its vapor. Though the lead was free from mercury, as demonstrated by the fact that spectral photographs of the light from the tube showed only the lead spectrum, after a current of 60 to 100 amperes had been passed through it in the form of successive sparks for a time, the lead spectrum gradually began to disappear. Instead of the lines indicating this element, those of mercury gradually appeared on the plate, together with those of thallium, a rather rare metal which lies between lead and mercury in the list of the elements.

Though the lead spectrum almost complotely disappeared, "this does not prove the transmutation to be strong," Prof. Smits reports, "as it is known that a small quantity of mercury can cause the spectrum of another element to disappear. But at all events our spectra show in a very convincing way the transmutation of lead into mercury."

The presence of this synthetic mercury was confirmed by a chemical test, for when iodine vapor was passed through the tube containing the product of twelve hours of sparking, the familiar red color of mercury iodide appeared.

PLEDGE SUPPORT TO RESEARCH TO FORESTALL NEEDLESS SUFFERING

Prominent public men and leading scientists have pledged themselves to see to it that the United States shall give proper support and encouragement to pure science research, it was announced recently by the trustees of the National Research Endowment.

"It is wiser to make large expenditures for scientific research, thus advancing civilization, improving human welfare, conserving health, and saving countless lives, than to tolerate unnecessary suffering and then endeavor to alleviate it at still greater cost," said the announcement.

Research in all branches of the mathematical, physical and biological sciences should be encouraged not alone for its material value but because of the intellectual and spiritual value of adding to knowledge, it is contended.