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Science Spotlight for June 12, 1947

FINDERS MAKERS

"Finders keepers", oft expounded principle, does not hold for finding chemical elements. Finders of elements do however claim the honor of naming them. Man's recent ability to transmute one element to another has initiated a "boom" in identifying "new" elements. New names have lately been proposed for several elements. These have come mostly from element finders in our atomic energy laboratories. Since the names are already appearing in atomic charts and literature, we will review their origin briefly.

Before radioactive isotopes were first made artificially in 1934, all but a few of the "natural" elements from hydrogen, atomic number 1, to uranium, atomic number 92, had been positively identified and named. When the elements were arranged in orderly sequence there were a few "gaps", elements not yet separated in sufficient quantity and purity to be unquestionably identified. The "missing" elements were those in the sequence at atomic numbers 43,61, 85, and 87.

That the missing elements were of odd atomic number is not strange. Generally greater abundance is found of elements of even atomic number, and in particular of those isotopes which have even atomic mass as well as even atomic number.

Make It Yourself

Discovery of new chemical elements, one by one, through the ages from the dawn of history to the atomic age (isotope age, that is) makes a most entrancing story. For the full story up to the war, we highly recommend the book "Discovery of the Elements" by M. E. Weeks published by "Journal of Chemical Education".

Tools of physics have contributed much to help the chemist find elements. Rubidium and cesium emerged through the use of the spectroscope. Polonium and radium were discovered through methods of radioactivity. Hafnium and rhenium were recognized through their x-ray spectra. With the development of atomic energy devices and techniques no element could continue to hide its identity.

Once man could transmute elements, searching for elements became a new kind of sport. Modern element hunters shoot sub-atomic "bullets" (nuclear projectiles) at atomic "hearts" (nuclei) of a known element, and by transmutation try to "bag" the missing element. For example, the missing element 43 was bagged by transmuting the well-known element 42, molybdenum, into element 43. Thus by modern methods — if the element hasn't been found, make it yourself!

Baker Number 92

Space will not let us tell about each claim for finding and naming elements 43, 61, 85 and 87. These fascinating stories, names of the discoverers, and interesting properties of the elements will have to be presented another time. Now we will stick to names.

Claims have been made for finding elements 43, 61, and 85 in nature. The names proposed were: "masurium" for 43; "illinium" for 61; "alabamine" for 85. Whether these elements have natural isotopes that are stable or of very long half life is now questionable. Hence it is doubtful whether the elements were really found. Also the claimants did not obtain isolated amounts and study their chemical properties.

Elements 43 and 85 were produced before the war by cyclotron transmutations at University of California. Isolation, positive identification, and chemical study were achieved. The names recently proposed by the finders are: for 43, "technetium" (symbol Te) after Greek "technos" meaning artificial; for 85, "astatine" after Greek word meaning unstable.

Element 61 was produced by cyclotron transmutation at Ohio State University and the name "cyclonium" proposed. Thorough chemical study and more positive identification were achieved with pile produced material at Clinton Laboratories. We understand that for the latter case first true discovery of 61 will be claimed - that the name to be proposed is "promethium" (for the Greek god who first carried fire to the world).

Element 87, unlike the above, did not have to be produced by transmutation to be positively identified and studied. A natural isotope of short half life has been found and verified in the actinium decay series (which starts from U 235). The name "francium" (symbol Fr) is proposed, after France where its discovery was made.

An unbiased international jury of outstanding chemists will finally choose the official discoverers and names. Meanwhile choose your own.

Above Number 92

Uranium was first discovered in 1789 by the German chemist Klaproth, and named in honor of the newly discovered planet, Uranus. Over 100 years later uranium was found to be radioactive. That radioactive elements heavier than uranium could be found in nature was considered a possibility. Attempts to find such in nature had however proved to no avail. Now anyone familiar with the Smyth report knows the story of the artificial production of elements 93 and 94 by transmutation of uranium. Appropriately, these new elements were named for the planets beyond Uranus, namely Neptune and Pluto: "neptunium" (symbol Np) for 93; "plutonium" (symbol Pu) for 94.

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Since release of the Smyth report production of elements 95 and 96 has been announced. These were identified through cyclotron transmutations of plutonium by the chemistry group with Seaborg at the Argonne National Laboratory in Chicago.

After announcement of 95 and 96 was cleared for release but before publication, Seaborg was guest on a "Quiz Kids" radio program. An imaginative quiz kid inquired of Seaborg about elements past 94. Whereupon Seaborg truthfully admitted existence of numbers 95 and 96. Their first public announcement thus came on this program. Hundreds of suggested names for the pair flowed in from the radio audience, including "Quizium" and "Kidium".

Elements 95 and 96 were finally named "americium" (symbol Am) and "curium" (symbol Cm); the former obviously named for America, the latter for Madame Curie, discoverer of radium and polonium.

Your columnist, anticipating rapid progress in packing particles into super-heavy nuclei, has a promise from the "over 94" team, now at Berkeley. When the get to element 100 they will consider his suggested name for it --"centurium" (symbol Ct.) If you want to get in on suggesting names for elements, rack your brains on a logical set for elements above 100!

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