would be fairly readily oxidizable to the VI state to ions analogous to PuO_2^{2+}. The experiments based on this assumption did not bear fruit, and it became apparent that some new tack had to be taken.

There were also, of course, various assumptions about the untried nuclear reactions that were used in these unsuccessful attempts to produce Am and Cm from the ^{239}Pu target. But Seaborg assumed correctly that the assumptions about the chemistry were what needed changing.

In his first attempts to predict the chemistry of Am and Cm, Seaborg chose as a guide a very simple pattern - namely, a direct extrapolation from the properties of U, Np, and Pu. When this approach did not work, he then made the very bold assumption that even in this heavy element region it was possible to take the regularity set by the periodic table in the lighter elements quite literally (Figure 1). If the pattern established by the periodic table after Cs and Ba were repeated in exactly the same way after Fr and Ra, then a new 5f element rare earth series (the actinides) would follow Ac in the same way the 4f rare earth series (the lanthanides) follows La. If such a 5f rare earth series were actually following Ac - but the apparent analogy with the lanthanides was not really going to be apparent until Am and Cm - then these new undiscovered elements should have chemical properties similar to Eu and Gd rather than U, Np, and Pu. Even though we have had the opportunity to look in the back of the book and see the answer, the assumptions that led Seaborg to his new formulation of the periodic table look bold even today, and it is rare indeed that anyone has such penetrating insights on the basis of only the scanty evidence that was available at the time.

In making the assumption that the straightforward regularity of the periodic table would become apparent once again at Am and Cm, Seaborg had very little guidance from either experiment or theory (2). Th and Pa, the first two elements after Ac, behave chemically very much like Hf and Ta, the first two members of the 5d transition series. Thus it was natural to assume that Th and Pa were the first two members of the 6d transition series. On the other hand, work in the wartime Manhattan Project was helpful in showing that something new was going on in the U, Np, and Pu region because Np and Pu bear no resemblance to Re and Os, and the chemistry of U differs in important ways from the chemistry of W. Also, although theory did not offer any concrete evidence either, several computations made in the 30's and early 40's did suggest that 5f electrons could be stabilized versus 6d in the U/Pu region (2,3).

In spite of the extreme skepticism expressed by his colleagues about the possible validity of the proposed actinide concept, Seaborg went ahead and designed a new chemical scheme on the basis of it for separating Am and Cm from the irradiated ^{239}Pu targets. His tenacity paid off because he, Ghiorso, and their colleagues quickly met with success. The initial evidence for the validity of the actinide concept was thus established by nature of the chemistry employed in the new element discovery experiments for Am and Cm.

In his 1945 article (4) describing the discovery of Am and Cm and his formulation of the actinide series, Seaborg laid special stress on the testing of his hypothesis through the extra stability that would be