ultimately assumes the alpha uranium structure which is associated with fspd hybridization.

Thus the high pressure technique gives an ideal way to determine f orbital stability because the more stable the orbitals, the higher the pressure required to bring about their delocalization. The results for the four metals Am, Cm, Bk, and Cf are given in Figure 4 (14). Since the pressure required to delocalize the f orbitals in Cm is much higher than in Am or Bk, its extra stability is clearly shown. Thus the stability of the f shell in Cm is demonstrated directly and its position as the middle member of the actinide series is verified in a most definitive way.

Another verification of the actinide concept comes from the discovery by J. L. Smith and R. G. Haire (15) of superconductivity in Am metal. The superconductivity is allowed in Am metal because it has a nonmagnetic ground state like La, which is also a superconductor. But the important point for adding to our understanding of the systematics of the actinide series is that Am metal is trivalent and nonmagnetic because it has a unique f^6 configuration in the ground state. Even europium, americium's homologue in the lanthanide series, does not exhibit the f^6 configuration in the metal (as shown by its divalency) and is not superconducting. Smith and Haire point out also that the f electron character in Am and La must be important in allowing superconductivity since other trivalent elements that do not have available f orbitals are not superconducting. Studies of Am superconductivity under high pressures should be most enlightening in elucidating the role of f orbitals in this phenomenon, and hopefully we will be treated to the results of such experiments in the near future.

The discovery of Am and Cm was especially useful for developing an understanding of the underlying 5f electronic properties of the series because they introduced a simplicity that was not offered by U, Np, and Pu. But suppose, for example, that Am had turned out to be divalent like No! Then it would have been even more difficult to discover Am although, fortunately, Cm would still have saved the day. Actually, even with the simplicity introduced by the discovery of Am and Cm, there was still enough confusion that many scientists provisionally classified the elements Th through Cm as both sub-group elements and as a second rare earth series at the same time. One of the scientists who did that was Seaborg himself (Figure 1). But within a few years it became obvious that Seaborg was correct in placing them as a second rare earth series and the sub-group classification disappeared.

Certainly a key result of the efforts of transuranium chemists over the last 40 years has been the validation and elucidation of the actinide concept. As we move ahead into further investigations of the architecture of the periodic table through chemical studies of Lr, the first members of the transactinide series and beyond, we are fortunate to have as a guide the valuable lessons from the work of Seaborg and his coworkers in those exciting early days of the discovery of Am and Cm.