TABLE I,1. Table of elements and isotopes [compiled from *Chart of the Nuclides* (Knolls Atomic Power Laboratory, April, 1956)].

Elements		Isotopes	
Stable	81	Stable	272
Radioactive:		Radioactive:	
Natural ($Z\leq 83$)	1[a]	Natural ($A<206$)	11[d]
($Z>83$)	9[b]	($A\geq 206$)	44
Natural:		Natural:	
Stable and Radioactive	91	Stable and Radioactive	327
Radioactive:		Radioactive:	
Artificial ($Z\leq 83$)	1[c]	Artificial ($A<206$)	702
($Z>83$)	10	($A\geq 206$)	169
Total	102	Total	1198
Neutron	1	Neutron	1
	103		1199

[a] Tc, observed in *S*-type stars.
[b] Including At and Fr produced in weak side links of natural radioactivity
[c] Pm, not observed in nature.
[d] Including H^3, C^{14}, and Tc^{99}.

nuclear material into any other even at low energies of interaction.

With this relatively simple picture of the structure and interactions of the nuclei of the elements in mind, it is natural to attempt to explain their origin by a synthesis or buildup starting with one or the other or both of the fundamental building blocks. The following question can be asked: What has been the history of the matter, on which we can make observations, which produced the elements and isotopes of that matter in the abundance distribution which observation yields? This history is hidden in the abundance distribution of the elements. To attempt to understand the sequence of events leading to the formation of the elements it is necessary to study the so-called universal or cosmic abundance curve.

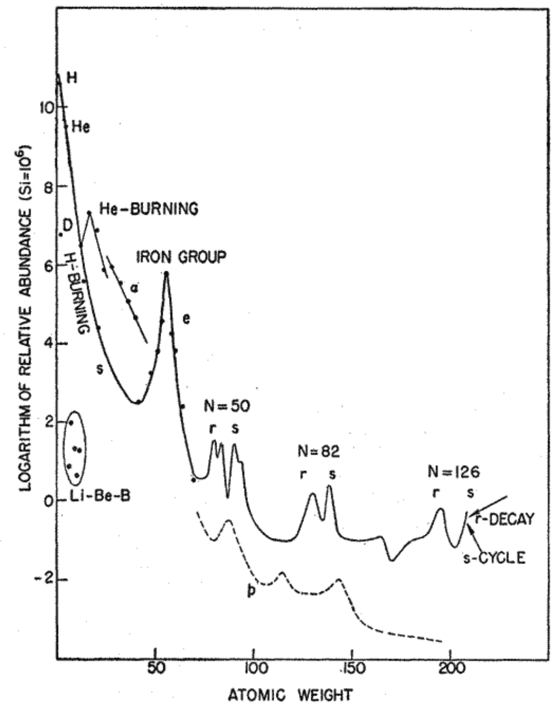

FIG. I,1. Schematic curve of atomic abundances as a function of atomic weight based on the data of Suess and Urey (Su56). Suess and Urey have employed relative isotopic abundances to determine the slope and general trend of the curve. There is still considerable spread of the individual abundances about the curve illustrated, but the general features shown are now fairly well established. These features are outlined in Table I,2. Note the overabundances relative to their neighbors of the alpha-particle nuclei $A=16$, 20, $\cdots$40, the peak at the iron group nuclei, and the twin peaks at $A=80$ and 90, at 130 and 138, and at 194 and 208.