The region now has a mean annual rainfall in excess of fifty inches, and is not subject to high winds carrying sand. It seems probable that the facetted pebbles indicate a former period of aridity which occurred after the lag gravel was formed, perhaps sometime during the Quaternary period.

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ISOTOPES OF URANIUM AND LEAD

THE *Science News Letter* item on Dr. Nier's work[1] in its headlines at least rather ignores the preceding work, preliminary to Dr. Nier's brilliant papers. That "lead atoms may yield clues to very old earth's history" and that in ordinary uranium there are two kinds of atoms with different atomic weight, yielding leads of different atomic weights, was argued by T. R. Wilkins as far back as 1926,[2] and, as he suggested, then in early days there would have been not merely more uranium, but a larger proportion of the more quickly decaying uranium isotope—actinouranium, and hence in the older uraniferous minerals the radiogenic lead would have more of that isotope, specifically Pb (207).

Though for some time there has been fair agreement as to the rate at which actinium (which yields Pb 207) and radium (which yields Pb 206) were being formed at present, there has not been agreement as to the relative *amounts* of the isotopes and hence of the relative decay constants of UI and AcU.

Wilkins's point of view has been strongly supported by A. v. Grosse, who drew a curve connecting the age of a lead with the proportion of Pb (206) to Pb (207), and John L. Rose[3] estimated the proportions by strength of the spectral lines and also gave curves to estimate age. Dempster also made a preliminary estimate of the proportions of the uranium isotopes.

There has, however, been a uniformity in the atomic weight of radiogenic lead, not easy to explain,[4] and it has been not easy to tell how much ordinary lead might be mixed in.

Dr. Nier's success in recognizing the amount of ordinary lead by the amount of Pb 204 present, and in getting the various isotopes not only of lead but uranium with much greater accuracy than before and from much smaller quantities, ten milligrams or less, is a great step in advance and puts age determinations by lead on a sounder basis, and the variation of the proportions of isotopes in what has been supposed to be ordinary lead makes it not needful to suppose a common source for all of it. The identification of Pb (204) as characteristic of common lead enables one to allow for it.

The report of the committee on the measurement of geological time will not be out until next fall, I regret to say. Thus, I think this note of explanation desirable, so that the important work of Nier toward settling the important controversies started by v. Grosse and Holmes may not be minimized, and yet the fact recognized that it is supported by and a continuation of the pioneer work of Wilkins and others.

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[1] June 18, 1938, p. 392; SCIENCE, Supplement, p. 10, June 10, 1938.

[2] *Nature*, 117: 719–720, 1926; *Phys. Rev.* (2) 29: 352, 1927; *Bull. Geol. Soc.*, 38: 124, 1927.

[3] John L. Rose and R. K. Stranathan, "Geologic Time and Isotopic Composition of Radiogenic Lead," pp. 792–6 (1936), with references to previous work.

[4] A. Holmes, "Age of the Earth" (3rd ed.), pp. 151–153; *Ec. Geol.*, 32: 763–782, 1937.

AUTHORITY CITATIONS IN BIOLOGICAL NOMENCLATURE

THE protest[1] against dual authority citations as now prevalent in American botanical literature is well taken. Unfortunately the author raises the question, What authority should be used, the original describer of the species or the maker of the generic-specific combination? Generic-specific combinations change every twenty years. Zoologists have been using for decades, with apparent satisfaction, the original describer. Thus that system must be quite usable and is far more stable.

As a matter of fact, the majority of biologists have no use for the authority because the old original descriptions are extremely meager and lack comparative data. Manuals and recent monographs are used by the great majority of biologists. Only the highly specialized systematist consults the old original descriptions, and he does not need to know under what genus any one species originally appeared, as he has the page citation and the series number of the species in his catalogue. Moreover, one hundred years hence these ancient citations will no longer be consulted.

Many of the old authorities are of no practical importance; they are of historical interest. A real contribution to the advancement of nomenclature would be to discard the original authority and supplant it by reference to the best description, including the best set of figures—which would usually be the latest family or generic monograph of the species in question. In such a monograph the historically minded biologist would find all necessary references to the original and primitive descriptions.

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[1] SCIENCE, 88: 128, August 5, 1938.