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Terrestrial Geochronology and Radiogenic Isotope Geochemistry at the Carnegie Institution of Washington 1950–2021

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Systematic research in geochronology at the Carnegie Institution of Washington (CIW) arose in 1950 with a research plan between the Department of Terrestrial Magnetism and Geophysical Laboratory to apply radioactive decays in minerals to the age determination of rocks [1-4]. The Carnegie geochronology program has differed from other similar efforts (e.g. universities, USGS) in its longevity, the succession of geochronologists trained, the development of basic analytical and interpretive approaches, and the initial focus on fundamental geological questions: a) the age of the Earth, b) the geologic structure of the continents, c) stratigraphic correlation of Precambrian rocks, d) ages of igneous intrusions and orebodies [1]. These were geochronological- and crust-oriented questions. The advent of plate tectonics drove research toward oceanic rocks, isotopes as tracers, and mantle geochemistry —leading eventually to current work in non-traditional stable isotopes, cosmochemistry, and SIMS. These latter topics, which did not arise directly from the early geochronology program, are necessarily excluded from this earlier history.

Founders in isotope geochemistry that resided or visited Carnegie include Aldrich, Allegre, Baadsgaard, Brooks, Davis, Doe, Erlank, Gast, Hart, Herzog, Hoffman, James, Krogh, Mattinson, Morse, Nicolaysen, Sinha, Shimizu, Tilton, Tera, and Wetherill. They and those who followed left an important legacy active today: *experimental advances and applications* (e.g. ion-exchange separation, decay constants, Concordia diagram, teflon bomb dissolution, sub-boiling still, Carius tube dissolution), interpretive fundamentals and utility of a wide variety of *isotope systems* (e.g. K-Ar, U-Pb, Pb-Pb, Rb-Sr, ^{10}Be, Re-Os, ^{146}Sm-^{142}Nd), and *new concepts and models* (e.g. zircon age systematics, metamorphic effects on geochronology, mantle heterogeneity, oceanic lithosphere and sediment recycling, subcontinental mantle antiquity, diamond dating, mantle evolution, and extinct radionuclide heterogeneity).

[1] CIW Year Book 50 (1951) p. 74-76. [2] Aldrich, LT (1994) Isotope Geology at Carnegie 1950-1970: Dating Earth Processes. In Good, G., ed. The Earth, the Heavens, and the Carnegie Institution of Washington, History of Geophysics, v5, AGU p. 215-223. [3] Brown, L (2004) Centennial History of the CIW II The Department of Terrestrial Magnetism. Cambridge University Press, NY, 295pp. [4] Yoder, HS (2004) Centennial History of the CIW III The Geophysical Laboratory. Cambridge University Press, NY, 270pp.