

RADIOCARBON DATING; PAST AND PRESENT CAPABILITIES AND LIMITATIONS

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Prior to the development of radiocarbon dating, late quaternary geologists were faced with a difficult question: "WHEN?". Considerable research effort was expended trying to estimate time frames. Radiocarbon dating provided the crucial temporal framework, freeing geologists to focus on the questions of "WHAT?", "HOW" and "WHY?". This has had a profound influence on research quality and our understanding of geological and environmental events of the last 50,000 years. From global-scale events such as the termination of the Pleistocene, to the death of a single plant associated with an isolated mud-slide, radiocarbon dating has provided the reference point from which the recent history of our earth and environment can be deciphered. Following the invention of radiocarbon dating in 1940 by Dr. Willard Libby at the University of Chicago, the few university-based radiocarbon laboratories devoted much of their time to understanding inconsistencies in results. By the early 1960's, chemical advancements such as the invention of the benzene method with liquid scintillation counting enabled researchers to efficiently obtain consistently reliable results. By 1980, commercial radiocarbon dating laboratories were available to readily provide the general scientific community with radiocarbon dates. Simultaneously, calibration data was becoming available to accurately correlate radiocarbon years to calendar years and accelerator mass spectrometry (AMS) was presenting a means to reduce previously-imposed sample size limitations. This presentation discusses the historical advancements, present capabilities, and limitations in radiocarbon dating.