



HANS E. SUESS, 1909–1993

Prof. Hans Suess was one of the pioneers of ^{14}C dating, and one of the first to develop the closely related field of ^{14}C geophysics. This was only one facet of a many-sided career, which included important contributions to the shell theory of nuclear structure, to the abundance curve of chemical elements and isotopes, and to nucleosynthesis. These other subjects are treated more fully in another memoir (*Meteoritics* 28 (1994): 289–290).

The present account is rather personal in nature. I knew Prof. Suess at Chicago early in both our careers, while I was still working with Willard Libby on the development of the method. From 1958 on, we were colleagues and friends at the University of California, San Diego (UCSD).

He came from a remarkable Austrian scientific family; his paternal grandfather and his father were both distinguished geologists. He was trained in physical chemistry, and made his first contributions in that field. After receiving his Ph.D. degree from the University of Vienna, Suess worked at ETH, Zurich, and the University of Hamburg. Harrison Brown, then on the Chicago faculty,

brought him and his family to the U.S. in the late 1940s. Suess quickly saw the possibilities in Libby's ^{14}C work, and decided to commit himself to this new field.

Libby at that time was receiving many inquiries from persons interested in setting up ^{14}C labs. He was determined to assist this process, not wanting, as he often said, to be "the Pope of archaeological dating". One of my last tasks in his group was to instruct selected persons in the method by taking them stepwise through our procedures. Several people went through this regime. The others took careful notes of each detail, and at first, stuck closely to Libby's techniques. Suess quickly grasped the principles, but showed boredom when exposed to details. He was already planning his own gas-counting approach.

After a short period at the University of Chicago, he went on to set up his first lab at the U.S. Geological Survey in Washington. Almost at once he began to produce important science. He explored and clarified the chronology of the end of the last ice age. He documented the 20th-century decrease in contemporary ^{14}C values caused by fossil-fuel burning, which I later christened the Suess Effect. I well remember Bill Libby's pleasure at receiving these results; he felt then that the future of the subject was safe.

In 1956, Suess received an offer from Roger Revelle to come and set up a ^{14}C lab at the Scripps Institution of Oceanography, then poised to develop into UCSD. He accepted and moved into a growing group of scientists with related interests, including Revelle himself. The subject of the distribution of ^{14}C among the various reservoirs was beginning to engage attention, and Revelle and Suess published one of three parallel papers in *Tellus* in 1958 dealing with this issue. It was this paper that first clearly set forth the problem of "global warming" with the man-made increase in atmospheric CO_2 . However, Suess had already referred to it, in his often somewhat oblique style, earlier on.

In the early years of the La Jolla lab, his work spanned a wide range of interests. With the help of Carl Hubbs, he measured many archaeological samples. He began a pioneering series of measurements of CO_2 in surface and deep ocean waters, assisted by George Bien, who became his chief aide over many years. He also continued some work on glacial history.

While his lab continued to publish date lists and otherwise support a broad range of studies, he became increasingly devoted to a series of careful measurements of bristlecone pine tree rings, using material provided by the University of Arizona Tree-Ring Laboratory. This provided a remarkable record of variations in the ^{14}C content of the atmosphere, extending continuously back more than 8000 years. The peak in ^{14}C content in the 17th century AD, first reported by de Vries, was found to be only one of a series of such events, presumably associated with decreases in sunspots and other measures of solar activity.

At the 12th Nobel Symposium held in Uppsala, Sweden in August 1969, Suess published his first calibration curve extending back to 5300 BC. This precipitated the second revolution in ^{14}C dating when Renfrew, using the Suess curve, demonstrated that Celtic astronomers at Stonehenge preceded the Egyptians rather than learning astronomical lore by cultural diffusion from Egypt. This first calibration curve included such earlier excursions christened (by others) "Suess wiggles". Unfortunately, statisticians cast doubts on the existence of the wiggles, leading to a debate concerning smooth vs. wiggle calibration curves. Subsequent work by the Groningen Laboratory and an NSF Workshop in Tucson, Arizona (1979) confirmed the validity of a wiggle calibration curve extending back to 8000 BP. Further high-precision work has left no doubt concerning the validity of wiggle calibration curves. The original discoveries remain of fundamental significance. The data have been

used by Sonett and others in the search for understanding of the Sun's behavior on the ^{14}C time scale, and of the causes of the apparent correlations between these variations and the terrestrial climate.

Suess was a member of the National Academy of Science, the Heidelberg Academy of Science, the Austrian Academy of Science, the Max Planck Society, West Germany, and the American Academy of Arts and Sciences. His awards included the Goldschmidt Medal (1974), the Leonard Medal (1977) and the Humboldt Award (1978).

Hans Suess had a rich and varied life, which kept him constantly involved with major scientific and human issues. His intuitive power was remarkable, often outrunning his colleagues' ability to understand him. He was an excellent, though unorthodox, experimentalist. One pictures him always in later years either travelling or on the telephone, until illness overtook him at the end. It was a privilege to have known him.

James R. Arnold

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