Johann Carl Vogel: Chronologist (1932–2012)

Author:
Graham Baker

Affiliation:
Kerlick Editorial and Research Solutions, Johannesburg, South Africa

Correspondence to:
Graham Baker

Email:
kerlick.gsb@iafrica.com

Postal address:
PO Box 1011, Melville 2109, South Africa

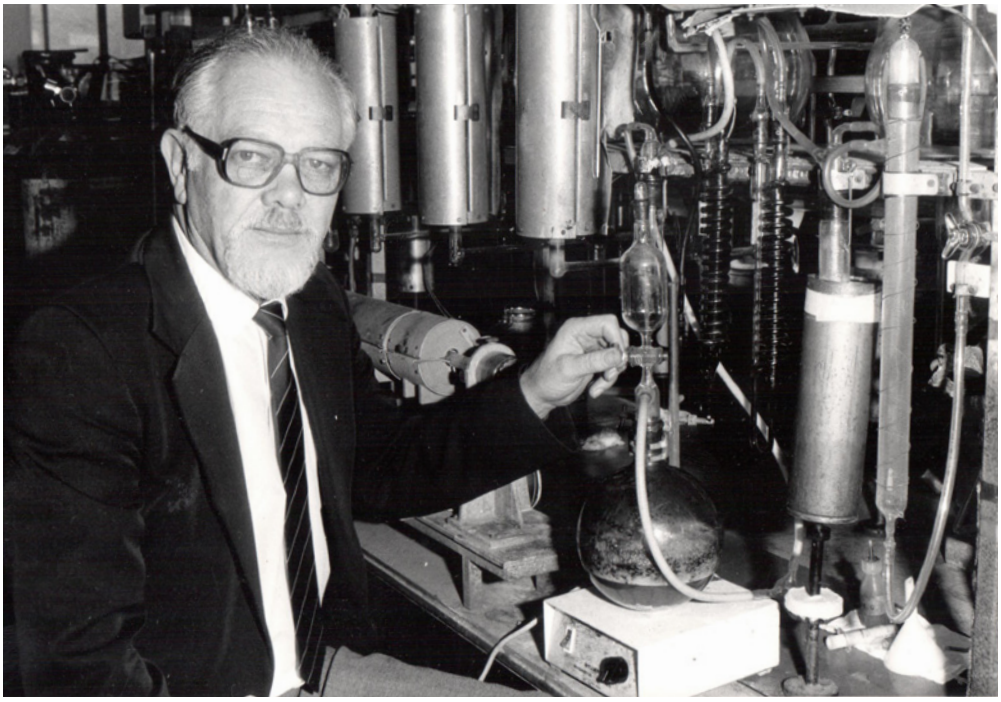
How to cite this article:
Baker G. Johann Carl Vogel: Chronologist (1932–2012). S Afr J Sci. 2012;108(9/10), Art. #1419, 2 pages. http://dx.doi.org/10.4102/sajs.v108i9/10.1419

Significant advances in science generally follow the introduction of new technology that produces unexpected results requiring an original kind of explanation and a reinterpretation of our understanding of the world. These revelations require the type of mind that makes novel connections across disciplines. John Vogel (he preferred that name), who died on 30 January 2012, had such a mind. Driven by an intense curiosity to understand the natural world, he commanded the intellectual abilities – and gifts as a superb experimentalist – to satisfy that curiosity to an unusual degree.

John obtained a thorough grounding in chemistry, physics and mathematics for his first degree at the University of Pretoria in 1951, followed by an MSc in chemistry in 1954, and then his doctorate at the University of Heidelberg in Germany under Professor Otto Haxel, one of the pioneers in the use of nuclear physics in environmental studies. John's doctoral work involved the construction of a mass spectrometer for the precise measurement of the stable isotopes of carbon and oxygen, a decade or so after the Nobel laureate Willard F. Libby had demonstrated the principle and application of radiocarbon dating, which John then pursued. Thus chemistry combined with physics to open a window on, initially, the absolute dating of carbon products of archaeological interest, previously out of reach of earlier techniques.

He wanted to return to South Africa after his PhD, but no sufficiently attractive position was available, so in 1961 John accepted an invitation to head the Radiocarbon Dating Laboratory at the University of Groningen in the Netherlands, where a few years later he was appointed to a personal chair in isotope geology. For the rest of his career, he maintained close ties with Groningen, Germany and elsewhere as sources of intellectual stimulus and of the latest techniques in his ever widening world of isotope research.

When John returned to South Africa in late 1967 it was to establish an isotope dating facility in the former National Physical Research Laboratory of the Council for Scientific and Industrial Research in Pretoria. The Quaternary Dating Research Unit (QUADRU), which he then directed



John Vogel in front of the preparation bench used to convert samples to carbon dioxide for ^{14}C counting (photo: Siep Talma).

for thirty years until his retirement in 1997, became for those three decades one of very few high-precision dating laboratories in the world. It was recognised as a national asset of international renown, made fundamental contributions to a variety of disciplines and was of practical value to their advancement. Its work centred on the isotopes of hydrogen, oxygen and carbon, as well as uranium series dating, and, later, the thermoluminescence dating of sediments. In its time QUADRU was at the heart of environmental isotope chemistry in South Africa.

John recognised the need to know the local context and the environmental setting of the samples he dated in order to understand the significance of the isotopes he recorded. For that reason he involved himself closely in many projects, often as an active participant, sometimes in their design, at other times after producing dates in the lab. He would personally visit sites to select samples or examine their source, and in the interpretation of the results he would engage with the geologist, archaeologist or other scientists as they drafted their articles. In the abstract of one of the archaeological papers published in this journal in 1999, the authors, C.A. Bollong and C.G. Sampson, wrote: 'That John's contribution has provided the very backbone of this project is to understate the obvious.'

The absolute or relative quantities of isotopes in a sample, however accurately determined, can easily produce misleading conclusions if the environmental context is unappreciated. The interpretation of the isotope record is not straightforward. Results from the laboratory had to be calibrated to take into account – not only the possibility of modern material as contaminants – but also such confounding influences as the Suess effect, caused by the injection of CO_2 into the atmosphere by the combustion of ^{14}C-free fossil fuel since the Industrial Revolution; the consequences for the isotope signature of nuclear bomb testing in the 1950s; the need for an accurate value for the half-life of ^{14}C; and the gradient in radiocarbon between the northern and southern hemispheres as a result of atmospheric transport. Having made the necessary corrections, however, he could 'date' groundwater, deduce past hydrological cycles, and thus give informed advice on the conditions for sustainable extraction for mainly domestic purposes. Once it was realised that plants adopting the C_3 and C_4 photosynthetic pathways concentrated carbon isotopes in a telltale way, it was also possible to help reconstruct past vegetation communities. By this means, and using other isotopic clues, it was feasible in principle to help identify an elephant population as a source of illegal ivory, or to deduce the kind of diet enjoyed by animals and our ancestors by analysing their bones or teeth. Radiometric dating and stable light isotope characterisation made possible a chronology and an environmental signature for the Stone Age and Iron Age of southern Africa. John also contributed to providing a geochronological framework for the early hominin sites of Sterkfontein, Swartkrans, Kromdraai and Makapansgat, which was an essential adjunct to morphological and faunal studies in the controversial field of human evolutionary research. A record of past climates during the Holocene in particular – needed to help calibrate models of future global climate change – was provided by his oxygen isotope analysis of stalactites at such sites as the Cango Caves.

John was an exceptionally dedicated and creative scientist, and meticulous in the execution of his research. He also expected everyone he worked with to hold to his own high standards. Always forthright and fiercely independent in his thinking, he was found 'difficult' by some, but he was intensely loyal to his group even as he made heavy demands on them. In private, in his later years, he was prepared to admit that he did not much care for research administrators who lacked the background or insights in science to justify their positions; or for those academics-turned-politicians who pursue a supplementary career for themselves rather than for the science they claim to serve.

An otherwise lonely man – yet one who guaranteed a warm welcome and stimulating conversation at home – he was fortunate in his sociable wife Ursula Weidemann, a Southwester whom he met in Heidelberg. She was a professor of ancient history and head of the Department of Classics at the University of South Africa, through which they endowed an eponymous travel scholarship for a student to visit Europe in pursuit of classical studies.

John's research output was prodigious. He published nearly 250 papers in a wide range of international and national journals; the dates from Groningen and Pretoria for sites in southern Africa and Europe were regularly reported in the journal *Radiocarbon* and are still generally accepted by geologists and archaeologists. A series of joint papers in *Nature* reported on the chronology of the Stone Age of southern Africa. A Festschrift in his honour was published in the April 1999 issue of this journal.

His accomplishments were widely recognised. He received the De Beers Gold Medal of the South African Institute of Physics in 1988, a medal of honour from the Suid-Afrikaanse Akademie vir Wetenskap en Kuns also in 1988, and a Certificate of Merit from the Southern African Association for the Advancement of Science. An honorary DSc conferred by the University of Cape Town in 1998 was particularly satisfying. He was a Fellow of the Royal Society of South Africa, an honorary member and past president of the Southern African Society for Quaternary Research, an honorary life fellow of the International Union for Quaternary Research, and a former president of the South African Archaeological Society. An honorary medal from the Association of South African Professional Archaeologists, presented to him at home in 2009, gave him special pleasure.

QUADRU is no more. New dating technologies have superseded the ones that John helped to pioneer. But for 40 years he revealed and refined the chronologies of climate change and human activities in southern Africa like no other.