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Obituaries

Professor Beno Rothenberg

Israeli photographer whose archaeological work revolutionised understanding of mining and metal production in the ancient world

Professor Beno Rothenberg, acclaimed photographer of the emerging state of Israel and founding father of archaeo-metallurgy, was one of only a handful of scientists who between them revolutionised the way in which we study and understand the production of metal before the Industrial Revolution. He pioneered the fusion of traditional archaeological and science-based approaches — which later came to be known as archaeometry — with a strong emphasis on painstaking data gathering and photographic documentation in the field, chemical and mineralogical analysis of the archaeological remains unearthed, and visionary, if sometimes contentious, interpretation of his observations. While his interests went well beyond the beginnings of mining and metallurgy, these are where he left his strongest legacy, not least through coining the term “archaeo-metallurgy”, now used worldwide for the study of ancient metals and their production using scientific methods, and through establishing, directly and indirectly, two of the leading academic schools in this field.

Born into a well-educated and wealthy family in Frankfurt, shortly after the beginning of the First World War, he grew up during the turbulent inter-war years before the family left Germany for Israel in 1933, when he was 19. At this time he had a keen interest in mathematics, which he hoped to pursue as an academic career. However, a few years later he was drafted into the Jerusalem unit of the Jewish defence force: the Hagana. During the Second World War he served in the meteorological service of the RAF in Egypt. The Arab-Israeli War in 1948 saw him attached to an armoured



Professor Beno Rothenberg
He dispelled the myth about King Solomon's copper mines

brigade under Yitzhak Sadeh, one of the founders of the Israel Defence Forces, taking photographs of operations as well as providing routine documentation. He must have been very good at this, setting him on a path that would soon make him one of the foremost photojournalists and editors of photographic albums of the young country. During this period he still spent much time at university, not so much to attain academic honours, but as an outsider, absorbing whatever knowledge and inspiration he came across.

His interest in archaeology probably grew out of his keen sense of observation when photographing landscapes; he noticed rock drawings and other prehistoric remains often overlooked by others. A formative phase was the time he spent in the 1950s with Nelson Glueck, the American rabbi and archaeologist, as his photographer. Glueck had a keen interest in biblical archaeology, while Rothenberg had never found the deep religious faith of his family. In any event, Glueck's search for “King Solomon's mines” in the southern Negev launched Rothen-



An ancient mine at Ergani Maden, Turkey, explored in 1968 by Rothenberg in his search for the origins of pyrotechnology

berg's second major career, in that he used his critical mind to question Glueck's association of a landscape and its archaeological remains to a historical narrative, by giving priority to verifiable facts and unbiased deduction. While dispelling the myth about King Solomon's copper mines, he discovered something much bigger — the vast ancient industrial landscape around Timna, with remains of thousands of mines and smelting sites. Timna remained at the centre of his attention for the rest of his life.

In August 1959 the *Frankfurter Allgemeine Zeitung*, a leading German newspaper, published an article by Rothenberg entitled “König Salomons Kupfergruben” (King Solomon's copper mines). Ten years later, Rothenberg's surveys and trial excavations in the Timna area had revealed sensational results and finds. Rothenberg's research, much regretted by Israeli archaeologists whose attempts to uncover Biblical evidence had been undermined, indicated that the southern Negev was not the site of King Solomon's mines and smelters, but showed evidence of successful Egypt-

tian expeditions and activities, dating from the 11th and 12th centuries BC at the time of the Egyptian New Kingdom, in territories which are now part of Eretz Israel. His discoveries were exhibited in the British Museum in 1971 under the cautious heading: “Timna: Valley of the Biblical Copper Mines”.

In addition to the work at Timna, Rothenberg still found the time and energy to initiate and lead the huge “Arabah Expedition”, an archaeological and archaeo-metallurgical exploration in the central and southern Sinai, which ran from 1967 to 1979, while Israel was in control of that area. As a result, a completely new picture of the archaeology of the Sinai was revealed, although much of the detail remains to be published.

So far, much of his research had been done by Rothenberg almost single-handedly. The obvious significance of his work finally led to his affiliation with academic institutions in Britain and Germany, most notably the Institute of Archaeology in London (now part of University College London) and the Mining Museum in Bochum (now the German Mining Museum). Rothen-

berg's impressive achievements and persuasive nature enabled him to enlist substantial support from both industry and academia. In 1973 he founded the Institute for Archaeo-Metallurgical Studies (IAMS), together with the eminent archaeologist Sir Mortimer Wheeler (emeritus professor of the Institute of Archaeology), Sir Val Duncan (chairman of Rio Tinto Zinc), Professor Ronnie Tylecote (co-founder of the Historical Metallurgy Society and a fellow honorary member of the Institute of Archaeology), Sir Sigmund Sternberg (the metal merchant turned philanthropist) and others.

From the beginning IAMS was closely affiliated with the Institute of Archaeology, where Rothenberg established the first taught and research programme for archaeo-metallurgy at any university. At the same time he realised that the sheer scale and the extreme challenges of his excavations in Timna required the involvement of a serious partner with access to substantial funding and expertise in mining technology. A few years earlier Hans-Gert Bachmann, a German mineralogist who shared his interest in early metal-

lurgy and archaeology, had approached Rothenberg to work with him on the study of slag, the waste left from ancient metal smelting. Bachmann put him in contact with the Mining Museum in Bochum under Hans Günter Conrad, who immediately seized the opportunity to send a team of mining experts and archaeologists to join Rothenberg's Timna-Arabah Expedition. For several years this proved to be a fruitful collaboration, generously funded by the Volkswagen Foundation, and laid the foundation for the museum's recognition as a research centre of international significance. Based on the experience gained here, the German Mining Museum subsequently developed its own long-term excavations in Feinan, Jordan and in Oman, both textbook projects of archaeo-metallurgical research directly influenced by Rothenberg's earlier and ongoing work in Timna.

However, Rothenberg's interests were by no means restricted to Israel. In 1968 he joined the American diplomat and amateur archaeologist Theodore Wertime and a few other eminent scholars on a long reconnaissance journey through Turkey, Iran and Afghanistan in search of the origins of pyrotechnology, where he contributed his skills with the camera as well as his experience from the work in Timna and the Arabah. Later, he pursued a major project in Spain, where he worked on the important Phoenician and Roman silver production sites at Rio Tinto near Huelva, again funded by the Volkswagen Foundation.

Importantly, and in contrast to other scholars of his generation who shared his cross-disciplinary interest, he managed to enthuse a number of students who went on to become professionals in the field he helped to establish, thus securing his legacy. This is even more remarkable since he never held a formal position at an academic institution and had no formal clout to help him to secure funding or positions for his students, who now teach in the UK, Cyprus, Spain, the US and Germany.

His professorship at the Institute of Archaeology was an honorary one — but this allowed him to continue his work in the Arabah Valley, and to follow his love of teaching and working with young people until he was in his early 90s, unaffected by retirement rules and the research performance pressures now prevalent in academia. He gave his last lecture in Prague in 2008, aged nearly 94, to an admiring audience. He continued to work on his academic publications, and even though some of his work remains contentious, he was undoubtedly one of the very few outstanding scholars who managed to establish their own field of research, and not only to excel in it, but to successfully pass on the baton to a second and third generation of academics.

He is survived by a daughter from his first marriage. His son predeceased him in 1993. He is survived by his estranged second wife and their daughter and his partner of 37 years.

Beno Rothenberg, archaeo-metallurgist, was born on October 23, 1914. He died on March 13, 2012, aged 97