

# The Wertime Pyrotechnological Expedition of 1968

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## Introduction

The 1950s and 60s saw a major increase in interest in scientific and technological issues in archaeology, particularly in metal and ceramic production, the origin of raw materials, and the development and spread of technologies. In 1958, the Research Laboratory for Archaeology and the History of Art at Oxford began publishing its Bulletin, which later developed into the journal *Archaeometry*; the Historical Metallurgy Society was founded in 1962 by Ronald Tylecote and others, soon publishing the journal *Historical Metallurgy*. Beno Rothenberg began his series of archaeo-metallurgical surveys in the Arabah and systematic excavations in the smelting camps of Timna, which eventually led to the formal foundation of IAMS in the early 1970s. In the United States, Cyril Stanley Smith in 1961 moved to MIT to become a professor between the departments of humanities and metallurgy in order to encourage the scientific investigation of the material record of the past (Goodway 1992).

In this academic climate, Theodore Wertime set out to explore in Western and Central Asia the beginnings of the use of fire, starting with a series of expeditions in Iran, and culminating in the survey of 1968, covering Afghanistan, Iran and Turkey. These countries were already known for their prominent role in the early development of pyrotechnology, from plaster to ceramic and metals. Wertime wrote in 1966, "Forty years ago a number of European countries were vying to be known as the original home of the blast furnace - today the competition has moved in space to the Middle East and in time to the much earlier beginnings of the smelting of ores and metals." (Wertime 1968: 927). In effect, archaeology was becoming more scientific and down-to-earth, starting to look beyond the palaces and grander people, in an attempt to find out more about the lives of ordinary people and addressing questions of early farming, urbanisation and the various technologies that gave rise to civilisations. This region, however, was by no means a virgin land waiting to be explored by innocent archaeologists. Clearly the Middle East had much to offer to Europeans searching for their cultural origins, whose sense of ancient history was taken largely from the Bible and classical authors; and from the early 20<sup>th</sup> century onwards, archaeological research in the region increased significantly. Politically and economically, however, the region had already been of great interest to Western nations for some time before that. The Indian Ocean had been largely a Muslim trading lake until the Portuguese took over control in the 15<sup>th</sup> century, soon followed by the Dutch, British and others, securing highly lucrative trade routes to India and China. More recently, the discovery of oil in the Middle East in the 1930s added a totally new facet to the economic interests, quickly changing it from a mere transit region to the riches of the East into a core area of strategic interest in its own right. This was further exacerbated by the geopolitical developments following the ideological and power struggles in Europe, resulting *inter alia* in the foundation of the state of Israel, the Soviet expansion after the Second World War and US-American attempts to contain and roll back this advance. Political, economic and archaeological interests thus overlapped each other for a broad swath of land, extending from the eastern Mediterranean littoral through Mesopotamia and Iran into

Afghanistan. This overlap of interests becomes almost dramatically manifest within the microcosm of the last of the pyrotechnological surveys led by Theodore Wertime, in 1968. It is this complex pattern of disparate but interconnected pursuits which really makes this expedition so remarkable.

## Before the 1968 Expedition

Wertime had already been active in the region for several years, both in his professional capacity as Cultural Attaché at the embassies of the USA in Iran and Greece, and in his very own quest for the birth place of 'pyrotechnology' as he called it. In 1961, along with the Iran Ministry of Mines, he had made a metallurgical reconnaissance of archaeological sites in the North, followed by a trip in 1962, together with Cyril Stanley Smith, which included some experimental archaeology in Yazd (Wertime, A2)<sup>1</sup>. In 1966, a survey covering 'The Great Persian Desert' was carried out as an adjunct to the excavations by Caldwell at Tal-i-Iblis. The group then included Theodore Wertime, Radomir Pleiner, Cyril Stanley Smith and G. H. Vossoughzadeh. They did a rapid and wide-ranging survey of old mining and smelting sites in Iran, with the intention of looking for archaeological evidence, traditional lore and pattern of settlement (Smith *et al.* 1967; Wertime 1967, A1). A further reconnaissance in 1967 was not attached to any particular excavations, but was coordinated with Lamberg-Karlovsky's field survey of 1967, this time looking for gold, lead, silver, copper and iron, and pursuing the mystery of tin in the river basins of the Albourz and Zagros mountains (Wertime 1967, A1). Thus, Wertime had already gained some experience in the region, and visited many archaeological sites. The 1968 survey, however, was going to be the largest and most ambitious of them all, funded by the Smithsonian Institution and the National Geographic Society in the USA, and headed by Theodore Wertime who had invited a host of experts from a range of different disciplines to accompany him.



Fig. 1: Ancient kiln at Maghiz, 28 August 1968.

## The team

Formal planning for this survey began in 1967, when Wertime started to approach various specialists to build his team. Having secured funding, he went about inviting a carefully selected group of experts. In a letter from Wertime to Braidwood, who himself was involved in ground breaking work in the region, Wertime mentions the planned survey and names of seven people he was sounding out (Wertime 1967, B1):

Dr. Ebrahim Shekarchi, chief Middle Eastern specialist for the US Bureau of Mines.

Dr. R.F. Tylecote, archaeo-metallurgist at the university of Newcastle upon Tyne.

Dr. Beno Rothenberg, archaeo-metallurgist from Tel Aviv.

Dr. Radomir Pleiner, archaeo-metallurgist at the Archaeological Institute in Prague.

Dr. Fred Matson, archaeologist at Penn State University.

Dr. Robert Brill, research scientist at the Corning Museum of Glass.

Dr. Carl Lamberg-Karlovsky, archaeologist at the Peabody Museum.



Fig. 2: Persepolis, 31 August 1968.

Not all of those mentioned did eventually travel, and other scholars were included in the expedition. Shekarchi for example, who had travelled with Wertime in the 1967 expedition, was mentioned, but due to other commitments was only able to establish the route for the 1968 survey and then handed the job over to Fred Klinger (Klinger 2003, D1).

The final team then included, in alphabetical order, Sam Bingham as the team's photographer; Robert Brill, interested in ancient glass, glazes and metals, from Corning, New York; Fred Klinger as the geologist; Fred Matson, a ceramicist from Philadelphia, Pennsylvania; Ezat Neghabban, an eminent Iranian archaeologist; three archaeometallurgists, Radomir Pleiner from Prague; Beno Rothenberg from Tel Aviv, and Ronald Tylecote from Newcastle-upon-Tyne; and finally John Wertime, one of Theodore's sons.

Not all of the members were present at all the sites, nor did they all take the same route. But even allowing for this degree of independence, it would seem that with ten specialists travelling there was cause for some interesting dynamics. Not all members felt that their needs were met in



Fig 4: Slag heaps and furnace remains at Meskani, 3 September 1968.

terms of choice of sites, "the various expertises of our expedition members were beyond mutual reconciliation", as Wertime himself put it (Wertime 1976: 491).

This discrepancy in interests becomes apparent from how different members of the group described at the time the aims of the expedition:

- "For a wrap up look at the region of the birth of Pyrotechnology" (Wertime A1, p2)
- "Reconnaissance to locate and examine early metallurgical and other sites that have contributed to the Ancient Middle Eastern civilizations" (Tylecote 1970: 285)
- "Quick survey of a large number of early pyrotechnological sites, and to bring together in the field, persons from various appropriate disciplines" (Brill 1968, A6)
- "Determine whether tin was present in amounts indicative of sources for tin ores used in antiquity..... but also afforded chemical and mineralogical data that were interpretable in the context of regional potential for other elements of current industrial use" (Domenico *et al.* 1978, abstract)

Theodore Wertime was clearly the facilitator and leader in this team. He was a powerful character who achieved most of his goals in life (Wertime 2000). During his time as Cultural Attaché to the US embassies in Tehran and Athens in the 1960s and 70s, he had managed to carve out, according to his son, a "parallel career as a serious historian of metallurgy" (Wertime 2000: 35). This he managed probably not just due to his love of ancient technology, but also for his excellent choice of fellow travellers on all his expeditions. He was, it seems, a travelling student choosing those who had lessons to offer he wanted to learn, and whose wisdom he sought to explain the places he, in his capacity as a diplomat, was able to arrange for them to go. He never took an active part in professional discussions of the team, at the sites as well as whilst travelling, but took notes during discussions of sites visited; indeed, some years later Cyril Smith told Beno Rothenberg whatever Wertime published after the 1968 trip were indeed views voiced by the professionals during their trip (Rothenberg pers. comm. 2004).

Bob Brill, who always felt treated well by Wertime, in a recent email mentions that "Ted was a difficult person with

a dark side - a complex and flawed individual” (Brill 2003, F2). In an email from Sam Bingham there is clear indication of some of the problems the team had. He speaks of moving fast, using a route that had ‘independent determinants’, with Wertime’s passion leading the way, and the interests of the other members taking a back seat. He recalls friction leading to fascinating debates, partly caused by other team members feeling Wertime was “not qualified to be as egocentric as he was” (Bingham 2003, F4). Sam Bingham describes himself as “tacked on at the last minute (grossly under-qualified) as photographer and camp cook” (Bingham 2003, F4), having just lost an eye in Vietnam where he had been a freelance journalist. Beno Rothenberg remembers being told that the National Geographic had sent Sam Bingham, whose photographs he later was never able to locate in the society’s archive.

So here we had ten individuals, with varying degrees of specialist knowledge, led by a difficult but dynamic character. From the outset, the undertaking was clear to be far from a smooth running; Wertime himself mentions this in a letter he had written to Braidwood in 1967. Regarding his choice of expedition members for the survey of 1968, he says “I hope the Turks don’t choke over this.” (Wertime 1967, B1). It may have been his very nature that helped him procure funds for so many expeditions; however, it was probably that very nature that also meant that this particular expedition did not get the academic attention it deserved when the dust of field-work had settled.

### Sites and sampling

As mentioned, not all the sites were visited by all the members and some members visited other sites alone; further-



Fig 5:  
Ancient furnace  
remains at Tamarish,  
3 September 1968.



Fig 6:  
Slag heap near  
Isfahan,  
4 September 1968.

more, no decision was taken as to the name and spelling of the site names. Beno Rothenberg was not present in Afghanistan and Radomir Pleiner did not visit Turkey. The survey began in Afghanistan in August 1968, covering the following sites:

Kara Murad Beg, Estalif, Bamian, Farinjal, Pandshir Valley, Zar Kashan, Mirzaka, Karystu Valley, Askar Kot, Tepe Mundigak, Herat. By August 12<sup>th</sup>, the members had reached Tehran / Iran, from where they went on to: Uzbeg Kuh, Deyhook, Tepe Yahya, Deh-i Sard, Sechah, Tal-i-Iblis, Qatru, Kuh-i Sorgh, Istebanat, Persepolis, Zar Tsheshmeh, Pasargadae, Hannasq, Talmessi, Meskani; all names in this section have been taken from Pleiner (1968, A11).

After Meskani further visits were made to Talmessi, before moving on to Sialk, and finally Ahaer in Iran. The expedition then moved into Turkey on September 16<sup>th</sup> covering: Trebizond, Tirebolu, Ergani-Maden Mine, Geyduk, Kultepe, Catal Hoyuk and Acem Hoyuk (Tylecote 1968, A3).

Two published maps exist from the survey, one in the geological report (Domenico *et al.* 1978), and the other in a short piece written by Tylecote about the journey for *Metals and Matter* (Tylecote 1970).

Early on Rothenberg and Tylecote had realised the lack of professionalism in the setup of the expedition; there were no proper maps, so that Rothenberg had to get a simple tourist map from the petrol station; he further recalls not doing any surveying in the archaeological sense, but visits to published sites and modern mines; the latter were assumed to have antique activities, and in their vicinity smelting sites were discovered at times. The geologist Klinger did not travel with the group but with Iranian geologists, sometimes joining the rest of the group in the evenings. The rest of the group never knew where the geologists went and what they did, and Rothenberg assumed they were doing a job of their own and only used the Wertime trip as a convenience. Wertime had fixed the route of the trip, and as his son was working on a PhD on early mosques of Iran a lot of mosques were visited; Rothenberg felt at times that the route was actually more determined by visits to mosques than to ancient mines (Rothenberg pers. com. 2004). He suggested that the team use a common system of recording and give numbers to the sites, to be written on the sample bags (Rothenberg pers. com. 2004), which they used alongside various members’ reports to name the sites.

No co-ordinated sampling was conducted by the group; as far as we could establish from the participants, several members of the group collected material according to their own briefs and interests. Klinger accumulated a systematic collection of rock and soil samples for his geological prospection work; Matson collected sherds of archaeological ceramics. Wertime did not collect any samples. The three archaeometallurgists collected slags, ores, furnace remains and other metallurgy-related material. The majority of sites visited were archaeological in nature; however, some of the recorded site numbers represent modern cities, local bazaars, museums and modern production centres. The lack of coordination between the members and their field notes made it difficult to associate the samples with their proper place names of origin when cataloguing the artefacts from the survey, some 35 years later. Thankfully samples were given site

numbers, which could be used in association with note books and reports to establish their provenance (Arab 2003). This confusion was already felt at the time by the members of the expedition themselves; Tylecote and Pleiner discuss this in personal correspondence after the survey. They discuss their eagerness to start analysis, and the issue of site names, with Tylecote finally suggesting that Wertime should decide what site names to use (Pleiner & Tylecote 1968, B6).

Clearly, the tight schedule did not allow the group to survey the vast lands they travelled in any detail; however, they tried to tap into the knowledge of the local people. Sam Bingham mentions visits to markets, and wherever an audience could be found, there was a display put on of the kind of material the team was interested in, with the curious invited to comment and mention where they had seen any of the materials being displayed (Bingham 2003, F4). This reflexive manner was also supported by ethnographic work (Matson 1968, A5). These approaches were modern for their time and show a real effort to address questions of past technologies, though in this instance there seem to have been too many questions.

### After the expedition

Both Klinger and Matson took their collections to the United States, where the geological material finally was analysed (Domenico *et al.* 1978), and the ceramics are now at the Matson Museum at Penn State University (Matson pers. comm. 2003). The archaeo-metallurgical collection first was held in Turkey, due to the antiquity laws of the country. The samples should have been recorded on entry to the country to enable later export; Rothenberg also felt that Wertime as a diplomat should have sorted out the problem (Rothenberg pers. comm. 2004). Wertime, however, apparently was not at all interested in the finds which only the professional team could handle and publish (for this reason there was no plan or budget for analytical or other work on these samples). Eventually, Rothenberg managed to meet the Turkish minister of mining who granted him an export permit. Tylecote took some samples with him to England for study, and the rest were left in Rothenberg's store in Tel Aviv for safe keeping, though he had no interest in dealing with these samples. When Tylecote later asked for funding to work on the samples Wertime had not been interested. Rothenberg waited for



Fig 7: Old mine entrance in Tabriz-Ahar, 13 September 1968.

a long time to hear from Wertime as he had taken lots of photographs and kept a record of the site numbers and the collection; he expected Wertime wanted to publish a report together with the team members (Rothenberg pers. comm. 2004). In fact, no joint publication was prepared. "We never took any useful decisions regarding publication and Ted said do it if you want to", Tylecote writes in 1973 in a letter to Klinger (Tylecote 1973, B12). Klinger in turn had other worries, not having analysed the samples collected on the 1968 survey, and blaming this on his pride in wanting to do the work himself and a fire that held back work at his laboratories (Klinger 1973, B12).

It seems quite clear that Theodore Wertime, who was the instigator of this expedition, lost interest in the work and was not being supportive enough after the expedition. We may assume that he was aware of this issue; in a letter to some of the members of the expedition of 1968, Wertime says, when speaking of another project in the region, that "this time we should institutionalise relationships in the area...As a beginner what are the chances Beno would invite some Iranian, Turkish and Greek archaeologists at his digs in Negev or Sinai?" (Wertime 1969, B7). However, no further expedition followed from this one, and its participants went on with their individual lives. Very few publications ever referred to it, until a chance meeting between Beno Rothenberg and a student in 2002 prompted his decision to transfer the archaeometallurgical collection to the Institute of Archaeology UCL for future curation and use in teaching and research. This collection is now fully catalogued, documented and archived at the IoA and accessible to use for interested scholars (Arab 2003).

### Politics of archaeology

Archaeology deals with the past, a commodity that raises interest in claims of ownership of cultural heritage, the right of permission of excavation and interpretation of past remains, and - in its most extreme - ownership of land. We may be looking at the past, and collecting material to represent and explain the past, but we do so with the permission of governments today, funded today, and in the social and academic climate of today. The modern world witnessed developments that saw the use of archaeologists in the World Wars for reading of maps, as well as an archaeology that makes use of developments in other fields to enhance its reading of the past; archaeologist being called into murder scenes with their understanding of stratigraphy and incomplete evidence; an archaeology whose tales of the past are being increasingly accepted by the general public as well as being used by interested parties to construct identities and claims of ownership; an archaeology that by now should accept its deeply political nature. We must therefore look at the political element that exists implicitly and explicitly within archaeology, and increasingly at the role of archaeology in the political arena.

The Middle East not only has a rich past but also a potentially rich future, which has not yet been fully realised. There were several known incidents of archaeologists using their work for other purposes in the last century, for example T.E. Lawrence, of Arabia-fame, whose intelligence activities in the Middle East were sometimes hidden by archaeology, illustrated by his involvement in excavations at the site of

Carchemish with Sir Leonard Wooley. Wendell Phillips in the 1950s had to leave Yemen hastily with fellow expedition members in an atmosphere of suspicion and fear, having been accused of having interests other than archaeology (Phillips 1955). Dr Todd Whitelaw (pers. comm. 2003) mentioned a geographical survey in the 1960s done by Loy and how he, Whitelaw, had been intrigued by the fact that the US office of naval research funded the geographical survey in the Peloponnesus (Loy 1970). It is apparently always useful to be aware of the geography and geology of other nations, and this attitude was nothing new. Cortes, arriving in Mesoamerica in the 16<sup>th</sup> century, saw fit to detain tribute collectors (Smith 2003), who have been a great source of information for the origin of gold, silver and other riches the Spanish so eagerly sought.

At the time that this survey took place roads were built in Afghanistan mile for mile by the Americans and the Russians, in their attempts to win favour with the government. Wertime mentioned to Brill that the Russians had constructed a tunnel that happened to be wide enough to accommodate two passing columns of the largest Soviet tanks (Brill 2003, F2). When not busy exporting wars there are all the other products of modern culture. Matson mentions the replacements of many pottery forms with plastic substitutes. He goes on to comment on the life ways encountered on the journey "Entering Turkey you can see modernisation but still evidence of older ways....with Iran under the Shah less oriented towards western ways" (Matson 1968: 9). The exportation of democracy is changing ancient life ways, which inadvertently make one a potential consumer in the global market, be it through the purchase of plastics, ammunition or suits to wear to the big boys' tables and be heard. At the same time in the West ceramics become again cutting edge of technology, organic foods increase in value, old life ways become more attractive again, questioning the logic of mass-produced industrial products which the West exports with increasing aggression, with us all affected by their profit driven ways.

The survey of 1968 was clearly done by a mixed group. We were trying to establish which member may have been interested in more than the ancient world. As we collected more documents, the story became more and more interesting. Various members both in the past and present voiced their suspicions of the interests of different members, in letters and communications archived at the IoA (Arab 2003).

Theodore Wertime was the Cultural Attaché to Iran in the early 1960s. It is in his son's Richard memoirs that we get a hint of Wertime's other interests. His son Charlie on a trip to India had discovered a book written in English and published in China entitled 'Who's who in the American CIA', with one Theodore Allen Wertime mentioned (Wertime 2000: 4). This has never been proven, but is of interest to us (Arab 2003). In a conversation in 2003 with Professor Matson on the subject of spying, he said he was unaware of Wertime having links with the US intelligence service, but went on to say that he (Professor Matson) made a point of never giving names of persons he met abroad. It would seem Professor Matson was well aware of his government's interest in other nations and their structures and systems.

It is intriguing that Wertime, during his time as cultural attaché in Iran in pursuit of his scholarly interest (which are

in no doubt), managed to survey a large part of the country. It would seem in the 1968 survey that Klinger was the unintentional 'spy', not so much because of his intent but that of the US Geological Survey, who paid for the most conclusive report to come out of this pyrotechnological survey. After the pyrotechnological survey, the only funding available for analysis happened to be for the geological report, which covers potential for minerals used in antiquity "and of use in the present development of the economies of the three countries" (Domenico *et al.* 1978: 5). Presently the US government is ensuring that certain countries do not achieve nuclear capability; meanwhile the Russians are helping to build a nuclear power station in Iran. The geological report happens to also mention sources for uranium, which is presently being extracted at one of the sites covered in this survey and is no longer accessible to archaeologists.

In the last few years, the USA has attacked Afghanistan where the Taliban were intentionally destroying major parts of the country's heritage until they were bombed out of the government; by invading Iraq, archaeological sites and museums were made vulnerable to destruction and inaccessible through the collapse of the government. How convoluted is the relationship of archaeology and society at large. What a dilemma we face, even if data are collected for innocent use, it is impossible to control how the information is



Fig 8: Mine entrance in Ergani Maden, 21 September 1968.

used. Archaeologists need to address the inherent politics in the discipline and examine closely its role in the political arena. European scholars have often followed their governments into foreign countries. Whether in the Americas, Africa, or parts of Asia, European institutions seemed to have left varying scars after up to 500 years of interference, with perhaps China with its long lived wall and boundaries retained if not increased since antiquity, as the only place relatively untouched. It is time for Western scholars to think about their role in all this and about how they can help redress the imbalances caused by their governments. The scientifically minded archaeologists in their attempts at being objective are often particularly reluctant to consider the socio-political aspects of the discipline.

Archaeology is a discipline that needs groups and teams of people, there is very little meaningful work that can be done by one person alone. Archaeology being made up of so many specialists from different fields needs to address the inter-personal aspect of the discipline to avoid conflicts of 'great minds'. The travellers involved in the survey of 1968 seemed to have had different interests which meant that the artefacts they so carefully collected were left without the necessary full documentation, had little attention paid to them and, had they not been stored by Beno Rothenberg, would have been lost in the mist of time.

### Collection and Documentation

The bulk of the pyrotechnological material assembled during the expedition in 1968 was transferred in 2002 to the IoA collections. It has since been repacked, re-labelled and catalogued, and given a full photographic documentation and an appendix of supporting texts, field notes and field photographs for future research (Arab 2003). The majority of the physical material is ferrous and non-ferrous slags and ores from Iran and Turkey, and technical ceramics such as tuyere, crucible and furnace fragments; remains of some metallic artefacts are also present. Access to the collection for study and analysis is available on request ([th.rehren@ucl.ac.uk](mailto:th.rehren@ucl.ac.uk)), and is governed by the IoA procedures for access to its collections. The related documentation comprises:

- Professor Pleiner's collection of preliminary reports and results of analysis undertaken on samples from the 1968 Survey by various members of the expedition.
- Professor Tylecote's notes from the British Museum, including copies of his field note book, letters and documents of interest, received from Dr Paul Craddock in 2002.
- Professor Rothenberg's field note book and photographs from the 1968 survey, and a taped conversation in 2002.
- Fred Klinger's geological report of the 1968 survey (Domenico *et al.* 1978) and correspondence in 2003.
- Several published reports and articles relevant to the survey of 1968.
- Correspondence relating to the survey of 1968, with varied peoples in 2002/2003, including a copy of the book published by Wertime's son Richard Wertime.
- Finally a basic report of the sites and their location on modern maps provided by Mr. Riyazi in 2002, with sites according to Professor Rothenberg's notebook.

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