

SWEDISH TRAVELLERS

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by A.P. Woolrich

By the end of the seventeenth century England had already undergone considerable industrial and technical development, with the result that foreign competitors, whose markets were beginning to be diminished as a result of these developments, were anxious to learn how serious this competition was likely to be. Sweden was one such competitor, in that she exported the bulk of her output of bar-iron and copper to Britain, so a series of expert observers toured the main industrial areas to learn at first hand what was being done. In addition other Swedes who toured the country kept their eyes open for industrial techniques, and recorded what they saw. The expert observers were often, but by no means always, from the *Bergskollegiet* - the Board of Mines, or the *Jernkontoret* - the Iron Bureau. These two bodies formed, with others, the machinery of state control of industry in Sweden - machinery which was not set up in this country until very recent times. The observers kept detailed diaries of their travels and often wrote formal reports on what they saw, and some of these survive in record offices in Sweden. Until recently, these records were little-known in Britain, and, so far, little use has been made of them by industrial historians.

A few accounts of travels around Britain have been printed in Sweden (1) but only two have so far been translated and printed in English (2). Rhys Jenkins used information from a set of translated abstracts from a number of reports made by mining experts in his studies of the non-ferrous metal industries (3), and these unpublished translations are in the Library of Liverpool University (4). More material is in the Rhys Jenkins Collection deposited in the Science Museum Library (5), but is not yet catalogued. Professors M.W. Flinn and Alan Birch investigated the diaries for various papers on the early iron industry in the North of England (6) and both have written papers about these records as a source for the study of the history of technology (7).

The prime source for the study of this material is a thesis by Dr. Sven Rydberg - in Swedish - which analyses many of the records in considerable detail. In many cases it is possible to discover the page number in a particular manuscript dealing with a place of interest, thus making the search for material very much easier. The reports and diaries studied in Rydberg's thesis cover the period from about 1690 to 1780 and at least 14 of them relate to Bristol and its neighbourhood. In the main the information contained in them deals with industry, but some travellers also commented on the social, religious and other aspects of what they saw.

Eric Odhelius. Mining expert and physician. (1691/2)
He came to Bristol in the winter of 1691, but Rydberg tells us nothing about what he saw. About 56 pages of his diary deal with Britain, and about a quarter of these cover iron. Other topics covered include lead and tin mining, vitriol and alum boiling and copper mining and smelting. Parts of his journal are in the Jenkins collection at Liverpool. The original diary is in the Bergskollegiets Arkiv of the Riksarkivet, Stockholm.

Thomas Cletscher. Mining expert. (1696)
About 200 pages of his diary deal with Britain and the bulk of it concerns copper mining and smelting. Parts of the diary are in the Jenkins collection at Liverpool. About 25 pages are devoted to Bristol, where he saw the smelting works at Conham and measured and described the furnaces. Detailed drawings are included. The original is in the Bergskollegiets Arkiv of the Riksarkivet, Stockholm.

Lars Benzelstierna. (1704)
Rydberg has very little to say about him, other than that his obituary states that he toured Devon, Cornwall and Somerset in 1704. Presumably he came to Bristol at that time. His obituary is in the Kungliga vetenskap-akademiens bibliotek, dated 1758, and there is also an entry in the *Svenskt biografiskt lexicon*.

Göran Wallerius. Metallurgist. (1710)
He described the buildings of Bristol as being indifferent and preferred those of Bath, which he described in some detail. He visited the lead and calamine mines of Mendip and then set off for Monmouthshire, where he studied the copper works at Redbrook. Here he noted that the furnaces were fired with coal, the same as those at Bristol, but that charcoal was sometimes used. He wandered freely about, until he was noticed and unceremoniously hurried out. His report is in Uppsala universitetsbibliotek (D 1527 Göran Wallerius' samlingar om de utländska bergverken).

Jonas Alströmer. Merchant and industrialist. (1719/20)
Alströmer made two journeys around Britain and it is certain that he visited Bristol on the second one. Rydberg did not study the material in detail, and so it is not known what he saw. It appears that his diaries are good on textiles. The diaries are in the Uppsala universitetsbibliotek (X 376-378) and the Kungliga Biblioteket, Stockholm (M 218)

Henric Kalmeter. Official of the Bergskollegiet (1720/23)
Kalmeter's diaries and reports are one of the most important of the Swedish records for the study of British technology. A long extract from his report on the

English mines is in the Jenkins Collection at Liverpool. Kalmeter's first journey was made in 1720, when he studied the copper works in Bristol. When he returned in 1723 he travelled from the west country and examined the calamine mines on Mendip. In Bristol he made contact with an employee of Nehemiah Champion and obtained information about the brass industry. Kalmeter bought a brass mould for use in casting iron pans, a boring machine for drilling for coal and some recipes for glass making, he was also very interested in coal mining and coke making. Before he left the city he also examined steel making and iron founding as well as re-examining copper and brass making. His report on the copper works is very detailed and he minutely describes the works at Rownham Meads, Conham and Crews Hole, as well as at Redbrook. His report contains such details as the weekly or monthly wages each grade of worker was paid, and costings of the transport of raw materials to the furnaces. Kalmeter's diary is partly in the Kungliga biblioteket, Stockholm (M 249: 1-5 Henric Kalmeter's dagbok öfver en 1718/1726 företagen resa till Tyskland Holland, Frankrike och England), and partly in the Riksarkivet Stockholm (Kalmeter's Resedagbok 1726/27). Kalmeter's relationer om de engelska bergverken 1720/25 is also in the Riksarkivet. A series of letters - in English - from Kalmeter to Alströmer is in Uppsala universitetsbibliotek (G 130).

Rienhold Rutker Angerstein. Director of steelmaking at the Jernkontoret. (1754)

Rydberg says that Angerstein's diary is a goldmine of information and a study of those portions in the Jenkins collection endorses this view. He made several extensive tours and came to Bristol from the west country. Here he examined ironfounding, glass making, soap boiling, salt making, tinsplate rolling (at Woollard), steel making, sail yarn making, brass making (at Warmley), lime burning and soft and hard soap making. His diary is particularly valuable because he illustrated much of what he saw with pen and ink sketches. Two of these were used by Jenkins in his paper on Bristol copper (B & G 1942). As an example of the sort of information given by Angerstein, this quotation (from the Liverpool translations) relates to Champion's works at Warmley:

"What is special about this mill is that it is driven by water, which is brought up from 3 fathoms by a fire engine and then runs into a wide reservoir; from this onto the wheels and finally to the fire engine to be pumped up anew. Mr. Champion told me that this fire-engine cost £2000 to build and that is also requires every year £300 to be maintained with coals etc. Mr. Champion's clerk or book keeper told me that in every week there will be consumed 5000 bushels of coals, which considering they own their own coal mines cost no more than to 3 Swedish stivers per bushel."

Angerstein's travel diary is in the Jernkontorets Arkiv, Stockholm, (R.R. Angerstein's Reseberättelse 1753/55)

Bengt Ferrner. Astronomer. (1760)

Ferrner, with a companion, came to Bath in the late

winter of 1759. Ferrner visited Bristol in January the following year and whilst there studied the brass industry. He tried to get some workers to join a Swedish company. Ferrner described Bath in some detail and visited Prior Park. His diary is in the Kungliga Biblioteket, Stockholm (M 239: 1-3 Bengt Ferrner's Flesedagbok).

Daniel Solander. Naturalist. (1761)

Solander did not keep a diary, but mentions his visit in a series of letters to Linnaeus, and says that he saw not only copper and brass making, but the whole process of making glass, from the preparation of the raw materials onwards. The letters are in Uppsala universitets bibliotek (Brev till Carl von Linné)

Johan Ludvig Robsahm. Steelmaker. 1761.

Robsahm toured most of the industrial centres of the country, and left a detailed diary of what he saw. He was particularly interested in Champion's process for making Spelter, and it is worth quoting in full his account of how he gained access to the works. His landlord put him in touch with a worker from Warmley, who agreed to take him round after dark. Prudently, Robsahm spent the day as far from Warmley as he could get, but in the evening:

"When it grew dark I rode myself back to Warmley to see the zincworks, whereupon the before mentioned man met me and between 9 and 10 o'clock escorted me to the zinc works which is built just by Mr. Champion's own house where he permanently lives. Each and everyone of the workmen has bound himself to a fine of 2000 Swedish dalers or prison not to let in anyone strange, but no lock is so burglar-proof which cannot be opened with the precious golden pick". (Trans. APW from Rydberg p.192)

Robsahm went on to describe the works, which had four furnaces, and illustrated his account with a sketch. He finished by saying that he left the works at 11 o'clock and immediately left for Bristol 'for I dared not stay there till morning'. The following day he left for Bath. While he was in Bristol he toured a flint glass works.

His diary is in the Kungliga biblioteket, Stockholm (M 260 J.L. Robsahm's dagbok öfver en resa in England 1761)

George Martin Wallenstrale. Minister of religion. He

later became Bishop of Kalmar, in Sweden. (1762) Wallenstrale seems to have been a very perceptive traveller. Not only was he interested in industry, but he took great pains to learn all he could about the religious life of Bristol. Part of his account of what he saw in the city has been translated, and published in the Trans. English Ceramic Circle (9). Wallenstrale stayed in Bristol for about a week, and lodged with a porcelain manufacturer, and fellow Swede, Magnus Lundberg. He was shown round the city by the resident Moravian Pastor, Lars. T. Nyberg (q.v.). He also made several excursions out of the city, seeing the anchorage of the big ships in the Channel, and meeting some French prisoners of war. He also stayed at Bath and visited Prior

Park. It is interesting to note that he walked on his travels. His note on his tour to Bath and Bristol are deposited in the Kalmar högre allmänna läroverks bibliotek (Supplementer till Walienstrales dagbok på dess utländska resa). He also wrote articles, which were printed in a Swedish newspaper. His account of his trip to Bath and his impressions of what he saw were printed in the *Götheborgske spionen* for 1766 p. 297ff, 313ff, 345ff, 353ff. His account of Bristol was printed in the paper for 1767 p. 161ff and 169ff.

Henrik Gahn. Physician. (1771/73)

In company with Eric Geisler (q.v.) Gahn toured England and Scotland. He was specially interested in medical matters, but this did not stop him being interested in industry as well. They came to Bristol and Bath by way of the west country. His diary is in Jämtlands bibliotek, Östersund, Sweden (H. Gahns reseanteckningar fran Englandsresan 1772)

Eric Geisler. Notary of the Bergskollegiet. (1771/73)

Together with Henric Gahn he toured England and Scotland. He took an interest in industry, but was taken ill in Bristol and had to remain there while his companions went on to Wales. His diary is in the Kungliga biblioteket, Stockholm (M243 1-2 Eric Geislers reseanteckningar)

Jacob Jonas Björnstahl. Humanist. (1776)

He was a very travelled man, visiting most European countries including Greece. He visited Bristol, but Rydberg does not say if he examined any industries. He did however talk to a Swedish sea-captain about iron imports. On leaving Bristol he went to Gloucester, where he met Bishop Warburton. He thought the Valley of the Severn came close to earthly paradise. His account of the area is to be found in Vol. 2 p.213ff of his travels (Resa till Frankrike, Italien, Sweitz, Tyskland, Holland, Ängland, Turkeit och Grekland, 6 vols., Stockholm, 1780/84)

Lars T. Nyberg. Resident Moravian Minister in Bristol. (1750/60)

Although not a true traveller, Nyberg is of interest because he showed Wallenstrale around the city when he came in 1762. Nyberg kept a journal of his stay here, which Bryan Little tells me is in English, and which shows Nyberg to have been a perceptive, humorous character. It is deposited, with other records from the Maudlin Street Church, in the University Library, Bristol.

Conclusion

Industrial spying is not a twentieth century phenomenon. In the eighteenth century it formed part of the great interchange of cultural and scientific information which went on among most European countries as well as America (10). It was certainly not confined to foreigners trying to penetrate British industry, for it worked the other way as well. Some of the travellers mentioned above were genuine tourists - Benzeltierna, Solander, Ferner, Gahn, Wallenstrale and Björnstahl. The rest were involved in industry in some role or another, and

they noted all they could discover about how British industry worked. Contacts were made wherever possible -- Kalmeter wrote to Alstromer during his visit of 1723 that he had made many contacts in Bristol 'against future need'.

As many of the reports were sent to official bodies in Sweden, succeeding travellers were well briefed on what their predecessors had seen and to whom they spoke. Robsahm, in 1771, examined a particular glass works at the express suggestion of Solander, who had been in Bristol a few months earlier. Nearly all the visitors travelled openly, with letters of introduction, but although they appear to have had little difficulty in getting very detailed information, they still tried to discover what they were not supposed to see. W Wallerius was literally thrown out of the Redbrook Copper works for wandering around without permission; Robsahm resorted to bribery to examine Champion's spelter furnaces.

British industrialists were not complacent about this state of affairs and many instances are known of British observers of continental industry. Abraham Darby is supposed to have travelled to Holland to learn the secrets of casting, and also brought back workers with him from there. He patented his method of casting iron pots, and from this the Coalbrookdale empire subsequently grew (11). A very similar story is told about the Bristol inventor of the English method of spelter manufacture, William Champion (12). Indeed these stories are so similar that it is possible that one man was involved, and the tale became garbled with the passage of time.

The information which has been handed down by these various tales is very meagre when it is compared with the wealth of detail to be had from the Swedish diaries. Rydberg says that many of the Swedes stand comparison with the native diarists such as Defoe and Arthur Young. Certainly where detailed descriptions of industry are concerned, it is this author's opinion that they surpass them. There does not seem to be a comparable British source of reportage.

Acknowledgement

The work so far done could not have progressed to this stage, without the help, advice and encouragement of several friends. Joan Day, Frances Neale, Patrick McGrath and George Watkins all read the draft of this paper in various stages and made helpful suggestions – though the faults are the author's. Christine Patterson corrected his attempts at translating Swedish. The author is grateful to Liverpool University for permission to publish the extract from Angerstein's diary, and to Dr. Sven Rydberg for permission to publish the extract from Robsahm's journal.

Notes

1. The diaries of Per Kalm (1748), ..I.J. Björnstahl (1776) Gustaf Broling (1779/99) and Eric Svedenstierna (1820/3)

2. *Kalm's Account of his visit to England... in 1748* Trans. Joseph Lucas, 1892 and Samuel Schroderstierna's *Notes on the English Iron Industry* Trans. M.W. Flinn, in *Edgar Allen News* Aug. 1954. A new translation of Svendenstierna's account (1802/3) is in preparation, as is a translation of the Angerstein diaries, which have never been printed before;
3. Jenkins used information in his papers:-
The Reverberatory furnace with coal fuel, 1612/1712 in *Trans. Newcomen Soc.*, 1934, (vol. 15).
Copper smelting in England, revival at the end of the seventeenth century, in *Trans. Newcomen Soc.* 1943/4 and 1944/5 (vol. 24).
The zinc industry in England: early years up to about 1850, in *Trans. Newcomen Soc.* 1954/6 and 1946/7 (vol. 25).
The copper works at Bristol and Redbrook in *Trans. Bristol & Gloucestershire Archaeological Soc.* 1942 (vol. 63).
4. The translations were made sometime before the paper on the reverberatory furnace was written i.e. about 1930. The work appears to have been done by staff in the Swedish Record Office, and is very selective, for the extracts deal with copper and brass manufacture exclusively. It seems that Jenkins had his attention drawn to these records by the late Dr. Carl Sahlin the authority on Swedish Steel. In addition to the abstracts noted in the summaries above, there are also included a number of letters from various people.
5. Jenkins used a plate of a drawing of a rolling mill from the tinplate mill at Woollard, which was reprinted in the *Collected Papers of Rhys Jenkins* 1936. None of this material appears in the Liverpool translations, but the Rhys Jenkins Collection in the Science Museum Library, London does have more Swedish material, which is not yet catalogued.
6. M.W. Flinn 'Sir Ambrose Crowley, Ironmonger', 1688/1713 in *Explorations in Entrepreneurial History*, vol. V no. 3, 1953. M.W. Flinn *Men of iron: the Crowleys in the early iron industry* Pub. Manchester U. Press 1962.
M.W. Flinn 'Industry and Technology of the Derwent Valley of Durham and Northumberland in the eighteenth century' in *Trans. Newcomen Society* 1953/4 and 1954/5 (vol. 29).
Alan Birch *The economic history of the British Iron and Steel Industry* Unpub. PhD Thesis, Manchester University, date not known.
7. Alan Birch 'Foreign observers of the British iron industry during the eighteenth century in *Jour. Economic History*, vol. XV 1955.
M.W. Flinn 'The Travel Diaries of Swedish engineers of the eighteenth century as sources of technological history' in *Trans. Newcomen Society*, 1957/59 (vol. 31).
8. Sven Rydberg *Svenska studieresor till England under frihetstiden* Uppsala 1951 (vol. 12 of studies and sources, pub. by the Swedish History of Science Society)
The work so far done would not have been possible without the works noted in this and the previous reference. Dr. Rydberg's book is particularly valuable.
9. A partial translation of Wallenstrale's account printed in the *Götheborgske Spionen* for 1767 is printed in a paper by R.J. Charlesworth 'Bristol and Sweden: some Delftware connexions' in *Trans. English Ceramic Circle*, 1963. The part translated is Wallenstrale's account of a faience factory, managed by his host, the Swede, Lundberg. This paper is interesting, because it also illustrates, in facsimile, a few pages from the newspaper containing the account.
10. This is not the place to deal with the many other diaries of travellers who looked at British industry. Details can be found in the papers by Professors Flinn and Birch (see note 7 above). A very interesting discussion of foreign observers of the eighteenth century railway systems of the country is to be found at p.332 of *Early Wooden Railways* by M..J.T. Lewis.
11. For details, and variations on the Darby story, see S. Smiles *Industrial Biography* 1878, Chap. 5; A. Raistrick *Dynasty of Ironfounders* 1953 p.20; R.A. Mott 'Abraham Darby I & II and the Charcoal Iron Industry in *Trans. Newcomen Soc.* 1957/59 (vol. 31); H. Hamilton *The English Brass and Copper Industries to 1800*, 1926 p. 107.
12. For details of the Champion story see Ellacombe *History of the Parish of Bitton* 1886. A. Braine *History of Kingswood Forest*, 1891 p. 232 and Rhys Jenkins 'The Zinc Industry in England in *Trans Newcomen Soc.*, 1945/6 and 1946/7 (vol. 25) p. 50.