



THE HAFOD-MORFA COPPERWORKS

LOWER SWANSEA VALLEY

Educational Resource for Key Stage 3 Pupils



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More information about the practicalities of site visits can be found on the website www.hafodmorfacopperworks or by emailing Stuart Griffin on info@hafodmorfacopperworks.com



WHY IS THE HAFOD-MORFA COPPERWORKS IMPORTANT?

We tend to think that the history of Wales is written in coal dust, iron and steel. In fact, is it copper that lies at the heart of Wales's development as an industrial nation. The Lower Swansea Valley was the hub of the World's first globally integrated heavy industry. In 1824, 15,000 people lived in Swansea, 10,000 of whom were supported by the copper industry. The Hafod-Morfa site is the only surviving metal works from this period, all 123 others having been demolished. This makes it an even more significant reminder of Swansea's history, and its role in World affairs.





AIM OF THIS RESOURCE

This resource provides educational material for both teachers and pupils to aid the exploration of Swansea's copper industry, with particular focus on the Hafod-Morfa Copperworks. The resource includes five activities covering history geography, literacy and numeracy.

The resource can be used in conjunction with a guided visit to the site, although this is not essential; the resource can also be utilised effectively from the classroom. It ties neatly into the skills and curriculum framework for KS3 pupils, with particular emphasis on historical interpretation, the communication of ideas and opinions, and the significance of the period in history.

Just as importantly, the resource has been tailored to meet the specifications of the Curriculum Cymreig. It offers a chance to explore the factors which have shaped Swansea and Wales' place in the wider World. The Curriculum Cymreig also emphasises the importance of young peoples' awareness of the factors which have shaped their locality, and emphasises particularly the importance of site visits. This resource has therefore been tailored with this specifically in mind.





HOW TO USE THE RESOURCE

The resource centres around, but is not totally devoted to, the accounts of men and women who were connected to the Hafod-Morfa Copperworks. These accounts are taken from historically accurate sources and help to bring the site to life by placing people back into the site once again. These accounts can be listened to using four wind-up audio devices on the site and on the website

<http://www.hafodmorfacopperworks.com> .

The resources can be used in conjunction with a visit to the site, or from the classroom using the audio stories on the web-site and the transcripts in this pack's appendix. It is envisaged that a combination is ideal, with some activities completed on a visit to the site and others in the classroom either before or after the visit.

Whilst it is possible for school groups to visit the site and navigate their way around the site on their own, it may also be possible to arrange a tour led by volunteer guides who will provide additional orientation to help to bring the site's busy history to life and point out some of the landmarks and reference points mentioned in the testimonies which can still be seen at the site.

The website above also links to a wide range of other resources for pupils to conduct their own research into the history of the site.





ONE TEACHER'S NOTES ACTIVITY 1

This activity interacts with the audio accounts and can be completed on the site or in the classroom. In pairs, small groups, or as individuals, pupils match the names of the people in the left hand column with the descriptions of what they did in the right hand column. Pupils might like to read through the exercise and attempt to match them before listening to or reading the accounts to check if they were correct. There are a number of ways in which the pupils can match the descriptions with the names. They can draw lines between them, cut them out and arrange them, or colour code them.

This activity has been designed to promote the key historical skills of historical enquiry by making them think about the various ways in which the copper industry affected people's lives. By encouraging pupils to think about different people engaged in different forms of work and employment pupils will be engaging with ideas surrounding variation, industry, labour relations and life in a different historical period.

If pupils are struggling, the following hints may be helpful:

- The Cape Horner is the man who sailed around the World trying to promote the Swansea Copper Industry
- The Hafod Woman worked at the copperworks and had children
- The foreman is the leader of a work crew
- The child worker is twelve years old and works in the rolling mills
- George Paddison was the man who had to be sewn up from top to bottom
- The Manager is the man who is in charge
- The Local Farmer farmed on the hill you can see from the copperworks



TEACHER'S NOTES ACTIVITY 2

This activity encourages pupils to imagine the site in the early nineteenth century, focussing on the noise, activity, pollution and the impact on the environment. This activity draws on the the accounts of the local farmer and the scientist Michael Faraday. It primarily a written exercise, and it will encourage pupils to think about their senses and the natural World. Elements of geography and art can also be incorporated when undertaking this task. A

Once they have listened to the accounts, pupils should first imagine, as a group or in pairs, and then write down what it would be like to be the farmer on the hillside next to the copperworks, ten years after the works set up. They will be encouraged to describe what has happened to the environment around them, and what the area now looks, sounds and smells like, hence encouraging them to develop an awareness of chronology and historical interpretation. To demonstrate the change, they could draw an illustration of what the local farming environment looked like before the copperworks, and what it was like once the copperworks were built. They should think particularly about pollution, livestock and the natural environment. By using the knowledge they have gained from visiting the copperworks site, pupils should think about how copperworks (chimneys, smoke, buildings) dominated the Lower Valley; numbering many more than just the Haford Morfa works.

In order to provide a sense of perspective and balance to what will be a negative portrayal, pupils could also suggest how the copperworks affected other people in the local area, including in both a negative and beneficial way.

The activity is designed to raise awareness of historical development, interpretation and chronology. It specifically encourages pupils to think about the processes and effects of historical change. It focuses specifically on industry and the environment, and can be linked to Personal and Social Education through demonstrating an awareness of how our surroundings and environment change, and the damages that can be caused to the natural World. By thinking about how the Swansea Valley changed over time, and what effect the industrial revolution had on the area, pupils will be engaging with a key element of the Curriculum Cymreig, which encourages them to think about their locality.



THREE TEACHER'S NOTES ACTIVITY 3

This activity again interacts with the audio accounts and encourages closer listening to the details. This activity involves extracts from an 1842 report on child employment in south Wales. Pupils should select words from the list at the bottom of the page to fill in the blanks.

The activity emphasises historical interpretation and analysis.

The following answers are correct:

“The smelters and calciner men work the 24 hours round i.e. from six o'clock in the morning to ~~six o'clock~~ the following morning (24 hours). In some instances boys under ~~13~~ years of age assist boys of an elder class at the ~~calcining~~ process”

- The managers of the Middle Bank and the “White Rock” copper works

‘The youngest boys and girls are employed to wheel the ~~coal~~ and ~~ashes~~ for the furnaces which are worked by their ~~fathers~~. The men are rather fond of ~~drink~~ and the women are bad managers’.

- John Thomas, aged 59, and George Hughes, aged 46, foremen

‘We have what we call the “long watch” once a fortnight when we work from Saturday morning to Monday morning (48 hours)’.

- John Richard aged 15 and David Davis, aged 14.

‘I work in the rolling mills. I put the copper sheets into the ~~furnace~~ to dry and when the man takes them out and cools them in ~~water~~, I put them up in a pile’.

- James Jones, aged 12



TEACHER'S NOTES ACTIVITY 4

This activity encourages pupils to think about Swansea's place in the wider World, and its significant role as a Welsh and British industrial hotspot. The activity should draw pupil's attention to the internationally significant nature of Welsh copper.

As individuals or in small groups, pupils are encouraged to use the outline maps of the world to draw the 'routes' of Welsh copper. The routes are given to the pupils in the form of an explanation of where copper materials or products went to, or came from. Some journeys will have been made by rail, but most by sea. An example has been done already. They should use an atlas or the internet to locate the precise places in Wales, Britain or the World that natural resources, materials, or people, were imported or travelled from, or exported to. A list of directions and routes is given. Pupils should mark these routes out clearly with different coloured pencils, and should illustrate which route is which with a key.

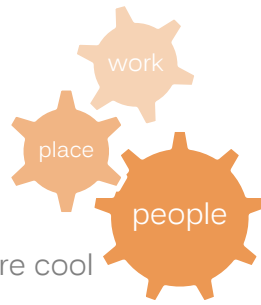
This activity incorporates key elements of the Curriculum Cymreig because it encourages pupils to think broadly about Wales' position, power, prestige and role in one of the first globalised industries. It will also aid their geographical skills because pupils will have to locate specific areas around the World, and establish the means and methods by which Welsh copper got from one location to another.



TEACHER'S NOTES ACTIVITY 5

This is a numeracy based exercise. Pupils should answer the following questions by working them out mathematically. They should try and do so without a calculator. There is room for them to show their workings.

This activity is designed to encourage pupils to think about some of the real life numbers of the Hafod-Morfa copperworks. It encourages historical enquiry, and also serves as a different way of thinking about the scale and size of Swansea's copper industry. Pupils are also given an opportunity to practice their application of number in a historical context.



THE CAPE HORNER

This person puts the copper sheets into the furnace and then stacks them in piles when they are cool

For twelve months at a time this person would not see his wife or children

After nearly dying at the copperworks this person was given a job for life

It is possible that this person may end their life in the workhouse

This person grew good corn on land near the copperworks before it became too polluted

This person gave 'hangers on' regular work if vacancies came up

This person spent thirty years on long voyages around the World helping the Welsh copper trade

This person looked after the boys and girls who worked at the copperworks. Many of these children were under the age of 13

This person is always so busy, they never have time to see a doctor and they struggle to get back to normal after childbirth

This person paid the workers every Friday afternoon so their wives had cash for the Saturday markets

This person remembers oak, ash and sycamore trees on their land before the copperworks opened

This person thought that boys were better suited to working in the copperworks than girls were

This person was taken under the engine mill wheel when a game he was playing went seriously wrong

This person is 12 years old and works from 6am till 6pm, and every other night

THE HAFOD WOMAN

THE FOREMAN

THE CHILD-WORKER

**THE ENGINE-HOUSE
BOY – GEORGE
PADDISON**

THE MANAGER

THE LOCAL FARMER



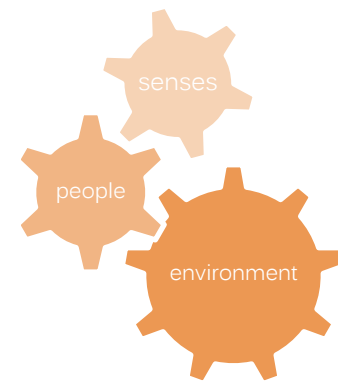
The Hafod Copperworks was established by John Vivian in 1810 and was the World's largest copperworks



Smelted copper was exported to Europe, India, China and Japan. This photo shows the Cape Horners responsible for plying this trade



ACTIVITY 2 – the farmer’s experience



Imagine you are the farmer on the hill next to the Copperworks. It is 1833 and the copperworks have been working for over twenty years. The crops and animals have suffered because of it. Write about your experience as the farmer. Think particularly about:

- *What can you SEE from the hillside? How has this changed in the past twenty years?*
- *What can you SMELL from the copperworks?*
- *What SOUNDS are coming from the copperworks?*
- *Is the copperworks a good or a bad thing for you? Is it good or bad for other people who are not farmers?*

Talk in groups about what the farmer would have experienced. Then use the space below to write about it.

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A series of 18 horizontal dotted lines for handwriting practice, spanning the width of the page.



The Lower Swansea Valley including
Kilvey Hill – once at the heart of a
global industry.

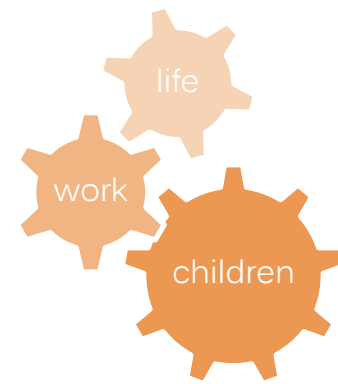


By 1950 the Swansea Valley was Europe's largest
post-industrial derelict landscape



THREE

ACTIVITY 3 – Children’s Report: fill in the blanks



The following statements are taken from a report about children’s employment in South Wales in 1842. Select the correct words from the list at the end to fill in the gaps. But remember – there are more words than blanks, so you will need to think carefully.

A

“The smelters and calciner men work the 24 hours round i.e. from six o’clock in the morning to _____ the following morning.

In some instances boys under _____ years of age assist boys of an elder class at the _____ process”

- *The managers of the Middle Bank and the “White Rock” copper works*

B

‘The youngest boys and girls are employed to wheel the _____ and _____ for the furnaces which

are worked by their _____. The men are rather fond of _____ and the women are bad managers’.

- *John Thomas, aged 59, and George Hughes, aged 46, foremen*



FOUR

ACTIVITY 4 – Routes of Welsh Copper



Using the information below, draw onto the blank maps of Britain and the World the routes Welsh copper took. Remember that the start or the end place is always Swansea. Think how the materials were travelled. For each different journey, mark the route in a different colour pencil. Make sure to keep a key in the bottom corner of the map so that you remember what each route means.

MAP 1: BRITAIN

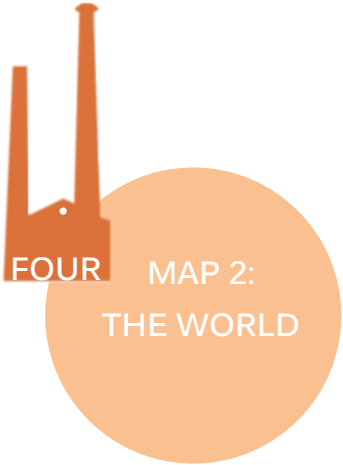
- Copper ore was mined in **Cornwall** and **West Devon** and then taken to **Swansea**
- Copper ore was mined in **Anglesey** and taken to **Swansea**
- Copper, coal and timber were taken (by boat) from **Swansea** to **Liverpool**



FOUR

MAP 1:
BRITAIN

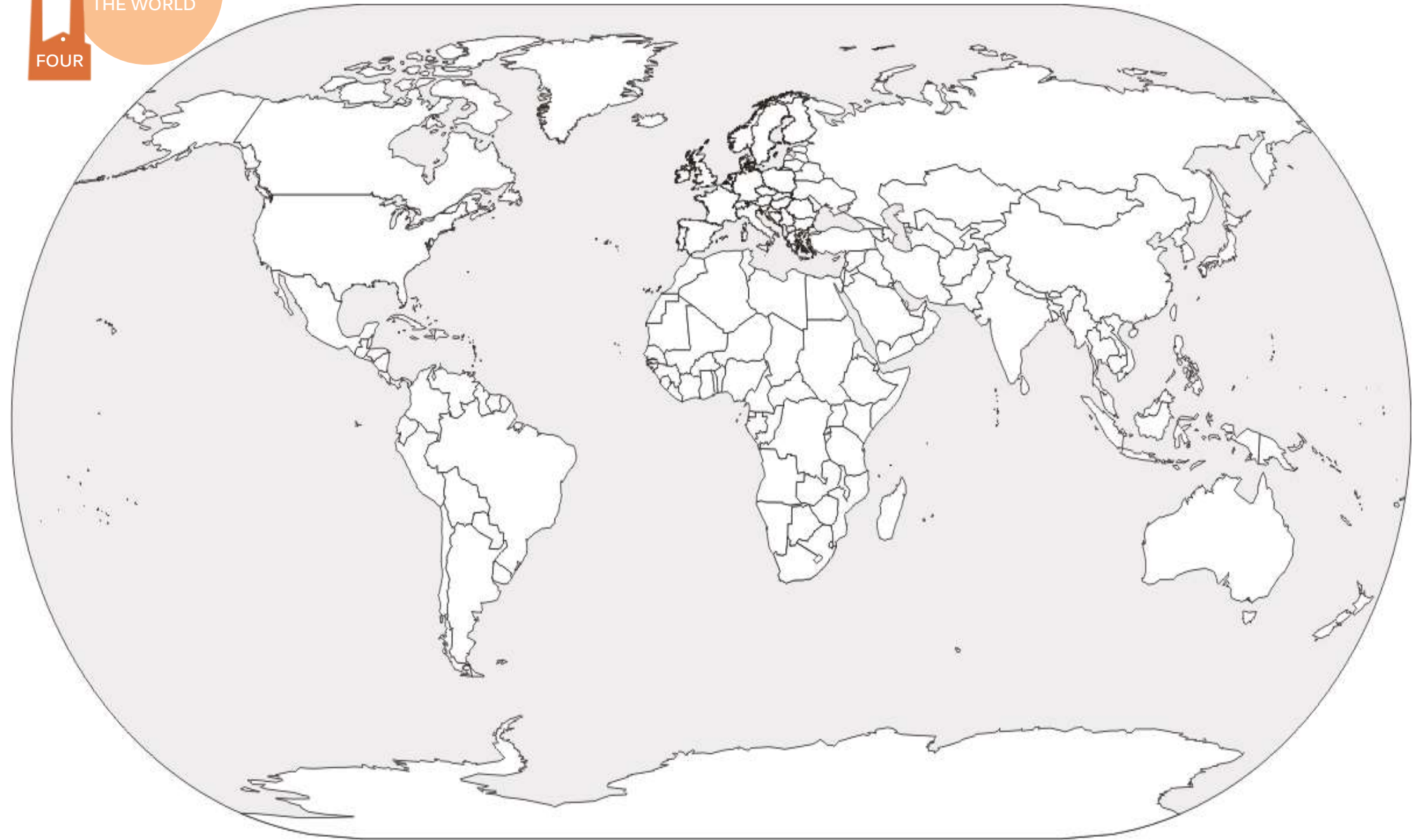




- Copper ore was transported from **Chile** to **Swansea**. One of the biggest ports in Chile was that of **Valparaíso**
- Copper ore was mined in **Namaqualand** in **South Africa** and then transported to **Port Nolloth** so it could be taken to **Swansea** (by train from the mine to the port, and then by boat)
- Copper ore was taken from **Cuba** to **Swansea**
- Copper ore was taken from **Peru** to **Swansea**
- Copper ore was taken from **Bolivia** to **Swansea**
- Some copper ore was taken from **Norway** to **Swansea**
- Copper, coal and timber were taken (by boat) from **Swansea** to **Portugal**
- Copper, coal and timber were taken (by boat) from **Swansea** to **Newfoundland** in **Canada**
- Welsh and **Swansea** miners and copper workers went to work in **North West Chile**
- **Swansea** copper smelters set up copperworks in **Burra**, and **Wallaroo**, **South Australia**



MAP 2:
THE WORLD

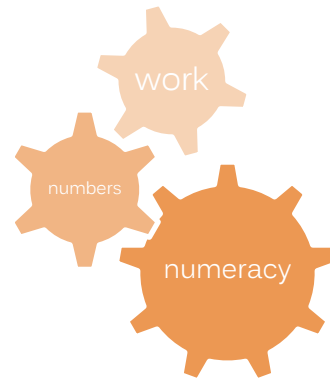




FIVE

ACTIVITY 5 – Copper Maths

Answer the following questions and give the answers in number form. Show your workings.



A

The Hafod copperworks site opened in 1810 and finally closed its doors in 1980. How long was it open for?

B

The Morfa site opened in 1835 and joined with the Hafod in 1924. How long did it take for the two sites to join?



C

In 1883 there were 12 copperworks in the Lower Swansea Valley. If each works had eight tall chimneys, how many chimneys would there have been in the lower Swansea Valley?

D

In 1823 there were 15,000 residents of Swansea. 10,000 of these were supported by the copper industry. In 1823, what percentage of the population of Swansea were supported by the copper industry? 4b) What is this percentage expressed as a fraction?

E

At age 14, David Thomas was working in the copperworks. He earned 5s per day. He worked for six weeks. Assuming he worked six days each week, how much did David earn a) in a week b) in the six weeks he was working there?

Appendix I – personal testimonies

The Cape Horner – Captain David Morgan (1836-1930)

‘Briefly stated I went to sea in 1851. My father allowed me to go thinking that one voyage would satisfy all my inclinations to a nautical life. But his hopes were in vain, for I was apprenticed during the following year 1852, at the age of 16.

I obtained my Master’s Certificate in 1864. The next thirty years were spent in long voyages round Cape Horn, altogether making 33 voyages, and crossing that dangerous Cape 66 times. I carried copper, nitrates, guano, hides, etc.

To give you some idea of the faith we sea-faring men have in our calculations as to latitude and longitude, I have started from Valparaiso [in Chile], sailed round the Cape, up the South Atlantic, through the North Atlantic, through the North Atlantic and not sighted land during the whole of that voyage until I reached Swansea Bay, a distance of between 7000 and 8000 miles.

The calculations are made by means of the sextant for gauging the sun’s altitude; the chronometer, a sea-watch which keeps wonderful time; sometimes the stars; a chart of course with which to localise the position of the ship when the latitude and longitude are found.

For twelve months at a time I never saw my wife and children, and my visits home were often of very short durations.’

Source: Joanna Greenlaw, *The Swansea Copper Barques & Cape Horners* (1999), pp. 137-9.

Hafod woman

'Look at me. One person, many lives

I started working in the copper works wheeling coal and ashes when I was 10. I went to school sometimes, unless I was needed at home. I was brought up speaking Welsh and I made my own clothes, I couldn't afford to be sick and I married a smelter from the next street.

Look at me. I look older than your mother, thinner than your wife, more careworn than your sister, and harder than your daughter. I always eat after my after my husband and children, I don't see the doctor and I always struggle to get back to normal after childbirth. Some of my children didn't live to see their fifth birthday. I go to chapel and my neighbours are my friends. I care about keeping the range hot, my family fed, the house clean and the rent paid.

Look at me. My reflection shows a child, a young girl, a wife and mother, and if God spares me, an old woman looked after by my girls, if not I might end my days in the workhouse.

Happy? I've no time for happy. Look at me. I am everywhere in the Hafod and nowhere in the history books.'

Source: *Account drawn from many sources*

The foremen, Hafod Copper Works (1841)

John Thomas, aged 59, and George Hughes, aged 46, foremen at the Hafod Copperworks. John Thomas had been working in the works for 26 years and George Hughes has been there for about five years.

'We look after the boys and girls that are labouring about the works. We put them to work and keep their time. We have in all about 130 boys and girls under 18. There are about 60 boys and 70 girls, about one half of them under 13.

The hardest work to which the boys are put is working 'the calciners' [types of furnace]. They are mostly worked by boys from 13 to 16 years old. Their turn continues for 24 hours and they are obliged to tend the furnaces every two hours. They can sleep for an hour, perhaps two or three times in the night. They work six turns or 'watches' one week and eight the other and get 2s. 6d. [12 ½ p] for each double watch of 24 hours.

The youngest boys and girls are employed to wheel the coal and ashes for the furnaces which are worked by their fathers and most of the children employed are the children of the workmen or those who have worked here. We do not consider the children are overworked here but we don't think it is a fit place for girls to work as it unfits them for all other work.

The characters of the men and their wives are generally improvident. The men are rather fond of drink and the women are bad managers. The colliers appear to save more money than the copper men although they do not get so much. The copper men must, however, from the nature of their work at the fires, live better, and they wear out more clothes, particularly shoes. They mostly wear flannel shirts and wear out four in the years when two will serve to colliers.

Source: *Children's Employment Commission* (1842)

The child-worker: James Jones, aged 12, Morfa Copperworks, 1841

'I work in the rolling mills. I put the copper sheets into the furnace to dry and when the man takes them out and cools them in water I put them up in a pile. There is another boy working at the same furnace. The work is not very hot. The furnace door is down when the sheets are drying.

The work is not hard and the boys do it very well but they are sometimes obliged to be busy. I have been working three years. I work from six to six every day and at night every other night. I have meal times. I have lost very little time from sickness and have met with no accident. I work inside the mills. I get 5s 6d [27 ½ p] per week under the foremen. My father kept school at Morryston and had about 50 boys in it. He is dead. I can read Welsh and English'.

Source: *Children's Employment Commission* (1842)

The Engine House Man

The Engine House is near the Hafod Copper Mills its purpose was to drive the mills. This was done by a large wheel connected to the main engine by a number of ropes which were driving belts. The engine was a "Musgrave". The big wheel was geared to drive the mill rolls my father as a boy (George Paddison) had a near fatal accident on this wheel in 1916.

It was a game played by the boys at work to sit on the ropes at the lowest point to ride few feet on them and then jump off.

My father failed to jump off the ropes and was taken over the wheel and down into the pit, he was picked up thought to be dead wrapped in sacking and taken to Swansea Hospital mortuary where he was found to be still alive. He was literally sewn together all down his left side.

He was given a job for life - no compensation in those days. He was given a job as a weigh bridge operator and then a gantry driver. He worked there for approx 4 years.

The remains of the engine house still remain but vandalised to a ruin.

Source: *Testimony from George Paddison's son, Ken Paddison, (1990s)*

The Manager: Mr Pooley, Morfa Works

'I have now been for thirty years an agent of the mines and smelting works, having from 25 to 1,000 men under my care during the whole of that time... We have made no reduction of wages here for the past six years. I never hear the slightest complaint as to their wages, or any expression of discontent on other subjects.

We have here no 'truck' but pay the men every Friday afternoon between two and three o'clock, so that their wives may go with cash in their hands to market on the Saturday.

A few of the men, and only a few, lose the Monday sometimes in drinking. They are mostly furnace-men who are thus intemperate; but we suffer no inconvenience by it, for there are always some 'hangers on' waiting an opening for steady employment, whom we put in the places of such as are absent until they return to their duty. As vacancies occur these hangers on are taken in as regular workmen.

The health of the men as a whole stands good. Drinking variously affects different classes of the workmen – for instance, refiners can bear almost any quantity of beer, they perspire so copiously at the furnaces. They drink beer chiefly – they rarely touch spirits.'

Source: Letters of the *Morning Chronicle* correspondent in South Wales. They were published as part of a series in the *Morning Chronicle* newspaper between March and April 1850.

The local Farmer (1833)

I am Morgan Morgan a farmer from Llansamlet. It is 1833.

I have lived in the parish of Llansamlet for 39 years and can remember before these works were established. When the wind blows over Mr. Vivian's works, it blows against Kilvey Hill. The hill is high and as barren as a road.

When I first knew Kilvey and that side of Llansamlet the land was very good corn, hay and pasture land; cattle and horses grazed on it. It is all barren now, and what there is, no cattle will eat it. If they eat it, it will poison them. The smoke has an effect through the bones, breaks the ribs of the cattle, and produces large knobs on their legs, some lying down and could not stand. Many of the farms are now untenanted, because there is no grass or culture for cattle or horses. There are no trees there now but I can remember oak, ash and sycamore.

Evidence from the Copper Smoke Trial held at Carmarthen Assizes in 1833

The Scientist: Michael Faraday

I am Michael Faraday, a scientist. I visited the Hafod Copper Works in 1819.

'I found Mr Vivian's copper works out of the town, up the river; and during the walk there met Mr Morgan, the Agent who showed me the place and the processes.

A large quay intervenes between the river and the works, and close to it are the yards and warehouses for the ore. In several of them the ore was lying in large quantities. It comes from Cornwall and contains not more than 8 per cent of copper.

In one place the men were weighing it in trays and carrying it to the furnaces. The furnaces are placed in the interior of the building. They are large reverberatories, resembling high baker's ovens with an immense fire at one end and the flue at the other. Between four and five ton of ore is a charge for one of these furnaces. Here it is roasted for between 36 and 48 hours, being occasionally stirred with a rake so that all parts may be exposed to the fire.

Much sulphur and arsenic is separated, occasioning principally the immense volume of smoke which ascends up the vale.'

Faraday's Tour in Wales, July 1819.