

Early Modern Europe, 1450–1789

CAMBRIDGE HISTORY OF EUROPE, 2ND EDITION

Merry E. Wiesner-Hanks

Primary Sources

CHAPTER TWELVE: ECONOMICS AND TECHNOLOGY, 1600-1789

CONTENTS

1. Difficult conditions in rural France, 1650s 2
2. Theft by a servant, Denmark 1625 3
3. The establishment of a workhouse in Greenwich, 1724 7
4. The enserfment of the Russian peasantry, 1649 9
5. Extract from the land register from the Silesian village of Zedlitz, 1790 12
6. On the compensation of a wife's labor, Ottoman Empire, sixteenth century 13
7. The introduction of the potato 13
8. Selling wine, Portugal 1645-46 14
9. Selling sardines, Portugal 1658 15
10. The Great Fire of London, 1666 17
11. Thomas Savery, The Miner's Friend, 1702 17
11. Thomas Savery, The Miner's Friend, 1702 18
12. Workers and cloth merchants on the effects of machinery, Leeds, 1786, 1791 22
13. Charles Aberdeen reports on conditions in cotton factories 22
14. Child labor in the early Industrial Revolution 24

1. Difficult conditions in rural France, 1650s

Agricultural productivity was very low in much of Europe in the seventeenth century, so that localized famines were common. These were exacerbated during times of war by the demands of armies, particularly because soldiers were often billeted with peasant families, who were ordered to feed them. Such problems can be seen in these reports from two different areas of France.

<http://www.fordham.edu/halsall/mod/17france-soc.html>



Floods as well as droughts created problems for rural people during the early modern period, and continue to do so. To the right of the bridge in this French village is a water-wheel, which may have powered a millstone for grinding grain or carrying out other productive tasks.

2. Theft by a servant, Denmark 1625

The rural poor often migrated to cities in search of employment. The lucky might get permanent positions as servants, but many were forced to resort to odd jobs and temporary work. The following court case dealing with a servant girl accused of theft reveals the hardship of a single woman trying to make a living by temporary employment and by running errands. (Sokkelund Herreds tingboger, 1624-25. Ed. Poul Erik Olsen (Copenhagen: Landbohistorisk Selskab, 1980), pp.22-23. Translated by Grethe Jacobsen and Pernille Erenfeldt)

Thursday December 9th 1625

Hans Lauridsen in Virum brought forward aftersaid testimonies against a woman named Karen Pedersdatter, reports (she is) born in Jutland.

Then Doritte Nielsdatter in Virum came forward to testify and made her oath according to the law and recounted how she saw aforesaid Karen had an apron in a basket and with it entered the eastern room, to which aforesaid Karen Pedersdatter answered that she only had aforesaid apron one day. In the same way, Sofie Kristensdatter of the same place came forward and made her oath according to the law and recounted how aforesaid Karen took a shift from the girl of Steffen Bager in Copenhagen and aforesaid Sofie was one of those who took (it) from her.

Maren [wife of] Peder Hanssen who was a servant with aforesaid Hans Lauridsen at that time, likewise Bodil Mortensdatter who also served aforesaid Hans Lauridsen, aforesaid Sofie testified likewise about the apron that Doritte has testified about.

Rasmus Esborson in Buddinge also made his oath according to the law and recounted how aforesaid Karen came to him in his house wanting to borrow a pair of hosen of his woman and told how she wanted to go to Hans Lauridsen's (house) in Virum and furthermore asked his woman if she

could borrow a food pouch and a knife and bring that to Hans Lauridsen. Sometime before that happened, she came to aforesaid Rasmus with a slice of pork and asked his woman if she could afford to pay her for this slice, then aforesaid Rasmus gave her 10 Shilling for it.

Likewise Laurids Andersen in Buddinge came forward, made his oath according to the law and recounted how his woman asked aforesaid Karen where she had been. Then aforesaid Karen answered that she had been to Copenhagen at Mette Islendriss with a goose, that aforesaid Hans Lauridsen supposedly gave her to bring to his sister and recounted that she got 12 shilling as a fee for this. Then she went home. A day or so later she returned bringing some pork, which were 2 hams, a shoulder and a piece of pork which she tried to sell ... and Laurids Andersen said furthermore that she swore that she got aforesaid pork from Hans Lauridsen in Virum as a payment. And aforesaid Karen, when she had borrowed the pouch from Rasmus Esborson's woman, then when she returned, she had a loaf of bread, which she swore that Hans Lauridsen gave her. Likewise a loaf cut into four pieces, which she swore Hans Lauridsen's woman gave her.

Likewise aforesaid Laurids Andersen recounted that Karen said to his woman that if she could get hold of some hops, then she could supply her with some malt. Recounted further that she had a piece of green cheese.

Likewise aforesaid Karen confessed to have lain in aforesaid Hans Lauridsen's barn for an entire month since she left his service without the knowledge of Hans Lauridsen and his woman.

Rasmus Esbemson in Buddinge asked aforesaid Karen whether he and his woman had housed her knowingly overnight any time to which she answered no, [she] had not been lying at (the house of) aforesaid Rasmus...

Thursday December 16th 1624

Hans Lauridsen in Virum brought forth into the court a woman by the name of Karen Pedersdatter along with some stolen items, which are a shift, an apron and a button, made from bone, which aforesaid Hans Lauridsen has found at Abelone's in Virum. Then came forward a witness from Abelone as she, because of her frailty, is unable to appear in court and testified according to the law that she for some time had been unable to leave her yard because of her frailty and that she had bought aforesaid button from Karen Pedersdatter outside the gate ... Jens Persen and Hans Persen in Virum and Hans in Lyngby testified to this under oath. And aforesaid goods were assessed to 4½ Marks for the apron, the shift and the button by these men, Peder Jorgensen, Hans Bendtsen in Emdrup, Soren Andersen in Utterslev, Thomas Persen in Gentofte

Furthermore came forward a witness against aforesaid Karen Pedersdatter, who is Sisse Laurids Olsen's wife in Buddinge and made her oath according to the law and recounted how aforesaid Karen came to her in her house and had a piece of bacon and offered it to her for 10 Shilling and then for 8 Shilling and as she were not interested in cash, she offered her beer. And aforesaid Sisse inquired of aforesaid Karen where she got that bacon. Then she said that she received a side of bacon from Hans Lauridsen in Virum and there was paint on that bacon, to which Hans Lauridsen answered that aforesaid Karen never received any bacon from him neither as a purchase nor as a gift, which aforesaid Karen herself agreed with and said she received some bacon from Soren Ludhorn and that he would be able to confirm that under oath.

Then came forward a witness by the name of Ellen Laurids' wife in Buddinge and here in court confirmed what her husband testified here eight days ago and Hans Lauridsen firmly denied to have given aforesaid

Karen the goose to carry to his sister and the other things in the testimony [of Karen] that he was supposed to have done, which is, given her bread.

Then came [Niels Jensen] forward to testify about the testimony of Sara Sorensdatter who has recounted to Laurids Mikkelsen in Copenhagen, and Niels Jensen in Virum was asked if it is the same shift which was taken off the body of aforesaid Karen Pedersdatter by the aforesaid women who testified before, to which Laurids Mikkelsen had answered that he does not know whether it is the same or not.

Finally, Ellen Laurids Andersen's wife came forward and complained about aforesaid Karen and recounted how aforesaid Karen stole 3 silver spoons from her and that two of her sieves disappeared while Karen stayed in her house which accusation aforesaid Karen denied but could not prove.

Having brought the case and offered testimonies to prove his case against aforesaid Karen, aforesaid Hans Lauridsen asked the judge whether or not aforesaid woman should be punished for her deeds according to the law which is the Jutish Law, Book 2 Chapter 95 and Chapter 102 and asked for a verdict.

[Jyske Lov 2-95: "How a man shall search for his stolen property"; 2-102: "How to pledge surety" (if accused of theft)]



Chichester workhouse, established 1681

The Bill of Fare for a Week			
	<i>Breakfast.</i>	<i>Dinner.</i>	<i>Supper.</i>
Sunday	Bread and Cheese	Beef and Broth	Bread and Cheese
Monday	Beef Broth	Hasty Pudding	The same
Tuesday	Milk Porridge	Plumb Pudding	The same
Wednesday	Milk Porridge	Beef and Broth	The same
Thursday	Beef Broth	Rice Milk	The same
Friday	Milk Porridge	Beef and Broth	The same
Saturday	Beef Broth	Hasty Pudding	The same

3. The establishment of a workhouse in Greenwich, 1724

The response to poverty in some parts of Europe, including Britain and the Netherlands, was the establishment of workhouses, where able-bodied poor would be set to tasks such as spinning and weaving. In this letter, a middle-class man from Greenwich writes to a friend in London about the recent establishment of a workhouse in Greenwich. Other documents describing workhouse rules can be found at:

<http://www.workhouses.org.uk/>

IT being observ'd that the Poor are very numerous, and cost about 800 l. to the Parish annually for supporting them; Two honourable Gentlemen of the Town offer'd to build a commodious House for Lodging and Dieting all

those Poor, provided the Parish would consent to dispose of their Weekly Allowances under such a Management, as might, with the Produce of their Labour, wholly maintain them.

THE Parishioners, taking the same into their Consideration, thankfully accepted of this Offer, and submitted the Direction of it to such Management, as the said Gentlemen should prescribe.

MR. Matthew Marryott, of Olney in Buckinghamshire, having, with great Success, directed the setting up Houses of Maintenance for the Poor in Buckinghamshire, and other Counties, was invited to Greenwich, to propose a Plan, by which the like might be done there. Accordingly, this Summer, a commodious House has been built near the Church, at the Charge of the Honourable Gentlemen aforesaid ; and at Midsummer, all such Poor, as receiv'd Weekly Pensions from the Parish, were admitted into it, to the Number of 900 odd, and are at present employ'd in the picking of Oakum, winding Silk for Throwsters, Spinning Jersey, and such other Work as they are capable of under Mr. Marryott's Direction.

THIS Undertaking being its Infancy, it does not yet appear what will be the Success of it ; but one good Effect it has already had, viz. That those that are absolutely necessitous, are better provided for than they were before ; and many of those were before burthensome to the Parish, have exerted themselves, so as to live by their own Industry, to avoid giving that Burthen; by which, the Parish have already sav'd considerably. And it has prov'd an effectual Means to drive Beggars out of the Town, notwithstanding the People in this House are lodg'd and dieted in so commodious a Manner as they are.

P.S. They are furnish'd with old Cable cut into Pieces, commonly called Junk, from the King's Yard at Deptford, to be pick'd into Oakum, for which they allow the Work-house 4 s. per hundred weight.

4. The enserfment of the Russian peasantry, 1649

In Eastern Europe, the rural poor had no opportunity to move in search of better opportunities, as they were increasingly bound to the land as serfs. The enserfment of the Russian peasantry was a gradual process, but the final step was taken in 1649, when they were bound completely to the land. Laws accomplishing this were part of a comprehensive law code, the Ulozhenie, which also regulated religious life, military service, taxes, taverns, legal procedures, and the minting of money, among other provisions.

Chapter XI. The law on the peasants...

1. Any peasants of the Sovereign and laborers of lords the crown villages and black volosts [villages that did not belong to the crown or the church] who have fled from the Sovereign's crown villages and from the black volosts and live on the land of the Patriarch metropolitans, archbishops, bishops or the monasteries or the boyars [aristocrats], chamberlains and the men of the Council or the chamber and the sewers, bearers of insignia and the Moscow gentlemen and the clerks and the attendants, town gentlemen and the junior boyars and the foreigners and any lords holding an estate by inheritance or service and [those peasants and laborers] are in the inquisition registers which the officers in the Service Tenure Department submitted to other Departments after the Moscow fire of the past year,¹³⁴ [1626], those fugitive peasants, or their fathers who are recorded as the Sovereign's and those fugitive peasants and laborers of the Sovereign being sought out, are to be brought to the crown villages of the Sovereign and to the black volosts to their old lots according to the registers of the inquisition with wives and children and with all their peasant property without term of years.

1. Also should there be any lords holding an estate by inheritance or service who start to petition the Sovereign about their fugitive peasants and laborers and say that their peasants and laborers who have fled from them live in the crown villages of the Sovereign and in black volosts or among the artisans in the artisan quarters of towns or among the musketeers cossacks or among the gunners, or among any other serving men in the towns beyond Moscow or in the Ukraine or on the land of the Patriarch, metropolitans, archbishops and bishops or the monasteries or the boyars, chamberlains and the men of the Council and the chamber and the sewers, bearers of insignia, the Moscow gentlemen and the clerks and the attendants, town gentlemen and the junior boyars and the foreigners and any lords holding an estate by inheritance or service, then those peasants and laborers in accordance with law and the [right of] search are to [be] handed, over according to the inquisition registers which the officers handed in to the Service Tenure Department after the Moscow fire of the past year, 134 [1626], if those, their fugitive peasants, are entered under them in those registers, or if after these inquisitions these same peasants or their children were entered in accordance with new grants to anyone in registers of allotment or withdrawal. And fugitive peasants and laborers are to handed over from flight according to the registers to men of every rank without term of years.

2. But if anyone is required to hand over runaway peasants and laborers in accordance with justice and the search, they are to hand over those peasants with their wives and children, and with all their property and with their grain, standing and threshed. And the holdings of those for former years prior to the present law Code are not dealt with; but if any runaway peasants, while runaways, married off their daughters, sisters or nieces to peasants of those holding by inheritance or service under who they lived, or on the side into some other village or hamlet, that [peasant] is not to be

held guilty and the husbands of those girls are not to be handed over to their [i.e. the runaways'] former lords holding by inheritance or service, because there was no Sovereign's prohibition as regards this until the present Sovereign's decree that no one was to accept peasants, but terms of years were decreed for runaway peasants because after the officers [of the inquisition had done their work] in many years the estates held by inheritance and service had changed for many tenants.



Peasant with a hoe, eighteenth century

5. Extract from the land register from the Silesian village of Zedlitz, 1790

In central Europe, peasants were not bound completely to the land, but they still generally had to perform extensive labor services. In this register, duties of male and female peasants during harvest-time are spelled out.

The 18 households... are obliged to send as workers every day 2 people, that is the husband and also the wife, or instead of the latter, a qualified maid, to do whatever work is necessary. For the harvest they must bring a third person with them. The field workers begin harvest work at sunrise, stop from 6:30 to 7 for a half-hour breakfast, work again until 10, when they eat for an hour in the fields, and then work from 11 until 2. They eat an evening meal from 2 to 3, and then they work again without stopping until sunset. The wives of the field-workers begin work once they have taken care of the herds, work with the men and maids until 6:30, and then go from the fields back to the house to prepare the meal, which they bring to the men and maids in the fields at 10:00. They eat until 11, and then stay working in the fields until evening, although they do the same things between 2 and 3 with the evening meal. If a field-worker's wife has a baby during the harvest season, she is free from service for 6 weeks, but the maid must still come to work regardless of this. If she has a baby when it is not harvest-time, the maid is also free from service for 14 days [and can help her].

6. On the compensation of a wife's labor, Ottoman Empire, sixteenth century

In many parts of Europe, including the Ottoman Empire, rural households engaged in production, particularly of textiles, during times of the year when agricultural tasks were less intensive. In the following fatwa, or religious ruling based on Islamic law, a Muslim jurist addresses a question about who owns the proceeds from the making of cloth within the marital household. (Süleymaniye Library, Istanbul: Semseddin Ahmed Kemalpasazade, Fetava, MS. Dar ul-Mesnevi 118, folio 23a. Translated by Leslie Peirce.)

Query: If [a man] buys cotton and his wife spins it and weaves cloth from it, whom does [the cloth] belong to?

Answer: If the wife's labor is voluntary, it belongs to the husband. Otherwise, she receives fair recompense for her labor [i.e. the going wage rate].

7. The introduction of the potato

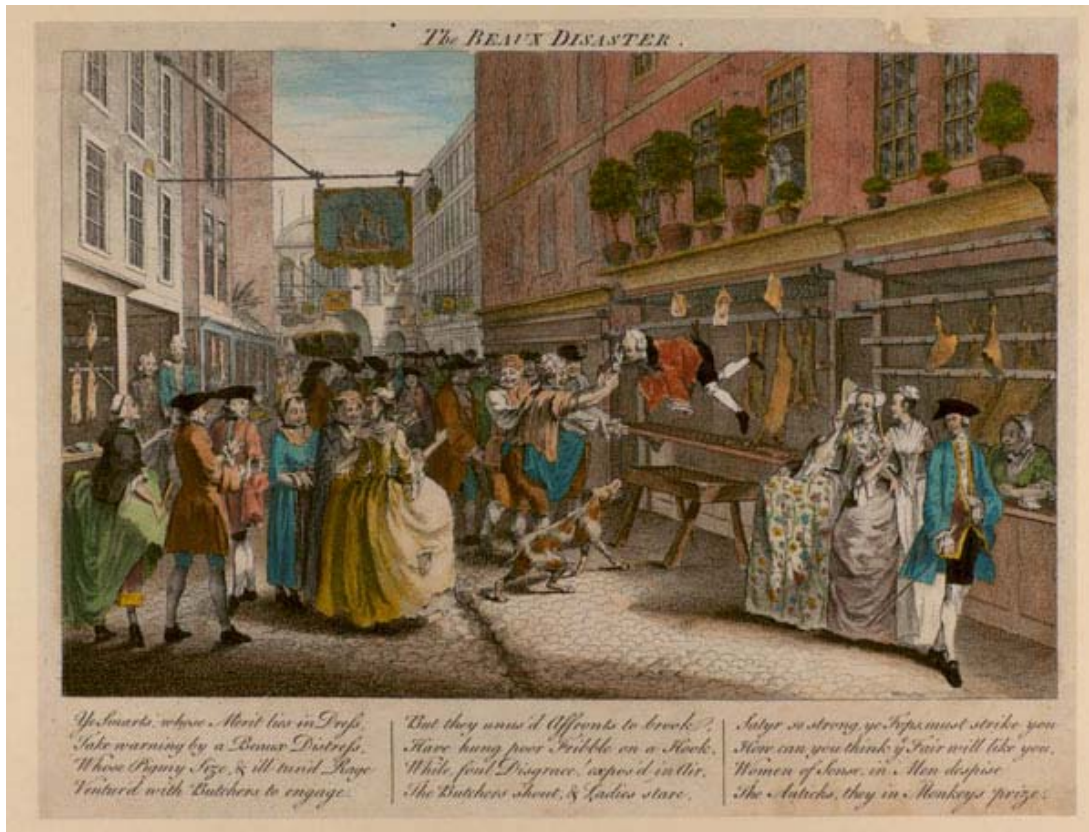
The most important New World crop introduced into Europe was the potato, which were fed first to animals, then to soldiers and slaves, and then to the poor. Potatoes could grow on poor soil and in areas where summers were cool, such as Ireland, Prussia and Norway. Writers on economic development and rural problems, including Adam Smith, all praised the potato, as this collection of sources from 1695 to 1845 indicates.

<http://www.fordham.edu/halsall/mod/1695potato.html>

8. Selling wine, Portugal 1645-46

City governments also tried to regulate rural production, or at least the sale and trade of rural products within the urban area. In this record from the Portuguese city of Porto, Caterina (whose last name is not provided, perhaps because she was a mere servant of Francisco Pinto) has been given licence to sell a determined amount of wine from her own vineyards. If she fails to stay within the set parameters, she will lose the right to use the pruning knife - that is, she will not be able to trim her grapevines so that they keep producing. (Arquivo Histórico Municipal do Porto, Livro de Vereações, No. 50 (1645-1646), f.19. Translated by Darlene Abreu-Ferreira)

And later on the same day behind month and year [21 January 1645] came to this council Caterina servant of Franciso Pinto and she took an oath to sell sixty barrels of wine warranted by Francisco Pinto that it was from her cultivation and it cannot be sold but by the said Caterina and if sold somewhere else it shall be by her and she cannot sell more than she said sixty barrels [or receive the] penalty of being disallowed to use the pruning knife and that in case that another woman be sent to sell the said wine this council must be informed. Manoel Ferreira wrote it.



A London street in the eighteenth century, with open butchers' stalls on the right and a sign for an inn on the left.

9. Selling sardines, Portugal 1658

Along Portugal's Atlantic coast many communities depended on imported goods brought in by ships from other parts of Portugal or beyond. Everything that entered Portuguese harbors was subject to some form of taxation, and this record shows two entries involving the same woman dealing with the main protein source of the poor, the lowly sardine. (Arquivo Distrital do Porto, Livro do Rendimento da Redízima...(1658), No. 142, f.143v. Translated by Darlene Abreu-Ferreira)

[24 May] Arrived the master Fernão Alvres resident of Sesimbra [near Lisbon] with his caravel by the name of Nossa Senhora da Peadade with salted sardines that was evaluated at three hundred milheiros [thousands] of which the tithe comes to thirty that auctioned to Isabel Antonia da

Ribeira at five hundred and fifty réis [per] milheiro amounting to sixteen thousand and eight hundred réis.

Arrived the master João Pinto resident of Sesimbra with his caravel by the name of Nossa Senhora do Rosajro with salt and sardines that was evaluated in four hundred milheiros of which the tithe comes to forty milheiros that was auctioned to the aforesaid [Isabel] at the said price amounting to twenty-two thousand and four hundred réis and it was left for her per João Antunes Barreto.

10. The Great Fire of London, 1666

Cities were often very tightly-packed, and fire was a constant danger. Just a few months after a devastating outbreak of the plague in London, fire destroyed more than three-quarters of the city. Newsheets quickly reported the events and discussed their religious significance, as can be seen in this first page of the London Gazette (below). For the entire paper, see:

<http://www.exmsft.com/~davidco/History/fire1.htm>

THE LONDON GAZETTE.

Published by Authority.

From Monday, Septemb 3, to Monday, Septemb 10, 1666.

Whitehall, Sept. 8.

THIS ordinary course of this paper having been interrupted by a sad and lamentable accident of Fire lately happened in the City of London: it hath been thought fit for satisfying the minds of so

many of His Majesties good Subjects who must needs be concerned for the Issue of so great an accident, to give this short, but true Account of it. On the second instant, at one of the clock in the Morning, there hapned to break out, a sad in deplorable Fire in *Padding-lane*, near *New Fish-street*, which falling out at that hour of the night, and in a quarter of the Town so close built with wooden pitched houses spread itself so far before day, and with such distraction to the inhabitants and Neighbours, that care was not taken for the timely preventing the further diffusion of it, by pulling down houses, as ought to have been; so that this lamentable Fire in a short time became too big to be mastered by any Engines or working near it. It fell out most unhappily too, That a violent Easterly wind fomented it, and kept it burning all that day, and the night following spreading itself up to *Grace-church-street* and downwards from *Chancery-street* to the Water-side, as far as the *Three Crosses in the Vintry*.

The people in all parts about it, distracted by the vastness of it, and their particular care to carry away their Goods, many attempts were made to prevent the spreading of it by pulling down Houses, and making great Intervals, but all in vain, the Fire seizing upon the Timber and Rubbish, and so continuing it set even through those spaces, and raging in a bright flame all Monday and Tuesday, not withstanding His Majesties own, and His Royal Highnesses indefatigable and personal pains to apply all possible remedies to prevent it, calling upon and helping the people with their Guards; and a great number of Nobility and Gentry unweariedly assisting therein, for which they were requited with a thousand blessings from the poor distressed people. By the favour of God the Wind slackened a little on Tuesday night & the flames meeting with brick buildings at the *Temple*, by little and little it was observed to lose its force on that side, so that on Wednesday morning we began to hope well, and his Royal Highness never despairing or slackening his personal care wrought so well that day, assisted in some parts by the Lords of the Council before and behind, that a stop was put to it at the *Temple*

Church, near *Wooler-bridge*, *Pic-corner*, *Aldersgate*, *Cripples-gate*, near the lower end of *Coleman-street*, at the end of *Bush-hall-street* by the *Postern* at the upper end of *Bishopsgate-street* and *London-hall-street*, at the *Standard* in *Cornhill* at the church in *Finechurch-street*, near *Cloth-workers Hall* in *Affincing-lane*, at the middle of *Mark-lane*, and at the *Tower-dock*.

On Thursday by the blessing of God it was wholly beat down and extinguished. But so as that Evening it unhappily burnt out again a fresh at the *Temple*, by the falling of some sparks (as is supposed) upon a Pile of Wooden buildings; but his Royal Highness who watched there that whole night in Person, by the great labours and diligence used, and especially by applying Powder to blow up the Houses about it, before day most happily mastered it.

Divers Strangers, Dutch and French were, during the fire, apprehended, upon suspicion that they contributed mischievously to it, who are all imprisoned, and Informations prepared to make a severe inquisition here upon by my Lord Chief Justice *Kent*, assisted by some of the Lords of the Privy Council; and some principal Members of the City, notwithstanding which suspicion, the manner of the burning all along in a Train, and so blown forwards in all its way by strong Winds, make us conclude the whole was an effect of an unhappy chance, or to speak better, the heavy hand of God upon us for our sins, shewing us the terror of his Judgement in thus raising the Fire, and immediately after his miraculous and never to be acknowledged Mercy, in putting a stop to it when we were in the last despair, and that all attempts for quenching it however industriously pursued seemed insufficient. His Majesty then sat hourly in Council, and ever since hath continued making rounds about the City in all parts of it where the danger and mischief was greatest, till this morning that he hath sent his Grace the Duke of *Albemarle*, whom he hath called for to assist him in this great occasion, to put his happy and successful hand to the finishing this memorable deliverance.

About the *Tower* the reasonable orders given for plucking down the Houses to secure the Magazines of Powder was more especially successful, that part being up the Wind, notwithstanding which it came almost to the very Gates of it. So as by this early provision the general Stores of War lodged in the *Tower* were entirely saved. And we have further this intimate cause to give God thanks, that the Fire did not happen where

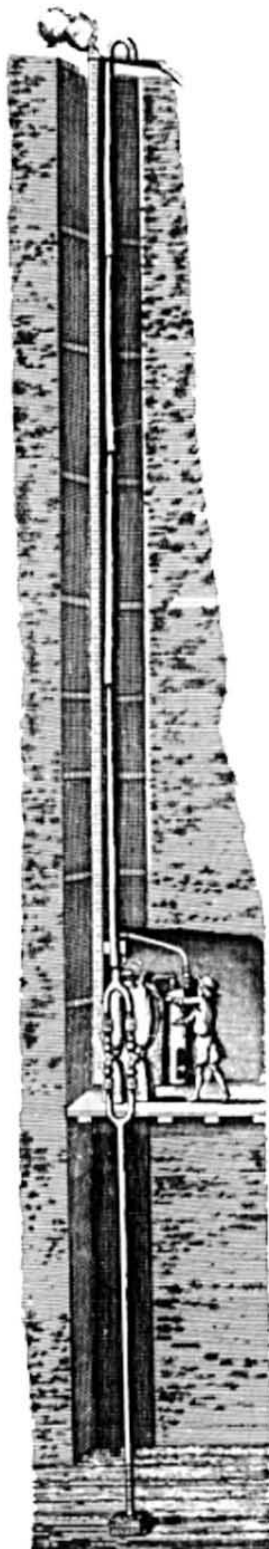
11. Thomas Savery, *The Miner's Friend*, 1702

Thomas Savery was an English military engineer who invented a machine to lift water out of mines. The long subtitle of his book describing and extolling his machine captures its contents: *The Miner's Friend: Or, An Engine to Raise Water by FIRE, Described, And of the manner of fixing it in Mines WITH An Account of the several other Uses it is applicable unto: and an ANSWER To the OBJECTIONS made against it.* The entire text can be found at:

<http://www.history.rochester.edu/steam/savery/>

Chapter II Of The Uses That This Engine May Be Applied Unto

It may be supposed that there are few People among us so ignorant, but must necessarily know of what value the Falls of Water are in most Places, as being applicable to mills; which are made after various kinds and forms, according to the different genius and abilities of the mill right; for mill work being in manner infinitely diversified; and had I leisure to comment there on, and give you an account, not only of the vast variety that I have seen and heard of; but (when encouraged) what may yet brought to work by steady stream, and the rotation or circular motion of a water-wheel, it was well these papers to a much larger volume than was at first designed, and frustrate my intended brevity. I only just hint this to



*The
Engine
Working in a
Mine*

show what use this Engine may be put to in working of mills, especially where coals are cheap.

I have only this to urge, that water in its fall from any determinate height, has simply a force answerable and equal to the force that raises it. So that an engine which will raise as much water as two horses, working together at one time in such a work, can do, and for which there must be constantly kept ten or twelve horses for doing the same. Then I say, such an engine may be made large enough to do the work required in employing eight, ten, fifteen, or twenty horses to be constantly maintained and kept for doing such a work; it will be improper to stint or confine its uses and operation in reflect of water-mills.

It may be of great use for palaces, for the nobilities or gentlemens houses: For by a cistern on the top of a house, you may with a great deal of ease and little charge, throw what quantity of water you have occasion for to the top of any house; which water in its fall, makes you what fountains you please and supply any room in the house. And it is of excellent use in cafe of fire, of which more hereafter.

Nothing can be more fit for serving cities, and towns with water, except a crank-work by the force of a river. In the composing such sort of engines, I think no person hath excelled the Mr. George Sorocold. But where they are forced to use horses, or any other strength, I believe no ingenious person will deny this engine to have the preference in all respects, being of more universal use than any yet discovered or invented.

As for draining fens and marshes, &c. I suppose I need say no more than this, that that force which will raise great quantities of water a height of above 80 foot, must necessarily deliver a much greater quantity at a lesser height. And that it is much cheaper, and every way easier, especially where

coals are water borne, to continue the discharge of any quantities of water by our engine, than it can be done by any horse engines what so ever.

I believe it may be made very useful to ships, but I dare not meddle with that matter; and leave it to the judgment of those who are the best judges of maritain affairs.

For draining of mines and coal pits, the use of the engine will sufficiently recommend it self, in raising water so easier and cheap; and I do not doubt, but that in a few year, it will be a means of making our mining trade, which is no small part of the wealth of this kingdom, double, if not triple to what it now is. And if such vast quantities of lead, tin, and coals are now yearly exported, under the difficulties of such an immense charge and pains as the miners, &c. are now at to discharge their water, how much more may be hereafter exported, when the charge will be very much lessened by the use of this engine, every way fitted for the use of mines? For the far greater part of our richest mines and coal-pits, are liable to two grand inconveniences, and thereby rendered useless; viz. The eruption and excels of subterraneous waters, as not being worth the expense of draining them by the great charge of horses or hand labor. Or secondly, fatal damp, by which many are struck blind, lame, or dead in these subterraneous cavities, if the mine is wanting of a due circulation of air. Now both these inconveniencies are naturally remedied by the work of this engine of raising water by the impellant force of FIRE.

For the water. Be the mine never so deep, each engine working it 60, 70, or 80 foot high by applying or setting the engines one over another, as shall be showed at large hereafter in the following pages, you may by a sufficient number of engines keep the bottom of any mine dry; and when once you know how large your feeder or spring is, it is very easy to know what sized engine, or what number of engines will do your business.

The coals used in this engine is of as little value, as the coals commonly burned on the mouths of the coal-pits are: for an engine of a three inch-bore, or the there about, working the water up 60 foot high, requires a fire-place of not above twenty inches deep and about fourteen or fifteen inches wide, which will occasion so small a consumption, that n a coal-pit it is of no account , as we have experienced. And in all parts of England where there are mines; coals are so cheap, that the charge of them is not to be mentioned when we consider the vast quantity of water raised by the inconsiderable value of the coals used and burnt in so small a furnace. What the quantity of coals used for one engine in a year is, cannot easily be ascertained, because of the different nature of the several sorts of coals.

As for the cure of damp by this engine, the air perpetually crowding into the ash-hole and fire-place, as it is natural for it to do, and with a most impetuous force discharge with the smoke at the top of the chimney, the contiguous air is successively following it; so that not only all steams or vapors whatsoever, that may or can arise, must naturally force its way through the fire and so be discharged at the top with the smoke. But this motion of the fire will occasion the fresh Air to descend from above, down all the pits, and every where else in the mine, but down the chimney; provided you have a heading drift, or passage from all the shafts, or pits in the same work it matters not; for here will be a perpetual circulation of air, and with that swiftness, as is hardly to be believed. This I have tried, and know to be true; so leave the ingenious miner to his own judgment. Whether when all the air is in a swift motion, that any stagnation of air (which has always been adjudged the cause of damp) can happen in any pit.

12. Workers and cloth merchants on the effects of machinery, Leeds, 1786, 1791

In the late eighteenth century, several machines were developed in England for various stages of the cloth production process. The best known of these were those for spinning and weaving, but the initial coarse combing of the thread before it was spun, known as scribbling, was also mechanized. Leeds in northern England was a major center of cloth production, and the introduction of scribbling machines threatened to throw many people out of work. This provoked a petition by workers in 1786, and a response by cloth merchants several years later.

<http://www.fordham.edu/halsall/mod/1786machines.html>

<http://www.fordham.edu/halsall/mod/1791machines.html>

13. Charles Aberdeen reports on conditions in cotton factories

Charles Aberdeen began work in a cotton mill in 1790 at the age of twelve. In 1832, along with others, he reported on his experiences at a hearing held by a Parliamentary Committee chaired by the reformer Michael Sadler. For additional interviews and other material relating to the Industrial Revolution in Britain, see:

<http://www.spartacus.schoolnet.co.uk/IRchild.htm>

Question: Does the business of the scavengers demand constant attention, and to be in perpetual motion, and to assume a variety of attitudes, so as to accommodate their business in cleaning the machinery to its motions?

Answer: Yes, to go under the machine, whilst it is going.

Question: Is it dangerous employment.

Answer: Very dangerous when they first come, but they get used to it.

Question: Are the hours shorter or longer at present, than when you were apprentice to a cotton mill?

Answer: Much the same.

Question: Will you inform the committee, whether the labour itself has increased, or other wise?

Answer: The labour has increased more than twofold.

Question: Explain in what way.

Answer: I have done twice the quantity of work that I used to do, for less wages. Machines have been speeded. The exertion of the body is required to follow up the speed of the machine.

Question: Has this increased labour any visible effect upon the appearance of the children.

Answer: It has a remarkable effect. It causes a paleness. A factory child may be known easily from another child that does not work in a factory.

Question: Has it had the effect of shortening their lives?

Answer: Yes.

Question: What grounds have you for thinking so.

Answer: I have seen men and women that have worked in a factory all their lives, like myself, and that they get married; and I have seen the race become diminutive and small; I have myself had seven children, not one of which survived six weeks; my wife is an emaciated person, like myself, a little woman, and she worked during her childhood, younger than myself, in a factory.

Question: What is the common age to which those that have been accustomed from early youth to work in factories survive.

Answer: I have known very few that have exceeded me in age. I think that most of them die under forty.

14. Child labor in the early Industrial Revolution

The same parliamentary committee gathered statistics about child labor, as Michael Sadler hoped to use this in arguments for a limitation of the working hours of children. The numbers fit with the comments of the interviewee in the previous source. Later in 1833 the first legislation limiting hours for children was passed in Britain; children under 13 working in the textile industry were to be limited to nine hours, and those 13-18 to twelve hours.

Age of workers in cotton mills in Lancashire in 1833		
Age	Males	Females
under 11	246	155
11 - 16	1,169	1,123
17 - 21	736	1,240
22 - 26	612	780
27 - 31	355	295
32 - 36	215	100
37 - 41	168	81
42 - 46	98	38
47 - 51	88	23
52 - 56	41	4
57 - 61	28	3