

9 Robert Boyle's Informants

FOR TEACHERS

Lesson Title: Robert Boyle's Informants

Area of Learning: evidence, explanation; empathy

Aims. Pupils should be able to: extract and analyse information from sources and compare sources

Vocab: informant, phenomena, phenomenon, mercantile, merchant, admiral, navy, physician, chemical, physical, temperature, traveller, colony, account, reputation, eminence, renown, biography, Protestant, West Indies, ambassador, sulphur, nobility, earl, serpent, anecdote

Time frame: one hour (completing worksheet for homework)

Resources: worksheets and sources

Pupil tasks: Pupils complete the worksheet, answering questions on the sources. In this lesson, pupils should learn about the importance of Boyle's informants and how he sometimes relied on information from those with experience of the wider world beyond Europe to substantiate his scientific theories.

In the first part of the lesson, teachers may need to work through each source with the whole class, ensuring pupils understand the meaning of each one by class questioning. Then, in the second part of the lesson, individual questions can be tackled as a whole class before pupils are allowed to write down answers.

Interesting interdisciplinary links can be made with Physics and Chemistry in relation to sources 3, 5, 7 and 8 (eg temperature, pressure, tests for chemicals producing different coloured flames, composition of urine, the transmission of sound). Sources 6 and 7 demonstrate how anecdotes relayed to Boyle by his visitors and informants were later used to support his scientific theories about sound and the 'particles' in the air.

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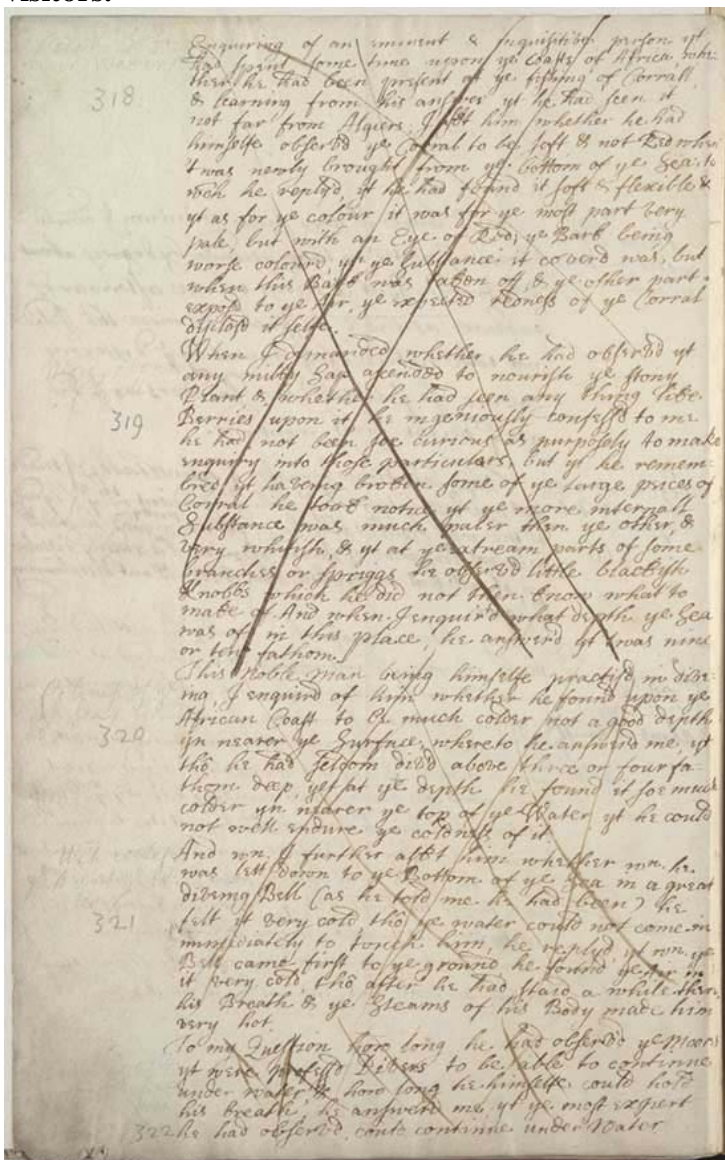
SOURCES

Names in some sources appearing in bold type are discussed in the *Biographical Information* sheet.

Source 1: Extract from a letter from John Evelyn (1620-1706). Evelyn was a wealthy, educated government official who was interested in science. He was one of the earliest members of the Royal Society. He wrote a diary for most of his adult life which is a good source of information for historians wishing to learn about life in the seventeenth century. He also provided William Wotton with information for his *Life of Boyle*.

'There was no man whose conversation was more universally sought after and cultivated, by persons of the highest rank and quality - Foreign Princes, Ambassadors, Scholars, Travellers - than Mr B. So as one who had not seen Mr Boyle was looked-on as missing one of the most valuable objects of our nation.' M. Hunter ed., *Boyle by Himself and his Friends* (London, 1994), pp. xlii.

Source 2: A page from Boyle's 'workdiaries', in which he recorded what he was told by his visitors.



This passage from Workdiary 21 is where he recorded some of what he was told by the Earl of Sandwich (see Sources 3-4). (Royal Society Boyle Papers 27, fol. 40r © The Royal Society.

Source 3: Boyle's description of a visit paid to him by the Earl of Sandwich, Edward Montagu, Earl of Sandwich, late 1660's.

'I asked an eminent person (Edward Montagu) that had spent time in Africa who was practised in sea diving whether when he was let down to the bottom of the sea in a great diving bell he felt it very cold, even when the water did not touch him. He replied that he found the air in it very cold, although after he had stayed a while there, his breath and his own body heat made him very hot. Replying to another of my questions, he told me that the deeper the bell descended into the sea, the more the surface of the water gushed into it; although, even when it reached the bottom, a large air pocket remained above the rim'. (Boyle's Workdiary 21-318, 320, 321 and 323).

Source 4:



Portrait of the Earl of Sandwich (1625-72) engraved by Abraham Blooteling after a portrait by Sir Peter Lely

Source 5: Boyle, Workdiary 21-250, 253 late 1660s

(<http://www.bbk.ac.uk/Boyle/workdiaries/WD21Clean.html>)

Boyle wrote of this man who visited him in the 1660s:

'**Dr Stubbe** assured me that at Jamaica some people got scorpion bites that were cured only by washing the part bitten with fresh urine ... He also told me he saw many Mangrove Trees ... in Jamaica that are so poisonous that if their sap drops upon men's bodies it blisters their skins'

Source 6: Boyle, Workdiary 36-19 mid 1680s

(<http://www.bbk.ac.uk/Boyle/workdiaries/WD36Clean.html>)

Boyle wrote of this man who visited him in the mid 1680s:

'**Sir John Chardin**, a good traveller, visited me and told me about India where he had visited. He had seen an Indian, thought to be a Magician, that kept tame serpents. When he played upon a musical instrument, these serpents would raise themselves upright using their tail and stretched their bodies so they were taller than a man. Some parts of the tune would make them sway to and fro, some parts made them stop still'.

Source 7: Robert Boyle, *Essay of the Great Effects of Even, Languid and Unheeded Motion* (1685), Works, vol. 10, p. 295. This was a printed book about Boyle's mechanical philosophy.

The extract given describes sound being transmitted through the air and its effects upon animals.

'The invisible motion of fluids (movement of air particles ie 'sound') affects animals ... For example **Sir J. C.**, a traveller, told me he had seen an Indian that kept snakes. When the Indian played on a musical instrument, these Serpents would raise themselves upright on their tails so that they were as tall as a man ... They seemed to be much affected by the music they heard'.

Source 8: Boyle, Workdiary 36-13 (<http://www.bbk.ac.uk/Boyle/workdiaries/WD36Clean.html>)

January 23 1685 A noble Venetian (**Giovanni Sarotti**) told me, last night, that he visited a place near Florence. On arrival he found a large hole in the ground. Out of this a flame burned, and it was as high as a man. This flame was not blue like that when sulphur is burned nor yellow as that of ordinary wood flames, but much more pale. A strong odour came out of the hole.

Biographical Information on Individuals Mentioned in Sources 3 – 8.

Chardin, Sir John (1643-1712): French Protestant, diamond merchant and traveller. He visited India in the 1670s and returned to France by sea in 1677. In 1681 Chardin emigrated to England because of the persecution of Protestants in France and he was knighted in March of that year. Boyle may have become acquainted with him through the Royal Society, of which Chardin was a fellow from 1682-1685.



Portrait engraving by David Loggan of Sir John Chardin, traveller and author (1643-1713)

Montagu, Edward (1625-72): Admiral of the Navy. Brought Charles II back to the throne in 1660. He was made ambassador to Spain and also visited Africa in the 1660s.

Sarotti, Giovanni: A Venetian, the son of Paolo Sarotti the Venetian ambassador resident in England 1675-81. Paolo and Giovanni established a scientific academy in Venice. Giovanni was elected a fellow of the Royal Society in 1679, on the recommendation of Robert Boyle.

Stubbe, Henry (1632-76): physician and writer. In 1661 he went to live in Jamaica as an official physician but ill health compelled him to return to England in 1665. He provides Boyle with many accounts of phenomena in the West Indies.

For Pupils Answer these questions on a separate piece of paper.

1. What can you learn from source 1, written by John Evelyn, about how renowned Boyle was? (Use a dictionary to check the meaning of words you do not understand). Explain your answer and try to quote from the source.
2. What kinds of people visited Boyle and how did the information they provided help him? Work in pairs, think carefully and use sources 3, 5, 6 and 8, and the biographical information supplied on a separate sheet, to complete the table below (first copy the table onto your own paper).

Name of visitor + source	occupation	Information supplied to Boyle about ...
Edward Montagu Earl of Sandwich Source 3	Admiral of the Navy	

3. According to the sources given to you on the worksheet, how many different types of people visited Boyle? (use column two of the table above to help you answer this).
4. Look at sources 6 and 7 and read the captions carefully.
 - 4a Who did Boyle say had visited him in source 6?
 - 4b What adventure did this person recount to Boyle?
 - 4c What did Boyle do with the information recounted to him in source 6 (hint: who is 'Sir J.C.' mentioned in source 7)?
5. In the light of your answers to questions 4a-c, why do you think Boyle was so eager to hear from travellers who had visited foreign lands?
6. Do sources 3-8 corroborate (support) the evidence in source one about Boyle's renown (fame) as a person that visitors to London wanted to see? Answer either 'yes' or 'no' and explain your answer, using the word 'because' and quoting from the sources.
7. Imagine you are Robert Boyle and that a man who has journeyed around the Mediterranean and seen several volcanoes in the 1660s is about to visit you. Write a diary entry describing the man's visit. Note down the questions you asked him and his responses. You may need to do some research on volcanoes before you attempt this task. Note that people in the 17th century would have known much less about volcanoes than geologists do today, so the questions you ask as if you were Boyle will need to be very basic and wide-ranging.