DR. JOHN FOTHERGILL AND THE ANGINA PECTORIS

BY

C. C. BOOTH, M.B., M.R.C.P.
Postgraduate Medical School of London

DR. JOHN FOTHERGILL was an exceedingly modest man. His biographer and pupil, John Coakley Lettsom, wrote of him after his death: 'Few men of distinguished reputation pass through life with more silent admiration. . . . Dr. Fothergill was more desirous of doing good than of having it known' (Lettsom, 1784). It is perhaps for this reason that relatively little is known of him or his work today. His contributions to the understanding of angina pectoris have, however, received some recognition from historians, for both Hingston Fox (1919a) and Major (1932) have reported John Hunter's discovery of ossified coronary arteries in a patient of Dr. Fothergill's who died with angina pectoris, the first recorded instance of coronary artery disease in this condition. But the extent of Fothergill's observations and their significance in directing attention to the heart in this disorder, have not hitherto been fully recognized.

Dr. Fothergill's self-effacing modesty may have been in great part the result of his upbringing as a member of a strictly Quaker family. Son of a famous Quaker preacher, he was born at Carr End, Wensleydale, Yorkshire, in the year 1712. Like many other eighteenth-century Nonconformists, he received his medical training in Scotland, where he graduated M.D. at Edinburgh in 1736. He went to London in the same year, and after two years' further study at St. Thomas's Hospital set up in practice. His reputation gradually increased, particularly after the publication in 1748 of his treatise on the *Malignant Sore Throat*, which won him international renown and assured his success. He remained one of the leading physicians in London until his death in 1780. He wrote, during an exceptionally busy life in practice, on a wide variety of medical subjects. But his achievements were by no means limited to the field of medicine. A strict Quaker throughout his life, he was an active member of the Society of Friends, held the office of Clerk to the Yearly Meeting, and in his last years took the leading part in founding the famous Quaker school at Ackworth. He was an ardent botanist, friend of Peter Collinson, correspondent of Linnaeus. He maintained a garden at Upton in Essex, which was said to be second only to Kew in the whole of Europe, and collectors from all over the world sent

specimens to him. He collected minerals, butterflies, shells and corals, animals, and insects of all kinds. A close friend of Benjamin Franklin, to whom he had been physician, he worked with him and the Quaker merchant David Barclay in a vain attempt to avert the final breach with the American Colonies in 1775 (Corner and Singer, 1954). He kept up a correspondence with many American friends, and he was associated with the early days of the medical schools in America. He never married, living in Harpur Street, Bloomsbury, with his sister for the later years of his life. As a man he seems to have been stern, rigid but kind. Fanny Burney, who met him when he attended her mother during an illness, described him as an 'upright, stern, formal-looking old man', whose manners were 'stiff, set and unpleasant'. Later, however, when she knew him better, she found him 'as humane as he is skilful' (Ellis, 1913). He moved little in social circles, but he was a keen member of a small and select medical society, whose members included William Hunter and Daniel Solander, and of which he was himself president at the time of his death.

It was to this Medical Society of Physicians, whose meetings were held at the Mitre Tavern in Fleet Street on alternate Monday evenings, that most of Fothergill's original medical observations were communicated (Hingston Fox, 1919b). The proceedings were published as the *Medical Observations and Inquiries*, and six volumes appeared between 1757 and 1784. Fothergill's two papers on angina pectoris were read to this Society. These papers were read a few years after Heberden's brilliant description of angina pectoris was first published, at a time when the aetiology of the painful affection of the breast was still unknown. Fothergill's observations on the disease were highly original and of considerable significance, for he was the first physician to suspect on clinical grounds that the heart might be affected in this condition, and he was the first to record abnormalities in the myocardium and coronary arteries of patients who died suddenly with this disease. His observations, which were read to the Medical Society in 1774 and 1775, were, however, preceded by the reports of two patients who had died with angina pectoris, in both of whom a post-mortem examination had been performed. These case reports were read by Heberden in 1772, the first being the only one he had himself seen at autopsy, and the second being a case of Dr. Wall of Worcester. In order to illustrate the significance of Dr. Fothergill's observations, it is necessary to describe these cases in some detail, and also to consider at greater length the extent of Heberden's contributions to the understanding of this condition.

On a July day in the year 1768, Dr. William Heberden had read to the College of Physicians in London his observations on the new disease to which he had given the name 'Angina Pectoris'.

Those who are afflicted with it [he had said] are siezed while they are walking (more particularly if it be uphill, and soon after eating) with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life if it were to increase or continue; but the moment they stand still, all this uneasiness vanishes. . . .

The termination of the angina pectoris is remarkable. For if no accident intervene, but the disease go on to its height, the patients all suddenly fall down and perish almost immediately.

Heberden's paper on the 'Angina Pectoris', published later in the *Medical Transactions* (Heberden, 1772), is a classic piece of descriptive medical writing. In it he summarized his experience of a disease whose course he had carefully watched and recorded in more than twenty patients in his practice. His description of the characteristic pain in the chest, the radiation of the pain, the age and sex incidence, has not been bettered by any writer since. Yet it must be admitted that Heberden had little idea of the cause of the pain which he had called angina pectoris. It belonged, he said, 'to the class of spasmodic, not of inflammatory complaints'; and he continued, 'But though it be most probable that a strong spasm be the true cause of this disorder, yet there is some reason for thinking, that it is sometimes accompanied with an ulcer, and may partly proceed from it; for I have seen two of these patients, who often used to spit up blood and purulent matter, one of whom constantly asserted, that he felt it come from the seat of the disorder.' He had no reason to believe that the heart was at fault, because 'the pulse is, at least sometimes, not disturbed by this pain, and consequently the heart is not affected by it; which I have had an opportunity of knowing by feeling the pulse during the paroxysm: but,' he went on, 'I have never had it in my power to see anyone opened who had died of it'.

An opportunity for performing a post-mortem examination in a case of angina pectoris came to him, however, soon after the publication of these observations in 1772. A worthy and benevolent gentleman 'who had been troubled with that disorder', left his body to Dr. Heberden to be opened and examined. He died suddenly, and Heberden arranged for the dissection to be carried out by 'that experienced and accurate anatomist, Mr. J. Hunter'. After a careful examination, no cause for the sudden death could be discovered. The thoracic contents were examined 'with peculiar attention, particularly the heart with its vessels and valves, and were all found to be in a natural condition . . .' (Heberden, 1785). Jenner, however, seemed to doubt the 'peculiar attention' with which the heart was dissected, for in a famous letter written years later to Caleb Parry, he referred to this post-mortem and wrote: 'There, I can positively say, the coronary arteries of the heart were not examined' (Parry, 1799a). At this time, in the year 1772, neither Heberden nor Hunter seems to have seriously considered that there

might be any significant lesion in the heart or coronary arteries of patients dying with angina pectoris.

Fothergill's observations were antedated by one other case report. Dr. Wall, a physician of Worcester, sent his notes on a patient who had died with angina pectoris to Dr. Heberden in a letter written in May 1772. This letter was read to the College of Physicians by Heberden in November of that year, but it did not appear in print until the third volume of the *Medical Transactions* was published in 1785 (Wall, 1785). The case that Dr. Wall recorded was that of a man of sixty-six years, who for six or seven years had suffered increasing tightness across his breast and arms on walking. He had, 'in the former part of his life', had several attacks of rheumatism. At the post-mortem examination he was found to have a heart 'of uncommon size', but there was no apparent abnormality 'till we opened the left ventricle; and there, the semilunar valves, placed at the origin of the aorta, were found to be perfectly ossified'. He did not think that the induration of the semilunar valves was necessarily always the cause of the disease, but suggested that 'some malformation in the heart and vessels, immediately proceeding from it, may be so'. His case appears to have been one of rheumatic aortic stenosis with anginal pain, and is the first recorded instance of a cardiac lesion in a patient dying with angina pectoris.

Within a year or two of Heberden's original paper Fothergill had also reached the conclusion that the heart might be affected in angina pectoris. In 1776 he published, in two papers, detailed case reports of two patients who had died with angina pectoris, together with the post-mortem findings. The first of these papers, read in 1774, included his reasons for supposing that the heart might be affected. He makes no reference to Dr. Wall's unpublished case, and it is quite likely that he had not heard of it. He had seen one case, he said, with the 'constriction which the thorax suffers upon accelerated motion', where a post-mortem examination had revealed a 'generalized anasarca', though the heart was normal with the exception of a small ossification in one of the mitral valves. Another circumstance, inducing him to interest himself in the heart, was 'that I have very seldom met with this disease, but it was attended with an irregular and intermittent pulse, not only during the exacerbations, but often when the patient was free from pain and at rest' (Fothergill, 1776a). These reasons, though incomplete and not in all respects correct, were sufficiently cogent to stimulate him to make further and more detailed observations in the cases that came under his care.

The first case that he described was that of R.M., aged about fifty-eight, who consulted him in the autumn of the year 1773. In July of that year he had been attacked 'with a spasm in the breast, which at first affected him only when he used exercise, and chiefly when he walked up hill'.

Dr. Fothergill advised him 'to abstain from everything heating, not however to drink less wine than usual, and to observe caution in respect to quantity of proper food'. He went to take the waters at Bath, and seemed a little improved by the journey and the waters, but 'they did not alleviate the original pain in his breast, which sometimes came so suddenly and violently, towards the morning especially, as to alarm those about him with fears of his immediate death, and which at length happened, very suddenly, in the morning of the 10th of May'.

It is a measure of Fothergill's interest, enthusiasm and influence, that he was able to arrange for a post-mortem examination on a patient dying in Bath whilst he was himself occupied in London. The dissection was carried out by the Langleys, 'judicious surgeons of the neighbourhood', and they approached their task armed with instructions from Fothergill 'to attend to the condition of the heart with all possible accuracy' (Fothergill, 1776a). The findings of this post-mortem have been dismissed by Hingston Fox as 'inconclusive' (Hingston Fox, 1919a), but there was one observation that Dr. Fothergill thought worthy of note, though its significance not unnaturally eluded him. The Langleys found the heart in the following condition: 'The auricles and ventricles with all the vessels and valves perfect; not the least ossification or appearance of disease, except on the outward muscular part, near the apex, a small white spot, as big as a sixpence, resembling a cicatrix.' Commenting on the case Fothergill drew attention to this 'scar-like appearance of the heart'. This seems most likely to have been due to a previous episode of cardiac infarction in the case of the unfortunate R.M., and it appears to be the earliest occasion on which a myocardial scar has been described in a case of angina pectoris. As to the causation of the pain in the chest, Fothergill suggested that the immense amount of fat found in the abdomen and chest of his patient could have impeded the flow of blood in the heart and lungs, but this he thought not the only cause of the distemper. 'Time and further opportunities must inform us of the rest,' he concluded.

The 'further opportunities' came in the summer of the same year, 1774, when H.R., aged sixty-three years, 'a gentleman rather inclined to corpulency, but active, and of a very irritable habit . . .' consulted Dr. Fothergill. For three or four years he had been unable to walk up a moderate ascent, because of a painful sensation of constriction in the breast. He took the waters at Buxton that summer, 'and though it did not appear that much ground was being gained, the same constriction returning if he attempted any exercise beyond a certain point, which his experience had taught him, yet he perceived no increase of the disease'. The end, however, was exactly as had been predicted by Dr. Heberden, and 'on the 13th of March, 1775, he fell down and expired immediately'.

It may have been easier for Fothergill to arrange the post-mortem examination on this occasion, for the patient died in London. But in the eighteenth century it must have taken considerable influence to persuade relatives to grant permission for the removal and dissection of a body. In addition, Fothergill was exceptionally busy, quite apart from his medical commitments, in the early spring of 1775. He was engaged on work with the naturalist, John Ellis, describing the Mangostan and Breadfruit (Fothergill, 1775a). He had been long occupied with Benjamin Franklin and David Barclay in formulating proposals for a conciliation between Britain and her American Colonies (Corner and Singer, 1954). In March 1775, when his patient H.R. died, he was busy with other Quakers subscribing money to help the needy in Philadelphia, and preparing a petition which he later presented to the King on their behalf. In a letter written four days after H.R.'s death, and sent by Benjamin Franklin's hand, Fothergill complained to James Pemberton in Philadelphia that he was 'exceedingly straitened for time by almost increasing applications in the duty of my profession' (Fothergill, 1775b). Nevertheless he found time to prevail upon the family of H.R. to allow the body to be opened by John Hunter, who did the dissection on the following day.

Fothergill's report of this case forms the substance of his second paper, and it contains the first description of calcification of the coronary arteries in a patient suffering from angina pectoris (Fothergill, 1776b). It might be supposed that the calcification of the coronary arteries was a chance finding in the course of the examination of the heart by the brilliant and skilful John Hunter, and that Fothergill played a relatively minor part in this discovery. A study of the evidence presented in this paper, however, suggests that this was probably not the case. Fothergill had in fact suspected previously that the heart might be affected in angina pectoris. In addition, he found an unexplained abnormality in the previous case, while John Hunter's examination of Heberden's single case had revealed no abnormality; and it seems most likely that it was Fothergill himself who suggested that Hunter take particular note of the condition of the heart in this case.

We can imagine Fothergill's intense interest in what was to be found. We can see the suppressed excitement in his stern old Quaker eyes as he described his previous cases to John Hunter. Perhaps he gave Hunter similar instructions to those he had given the Langleys nearly a year before. History leaves no record of their conversation, but the post-mortem findings fully justified Fothergill's expectations. Hunter's description of the heart and aorta follows:

> The heart to external appearances was also sound; but, upon examination, I found that its substance was paler than common, more of a ligamentous consistence, and in

many parts of the left ventricle it was become almost white and hard, having just the appearance of a beginning ossification.

The valvulae mitrales had a vast number of such appearances in them, and were less pliant than in the natural state; but did not appear to be unfit for use.

The semilunar valves of the aorta were thicker than common, but very readily filled the area of the artery.

The aorta had several small ossifications on it, and several white parts, which are generally the beginning of ossifications, and which were similar to those found in the heart and valves.

The two coronary arteries, from their origins to many of their ramifications upon the heart, were become one piece of bone (Fothergill, 1776b).

The significance of these findings may have escaped John Hunter. He himself never attempted to explain them. Parry, in his *Syncope Anginosa* published in 1799, wrote: 'In a person dying of angina pectoris in the year 1775, Mr. Hunter found the coronary arteries ossified; but, as far as I can learn, did not consider this state as having any important influence on the patient's health, and says nothing of it in any of his lectures or publications' (Parry, 1779b). In Hunter's later years, there was a very good reason why he should have said nothing of it for he was himself a sufferer from angina pectoris. Jenner avoided discussing the subject with him for this reason, and he postponed publishing his own theories on the subject, 'as it must have brought on an unpleasant conference between Mr. Hunter and me' (Parry, 1779c).

Parry, however, made no reference to Fothergill's conclusions, which were published twenty-three years before the *Syncope Anginosa* appeared in print, and some years before Jenner accidentally discovered ossification of the coronary arteries in another patient with angina pectoris. Fothergill had not missed the significance of Hunter's findings. While he did not fully understand them, he commented: 'The state of the parts about the heart fully shows, that under such circumstances, it is impossible to bear with impunity the effects of sudden and violent agitations, whether they arise from gusts of passion, or suddenly accelerated muscular motion' (Fothergill, 1776b).

Fothergill was one of the first physicians to attempt to correlate the clinical features with the pathological findings in cases of angina pectoris, and he was the first to look specifically for cardiac lesions when the bodies of his patients were dissected. Heberden, to whose brilliant clinical description little has since been added, went so far as to say that the heart was not affected, and, perhaps a little unluckily, Hunter found no lesion in the heart of the one patient whose autopsy Heberden was able to arrange. But, as Jenner pointed out, the coronary arteries were not examined in this case. Fothergill was not the first to find a cardiac lesion in angina pectoris, for

Dr. Wall had correctly surmised that the ossification of the semilunar valves that he found in his case might have been connected with the pain in the chest. But the observations that Fothergill made, and the cardiac lesions that he described, were entirely original and represented a major contribution to the understanding of angina pectoris. For these observations much of the credit belongs to Dr. Fothergill. No doubt he would never have claimed it.

ACKNOWLEDGEMENTS

I should like to thank Mrs. B. C. Corner for her enthusiastic encouragement and for supplying me with copies of Dr. Fothergill's letters in Philadelphia; Professor John McMichael and Dr. Edwin Clarke for their criticism and advice; and the Academy of Fine Arts of Pennsylvania for permission to reproduce the portrait of Dr. Fothergill.

REFERENCES

CORNER, B. C. and SINGER, J. W. (1954). 'Dr. John Fothergill, Peacemaker.' *Proc. Amer. Phil. Soc.*, XCVIII, 11.

ELLIS, A. R. (1913). *The Early Diary of Frances Burney*, I, 265–7. London, G. Bell.

FOTHERGILL, J. (1775a). *Letters to John Ellis.* Ellis MSS., Linnean Society, London.

— (1775b). *Letter to James Pemberton.* Etting MSS., Historical Society of Pennsylvania.

— (1776a). 'Case of an Angina Pectoris, with Remarks.' *Med. Obs. and Inq.*, V, 233.

— (1776b). 'Further Account of the Angina Pectoris.' *Ibid.*, V, 252.

HEBERDEN, W. (1772). 'Some Account of a Disorder of the Breast.' *Med. Trans. Coll. Phys. Lond.*, II, 59.

— (1785). 'A letter to Dr. Heberden, concerning the Angina Pectoris; and Dr. Heberden's Account of the Dissection of one, who had been troubled with that disorder.' *Ibid.*, III, 1.

HINGSTON FOX, R. (1919a). *Dr. John Fothergill and his Friends*, p. 68. London, Macmillan.

— (1919b). *Ibid.*, p. 142.

LETTSOM, J. C. (1784). *The Works of John Fothergill, M.D. . . . With some account of his life*, p. 100. London, C. Dilly.

MAJOR, R. H. (1932). *Classic Descriptions of Disease*, p. 459. Springfield, Ill., C. C. Thomas.

PARRY, C. H. (1799a). *An Inquiry into the Symptoms and Causes of the Syncope Anginosa, commonly called Angina Pectoris*, p. 3. Bath, R. Crutwell.

— (1799b). *Ibid.*, p. 107.

— (1799c). *Ibid.*, p. 4.

WALL, J. (1785). 'A letter from Dr. Wall to Dr. Heberden on the same subject.' *Med. Trans. Coll. Phys. Lond.*, III, 12.