The Harveian Oration.

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BY

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HARVEY, THE MAN AND THE PHYSICIAN.

SIR THOMAS BARLOW prefaced his oration by a reference to the chief benefactors of the College: Linacre, the first president, in whose house in Knight-bridge Street the first meetings were held; Dr. John Caius; Dr. Richard Caldwell, president in 1570, who, jointly with Lord Lumley, endowed the Lumleian lectureship; Dr. William Gilbert, pioneer in the study of magnetism, and president in 1600; Dr. Theodore Gouston, one of Harvey's younger contemporaries, who founded the lectureship which bears his name; Sir Theodore de Mayerne, another of Harvey's contemporaries; Dr. Baldwin Hamney Junior, also a contemporary of Harvey, a munificent benefactor of the College, who presented to it the buildings in Amen Court, and contributed to the rebuilding in Warwick Lane after the fire in 1666; the Marquis of Dorchester, an honorary Fellow, a student of physics and anatomy, who had probably gained Harvey's regard in Oxford; and Dr. Croone, one of the original Fellows of the Royal Society, to whom the College owed many valuable endowments. Finally he announced that the offer of Mrs. Eliza Streatfeild, made last June upon the advice of Sir John Tweedy to the two Royal Colleges of a sum of money for the purpose of endowment of research had been accepted, and that the deed of endowment provided for the transfer of £10,000 2½ per cent. annuities, to be known as the Streatfeild Research Fund, the interest to be applied to the promotion of research in medicine and surgery.

Turning then to the life and work of Harvey himself, Sir Thomas Barlow said: We know that the young Harvey was a pupil at the King's School, Canterbury, from the age of 10 to 15, where we may well assume that he gained the foundations of that classical knowledge which stood him in such good stead throughout his life. It was there probably that he made his first acquaintance with Virgil, whose poetry fascinated him in his later life; is it possible that he may even have begun to read Aristotle, whose influence over him was probably greater than that of any other writer, ancient or modern?

But were there no other studies than the classics which laid hold of young Harvey in his schoolboy days?

Dr. Venn, the learned President of Caius College, Cambridge, has drawn my attention to the regulations of the scholarship which Harvey obtained and which enabled him to go from King's School, Canterbury, to Caius College for six years. It was founded in 1571 by Matthew Parker, Archbishop of Canterbury, who was an intimate friend of Dr. Caius, and it is not unlikely that Caius influenced Parker in framing the conditions under which it was given. The most interesting of these is the enactment that at the university the scholar shall be educated first in subjects that pertain to or are serviceable to medicine and then in subjects which actually constitute medicine itself. Such a regulation for a medical scholarship is very remarkable and Dr. Venn considers unique at that time.

Let us consider for a moment its bearing upon Harvey and his predilections. It is not unreasonable to assume that he had already determined to become a doctor. Are we justified in any further speculations?

We know that throughout his later life Harvey was not only devoted to comparative anatomy, but that he was a keen naturalist. Dr. Norman Moore points out that in Harvey's *Prelectiones* there are references to the anatomy of no less than eighty animals. His book on generation is a mine of observations on natural history. In his Continental travel with the Duke of Lennox he complains bitterly that there was scarcely a dog, crow, kite, raven, or any bird or anything to anatomize; and when he was travelling with Lord Arundel in Germany, on the testimony of Hollar the artist, he made frequent

excursions in the woods, making observations on strange trees, plants, earths, and naturals, and caused some anxiety to Lord Arundel lest he should be waylaid or murdered.

This intense lifelong devotion to natural history is usually an inborn quality, and it is by no means unlikely that in Harvey's schoolboy days it was this strong predilection that justified the authorities in nominating him to what was practically a medical scholarship. Harvey's first term at Cambridge began in May, 1593, when we are told he was admitted to the scholars' table at Caius College. Dr. Caius had been gathered to his fathers twenty years before. Dr. Legge, whom he had appointed as his successor, was of Caius' way of thinking in his Roman proclivities, and there was a stormy time in the college for a while. There is no indication that Harvey was drawn into this conflict, and it may have quieted down when he entered the college.

His tutor and surety was George Estey, who seems to have been a worthy parson and was appointed Hebrew lecturer the year after Harvey's entrance; but Harvey never refers to him.

Although Caius College had a medical reputation we find rather meagre evidence of systematic instruction in medical subjects, and this in spite of Dr. Caius having laid down certain definite plans for its maintenance. He had obtained a licence for the dissection of two bodies annually in the winter and for their decent burial. The church registers give evidence that bodies, chiefly of prisoners, were dissected. Demonstrations were given.

Dr. Venn, by reference to the *Exiit Book* and the *Computus Book* of the college, which give detailed entries respectively of the students' absences and the charges for their commons, has been so good as to furnish me with some interesting and suggestive information about Harvey's time at Cambridge. As these entries have an important bearing on the question of when Harvey left Cambridge and when he entered Padua I bespeak consideration of them. It is commonly stated that Harvey took his B.A. degree in 1597 and that he left Cambridge in 1598 and entered Padua in that same year. I think you will see that this is incorrect. He entered Padua in 1600.

The *Exiit Book*, which was made up half-yearly, shows that during the first three years there were no absences. This may mean that Harvey did not leave the college at all during this period or for such brief intervals as did not involve any deduction from the stipend of his scholarship. We have to remember that one month's absence for holiday was allowed by statute, and that could be taken at any time. The *Computus* or *Account Book* is consistent, for it shows that Harvey's stipend from his scholarship was very nearly sufficient to pay the cost of his commons.

But from 1596 to 1599 the *Exiit Book* shows repeated absences. It is clear from the dates that Harvey was away from college not less than sixteen months. Some of his absences were of two months' duration or more, and some of them a few days up to a fortnight, and from his own letter in Michaelmas, 1599, he evidently required at times a long period for convalescence. The accounts show that he only received a stipend for one quarter between Michaelmas, 1599, and Lady Day, 1600—so that his scholarship lapsed at Christmas, 1599.

We know that, like Sydenham, Harvey suffered at various times severely from gout. He complained very little of his ailments, and somewhere speaks of the help which his pathological and anatomical investigations gave him by rousing keen interest and making him forget his pains. I suggest that the absences during the last half of Harvey's time at Cambridge were probably due to attacks of gout.

Harvey took his Arts degree in 1597, but there are no details obtainable concerning it, nor about his work at Cambridge after he had taken his degree. It is significant that there are no references in Harvey's works to his Cambridge life. His poor health and the limited facilities for anatomical study may have left this period as one which he would gladly pass by. There is a categorical statement in Aubrey's *Memoirs* that Harvey bequeathed the house in which he was born in Folkestone to Caius College, Cambridge, in spite of the protest of his brother Eliab. This has been quoted again and again, but, like many of Aubrey's statements, it is untrue. Harvey bequeathed nothing to Caius College.

We may take it, then, that following in the footsteps of Linacre and Caius and of other fellows of this college, Harvey went, in the year 1600, to Padua, and not in 1598. Now it is interesting to mention that an examination of the archives of Padua, made by the university authorities at Mr. D'Arcy Power's request, has failed to reveal any mention of Harvey before 1600. To quote from Mr. Power's admirable life of Harvey, there are entries which show that at the usual time of election—that is to say, on August 1st in the years 1600, 1601, and 1602—he was elected a member of the Council of the English nation in the Jurist University of Padua. This I take to have been a sort of Students' Association.

Those of you who have been to Padua will remember, in the university courtyard, the host of memorial tablets giving the arms and name and the nationality of centuries of alumni. Two in the lower cloister are alleged to pertain to Harvey. One of them is decayed and the inscription erased, but the other is well preserved, is undoubted, and gives 1600 as the date. This agrees with the data which I have given already.

The two most interesting things at the University of Padua are the great cathedra or wooden pulpit from which Galileo addressed his class in Harvey's time, and the anatomical theatre where Fabricius demonstrated his dissections to Harvey and his fellow students. They are not far apart.

There is a capital picture of the anatomical theatre in the charming book on Harvey written by Dr. Curtis of Columbia University and published last year. Dr. Curtis points out that the tiers are really standing places with rails in front to lean upon, which rise at a very steep angle from the central pit. The arrangement now in vogue, in fact, more resembles that in our hospitals, in which students stand and look down at the operations or at *post-mortem* demonstrations, than an ordinary anatomical lecture theatre. Dr. Curtis makes the suggestive remark that "the place looks fit to have been a nursery of object teachers, for it is too small to hold a pompous cathedra, and the veteran to whose Latin the young Englishman listened must have stood directly beside the dead body."

Before we follow Harvey's further career, let us pause for a moment to consider the intellectual atmosphere of Europe when he began his course at Padua.

There had been the great revival of classical learning, followed not only by the Reformation and the consolidation of the Protestant states, but by the counter Reformation in the old Catholic countries. And there was a great ferment of free inquiry on philosophy, on the principles of government, on the polity of nations, the rights of the humbler folk, and the conduct of life. The creation and the dissemination also of our greatest literature was then in progress in our own country.

England, in spite of its insularity, always, I believe, the most tolerant and open-minded of European countries, welcomed to permanent posts many learned men from other lands. Continental travel attracted many of our countrymen, and English scholars sought illumination in those days far more in Italy than in Germany or even in France.

It concerns us most of all to ask what branch of natural science chiefly attracted educated men. I have already referred to our president, William Gilbert, the inspirer of Galileo. Galileo had been lecturing six years at Padua before Harvey went there. But we must bear in mind that, though he had many ardent disciples both in Padua and Florence, yet he had to encounter formidable opposition as well as persecution, and both his discoveries and his doctrines were a long time in gaining acceptance. Harvey himself seems always somewhat timid about the findings of astronomy, and regards them as unprovable. Astrology was still widely accepted.

Robert Boyle was not born till 1627, and the work of Torricelli and of Pascal was yet to come. The Royal Society held a few informal meetings in 1645, but did not receive its charter till 1662.

Thus, although at the end of Harvey's life physics had made great advances, at the time of which we now speak—namely, 1600—it was by no means a popular science. The chemistry of that time was dominated by unverifiable hypotheses, and it is quite what we should have expected that Harvey, according to Aubrey's statement, undervalued its exponents, and spoke against it. It was much too vague and nebulous to suit Harvey.

We have, then, to turn from the physical to the biological sciences. The subject which not only engaged the energies of some of the greatest men of that generation, but also attracted the interest of educated people, was human anatomy. Italy was the Mecca of anatomical students. At Padua itself there was a great tradition, for Vesalius, Fallopius, and Fabricius formed a brilliant succession of teachers. Dr. Caius, as we know, had not only studied with Vesalius, but had lived in the same house with him.

But with regard to human anatomy as a subject of interest amongst educated people, let me quote a sentence or two from Evelyn's *Diary*, though they relate to a time a little later than this particular date. During the troublous years immediately preceding the Commonwealth, Evelyn travelled on the Continent. Whilst at Padua he took out a short course of anatomy and physic. During a month he tells us that he saw a man, a woman and a child dissected by Veslingius, the anatomical professor, with all the manual operations of the surgeon on the human body. He also purchased from Veslingius's assistant some rare tables of veins and nerves, and gave orders for a third to be prepared of the lungs, liver, and nervi sexti par, and the gastric veins, which he sent to England and ultimately presented to the Royal Society. But before that presentation was actually made we find that Sir Charles Scarborough, who succeeded Harvey as Lumleian lecturer, induced Evelyn to lend them for a time to our College for his own lectures. Scarborough had been unable to induce Evelyn to present them to our College. They were given by the Royal Society to the British Museum and by the British Museum to the Hunterian Collection, and are now in the Royal College of Surgeons Museum. These tables are similar to those six preparations which were given to this College in 1823 by the Earl of Winchelsea. They were said to have been inherited from Harvey, and to have been used by Harvey at his lectures. That, I think, is more than doubtful.*

Thomas Hobbes, the philosopher, dissected in Paris along with his friend the many-sided physician William Petty, and at a later period Robert Boyle also dissected in Ireland under the same friendly guidance.

Descartes studied human anatomy, dissected many brains, and repeated Harvey's experiments on the circulation for himself. The Port Royalists, following Descartes's lead, repeated many vivisection experiments on the circulation. Fra Paolo Sarpi, the ecclesiastical statesman and adviser of the Venetian Republic, seems to have found time and opportunity to study anatomy to considerable purpose and even to make observations on the valves in veins. He was probably in touch with Fabricius, and we know that Padua partly depended on Venice for some of its anatomical material.

Charles I took the greatest interest in anatomy and in the numerous demonstrations, not only on the circulation of the blood but on embryology, which Harvey gave him from time to time.

But it is important to note that although the great Italian anatomists had made enormous strides in the study of structure their knowledge of function was lamentably small—in other words, physiology had not kept pace with anatomy. It has indeed been affirmed that physiology had not advanced since the time of Galen, and doubtless its inadequate progress was partly the consequence of the prevailing ignorance of physics and chemistry. But in the evolution of knowledge and of method the disproportionate study of human anatomy on its structural side must be credited with the development of observation, and so far it was a big step in the long and bitter struggle against the trammels of authority.

That was the beginning of a momentous epoch in the history of human knowledge when, on St. Luke's Day, 1600, a young Englishman, aged 22 years, rather under the average height, with raven hair, dark piercing eyes, rather sallow complexion, and with a keen, restless demeanour and rapid speech, enrolled himself amongst the pupils of the learned, laborious, and generous Fabricius. What was Harvey's exact attainment at this time in the

* I suggest for consideration whether these tables may have come into the Winchelsea family not through Harvey, but possibly through Sir John Finch (the son of Sir Heneage Finch) who was M.D. of Padua, and not only English Consul there, but Syndic of the University. He was admitted an extraordinary fellow of our College in 1660, and seems to have had for an anatomical pupil one Marchetti, who made "tables of veins, nerves, and arteries, five times more exact than are described in any author." Vide Dr. Edward Browne's letter to Sir Thomas Browne. *Sir Thomas Browne's Works*, vol. i, p. 91.

details of anatomy and the technique of dissection we have no means of knowing. But we have reason to believe that even then he was by no means ill equipped with ancient learning; we know that he was a keen and accurate observer and an enthusiastic naturalist, and that he had a mind reflective as to the causes and relations of things, fertile in recognizing resemblances, and, above all, ready in making working hypotheses and in devising experiments which would more or less verify those hypotheses. It was in these latter qualities that Harvey's supremacy over his teachers and predecessors ultimately became so manifest. The addition of experiment to observation was vital and far reaching. The exact relationship between teacher and pupil we do not know, but it must have been very intimate, as proved by all Harvey's references to Fabricius, not only in respect to the organs of circulation but also in respect to his observations and speculations on generation. These references are not merely respectful but reverent.

From the time when Vesalius described the valves of the heart the Italian anatomists had been keenly exercised on the valves in various parts of the vascular system, and Fabricius's discovery of the valves of the veins was as far back as 1574. But the scientific use of the imagination seems to have been dormant with these clever observers, and they were singularly inept in explaining the mechanism of the valves. Sir William Osler suggests that it was reflection on the mechanism of the valves of the veins which at this early period of his career set Harvey on the right track in his great discovery, and there is a remark of Harvey's friend Robert Boyle which is not inconsistent with that suggestion. Boyle says that Harvey's observations on "contrivances similar to the valves used in hydraulic engines for preventing counter currents led to his discovery of the circulation of the blood." Whether Boyle's remark refers to the period of study at Padua or not, it is certain from the terms of his diploma in our possession that Harvey enormously impressed his teachers and examiners with his knowledge and ability.

Harvey returned home in 1602, and after his incorporation as Doctor of Medicine at Cambridge he came to our College and submitted himself to examination as a "candidate," which title in those days I take to have been equivalent to our present designation of member.

Dr. Norman Moore has found, by consulting the *Annals*, that Harvey was examined no less than four separate times between May, 1603, and August 4th, 1604, although he satisfied his examiners on each occasion. Moreover, of his contemporary candidates he was the last to be elected to the fellowship—namely, on May 16th, 1607, he being then 29. Whether in that early period of his connexion with this College he had any opponents we have no other means of ascertaining, but he seems to have had the support of the president, Dr. Atkins, when he applied for the post equivalent to what we should now call assistant physician at St. Bartholomew's Hospital, and especially that of Dr. Wilkinson, whom he assisted and after his death succeeded.

In the literature about Harvey there is nothing more interesting than Sir James Paget's records, drawn from the *Annals* of St. Bartholomew's Hospital. The relations between the governors and Harvey are altogether honourable and creditable to both sides. I will only refer to the revised hospital regulations submitted by Harvey in 1633 and adopted. These rules show that in general medical policy Harvey was a strong conservative, and that he stoutly maintained the then existing supremacy of physicians over surgeons. The surgeon was not only obliged to consult the physician in all difficult cases, and whenever inward physic was required, but he was not to be allowed to perform any major operation without the approbation and the direction of the physician. The surgeon was not only forbidden to give inward physic, but was required to declare to the physician what external remedies he applied in any given case. The surgeon had to attend the physician in his weekly consultations in the great hall to which the patients were brought, and where both matron and apothecary attended. In those days the surgeons had to visit their patients in the wards, and the physician as a rule only went to the wards when his patients could not be brought to the hall where most of the medical work was done.

During the thirty-six years, with certain intervals, that Harvey was connected with St. Bartholomew's Hospital

he must have seen a great deal of disease amongst the London poor. But his post of Court physician, first to James I and subsequently to Charles I, led to his having a considerable *clientèle* amongst the well-to-do. We know that some of the most eminent men of the time were his patients. Aubrey disparages his "therapeutic way," and maintains that although he was a great anatomist he was not much of a physician, and that after his great discovery was fully announced his practice waned. Aubrey is a very inaccurate person, but this statement may have some truth in it. It is interesting to realize that the philistine is the same in every generation in his estimates of the merits of medical practitioners as in other estimates. If a doctor proves his greatness by some purely scientific discovery which has no immediate practical application, if he distinguishes himself in literature or art, the philistine shrugs his shoulders and says that is all very well, but that such a man should be a good practitioner is impossible. Let us, then, consider some of the evidences derived from Harvey's writings bearing on the subject of his clinical experience.

In his first disquisition to Riolanus, Harvey refers to his unpublished MS. on medical anatomy or anatomy in its relation to medicine. This MS., then in Harvey's possession, has, alas! been lost, but it may yet be found. But his own references to this MS. are very relevant to our inquiry. In alluding to its contents Harvey says he "desires to relate from the many dissections of the bodies of persons diseased, worn out by serious and strange affections, how and in what way the internal organs were changed in their situation, size, structure, figure, consistency, and other sensible qualities from their natural forms and appearances, and in what various and remarkable ways they were affected." I quote this long sentence because it embodies Harvey's ideal of the morbid anatomist and shows that he belonged to the true faith—namely, that the best physicians are first of all good morbid anatomists. In this letter his illustrations are, as might be expected, chiefly drawn from the diseases of the circulatory system; he gives interesting references to aneurysms, apoplexies, and calcified arteries. In more than one place he refers to the small radial pulse on the distal side of an aneurysm of the neck. He recognized that empyema might ulcerate into the lung and discharge through the bronchi.

In his work on generation, which contains many clinical illustrations, there is a careful analytical description of the case of Lord Montgomery's son, who had an exposed heart, left bare after a severe suppurating injury to the chest, and his report of the *post-mortem* examination of Thomas Parr is a sample of the thorough way in which he made his autopsies.

In his second letter to Riolanus he shows how wide was his acquaintance with local disturbances of circulation, which he had discussed at length in the lost *Medical Observations*. There was one disease common in his contemporaries, and of which he had abundant experience in his own person—namely, gout. Whether he was permanently crippled is, I think, doubtful, but that he suffered severe pain, especially in his lower limbs, is quite certain. Heberden sneers at the methods which Harvey adopted to relieve what we may probably regard as attacks of localized gouty hyperaemia. But Harvey's plan of plunging his feet into a pail of cold water seems to have been justified by the results, and Heberden has the candour to admit that he lived till he was over 80 and does not appear to have died from gout, but from old age. This mode of treatment shows not only Harvey's courage, but his independence of conventional dogmas. In our own times we have learnt that the local application of cold in febrile and hyperaemic states is not the dangerous thing it was once supposed to be.

In Harvey's *Praelectiones* there are many clinical observations introduced by way of illustration. In his valuable introduction Dr. Norman Moore points out that Harvey was "familiar with scarlatinal desquamation; he had noted the enlarged liver in those who died after long suppuration, and the shrunken liver in cirrhosis." "The varying appearances of gall stones and the common shape of large renal calculi were well known to him, and he describes pericarditis and its symptoms from his own observation." It is quite true that Harvey says very little about drugs in any of his memoirs. That is not exceptional in physicians who are distinguished as morbid

anatomists. One would like to believe that when the apothecaries of that time disparaged his "bills" (as prescriptions were then called), they may have been too short and too simple to please the apothecaries. There is a report on the case of Prince Maurice when Harvey was with the King at Oxford, in which it is stated about Harvey and his colleague, Edmund Smith, that the "doctors do resolve to give very little physic, only a regular dyett and cordyall antidotes." It is significantly added that Prince Maurice did well.

But I think I have noticed occasionally that when a morbid anatomist ventures into the realm of therapeutics he may show an immense confidence in some particular preparation, and it is not altogether an exceptional incident that in a letter to his friend Hamer, which we possess, concerning the ailment of a poor woman in whom they were both interested, Harvey extolled the therapeutic value of the heel bone of the deer. Perhaps he had found it a useful way of administering phosphate of lime. But whether he gave many drugs or few, Harvey had confidence in the relief or removal of pain by "the detraction of blood, the application of cupping glasses, or the compression of an artery which leads to a part." He also used cupping glasses for the relief of asthma.

In his work on generation Harvey shows practical acquaintance with both midwifery and gynaecology. He recognized the dangers of retained secretions in the body of the uterus and showed courage and decision in dilating the cervix, and in some cases in the employment of intra-uterine injections. He had carefully studied cancer of the uterus, and I commend to my gynaecological brethren a remark which shows Harvey's shrewdness. Speaking of certain uterine troubles he says: "Women are peculiarly liable to these accidents, especially those among them who lead a luxurious life or whose health is naturally weak and who easily fall into disorders. Countrywomen and those accustomed to a life of labour do not become dangerously ill on such small grounds."

But Harvey was not unacquainted with the surgery of his day. In this same mine of clinical experience—the work on generation—will be found reference to cases of large sarcoceles, the treatment of which he had initiated by tying the afferent artery so as to limit the blood supply. He subsequently removed the tumour by extirpation with the knife or the searing iron.

Perhaps Harvey's conservatism as regards the relative status in his time of physicians and surgeons and his daring to have an independent opinion on surgical cases and even performing some operations (for in his will he left his surgical instruments to his friend Scarborough) may have roused the antipathy of the Barbers' and Surgeons' Company. At all events, they endeavoured to convict him of ill practice in the case of an alleged fracture of the skull. There was no allegation of operation on his part, but only of erroneous opinion. But I do not gather that the Barbers' and Surgeons' Company supported their condemnation by any *post-mortem* evidence. I think we may rest content that our Harvey, who was universally admitted to be a great anatomist and naturalist, was also an experienced pathologist, a learned physician, and that he had the qualifications of a good all-round practitioner.

Harvey's Court duties were by no means strictly limited to medicine. As physician to the Court he was instructed to take two long and important Continental journeys. The first of these was in 1630, when he accompanied the young Duke of Lennox on a rather prolonged tour in which he was obliged to dodge the plague on several occasions and was greatly impressed with the impoverishment of the countries through which they travelled. The second Continental journey made at the Royal command was in 1636 when Harvey accompanied Thomas Earl of Arundel, the Lord High Marshal, on an embassy to Vienna and Ratisbon which was mainly concerned with efforts to secure the restoration of the King's nephew, the young Prince Palatine, to his proper status. About three years ago I had the good fortune to secure for this College eleven of Harvey's letters referring to a painful episode of this particular journey. Harvey's writing is very hard to read. It is the writing of a man of terse expression and who had no time to waste. The contractions are appalling. These letters are not quite so difficult as the few others which are extant, and they show that when he took pains he could make a tolerable script as well as express himself forcibly. They were written to Harvey's friend, Basil

Lord Feilding, the eldest son of Lord Denbigh. Feilding was English Ambassador at Venice, and, it would appear, had invited Harvey to visit him. Harvey looked forward to this visit with great delight. There exist in the Clarendon State Papers fairly complete reports of this embassy on the official side, forwarded by Lord Arundel and his staff. It may interest you to follow Harvey's steps on this journey. Lord Arundel's reports are addressed to Sir Francis Windebank, one of the Secretaries of State for Foreign Affairs. The first is from Utrecht, in which Arundel informs Windebank that he has left his son at Leyden suffering from a stomach attack, but under the care of Dr. Harvey. They soon rejoined the party, and we next hear from Arundel at Cologne, where he says he has been this evening "at the Jesuits' fair new church and college where they used me with all civility. I found in the college little Dr. Harvey who means to convert them."

I think it is more than likely that this polemic related, not to theology, but to Harvey's doctrine on the circulation, for at the next stage, Nuremberg, Harvey writes a very courteous letter to Dr. Hoffmann, in which he tries to disabuse his mind of certain misconceptions, and offers to give him a demonstration of the circulation. This letter is included in Harvey's published works, and shows that along with his scrupulous courtesy he could usefully blend a little elegant sarcasm, for he begs Hoffmann, if he will not come to a demonstration or investigate by his own dissection, that he will not vilipend the industry of others nor charge it to them as a crime; "do not derogate," he says, "from the faith of an honest man not altogether foolish nor insane who has had experience in such matters for a long series of years."

The first and second of Harvey's letters to Lord Feilding relating to this journey were written from Lintz, to which the ambassador's party had gone on leaving Nuremberg. Here the first meeting with the Emperor Ferdinand took place. Harvey says he accompanied the Emperor on some hunting excursions. He speaks of him as a pious, good man, desirous of all love, quietness, peace, and justice! He refers to the impoverishment of the country by the thirty years' war and to the licence and oppression and anarchy which prevailed in Germany. Nevertheless they had joined in a feast given by the Count of Milan, "the chief Major Domo of his Majesty where they drunk hard and had many expressions and many good wishes." There are ominous references to the plague and the fear of it.

The next move is to Vienna, where Harvey sees the Queen of Hungary and praises her two fine little babies. Then they go to Ratisbon, where they have to await the assemblage of the Diet of the German Empire, which somewhat shadowy and dilatory body will have to discuss the questions respecting the young Prince Palatine's claims. From the Clarendon State Papers we learn that everybody in Lord Arundel's mission was excessively tired by the long delay. Harvey seems to have been terribly bored, and to have besought Lord Arundel to let him go to Italy during the vacancy, as "he styles the waiting time. In one of the Clarendon dispatches there is a reference to "honest little Harvey, whom the Earl is sending to Italy about some pictures for His Majesty." This opens up a very interesting little bypath upon which other correspondence of Lord Feilding's throws additional light. Lord Arundel, as we know, was one of the great English virtuosos of that day, and was the first to collect objects of art from Italy and elsewhere. His name is chiefly associated with the collection of Greek and Roman marbles which was ultimately secured for the University of Oxford by the mediatory efforts of John Evelyn. But he was a collector of pictures also. In some of the Feilding letters there are references to the pictures which at various times Feilding acquired for the King's collection, and the Marquis of Hamilton writes to Feilding on the same subject, in which he delicately hints that Lord Arundel might take the opportunity of feathering his own nest, and that he might even forestall Feilding in some of his bargains.

At all events, the invitation to Harvey to visit Lord Feilding at Venice may well have led to the extemporized mission which was entrusted to Harvey by Lord Arundel. But poor Harvey little dreamed of what was in store for him. He doubtless left Ratisbon in high spirits at his escape from the weary diplomatic tedium so trying to his active spirit. He was armed with visé to his passport and

commendatory letters, but when, having crossed the boundary of the Venetian territory, he arrived at Treviso, he writes to Lord Feilding that he was unjustly affronted, being stayed and commanded by the podestà to go into the lazaretto without any cause or suspicion alleged. It is clear that they were terribly and perhaps unreasonably afraid of the plague. Harvey produced his viséd passport and recommendations from the King of Great Britain, from the Emperor, and from Lord Arundel, but the podestà would not look at them. Harvey refused to go to the lazaretto for fear of the infected persons who had been sent there before, and elected to stay in the open fields. He scribbles his letter on the grass in the field, and begs Lord Feilding to procure his release with all expedition. He seems to have subsequently arranged to sleep in a poor open garden house and to lie upon straw, but was by force and threatening of muskets compelled to go into the lazaretto, into a very nasty room, where the vetturin and his two servants and saddles lay!

The podestà, probably as the result of Lord Feilding's complaint, in three days' time sent a coach offering to take Harvey back to the poor garden house (where he had been before). Harvey did not conceal his irritation, and indignantly refused to accept anything whatever from the town authorities, least of all a bed which he believed would have been an infected one, so he elects to sleep on straw. Subsequently the Senate of Venice sent him a message that he must stay where he was till further orders, without specifying the time. Meanwhile poor Harvey, having bad food and great exposure, had contracted sciatica. He seems to have been kept between a fortnight and three weeks, but we do not know the exact date or method of his release. He sent on his letters to Lord Feilding, and though he did not stay long in Venice he seems to have had a good time there, and then he went to Florence, where he enjoyed the hospitality of the Grand Duke, who lavished everything upon him that heart could wish.

Harvey's last letter to Lord Feilding was to announce his return to Ratisbon in November so as to be ready to accompany Lord Arundel on his return to England, his mission having turned out rather a fiasco. It has hitherto escaped notice, but I find in the Clarendon Papers a letter from Sir John Borough in which it is stated that they were aware at Ratisbon that Dr. Harvey had been kept in quarantine at Treviso, "being not as yet, for aught we hear, released." His return to Ratisbon may have been somewhat surprising. A perusal of Harvey's letters and of the State Papers gives us a poor opinion of the estimation in which Englishmen were held in Charles I's time in foreign lands, and we may be sure that Cromwell would not have brooked such scant consideration to any English subject during his rule.

Between the time of Harvey's leaving Florence and going back to Ratisbon we must, I think, intercalate his visit to Rome, where, under the hospitable roof of the English College, he dined with one who became a very staunch friend. This was Dr. Ent, who, in the evening of Harvey's life, secured for publication his work on generation. The alleged visit to Rome with Dr. Ent which Aubrey mentions has been shown by Dr. Munk to be one of his many inaccuracies. The joint visit was the one just mentioned; it was in October, 1636. Harvey was back in London at the end of the year. He doubtless made other visits to Italy, and probably to Padua.

As Court physician, Harvey accompanied the King for his Scottish coronation. It is eminently characteristic that the chief interest for Harvey was not the ceremony, nor the theological disputes, but his own visit to the Bass Rock in order to find out some points with regard to the solan goose, which then, as now, congregated on that island in great numbers. He probably also accompanied the King in his abortive warlike journey to Berwick in 1639, and perhaps again in 1640, but there do not appear to have been any important questions of natural history to be solved in those journeys, and I find no reference to them in Harvey's papers. The clouds were gathering for the Civil War, and Harvey's official association with the King rendered him persona ingrata not only to the Parliamentarians in the House of Commons, who tried to oust him from St. Bartholomew's Hospital, but to a mob who sacked and plundered his official lodgings in Whitehall. It is somewhat piquant and characteristic that Harvey, referring to this outrage, says the cause of his sorrow is that certain

rapacious hands "stripped not only my house of its furniture, but what is subject of far greater regret with me, my enemies abstracted from my museum the fruits of many years of toil, . . . whence it has come to pass that many observations, particularly on the generation of insects, have perished, with detriment, I venture to say, to the republic of letters." It has been assumed that Harvey's "Medical Observations" as well as some other papers were destroyed by this mob. But Sir George Paget has drawn attention to the fact that Harvey himself speaks of these same Medical Observations being in his possession at the time when he writes, many years afterwards, his first letter to Riolanus.

In regard to the historic incident of Harvey looking after the two young princes at the fringe of the battlefield of Edgehill, it is interesting to remember that his friend Lord Feilding had been removed from his ambassador's post at Venice and was fighting on the Parliamentary side, whilst the Earl of Denbigh (Lord Feilding's father) was fighting for the King. There must have been many of Harvey's friends on both sides of the great struggle, but it is noteworthy that throughout the four years, from 1642 to 1646, that Harvey was with the King at Oxford there is no evidence that he took any part in political affairs, and there is no report of any utterance of greater resentment than is expressed in the one just quoted concerning his natural history collection.

Nothing daunted by the limitations of his surroundings at Oxford he goes to visit his friend Bathurst at Trinity College and conducts with him daily observations on the development of the hen's egg. He was incorporated a Doctor of Medicine of Oxford, and during the last year was appointed Warden of Merton College. His brief opening address to the fellows, appealing to them to cultivate harmonious friendship amongst themselves and pledging himself for the development of the welfare of the College, is quite in harmony with Harvey's subsequent utterances at the College of Physicians. One interesting experience at Merton was his welcome to Scarborough, who had been expelled from his fellowship at Harvey's old college in Cambridge on account of his Royalist principles. Scarborough seems to have been not unnaturally interested in the lively military expeditions around Oxford of Prince Rupert and his fellow officers. Harvey said to him, "Prithee leave off thy gunning and stay here and I will bring thee to practice." He probably recognized Scarborough's mathematical abilities and foresaw a great future for him, and Scarborough is said to have helped Harvey in some of his investigations.

In Clarendon's *History of the Rebellion* some of the most attractive pages are the character sketches of the chief men on both sides, and it is significant that Harvey finds no place. Indeed there is not a single mention of him in the whole of the work. Clarendon seems not to have concerned himself, in writing his history, with a single person who took no active political or military part in the great struggle. It seems remarkable in view of Harvey's long personal devotion to Charles I, in prosperous as well as in adverse days, that when the surrender came he left him, and it is doubtful if he ever saw him again. But in fairness we must remember that after the surrender Charles's movements up and down the country were not under his own control, and very shortly the access of particular adherents and attendants was regulated and Harvey may not have been permitted to join him even if it were desired. At all events, he retired a saddened man of 68 to the quiet and rest provided him by his relatives in London and its neighbourhood, and his rich and influential merchant brothers may well have secured him protection in his retirement.

It is probable that from 1602 onwards Harvey was working at his subject, and from 1609, when he was formally elected physician to St. Bartholomew's Hospital, he must have gradually acquired a reputation as an anatomist as well as a physician. In 1615, being then 37, he was appointed Lumleian lecturer to this College, a post which he held, with certain inevitable absences, until 1656, the year before he died. The *Prellectiones*, which bear the date of 1616, are really the lecture notes for the first anatomical course which he delivered. His introduction, with its detailed categories of anatomical study, is interesting as a logical academic statement, but the practical instructions which Harvey laid down for his own

guidance in method seem to me the last word as to the proper objects and limits of oral teaching and demonstration, and are a model to be utilized by every medical teacher of our own time. The special value of this MS., which deals chiefly with the viscera, is that we have here Harvey's first account of the circulation of the blood, the full exposition of which he gave in his printed book in 1628. For these twelve years Harvey had expounded his doctrines to our predecessors, and it is significant that from within this College there was no criticism or opposition to the full acceptance of those doctrines, with the solitary exception of one licentiate, a certain Dr. Primrose, who was rather an abject pupil and follower of Riolanus, the anatomical professor at Paris. Harvey demolished the master Riolanus in the two disquisitions addressed to him, and the pupil needs no further consideration.

I need not dwell on Harvey's masterpiece, so brief, so terse, and so convincing, a model for all time of inductive reasoning. Let us never forget the two supreme doctrines which he established, and which neither his predecessors nor his contemporaries had understood: (1) The circulation of blood from heart through arteries and back through the veins to the heart again. The pulmonary circulation, it is true, had been more or less apprehended, but it was reserved to Harvey to establish the true nature of the systemic circulation and to give the *coup de grâce* to the ebb and flow movement of the blood current now this way, now that, which was the accepted explanation up to his time. (2) The muscular contraction of the ventricles, the real motive force of the circulation, which had been conspicuously ignored and misinterpreted previously.

It is quite true that Harvey's view of the respiratory function was inadequate. For him it was summed up in cooling and ventilation; he never thoroughly faced the difference between arterial and venous blood, and it is doubtful if the meaning of oxidation had taken any definite shape in his scheme of life. But the day of chemistry was not yet, though it was not far off, and it was impossible for him without the help of the microscope to bridge over the space between the arteries and the veins. How he would have leapt for joy if Malpighi had only demonstrated the existence of the capillaries within Harvey's lifetime!

What was Harvey's method? It is certain that he had a wide and thorough acquaintance with the work of his predecessors, but he differs from them all in the courage and independence with which he really begins his work by ascertaining by his own senses what are the anatomical facts untrammelled by the statements of authority. He follows up his human anatomy by comparative studies of the circulatory organs of every animal that he can obtain. Then he reflects on the simplest explanation of the anatomical mechanism before him. Finally he devises experiments, vivisectional and otherwise, to test and verify his hypotheses.

The question has been asked again and again, What was the relation between Bacon and Harvey? Bacon, in his *Novum Organum*, which was published in 1620, makes no reference to Harvey's discovery. Harvey's book appeared in 1628, and Bacon died in 1626, but one would have supposed that Bacon might have heard the account of Harvey's discovery during the four years which had elapsed since he first expounded it in the College. On the other hand, Sir Samuel Wilks is not, I think, correct when he says that Harvey had not read Bacon's works, and owed nothing to Bacon. In the twenty-fifth exercise of Harvey's book on generation there is a sentence in which he proposes to review and analyse some of his previous results, and he says: "Wherefore I think it advisable here to state what fruits may follow our industry, and, in the words of the learned Lord Verulam, to enter upon our second vintage." If Aubrey is to be credited, Harvey "esteemed Bacon for his wit and style, but would not allow him to be a great philosopher. 'He writes philosophy like a Lord Chancellor,' Harvey says, 'but I have cured him.'" I think probably, in spite of Bacon's many-sided enlightenment. Harvey looked upon him as an academic *littérateur* who had no claims to eminence in practical investigation, and it may well be that Bacon's deep-rooted antagonism to Aristotle, which dated from the time when he was a student at the university, may have roused Harvey's distrust. "A man of genius lights his own fire," said John Foster, and in spite of all that has been said about every man's work being more or less

dependent upon his environment and the heritage of the past, I do not think we are wrong in claiming that Harvey was a creative genius.

The work on generation has been spoken of as Harvey's aftermath, but in many ways it is more interesting than his *magnum opus* on the circulation, and I do not think it has received adequate appreciation from my distinguished predecessors. It tells us a great deal incidentally about the world experiences of a long and chequered career, and it shows Harvey to us on the speculative and contemplative side. The anatomical observations are of course circumscribed by the absence of microscopical methods, though it must be admitted that Harvey used such magnifying lenses as he possessed to some purpose. There are some erroneous conclusions, but not bad ones.

The introductions on the manner and order of acquiring knowledge and on the method of study are, I submit, masterpieces of lucid exposition. This work is interesting as showing Harvey's own estimate of his teachers. "Foremost of all among the ancients," he says, "I follow Aristotle; among the moderns Fabricius of Aquapendente, the former as my leader, the latter as my informant of the way. . . . For even as they who discover new lands and first set foot on foreign shores are wont to give them new names which mostly descend to posterity, so also do the discoverers of things, and with perfect propriety, give names to their discoveries. . . . And now I seem to hear Galen admonishing us that we should best agree about the things, and not dispute greatly the words."

But with all Harvey's reverence for Aristotle's philosophy, I believe he respected him most of all as a great naturalist and observer, and it is noteworthy that for him as well as for Fabricius and for Galen, his reverence never prevented Harvey from pointing out their blunders in anatomical observation as well as in the deductions drawn therefrom. For example, in his fourteenth exercise, Harvey goes so far as to suggest that on one point Aristotle had not himself seen the things he described but received them secondhand from another observer, and that the periods were not given rightly.

As I have already indicated, from 1646 to 1657, his Court duties ended, his private practice relinquished, Harvey lived henceforward in retirement, first with one of his merchant brothers then with another in London or in the country near by. His brothers were substantial and influential people. In earlier years, when their father had left Kent and had come to live in London, Fuller tells us that "as the sons got great estates they made their father treasurer thereof, who, being as skilful to purchase land as they to gain money, kept employed and improved their gainings to their great advantage; so that he survived to be the meanest of them of far greater Estate than himself." In later years his brother Eliab looked after Harvey's money affairs, and he had no anxieties.

We know little of Harvey's married life, but I think it must have been a happy one. His wife was the daughter of a cultivated and eminent physician, Dr. Launcelot Browne. They were married at the very outset of Harvey's professional career, and the wife died probably during the time Harvey was with the King at Oxford. The references in Harvey's will to his dear deceased loving wife show his solicitude to perpetuate her wishes and his gracious desire that certain of his benefactions should be regarded as from her, though she had long since passed away, manifest his tender affection for her. It is clear that his sisters-in-law and all their respective households were unceasing in their care and solicitude, and the detailed and thoughtful remembrance in his will of all his relatives and their servants, and of many poor folk, is very touching. He was childless, but his care for his nephews and nieces was very marked.

This College was the chief interest of his old age. Besides being Lumleian lecturer he had been at different periods censor, treasurer-elect, and finally, when he graciously declined the proffered presidency, councillor of the College.

It is interesting to think of the devotion and long duration of his friendships. In old days he had nominated Dr. Edmund Smith as his substitute at St. Bartholomew's. Edmund Smith was with Harvey at Oxford, and now when Harvey was building at his own expense the costly and beautiful addition to the College edifice it was Edmund Smith who really superintended the whole business for him and whose name at Harvey's desire, along with that

of Dr. Prujean, the president, appeared on the commemorative inscription. I have referred to the brotherly attachment of Harvey, Ent, and Scarburgh. Harvey's discoveries were at length warmly accepted by foreign universities and by foreign anatomists and scholars, notably by Slegel, Bartholin, and Descartes. Some of these foreign anatomists stoutly defended Harvey's doctrines against the few remaining obscurantists who were still in opposition. His friend Thomas Hobbes said that Harvey was the only man whom he knew that had lived to see his own doctrine established in his lifetime. Abraham Cowley's poetry is seldom read in these days, but his two poems on Harvey, based on intimate knowledge of the man and of his work, are full of genuine feeling and devotion. But the recognition most precious to him was the homage of this College. Fuller says of him he was not only Doctor Medicinæ but Doctor Medicorum. The homage of the College was shown during his lifetime by the erection of his statue. It was further shown by the large gathering of fellows who followed his remains beyond the city walls in the first part of his funeral. How many of them gathered round his tomb at Hempstead in Essex we do not know. The homage of his successors in this College was shown in 1883 by the reverent removal of his remains from the damaged outer vault where they lay, to a sarcophagus in the chapel above.

Whilst we of this generation render our homage to our great benefactor let us in a few words picture to ourselves the outstanding features of his work and character.

First observe his pursuit of truth for its own sake, even though a complete solution were not forthcoming and quite independently of any ulterior benefit that might ensue. His discovery was one of those which, in Bacon's phrase, might fairly be called "light bearing" rather than "fruit yielding."

Amongst the objections which Harvey had again and again to combat in his work on the circulation was the ever-recurring question, *Cui bono?* Listen to his reply:

I own I am of opinion that our first duty is to enquire whether the thing be or not, before asking wherefore it is. . . . Meantime I would only ask how many things we admit in physiology, pathology and therapeutics the causes of which are unknown to us? Whoever therefore sets himself in opposition to the circulation because if it be acknowledged he cannot account for a variety of medical opinions, nor in the treatment of diseases, give satisfactory reasons for the phenomena that appear or who regards it as in some sort criminal to call in question doctrines that have descended through a long succession of ages; to all of these I reply that the facts cognisable by the senses wait upon no opinions, and that the works of nature bow to no antiquity for indeed there is nothing either more ancient or of higher authority than nature.

With what labour (he says) do we attain to the hidden things of truth when we take the averments of our senses as the guide which God has given us for attaining to a knowledge of his works, avoiding that specious path on which the eyesight is dazzled by the brilliancy of mere reasoning, and so many are led to wrong conclusions to probabilities only and too frequently to sophistical conclusions on things.

The doctrine of "spirits" dominated the physics and the physiology of that time. Harvey says:

As it is still a question what they are, how extant in the body, of what consistency, whether separate and distinct from the blood and solids or mingled with these—upon each and all of these points there are so many and such conflicting opinions that it is not wonderful that "the spirits" whose nature is thus left so wholly ambiguous should serve as the common subterfuge of ignorance.

Persons of limited information when they are at a loss to assign a cause for anything, commonly reply that it is done by the spirits, and so they bring the "spirits" into play upon all occasions even as indifferent poets are always thrusting the gods upon the stage as a means of unravelling the plot and bringing about the catastrophe.

Harvey's demolition of the doctrine of "spirits" marks an epoch in the history of science.

Long sentences were the fashion of the time, but Harvey makes his meaning plain. He was keenly alive to the bondage of names and phrases. He was anxious to get the *knowledge of things* and not greatly concerned about names. He maintains that our business is not so much to inquire what a word properly signifies as how it is commonly understood. His writings are lit up by quaint and homely similes, but they are free from the pedantry of his time. Sir Clifford Allbutt thinks he was lacking in imagination. Perhaps that is so, and I think the result is

that although some of his conclusions are incomplete and inadequate they contain remarkably little that is erroneous.

And about his character: There is in the opening sentences of his will a humble and definite statement of his Christian faith, and in his book on generation he expresses his conviction of the immanence of God. "He takes," Harvey says, "the right and pious view of the matter who derives all generation from the same eternal and omnipotent Deity at whose nod the universe itself depends."

Aubrey says that Harvey, like his brothers, was choleric. You may say that the Treviso letters support that assertion, but remember he had great provocation, and he was a gouty subject. At all events, his choleric temper did not interfere with his courtesy and modesty in controversy, nor with generous appreciation of the work of his contemporaries. Harvey's power of concentration and detachment in biological observation in adverse surroundings was amazing. He was patient and laborious in his investigations, and reluctant to make any premature announcement of his conclusions. He was content to wait the judgement of time and enlightenment. He grew more and more fond of contemplation and even of solitude at times, because it gave him greater opportunity for contemplation. His love of family and of friends has been already noted, and to this may fitly be added his unfailing kindness to young men and readiness to advise them as to travel and books, and his willingness to take trouble on their behalf.

The concluding parts of his last letters are very touching. The nearer he approaches the great divide the more he craves for the abiding remembrance and the affection of his correspondents. It is not only the old man eloquent, but the old man mellowed and gentle.

And now in these severe and strenuous days, when we trust that "the winter of our discontent" is soon to pass away, we recall once again the last exhortation of our great master. He bids us "ever to search out and study the secrets of Nature by way of experiment, and for the honour of our profession to continue mutual love and affection amongst ourselves."

MERALGIA PARAESTHETICA.

BY

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MERALGIA PARAESTHETICA—a condition characterized by mononeuritis of the external cutaneous nerve of the thigh—is said to be of infrequent occurrence. In my experience, however, it has not seemed so rare when once the condition is recognized, and I have perhaps seen a dozen cases in the last ten years, five cases in soldiers having come under my care within the last nine months. The condition is important from a military point of view, because it is capable of giving rise to disability of longer or shorter duration, and this disability may be recurrent.

The condition, which occurs in both sexes, may occur with bilateral symmetry, but more commonly one limb alone is affected. The special feature of this neuritis, which, as the external cutaneous nerve is purely sensory, is unattended by motor disturbance, is dissociated sensation, the deep or protopathic sensibility, through afferent fibres contained within the motor nerve bundles supplying the muscles, being unimpaired. Sensation over the area of distribution of the affected nerve, which, as a rule, can be strictly delimited, is lost, so far as finer sensibility is concerned, for slight touch, for perception of points, for heat and cold, and to a certain extent for pain, while deep pressure can be perceived, and a touch on the bare skin is felt as though a layer of clothing intervened, or as one might feel a touch on the back of a gloved hand. In old-standing cases a distinct cutaneous thickening may be made out locally if a fold of skin is pinched up between the finger and thumb, and the skin of the affected area (in some cases at least) begins to grow bald from atrophy of the hair follicles; while, either in association with this, or as the result of the local analgesia, the phenomenon of the cutis anserina is lost locally, so that if the patient is examined in a cold room there is no goose-skin on an area