

ABSTRACT OF  
The Harveian Oration

ON

THE FORCES OPPOSED TO HARVEY  
AND HIS RESEARCHES.

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MR. PRESIDENT AND GENTLEMEN,—The discovery of the circulation of the blood by William Harvey is commonly regarded among scientific discoveries as eminent if not unique, and this in the judgment not of Englishmen only. My purpose to-day is to show that at any rate it was made against enormous difficulties.

To put this discovery in right perspective we must have some vision of the history of philosophy, science, and medicine. Medicine, herein in contrast with theology and law, had its sources almost wholly in the Greeks; from them for good or evil it took its first scheme of thought; and in the schools of Hippocrates and of Alexandria it was based, more soundly, on natural history and anatomy. The noble figure of Galen, the first physiologist and the last of the great Greek physicians, portrayed for us by Dr. J. F. Payne in the Harveian Oration of 1896, stood eminent upon the brow of the abyss when, as if by some convulsion of nature, medicine was overwhelmed for 15 centuries. Galen practised the method of verification by experiment, first introduced, perhaps, by Archimedes; but after him it was lost till the time of Gilbert, Galileo, and Harvey.

In the growth of societies small civilisations have been sacrificed to the formation of larger aggregates, whereby stable equilibrium may be attained for the highest ends. Perhaps because of her very freedom of thought Greece never became a nation. Even the Roman peace, bought as it was at the cost of learning and the arts, was but a mechanical peace. In the wilder regions of the empire the bodies but not the wills of men were in subjugation, and even in Rome itself the sanction of patriotism was failing. Under the Frankish invasion the very traditions of learning and obedience seemed to be broken up. Then Europe was saved by the inspiration of the Christian religion which, entering as a new element into the ancient fabric of Roman empire, was now to hold men's service in heart and soul as well as in body; but to this end no mere mystic or personal religion could suffice; clothing itself with the political and ritual pride and even with the mythology of the pagan empire it inspired a new adoration, but it imposed upon men also a universal and elaborated creed. In the third century philosophy was born again in neo-platonism, the offspring of the coition of east and west in Alexandria, where all religions and all philosophies met. The world and the flesh were crucified that by the spirit man might enter into God. Pure in its ethical mood, neo-platonism, says Harnack, led surely to intellectual bankruptcy; the irruption of the barbarians was not altogether the cause of the eclipse of natural knowledge. Yet even then, as again and again, the genius of Aristotle came to save the human mind. Proclus, ascetic as he was, was also versed in Aristotle and he compelled the Eastern mysteries into peripatetic categories and bequeathed a formal philosophy to the Faith. Thus the first scholastic period was fashioned and the objects and methods of inquiry were determined for 30 generations. Rationalised dogma lived upon dialectic and conflicted with mysticism, but logic, dogma, and mysticism alike disdained experience. The Faith then was the first adversary of Copernicus, Galileo, and Harvey.

It was the fortune of the Faith that of all the treatises of Plato, the *Timæus*, the most fantastic and least scientific, should have survived to instruct the mediæval world, while those works of Aristotle which might have made for natural knowledge fell out of men's hands; moreover, the *Categories* and the "Interpretation" made for more than Aristotelian nominalism and turned men's minds rather to rhetoric and

dialectic than to natural science. Thus it was that Plato's chimæra of the human microcosm, a reflection of his theory of the macrocosm, stood beside the Faith as the second great adversary of physiology. The influence of authority whereby Europe was to be welded together penetrated into all human ideas. As in theology was the authority of the Faith so was that of Plato and, in the second period of the Middle Ages of the Arabian versions of Aristotle and Galen. It is not easy for us to realise a time when intellectual progress, which involves the successive abandonment of provisional syntheses, was unconceived, when truths were regarded as absolute, when reasons were not tested but counted, when even Averroists found final answers either in Aristotle or in Galen. Thus in the irony of things was Harvey withstood by the dogma of that Galen who, in his own day, had earnestly appealed from dogma to nature.

In the *Isagoge* of Porphyry is distinctly set forth a problem which during the Middle Ages rent Western Europe asunder, a problem, says John of Salisbury, which engaged more of the time and passions of men than for the house of Cæsar to conquer and govern the world; a problem, indeed, which in our own day is not wholly resolved. This was the controversy of the Realists and the Nominalists, first brought to a clear issue by William of Champeaux and Roscellinus. Now Plato held ideas not as mere abstractions but as creative forces, and we shall see how potent was this function in mediæval thought. Every particular, every thing, was regarded by the realist as the product of universal matter and individual form. Now form might be regarded, and variously was regarded, as a shaping, determinative force or principle, pattern or mould, having a real existence apart from stuff; or, on the other hand, as a principle or pattern having no existence but as a conception of the mind of the observer. And for the Realist not individuals only but genera and species also have their forms, either pre-existent (*universalia ante rem*) or continuously evolved in the several acts of creation (*universalia in re*). For instance, the Church exists for the Realist as a thing apart from the wills of successive generations of individual men; man has fallen not only in many or all individual cases but also as a kind—a kind having an independent existence; in the Sacraments, again, there may be a change of hypostasis without change in sensible matter. Now if forms pre-exist (*ante rem*) the Will of God must be pre-determined; or if form be an immanent function acting *in re* we are landed in Pantheism. Thus Erigena, the brilliant prophet and Protestant of the first period of the scholastic philosophy, was virtually a Pantheist, as Spinoza was the last great Realist. Aquinas, who determined the philosophy now ruling in Rome, brought about a compromise which covers up rather than solves the difficulty. The problem, it is evident, was no hair-splitting; it dealt with the very nature and origin of being and it agitated the minds of earnest men at a time of fervid and widespread enthusiasm for knowledge.

Now closely allied to the argument concerning universals was that concerning "matter and form." Whether the terms used were "form and matter," "force, energy, or pneuma and matter," "soul, archæus, or life and body," "determinative essence and determinate subsistence," "male principle and female element," "the potter and the clay of the potter"; or whether, again, they were "effect and cause," "nature and law," "being and becoming," the riddle lay in the contrast of the static and dynamic aspects of things; in the incessant formation of variable individuals in the eternal ocean of existence. Even Francis Bacon never got out of the tangle of form, cause and law. It has been the temptation of philosophers of all times, and even of Harvey himself, than whom none had put better the conditions of scientific method, to suppose that by means of abstraction kinds may be apprehended; that thus they may get nearer to the inmost core of things; that by purging away the characters of individuals they may detect the essence and the cause of individuation, not perceiving that the content of notions is indeed in inverse proportion to their universality. We see this error continually to-day; for instance, we may discuss the causes of typhoid fever and bewilder ourselves by forgetting that there is no such thing as typhoid fever, and that the only causes of a general notion are the psychological causes of its generation in the mind of the thinker at the time; that which is due to objective causes is of course not the general notion but the particular case, a very different matter.

Before motionless stuff—before the problem of the "primum mobile"—even Harvey himself stood helpless when

he had come to the end of his admirable experiments and began to indulge in contemplation. In his need for a motor for his machine he was not able to divest himself of the language or even of the philosophy of his day. In his day he could not help regarding rest and motion as different things and motion as a superadded quality. The motion he attributed not to a property of the heart but of the blood—to its "innate heat," which is as far as he could possibly have got. But by way of explanation he adds that the innate heat of the blood is not fire nor derived from fire; nor is the blood occupied by a spirit, but is a spirit; it is also "celestial in nature, the soul, that which answers to the essence of the stars ..... is something analogous to heaven, the instrument of heaven." In denying that a spirit descends and stows itself in the blood or elsewhere, as an "extraneous inmate," he bravely says: "I cannot discover this spirit with my senses, nor any seat of it." And yet in the treatise "De Generatione" he propounds a theory of the impregnation of the female not by any material from the male but by the influence upon her of a "general immaterial idea," which even for his own time was very substantial realism. The riddle which oppressed the great thinkers from the Greeks to Lavoisier was then the nature of the "Bildungstrieb"—of the "*impetum faciens*." What makes the ball to roll? Does heart move blood or blood move heart, and in either case what bestows and perpetuates the motion? Telesius, the first of the brilliant band of natural philosophers in Italy of the sixteenth and seventeenth centuries, still sought this principle of nature in the "form" of the peripatetics. Gilbert regarded his magnetic force as "of the nature of soul, surpassing the soul of man." Galileo, although willing to conceive circular motion as perpetual and even self-existent, was unable thus to conceive rectilinear motion. All these naturalists, including Harvey and even Descartes, followed the mediæval world and Aristotle in deriving the source of motion directly from that of the spheres—from the quintessence.<sup>1</sup> Till Copernicus transfigured the cosmos, and Galileo and Newton carried terrestrial physics into the celestial worlds, the heavenly bodies were regarded as animated beings, themselves active, and by propagation from sphere to sphere animating all "sublunary" matter, wheels within wheels, even to its innermost particles.

Of the origin of energy we have not solved the riddle—we have given it up; but instead of finding its sources without we find them within. Harvey's contemporary Francis Bacon sagaciously guessed that heat is an expansive motion of particles, but he regarded heat and cold as two contrary principles. Almost in the same generation the brilliant John Mayow perceived a substance in the air "allied to saltpetre" which passed in and out of the blood by the way of the lungs or placenta. So innate heat gave way to phlogiston, and soon afterwards oxygen and the conservation of energy turned out to be "form," "spirit," "essence," "primum mobile," "causa efficiens," "potentiality," and the rest of them, and by Lavoisier a vast pile of metaphysics was blown into the air. But to kill a strong theory outright takes many a generation. Realism, shaken by Abelard and scotched by Hales and Ockham, not only survived to mislead Harvey, but it stretches its withered hand over us still, in the nursery, in the schoolroom, in the university, and in the great arguments of life.

As strong as realism was a third adversity—the pride of human mind. The asceticism of the East, disdainful of carnal things, brought the dualism of matter and spirit into monstrous eminence; and in respect of medicine in a few generations it turned the cleanest people in the world into the most filthy.<sup>2</sup> Almost to this day the mechanical arts, presumably concerned with lower categories, have been regarded as base, and the crafts, even of the laboratory, as unworthy of great souls. Anatomy had to labour also against both ecclesiastical and popular antipathy; chemistry and mechanics were gross pursuits unless endowed with the perilous distinction of alchemy and sorcery. Unfortunately, this charge upon the dignity of man was made heavier rather than lighter by Petrarch and the humanists of the Renaissance; and in Oxford of the seventeenth century we find that Boyle was bantered by his friends as one "given up to base and mechanical pursuits." In a certain important respect medicine suffered greatly from this prejudice. It

is obvious that, speaking generally, medicine would find its most positive and direct control in those diseases and in those therapeutical experiments which take place on the outside of the body. Yet surgery fell under the proscription of a handicraft, and, as such, was eliminated from the College of Physicians both in London and Paris; and thus the genuine work of such men as Paré and Gale was without influence upon medicine. Thus it came about that Francis Bacon says of the physicians of Harvey's day that they saw things from afar off as if from a high tower. From Erasistratus to Celsus physicians practised medicine as one art. Galen taught not the simplicity but the unity of medicine; and Littré points out that this unity is consistent in the Hippocratic writings. Surgery, by virtue of its imperative methods, was kept clear of philosophy on the one hand and of humanism on the other. Fortunately for Harvey his master Fabricius was as great a surgeon as anatomist; and such also was Fallopius. Thus it was that medicine at the end of the Middle Ages had not recovered the standard of Alexandria. And against this adversity also had the founder of physiology to contend.

Happily, Arabian scholastic philosophy took its root in Alexandria when neo-platonism had veered towards Aristotle and was therefore more uniformly peripatetic than the Christian scholasticism. It is one of the signs of the greatness of Aristotle that thus garbled and glossed his power made itself felt in the thirteenth century, chiefly by the great Franciscans Alexander Hales, Roger Bacon, and William Ockham—Roger Bacon whom we may call the first of the natural philosophers of the West. This former renaissance determined the second period of the Middle Ages, the period distinguished by the Arabian version of Aristotle, by a check to the chimæras of realism, by some liberty of secular knowledge—for even bishops came out of the school of Toledo—and again by the coming of the friars whose influence upon the thought of the Middle Ages was a curious proof that as all ways are said to lead to Rome, so all systems of thought, in spite of the thinkers, led to natural science. The logic and rhetoric of the Dominicans, by their rationalism, defined, and in defining restricted, the dominion of the Faith. Men got used to reason and made a language for thought. And in the history of the unlearned Friars Minors we find, as elsewhere in history, that mysticism is more favourable to natural knowledge than the passionate dogmatism of Clairvau or the dogmatic rationalism of St. Thomas. The Victorians, as Gerson after them, despised reason rather than feared it. Mysticism makes for individual religion, as in Glisson and Newton, rather than for the Church. Hence it may have been that independent thinkers, like Hales and Bacon and Ockham, entered the Franciscan order. The former renaissance brought also a more tolerant spirit. Albert of Cologne owed as much to Avicenna as St. Thomas to Averroes—sages technically damnable, yet "mighty spirits" worthy of reverence. Dante put in hell, but on green meadows in an open place, lofty and luminous, not only Aristotle, Plato, and Socrates, but also Euclid, Ptolemy, Hippocrates, Avicenna, Galen, and "Averroes who made the great commentary." Universities were founded in France, England, and Italy. But the natural science which made the second renaissance irresistible was absent from the former and at the end of the century a reaction set in. During the two following centuries in Spain freedom of thought was crushed out by the Church; but in the conflagration of books of philosophy medical works, such as the "*Colliget*" and the Commentary on Galen of Averroes, were largely spared; yet in the fourteenth and fifteenth centuries the very name of Averroes, "the mad dog that barked against the Christ," not only became ecclesiastically accursed, but also began to signify loose life as well as free thought; a resentment of which there was no trace in Albert or Aquinas.

Averroism, however, held its ground at Padua, which had become celebrated for medicine as Bologna for law, and although Averroism, like any other philosophy taught as a separate study, decayed, yet, effete as it was, it kept the ground open at a time when the tide was turning against free thought, when the commercial supremacy of Venice was declining, when the Spanish Inquisition was established in Rome, and when even the influence of the Florentine humanist was rather against natural knowledge than for it. No doubt the coarse and disingenuous scepticism of the physicians of North Italy and their pretentious manners alienated the humanists not only from themselves but also

<sup>1</sup> Vide Arist., De Coelo; and Met. xii.

<sup>2</sup> Those curious in such things will notice that the mediævalising clergy of our own day have discarded in their persons that fair linen which in their fathers was the emblem and example of cleanliness.

from natural philosophers, such as Telesius and Galileo; and Averroists and Humanists alike stood by at the burning of Bruno. Harvey entered Padua at a fortunate time; he found Galileo engaged in teaching and also in methodical research, for Galileo was not only a great discoverer, but he was the first to formulate fully and clearly that method which we know under the name of the "inductive method." The discovery of Greek texts had destroyed the conventional Aristotle and the conventional Galen; Gregory by the reform of the calendar had put the axe to the root of astrology; Newton was soon to carry terrestrial physics into celestial spheres; and Boyle was soon to create chemistry; anatomy was fully awake already. In England, moreover, with the accession of Elizabeth more spacious times were assured, and Charles protected Harvey. Clinical teaching also had been established at Padua by Fracastorius and Montanus, to be pursued in Heidelberg, Leyden, and Vienna. Physiology, however, was awaiting Harvey. Servetus had buried his conception of the lesser circulation under a pile of theology; Columbo and Fabricius, however, had prepared the way, not so much by the value of their discoveries as by their practice of the experimental method in this science, for the anatomists, Galenists to a man, had done next to nothing for physiology.

The genius and courage required to make discoveries like that of the circulation of the blood cannot be measured directly; there is no method of determining the specific gravity of such adventures: I have tried, however, to shadow forth the weight of the social systems, opinions, prejudices, and habits against which Harvey's gigantic effort was made. Almost in the year of the publication of the "De Motu Cordis" (A.D. 1628) the Parliament of Paris issued an edict that no teacher shall promulgate anything contrary to the accepted doctrines of the ancients. Under such conventions Harvey's discovery burst like an earthquake—under corrupt Galenism, venerable sophistries, current abstractions bequeathed by realism, and long-winded dialectics on critical days, coctions, derivatives, or revulsives, and dogmas based on uncritical subservience to texts. His work stood out even more ascendant against a lurid background of folk superstitions—of vampires, witch-burning, magic, cabalism, astrology, alchemy, chiromancy, and water-casting. In terrestrial and celestial physics Galileo, persecuted as he was, had some strong current with him; Copernicus was before him, Kepler was beside him; but in physiology upon the path of Galen the waters had closed as upon the track of a great ship; and among Harvey's contemporaries and immediate forerunners there was none to claim a share with him in the discovery of the central fact of physiology, or in his application of the method which opened the way to Pecquet, Glisson, Steno, Wharton, Willis, Haller, and Bernard.

## An Address

ON

## APPENDICITIS!

*Delivered before the Mirfield Medico-Chirurgical Society.*

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GENTLEMEN,—I very much appreciate the kindness which prompted the members of this society to ask me to be here this evening, and I felt that I had only one course open to me and that was to accept your kind invitation.

The subject which I have selected to bring before you is appendicitis. I am afraid, however, that I can tell you very little which you do not already know or which you cannot find in the numerous monographs on this subject that have been written during the past 10 or 15 years. Still, I have thought that to hear how the subject is viewed by one who, like myself, enjoys the privilege of being attached to the full surgical staff of a great provincial hospital may be of interest, and perhaps of some value, in helping you in the diagnosis and treatment of cases of this nature which may

present themselves in your practice. To bring one's thoughts to a focus from time to time as to the pathology of any class of disease, or to review any portion of one's work—the mistakes and failures as well as the successes—is always a useful and wholesome discipline. We see where we stand and we recognise difficulties which we have yet to overcome in points of pathology, diagnosis, and treatment. To no class is this more important than to members of our profession and that, I think, is one of the great functions of our medical societies. We are so accustomed to give dogmatic opinions to our patients that if we had not the restraining influence of the friendly criticism of our *confrères* we should be in danger of believing our own dogmas and cease to have an open mind, receptive for the new developments of an ever-advancing knowledge.

The whole subject of appendicitis is of recent development—15 or at most 20 years—and it is only during this period that the important part played by disease of the vermiform appendix has been appreciated. Here and there a few observers had pointed out the fact that the appendix was diseased and perforated in some fatal cases of peritonitis. In 1812 an English physician, Dr. Parkinson, brought before the Royal Medical and Chirurgical Society of London a case of ulcerated and perforated vermiform appendix from a boy, aged five years, who had died from general peritonitis, and it is of interest to us in Yorkshire to recall the fact that in 1861 the late Mr. Nunneley of Leeds described such a case in the Transactions of the Pathological Society of London. Mr. Darwin has not overlooked the condition and refers to it in his "Descent of Man," which was published in 1874. Up to the last few years isolated cases may be found by the careful and patient student scattered throughout medical writings. Before the important part which is played by the appendix was definitely settled the diseases in its neighbourhood were thought to have arisen in the cæcum, and we have such terms as "typhlitis," "peri-typhlitis," and "paratyphlitis" to describe the condition. These expressions have now been practically superseded by the term "appendicitis," a word which most of us object to, but which is now so universally in use as to have become a permanent fixture in our nomenclature. A recent writer has suggested the term "epi-typhlitis," but I very much doubt if he will succeed in popularising it. Pathologists, making post-mortem examinations with the fixed idea that the disease was in the cæcum, did not upset the views of the orthodox by examining and inquiring into the condition of the appendix. To many observers—workers in America, on the continent, and in this country—we owe our present knowledge. [The anatomy, the variations of position, and the histology of the appendix were described and illustrated by drawings and specimens. One interesting specimen was shown in which the appendix was found in the sac of a right inguinal hernia attached to an undescended testis which had become malignant. The hernial sac was opened during the operation of castration, and the appendix being found adherent to the testis it was removed.]

Having briefly reviewed the anatomy and histology of the appendix let us inquire into the common causes producing the inflammatory changes. It is more than probable that the presence of scybalous masses or concretions in the appendix is the starting point of a very large proportion of inflammatory processes. By some it has been assumed that these masses are formed in the appendix—and this may be so in a few cases, especially in a long appendix—but it is more than probable that in the majority of cases they are formed in the cæcum. The inflammatory changes are probably produced in this way. The concretion enters the appendix and, being large for the lumen, dilates its walls, and by preventing the return of blood produces a venous stasis, or it may simply produce a certain amount of local irritation and perhaps an abrasion of the mucous membrane, and thus a lowering of the vitality of the parts. Micro-organisms, the second factor, now come into play. These are always present in the gut and they attack its walls the moment its vitality is lowered or its walls are injured. A great variety of micro-organisms are present in the gut. The bacillus coli communis and various forms of streptococci and staphylococci are the probable offenders.

In the milder cases the irritant is quickly removed and the inflammatory condition subsides. In the sub-acute and acute cases the action of the offending body is prolonged, so that in some cases the inflammatory condition extends beyond the limits of the appendix and a perforation may form or the