BRITISH MEDICAL JOURNAL

LONDON: SATURDAY, OCTOBER 24th, 1936

THE BACKGROUND TO HARVEY*

BY

SIR WALTER LANGDON-BROWN, M.A., M.D.CANTAB., HON. D.Sc.OXON., F.R.C.P.

EMERITUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE; CONSULTING PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL, ETC.

The personality of every great man has a certain impact on his own generation, but when Thomas Hobbes said that Harvey was the only man who had seen his theories accepted during his lifetime he must have been thinking of the younger generation which had grown up since the theory became known. For the men of Harvey's own standing were never convinced. Questions that we know were put to an unsuccessful candidate for the Licentiate in 1632 prove that his discovery had not yet been accepted by his colleagues. Nevertheless, had his biography been written in the vogue still only too prevalent of searching for what was called "the real man," which means a hunt for his failings, Harvey would have emerged from the ordeal very well, and it would still have to be allowed that he profoundly influenced physiology, if not medicine, for the rest of the century. Mr. Wilfred Trotter said of John Hunter: "It needs all our imaginative sympathy to picture the twilight country in which his labours were carried on—the air is dim and thick, the range of vision short, the appearance of things ambiguous. . . ." This is even truer of Harvey, but as Mr. Trotter pointed out, Hunter's influence was more limited to the indirect and germinal, while every student of physiology is in some sense the beneficiary and direct legatee of Harvey.

I do not aspire to paint yet another portrait of Harvey, for the hastiest perusal of the Orations will prove how well that has been done, but to try to picture something of his background, in the hope that thereby I may do something to make his figure stand out more clearly against it: not so much the physical background of Cambridge, Padua, St. Bartholomew's, and this College as the background of the thought of his time. An ambitious task, but it has always interested me to inquire why men thought what they did when they did. And this shall be my offering to a great name. I am the more encouraged to make this attempt because, for reasons I hope to analyse, the seventeenth century has a topical interest for us to-day. Different ages have been interested in different epochs: our fathers were interested in the Renaissance; the Renaissance was interested in the Classical Age; to-day we seem to be rounding off a school of thought that was born in the seventeenth century, and so we turn back to inquire, Why did men think what they did then?

We are learning that the Dark Ages were not so dark as they were painted. The marvellously rapid flowering of the Renaissance tends to blind us to the subtle changes that were occurring before. Sometimes there comes a spring so early in the year that we fear the return of a frost that will nip the incautious buds. Something of that sort happened in Europe in the

thirteenth century. There was a stir in the air. True, there had already been a revival of architecture, but now a new and delicate art was being revealed by such men as Duccio and Giotto. A new attitude to the world, a frank love of nature, of life in all its manifestations made its appearance. I like to think it was due to St. Francis of Assisi. His example certainly inspired Giotto to his earliest creative efforts, and the Franciscans were the first scientific investigators of this new age. For when man begins to wonder he desires to investigate. Was not Roger Bacon, the father of English natural science, a Franciscan?

And then came the frost, and the icy fetters of theological authority imposed a return of winter. Roger Bacon languished in prison for many years, and no attempt was made to revive any interest in experiment until the days of his greater namesake. The impulse towards a newer, freer attitude to life was nipped in the bud, and had to throw down deeper roots before again emerging. One great and permanent gift remained—the universities.

The Renaissance was late in reaching England. Even in France it was unknown till 1494, and the first Renaissance architecture in England is to be found in a chantry dating from 1500 in Christchurch Minster. Consequently we are in this country a little apt to overstress the part played by the new learning, the new writing, and the new world in producing that wonderful efflorescence. Its inner essence remains as mysterious as the springing of youth into adolescence, and these events had found a soil already fertilized as the work of Donatello, Fra Angelico, and Luca della Robbia testified. It has been said, somewhat sardonically, that at Cambridge "learning like a stranger came from afar" in the person of Erasmus in 1510. Eight years after that Thomas Linacre founded this College, and two years later his lectureships at Oxford and Cambridge, while in 1540 Henry VIII founded the regius professorships there. With such a splendid start it may seem strange that the immediate results were disappointing. Yet on inquiry it is not so surprising. For the aim was to revive the old medical learning. It was authoritarian. Medical teaching at the universities consisted in the reading and expounding of Hippocrates and Galen, and in this College, in 1559, John Geynes was cited for impugning the infallibility of Galen. Not until he had humbly recanted was he admitted to Fellowship in the following year. Something more was needed than the revival of the old; a new spirit was required to make these dry bones live. It seems paradoxical that the reign of Mary Tudor should have indirectly contributed to this desirable end, but those who fled then to Geneva, Frankfort, and Strasbourg returned on Elizabeth's accession, bringing with them a wider culture than England had previously known. But that

* The annual Harveian Oration delivered before the Royal College of Physicians of London on October 19th, 1936.

new spirit found clearest expression in Francis Bacon's *Novum Organum*. In these days, when every week some book is proclaimed as epoch-making, it sounds jejune to apply this epithet to a work which showed the way to the investigation of the world of phenomena. Projected in his youth, it was prepared by a series of sketches, revised and rewritten at least twelve times, and finally published in 1620.

Influence of Bacon's Philosophy on Contemporary Thought

Men did not realize its portent at once. Even Harvey was mildly scoffing at his distinguished patient's philosophy though he admired the man. Yet as Sir William Hale-White clearly showed in his Oration, he must have been deeply influenced by it. Just so, though more openly, men scoffed at Darwin, Lister, and Freud, only to find themselves, a few years later, utilizing their ideas and their methods. Why does this history repeat itself so inevitably? Because "there can be no approach to truth without some threat to the thinker's personality" (Trotter). The dogmatic rationalism of the scholastics had produced a system which claimed to give a coherent and consistent account of nature, of man, of the spiritual world, and of any other kind of world which might be supposed to exist. Why trouble to look further, why explore an uncharted sea? The unknown might change us, shake us out of our comforting certainties. Without curiosity there can be no science.

Into this dusty atmosphere of scholasticism Francis Bacon came like a breath of fresh air, declaring that we are not spiders to go on indefinitely spinning cobwebs out of ourselves. He praised the more excellent way of the bee, which gathers its material from the flowers of the garden and of the field, but digests it and transforms it by a power of its own. Though much of it appeared in his earlier works, the *Novum Organum* contains the fruit of his thought.

Bacon never claimed to have originated the method of induction, which he freely attributed to Plato. But so great a stimulus did he give to its employment that it may seem strange that his plan for the renewal of the sciences has never been deliberately followed in its entirety by others. Two, perhaps three, flaws in it may offer a partial explanation. In the first place the defects in his own scientific equipment led to a certain crudity in his conceptions of nature, which gives some justification for Harvey's scoff that Bacon "wrote philosophy like a Lord Chancellor." In the second place he claimed that his way of discovering sciences went far to level man's wits and left little to individual excellence. Never was there a greater fallacy. It leaves out of consideration the scientific use of the imagination. Fabricius had observed the valves in the veins, but regarded them as pockets designed to catch blood that would otherwise have collected in the extremities. Robert Boyle tells us that Harvey saw a tiny but momentous flaw in the argument; for he observed that the veins to the head also had their valves set towards the heart. There was the germ which, cultivated by his scientific imagination, flowered into his immortal discovery. Pasteur said that chance only visits the mind that is prepared. Although Darwin claimed to have worked on true Baconian principles, he wrought better than his master knew, for his collection of instances was guided by a hypothesis of which the validity could be tested. No one who has had to disburse the endowments for research can accept the view that the scientific method levels men's wits.

In the third place, when Bacon said "I only sound the clarion, but I enter not into the battle," he deprived himself of the crucial test of his own method. He did, as a matter of fact, carry out a few experiments, one of which was fatal, for on a wintry day in March, 1626, he

caught the chill which ended his life while stuffing a fowl with snow to see if cold would delay putrefaction. It was probably this scant practical experience which led him to slight William Gilbert's work, a more careful study of which would have saved him from some errors. Gilbert was "the first real physicist and the first trustworthy methodical experimenter," and we are proud that he, who influenced Harvey, was a President of our College.

Nevertheless Bacon "did more than anyone else to free the intellect from preconceived notions." In his own words, he pointed the way to "a new and unexplored kingdom of knowledge within the reach and grasp of man, if he will be humble enough and patient enough to occupy it."

But he was notoriously a better guide in science than in morals, and it is impossible to understand seventeenth century thought without taking into account its preoccupation with morals. At the Renaissance men felt released from the moral and religious codes which had bound them for centuries; they believed that they could reap where they had not sown. The subtle awakened intellects appreciated the advantage of brain over brawn, and proceeded to exploit the simpler-minded. Caius even came to doubt the wisdom of his benefactions and of his support to the new learning. However, the reign of the Machiavellis was not unchallenged for long. Morality would keep breaking through. Over this line of cleavage Shakespeare brooded. A new sensibility was being born, and he was conscious of a note of irresolution. He realized that the Mercutio of the South was giving way to the Hamlet of the North. Unlike Dante, who was always a judge, Shakespeare was a recorder. It takes a poet to plumb a poet's mind, and it was John Keats who put his finger on one of Shakespeare's greatest characteristics, his capacity for "being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason."

The age had been one of feverish activity. England had experienced every stimulant: wild adventures in the ends of the earth, threats of destruction from abroad, constant plots within. Now it was beginning to sober down. Though Shakespeare could remain with his mind in suspense, his fellows could not. They wanted facts. Again the cry arose, "What is truth?"; but this time the jesting Pilates stayed for an answer. "The climate of opinion" is a happy phrase we owe to Joseph Glanvill (of *Scholar Gypsy* fame). How did men comport themselves in the new climate that was surrounding them? According to their kind; some simply looked back with bitter regret, others forward with eager anticipation, some imitated Mr. Facing-both-ways.

Robert Burton looked back. He was a scholiast born out of due season, and grew old in an age he condemned. Like the "melancholy Jaques" in many ways, he had a melancholy of his own, compounded of many simples, indeed, for his *Anatomy of Melancholy* is a mosaic of quotations. Mark Pattison described the typical scholastic attitude thus: "If a great writer has said a thing, it is so." It reminds one of case-made law, always so foreign to the medical mind. But the authoritarian note was no longer acceptable in the new atmosphere, and Burton felt that by any human standard the entire order of the universe was irrational. It has been said that he was filled with hatred, scorn, and derision for the whole scheme of things in which he found himself. What could one do, he protested with tears in his eyes, but laugh? Touchstone and Jaques in one.

John Donne's Modernity

John Donne, the famous Dean of St. Paul's, on the other hand, illustrates alike in his life and thought the transition from the sixteenth to the seventeenth century.

He was "in certain aspects of mind and training the most mediaeval, in temper the most modern of his contemporaries." As Mr. John Sparrow wrote with deep insight while still only a schoolboy at Winchester:

"Despite all vicissitudes of fortune, despite even the apparent changes in his character, Donne himself was always essentially the same. . . . There are two ways of arriving at the pitch of emotion necessary for the production of such writings as Donne's. One is the absolute surrender to pleasure, and the sacrifice of the ordinary standard of morals; the other is the complete banishment of pleasure, and the consistent living up to an ideal. Donne adopted both of these. . . ." And "there lingers about him something unexorcised as if pagan incense were burning in a Christian crypt."

Brought up a Roman Catholic, he had become Anglican by the time he was 24, but his steps to the altar were somewhat devious and faltering. He was worldly and time-serving, ascetic and devout, with equal sincerity. He stood haughtily apart from his contemporaries except Ben Jonson, for he had the scornful indifference of the innovator, regarding himself as destined to inaugurate a new era. He revolted against the conventional and classical imagery of the Renaissance, and was as determined to break it up as Wordsworth was to release poetry from Miltonic diction when it had become outworn through sedulous imitation. He experimented with prosody and rhythm like our own Laureate Fellow, Robert Bridges. It is significant that there has been of late a great revival of interest in Donne, just as there has been in El Greco. The writings of one have affinity with the paintings of the other. Both can be ascetic and devotional, just as they can be distorted, startling, and bizarre.

This reawakened interest is comprehensible if I am correct in my thesis that certain trends of the seventeenth century are reasserting themselves to-day. "Every young poet to-day would like to write like Donne; intensity is the most admired of all qualities. Yet—and there's the rub—so few know what to be intense about, except negative attitudes" (Desmond MacCarthy). Certain it is that modern poets have abandoned the mellifluous line of Tennyson for a condensed allusiveness, an obscurity, a concentration of thought, an imagery drawn from things of everyday life just as Donne departed from Marlowe's mighty line to the same end. Whether beauty has been served thereby must be left to individual opinion. The modernity of Donne's ideas in some ways is shown by the fact that he wrote an essay in favour of voluntary euthanasia in 1624. The essence of his intimate thought is to be sought, however, in his *Devotions on Emergent Occasions*, written during a serious illness. Did any writer ever relish an illness so keenly? It certainly gave opportunity for his self-flagellating temperament, and it is entertaining to observe how gratified he was when the King sent his own physician to consult upon his case.

A greater and more sympathetic figure than either Burton or Donne was Sir Thomas Browne (1605–82). Like a two-headed Janus he looked both backwards and forwards. To this peculiarity of his temperament one of the fascinations of his style is due, for it will be observed how frequently a classical phrase or allusion is balanced against an Anglo-Saxon word or homely illustration. Moreover, this dualism of phraseology is accompanied by a dualism of thought, which he clearly acknowledged when he said: "Thus is Man that great and true Amphibium, whose Nature is dispos'd to live, not only like other creatures in diverse Elements, but in divided and distinguished worlds."

To this point of view modern philosophy is tending. The materialistic science of the nineteenth century is dead, neo-vitalism died with the recent lamented passing

of its greatest exponent, and, while the mechanistic theory of life is being pushed further than ever, its protagonists gladly admit that at most it can only attain one aspect of the truth. Thus Sir Thomas Browne joins hands with the twentieth century, though the way in which he expresses this attitude of his mind may give one the impression of scepticism hand in hand with credulity. As he said, "Where Truth seems double-faced, there is no man more paradoxical than myself," for he had realized that where a fact or opinion previously widely adopted can be tested by experiment, and is not proved correct thereby, you should give it up. But where it is not open to experiment, or that method has as yet been insufficiently applied, you are at liberty not to give it up and to doubt the wisdom of those who do. Unlike Bacon, who rejected hypotheses, he attempted to use them. The particular fact was important in Bacon's eyes, the general principle in Browne's.

Sir Thomas Browne was an Honorary Fellow of this College, but it is not correct to say, as it often is, that he became a Fellow of the Royal Society. The name "T. Browne" modestly squeezed into a corner of their Roll is that of his beloved grandson, to whom he wrote such charming letters. It has been stated on Wilkin's authority that Sir Thomas wrote the Harveian Oration for his son Edward to deliver. The *Sloane Manuscripts* contain this Oration in Sir Thomas's writing with references to the lecture theatres in different Continental universities which Edward had visited, for on this subject, as his father pointed out, he could tell "more than any other is like to say." But as a matter of fact Edward was never Harveian Orator. Perhaps with fatherly pride he had expected him to be, and it is unfortunate that he did not live long enough to see his son occupy our Presidential Chair, which would have more than compensated for any earlier disappointment.

It was Sir Thomas Browne who enriched our language with the word electricity. That he was himself an experimentalist can be seen from his *Miscellaneous Writings*. Mr. Geoffrey Keynes says that he "may be justly compared with his contemporary Robert Boyle in his restless curiosity and his use of the experimental method, though he fell far short of Boyle in his achievement." Dr. Needham, however, attaches great value to his work on the chemical aspects of embryology, which has been quite overlooked, although his originality and genius in this field is hardly less remarkable than in so many others. Harvey's approach to embryology, unlike Sir Thomas Browne's, was in the main morphological, and to-day the biochemical aspect of that subject has pride of place.

On such an occasion as this, when we are striving to find "an antidote against the opium of time," Browne's *Urne-Buriall* may strike us with a sudden chill: "The iniquity of oblivion blindly scattereth her poppy, and deals with the memory of man without distinction to merit of perpetuity. . . . Diuturnity is a dream and folly of expectation." Yet it is not entirely true, for were it so should we be listening to his solemn music to-day? Saintsbury, no mean judge, speaks of

"a mixture of shaded sunlight and half-illuminated gloom which makes the charm of his style and habit of expression; its connexion with the singular clarity and equity of his temper and judgement is quite unmistakable."

How well this corresponds with the description of the man by his intimate friend Whitefoot: "He was never seen to be transported with mirth or dejected with sadness." He was indeed himself the great "Amphibium," and while he was floating placidly in divided worlds, the great "Leviathan" pushed on stormily towards a completely materialistic philosophy.

Thomas Hobbes's Conception of a Totalitarian State

Thomas Hobbes was born in the year of the Armada and lived through the Civil War, the Commonwealth, and the Restoration to within nine years of the Revolution. Much had he seen and known of changes during those more than ninety years, yet he remained unchanging, obstinately set in his opinions. When the Long Parliament began to be active, he fled to France, where he became tutor to the future Charles II. But in 1657 he returned to England because he feared the attitude of the French clergy, who were no more tolerant towards him than the Puritans. He was a friend of Ben Jonson, of Lord Herbert of Cherbury, whose philosophy was diametrically opposed to his, and of Descartes, and he knew Galileo. Harvey left him a legacy. He was not only a friend of Bacon, but acted for a time as his secretary. Yet he never set much store by experiment, and he founded his mechanical theory on Galileo rather than on Bacon. It is a little disconcerting to find that men of such varied culture left him so unaltered. It is also suggestive of some attractive traits in the man that they put up with his truculence.

His theory was neither attractive nor flattering, starting as it did from a belief that the whole nature of man is a consistent scheme of selfishness. It was not until he was 40 that he formulated his philosophy on a geometrical basis. I like Aubrey's account of this. In a friend's library

"a copy of Euclid lay open at the forty-seventh proposition of the first book. So he reads the proposition. 'By God,' says he, 'That's impossible.' So he reads the demonstration which referred him back to another (and so on), that at last he was demonstratively convinced of that truth. This made him in love with geometry."

He wanted to reduce the doctrine of justice and policy in general to the "rules and infallibility of reason after the fashion of mathematics." For him motion was the one reality, all others but "the fancies, the offspring of our brains."

From geometry he passed through physiology to moral philosophy, believing that "the motions of the mind have physical causes." There is a suggestion of conditioned reflexes and behaviourism in the statement that "the internal motions set up by the action of objects upon the senses become reactions on the external world and these reactions minister to the preservation of the individual." He maintained that the appetites and passions of men are such that unless they be restrained by some power they will always be making war upon one another. Government is a social compact for the sake of peace, and men must give up their rights to one man or one assembly of men. And thus we arrive at the absolute monarch, who has rights but no duties, as the apex of his pyramid. Curiously modern some of these items, even if the sequence is a little obscure: matter as a form of motion, and conditioned reflexes leading up to the conception of a totalitarian state. And this quotation is painfully topical: "Covenants of mutual trust where there is a fear of not performance on either part are invalid." These are the main arguments in his chief and most famous book *The Leviathan*. But though an amateur, he could not refrain from controversy with genuine mathematicians and scientists such as John Wallis, the first of Glisson's pupils to proclaim Harvey's discovery in public, and with the great Robert Boyle. In these disputes he was labelled "the greatest of circle-squarers."

There is a logical sequence in his attempt to show that the whole fabric of human life and society is built out of simple elements. It is in his premisses that error lies, for "the individual is neither real nor intelligible apart from his social origin and traditions [which] influence

his thoughts and motives" (Sorley). Still, as I have reminded you, certain schools of thought to-day favour this pushing of the mechanistic theory as far as it will go, while recognizing, as Hobbes did not, that it must leave a whole system of values untouched. And for good or evil the totalitarian state is with us to-day. So one cannot help feeling a certain regard for the obstinate old man who stuck to his logic with more than French tenacity, and who was only just spared from seeing the divine right of kings finally perish in this country with the landing of William of Orange.

The Cambridge Platonists

For throughout the century the doctrine of the divine right of kings had been challenged by a people who were finding their staple intellectual and spiritual food in the Authorized Version of the Bible. As Fisher says:

"Here was a people's University. Plunging into this vast miscellany, where all that is most solemn and sublime from the distant East is mingled with the records of a savage antiquity, the peoples of England wandered at their own sweet will, unshepherded and unfettered, and finding always by the way lessons for the conduct of life, some of infinite depth and beauty, but others prompting to gloom, pride, and self-sufficiency."

What the nation needed on waking from the heady dreams of the Renaissance was what Europe needs to-day—a time of political peace and social calm. But it was not to be. Though knowledge continued to grow, the thoughts and emotions of the people were diverted by class hatred, religious controversy, and political storms. The climate of opinion was overcast with thunder clouds, and Milton's "two-handed engine at the door" stood ready to smite. It has been well said that it was King James's Bible that cost his son his head.

I believe that if the Cambridge Platonists could have had their way much strife would have been avoided. In the political and theological turmoil of the times theirs was a steadying and pacifying influence, but unfortunately not sufficiently widespread. Yet Harvey thought little of them. In this matter he was more Royalist than the King. Their home, both spiritual and material, was Emmanuel College. In 1584 Sir Walter Mildmay obtained a charter of incorporation, purchased the home of the Black Friars which had fallen into ruin after the dissolution of the monasteries, and rebuilt it as Emmanuel. Mildmay was a Puritan, and from the first the college had a decidedly puritanical character. He told Queen Elizabeth that he had "set an acorn, which, when it becomes an oak, God alone knows what will be the fruit thereof." That acorn grew fast, and Fuller wrote in 1634: "Sure I am at this day it hath overshadowed all the University, more than a moiety of the present masters of the Colleges being bred therein." Soon after Fuller wrote this the influence of Emmanuel was to spread across the Atlantic, for John Harvard migrated thence to Massachusetts and saved a college there from disaster with his father's money, to make it the pioneer university in the United States.

Mullinger, the erudite, if eccentric, librarian of St. John's College in my undergraduate days, regarded Sherman of Trinity as the founder of the movement, and Henry More, who was certainly a leader, hailed from Christ's. But all the others, of whom I need only mention Whichcote, John Smith, Cudworth, and Culverwel, were all trained at Emmanuel. Their avowed intention was to bring the Church back to "her old loving nurse—the Platonick philosophy." Their Platonism was, in Wordsworth's phrase, "reason in her most exalted mood," and has been expressed more fully as

"the mood of one who has a curious eye for the endless variety of this visible and temporal world, and a fine sense of its beauties, yet is haunted by the presence of an invisible

and eternal world behind or . . . within the temporal and visible" (J. A. Stewart).

But they were not mere mystics; they regarded abstinence from dogmatism as one of the most effective means of promoting unity and concord. Whichcote held that the inductive method was as calculated to prove effectual in allaying theological contention as it had been in the hands of Galileo and Harvey in their respective fields. He maintained that authority proceeds from right reason, not reason from authority. And further he said, "it ill becomes us to make our intellectual faculties 'Gibeonites,' hewers of wood and drawers of water for the will and the emotions." No wonder that most of them detested Hobbes's materialistic philosophy and were alarmed at his influence. Though he was intellectually more than a match for them, they had a vision which he lacked.

Though Puritan in origin, it would be a mistake to regard them as simply Puritans; theirs was a middle course. They had that wider culture which is sometimes successfully grafted on a Puritan stock. Dean Inge, in his book on the Platonic tradition, says:

"Besides the combative Catholic and Protestant elements in the churches, there had always been this [third] element with very honourable traditions, which came to life again at the Renaissance but really reaches much further back. The flame which [the Cambridge Platonists] kindled among us was lighted in Italy, when, Grocyn and Linacre visited the famous Platonic Academy at Florence." But they received "the treatment, as we know both from history and fiction, which those must expect who interpose their persons between two violent combatants. . . . In time of war the prophet and seer are not wanted. Effective partisan cries have to be devised which will appeal to and be understood by the masses. All fine issues are coarsened."

One must regretfully feel that, just as the story of the Reformation would have been very different if Erasmus instead of Luther had been its leader, so would the history of Charles I's reign if Roundhead and Cavalier could have listened to the sweet reasonableness of these Platonists. But the scholar is no match for the demagogue at such times.

Yet their labour was not in vain in the intellectual world. Only six months after Henry More entered, Milton left Christ's. We know that he described his academic studies as "an asinine feast of sow thistles and brambles," yet a few years later "Cambridge men were deep in Descartes and some of them in Bacon." A new intellectual life sprang into being, and the leaven spread as the Platonists were appointed to responsible positions throughout the university. I cannot enter the courts of Emmanuel without feeling that something of the cool restraining influence of those Platonists haunts them still. They should be living at this hour. Peace be to their ashes.

Seventeenth Century Belief in the Supernatural

We are apt to forget that all the Athenians were not reasonable enlightened people, clearly though their refusal to learn from experience proclaims the fact. In the same way we sometimes forget that the enlightenment of the Renaissance never penetrated the popular mind, which remained largely mediaeval in outlook. Just so to-day we can see what the ordinary man feels and thinks from the letters he is impelled to write to the popular press rather than from the writings of Whitehead and Inge. The great witch controversy of the seventeenth century throws light on the popular mentality, in which, alas, greater minds shared. To us it seems almost incredible that such men as Sir Thomas Browne, Henry More, and Joseph Glanvill should have believed in witches. But we must remember they felt that to doubt the existence of evil spirits implied an equal doubt in the existence of

beneficent spiritual forces. In appealing to demonology they were

"tapping a reservoir of traditional supernatural belief which lay deeper in the national consciousness than Christianity itself, and deeper certainly than the new ice-crust of rationalism which now covered it" (Willey).

H. V. Routh explains this obsession in terms of modern psychology by saying:

"As men struggled towards a higher level of civilization, they instinctively accused these pariahs [witches, etc.] of all that . . . progress had branded as accursed, but could not eradicate from the imagination. . . . For many, and in some cases, subconscious motives, men wished to believe in witchcraft—and the intellect generally follows the emotions."

It was the peaceful penetration of the scientific outlook which ultimately destroyed the belief in witchcraft.

In this matter Harvey was on the side of the angels. We know that he presided over the committee which examined the survivors of the unfortunate Lancashire Witches in 1634 and pronounced them free from any of the signs then supposed to indicate a witch. Then there is the amusing story of his being sent by the King to inquire about a witch on Newmarket Heath. Harvey pretended to be a wizard and got her to show him her familiar—a pet toad. In her absence he dissected it and found it to be an ordinary toad. He pacified the old woman, exasperated by the loss of her pet, by explaining he was the King's physician and had adopted this method of clearing her reputation. One can vividly picture the scene; indeed, if Harvey were the "cholerick little man" as pictured by Aubrey, it is all the more to his credit that he handled the infuriated beldame so gently. Nor does his courtesy in controversy, so rare in those days, support Aubrey's epithet. We may attribute some share in this tolerant attitude of his to the united family that formed the background of his early life. Indeed throughout they obeyed the request in their father's will to live in unity and mutual help, and one hears an echo of this in Harvey's injunction to our College.

The background furnished by Caius College, St. Bartholomew's Hospital, and our own College has been fully described by others and needs no comment from me save this: we like to think of them in terms of our personal knowledge; but they have all changed, almost beyond recognition, and changed immensely for the better. But until the war Padua still looked much as it must have done when Harvey paced its colonnaded streets and secluded Botanic Garden. He must have gazed on Giotto's simple dignified frescoes in the Chapel of the Arena, and marvelled as we do still at the mingled beauty and learning so enthusiastically expressed by the youthful Mantegna on the pictured walls of the Eremitani. The vast Salone still shelters Donatello's wooden horse, and his sculptured high altar reposes under the five domes of San Antonio. In the buildings of the University, nicknamed "Il Bo," stands the anatomical theatre where Harvey watched the dissections of Fabricius—that theatre which served as the model for the old anatomical theatre at Cambridge that lasted into my own student days. Just as the spirit of his maturer age is preserved in this College, so in Padua we can best realize the material surroundings of Harvey's youth. Here, too, we may well imagine he gained that knowledge of art which fitted him to be entrusted with the responsibility of buying pictures in Venice for such a connoisseur as Charles I.

Harvey's Studies in Embryology

Soon after that historic cannon ball on Edgehill roused Harvey from his book he retired to Oxford and the pursuit of embryology. He had previously gathered much practical lore from the keepers of the royal forests, and a countryman said of him "if he had been as stiff as some

of our starched and formall doctors he had known no more than they." It must have been a relief to leave the turmoil behind and to watch the development of the chick in Bathurst's rooms in Trinity. This aspect of his work has quite naturally received less attention in these Orations, except for Dr. Herbert Spencer's scholarly exposition fifteen years ago. Since then embryology has advanced in a new direction which makes it fitting to return to the subject for a few moments.

The widest differences of opinion have been expressed concerning his *De Generatione Animalium*. Sir George Ent felt like "another Jason, enriched with the Golden Fleece" when he was allowed to carry it off for publication. Some others have regarded it as a splendid failure. The recent critical analyses of its contents by Needham and by Meyer will help to restore the balance between those two extremes. One cannot help feeling that loyalty to a great name has inspired praise lavished by some, and that the work contains much speculation as well as observation.

I said at the outset that the personality of every great man has a certain impact on his own generation. The converse is inescapably true. We may rightly marvel more at the release from contemporary thought which Harvey displayed in his work on the circulation than at his bondage to it as shown in his embryology. The results of the different mental attitudes that characterize the two books may be summed up in Bacon's aphorism: "If a man will begin with certainties he shall end in doubts, but if he will be content to begin with doubts he shall end in certainties." When at the end Harvey said he despaired of understanding development, we may fairly ask whether he did not begin with what he regarded as some certainties.

Yet much of value remains. Harvey stoutly upheld the doctrine of epigenesis against the prevalent theory of preformation. It is astonishing what a hold that Chinese box idea of the ovum continued to have even into the early nineteenth century. Harvey's conception of the gradual differentiation of the simple and homogeneous into the complex and heterogeneous showed philosophical insight, and anticipated the ideas of the present century. Nor was this all. He anticipated Glisson by a quarter of a century in the generalization that all living tissues are characterized by a response to stimulation, and he contested the view of his own master Fabricius that the maternal and foetal circulation directly communicate. And to him we owe the epigrammatic generalization "*ex ovo omnia*."

Considering how little Cambridge did for Harvey in his lifetime, I feel in private duty bound to emphasize something of what my University has done in the last sixty years to develop some of his views. Harvey's idea of the intrinsic rhythm of heart muscle was carried to triumphant demonstration by Gaskell and has formed the basis of the new cardiology. Frank Balfour's evolutionary conceptions of embryology may be out of fashion now, but what a stimulus they gave to the whole of animal morphology. And they were based on epigenesis. Balfour had been dead seven years when I went to Cambridge, but his old department was still lit with the radiance of his enthusiasm. The studies of Walter Heape and of our own Baly medallist, F. H. A. Marshall, have carried on the torch. And the latest phase, the new chemical aspect of embryology, is associated with the name of Joseph Needham, our Oliver-Sharpey Lecturer of this year.

The Modern Parallel of Harvey's Time

I have tried throughout to indicate the ways in which the turmoil of thought in Harvey's time is reproducing itself to-day. In both instances there had been a phase

of great and rapid expansion both in thought and in wealth, followed by disillusionment on the intellectual side and greater stringency on the financial. On each occasion old standards were destroyed before adequate new ones could be provided in their place. A new phase of thought is accompanied by a new form of art. If the Baroque did not spring from the Counter-Reformation it was at least greatly fostered by it. The exponents of the new Baroque, Picasso and Epstein, appear to express the feelings of the post-war generation more satisfactorily than they do mine. In their influence on younger poets Donne is paralleled by T. S. Eliot. It is not without significance that some modern writers are beginning to justify Machiavelli and his ideal of the domination of a ruthless leader, while Elizabethan and Jacobean thinkers felt the effect of his doctrines to be corrosive and withering. It has been well said that:

"the sinking of the clear exaltation of Elizabethan dramatic poetry into the sophisticated, satirical conflicting mood . . . of the Jacobean drama had many concurrent causes. The apprehension, regret, and disillusionment inevitable to the conscious passing of a long period of high civilization were not in this case unfounded, and those who had known the great age, even those who had only grown to manhood during its latest year, were touched by them (like the generation that succeeded the Great War) without being able to define their loss in what had passed. Moreover . . . a stage of development in which some transition from wonder and discovery to assessment and criticism was inevitable."

The modern parallel unfortunately needs no emphasizing. There is, however, one outstanding difference. Then the way of investigation by experiment was new and seemed full of hope; now there are murmurs to be heard against science itself. Bacon's utterances have not quite the same thrill. The discovery of facts has not in the long run proved so exhilarating after all (Basil Willey). Science, on the one hand, offers material comfort, on the other, intellectual abstractions. This leads to a mechanized world without moral direction. Too many men use dangerous machines like toys, as would a child. In the reaction against this we are actually hearing sighs of regret for the passing of the scholastics, with their strange doctrines that a belief can be metaphysically true though empirically false. Men grasp at the indeterminacy of the atom to revive the idea of miracles. As in other ages of spiritual doubt and political uncertainty, the cult of astrology, not to mention other strange cults, is becoming fashionable.

Man's brain has not been able to adapt itself quickly enough to the material changes of the last hundred years. Sir Alfred Ewing was saddened in his last years by the use men were making of the inventions he himself had helped to promote. Lowes Dickinson asked if there were a way of escape from the alternatives: Shall we allow science to destroy us, or shall we destroy it to save ourselves? Such statements, however, relate to the physical sciences: biology must restore the balance. If we would understand ourselves—a much-needed investigation—we must realize that we are subject to the laws of biology. A study of history from the biological angle would contribute towards that understanding.

And of all branches of biology medicine can play the largest part in the reconciliation of science with ethics. In these latter days medicine is becoming increasingly psychological in its approach to suffering, while developing its scientific armament as much as possible. The field of medicine is ever widening; we can neither remain isolated in our laboratories nor merely stay by the bedside. We are taking a broader view of Harvey's injunction to seek out the secrets of nature, and are becoming one of the leading social services. In that development I am proud to think that his ancient College is now playing an increasingly important part.

Towards the end of his life Harvey wrote to a young medical man that as an explorer his own days were, alas, numbered. "But," said he, "it will always be a pleasant sight to see distinguished men like yourself engaged in this honourable arena." There spoke the true spirit of adventure, glad to hand on the torch to the younger generation. In like spirit it is good for us on this morrow of St. Luke's to pause amid the rush of life for an hour to join hands with those who have gone before and with those who will come after us. Thus is the real continuity of this College assured. And so I exhort you in Harvey's own words "for the honour of the profession to continue in mutual love and affection."

CLINICAL EXPERIENCES WITH THE NEW ALKALOID, ERGOMETRINE*

BY

CHASSAR MOIR, M.D., F.R.C.S.ED., F.C.O.G.

READER IN OBSTETRICS AND GYNAECOLOGY, UNIVERSITY OF LONDON
(BRITISH POST-GRADUATE MEDICAL SCHOOL)

At the Centenary Meeting of the British Medical Association in 1932 I had the privilege of showing to this Section the results of work that had just been done which clearly showed that the traditional clinical action of ergot was due not to the alkaloids ergotoxine and ergotamine, which had hitherto been regarded as all-important, but to a substance still unidentified.¹ At that time I was actively engaged in a combined work with the late Dr. H. W. Dudley in an attempt to identify this substance. The search was long and difficult, but was eventually brought to a successful conclusion by the isolation in pure chemical form by Dr. Dudley of a new alkaloid to which the name ergometrine was given. A description of this new alkaloid, together with its essential chemical, pharmacological, clinical properties, and method of isolation was given in March, 1935,² and subsequently amplified.^{3 4 5}

It is now sixteen months since the manufacturing chemists of this country made ergometrine freely available to the medical profession, and it is fitting at this time to endeavour to assess the usefulness of the drug in clinical practice. Before dealing with purely clinical matters it is necessary to make certain remarks concerning the position of the new alkaloid.

Nomenclature

At one time some confusion threatened to arise by announcements made from three other widely separated laboratories of the successful isolation of new ergot alkaloids having high activity of the type under discussion.⁷ These alkaloids were named ergotocin (Kharasch and Legault), ergostetrine (Thompson), and ergobasine (Stoll and Burckhardt). In the case of two of these substances the suggestion was made that they differed in certain chemical characteristics from the ergometrine discovered and described in this country. Any doubt which these claims may have aroused has now been dispelled. As the result of efforts made by Sir Henry Dale, a friendly exchange of samples has been effected between the different laboratories and, following comparative tests carried out by the various workers concerned, a combined letter has now been issued in which the four alkaloids are definitely stated to be identical.⁸

It is fitting to mention that the manufacture and sale of ergometrine is, and always has been, entirely free from

patent rights, nor is the name in any way protected. From the time of its discovery the methods of preparation have been openly published for the benefit of scientific workers the world over. On the other hand, the three other names suggested for what is now admitted by all concerned to be one and the same alkaloid appear in all cases, at one time or another, to have been subject to some kind of proprietary protection; and the methods by which isolation was accomplished have not yet been published.

The name ergometrine, besides being free from commercial interests, is also the name proposed by the workers who in 1932 first demonstrated the presence of the new substance in ergot, and who in 1935 identified the substance as a new alkaloid and gave the first chemical and pharmacological description by which the substance could be identified by other workers. It may be supposed that these reasons have been effective in establishing the use of "ergometrine" as the scientific name of the new alkaloid in countries other than this. "Ergometrine" is also the name by which the substance is known in clinical medicine in this country and in Europe generally.

It should be mentioned, however, that the Council of Pharmacy of the American Medical Association has decided to rename the alkaloid for clinical use in the U.S.A.⁹ This decision, it has stated, was made because the names in use were objectionable because (1) they were registered trade names, or (2) they were therapeutically suggestive. The first objection does not apply to ergometrine, and one must therefore suppose that the name was criticized because of its therapeutic suggestiveness. In answer to this it has been pointed out that the familiar word "ergot" has for the physician a much greater suggestion of special uterine action than has the Greek root to which objection is taken, and that by choosing "ergonovine" as the new name the American Council has shown that it has no difficulty in swallowing the "ergo" camel while straining at the "metrine" gnat. The decision appears to be a somewhat pedantic application of a principle which in certain instances may possibly be useful, but which even in the best circumstances inevitably results in creating confusion in medical literature.

In passing, it may be pointed out that the Council's action is in keeping with its decision a few years ago to alter the name of the pure crystalline vitamin C, which its discoverer Professor Szent-Gyorgyi and his collaborators had named ascorbic acid. In an inconsistent fashion, however, the Council takes no exception to the use in the United States of certain other names of far greater therapeutic suggestiveness than that of the substance under discussion. The alkaloids morphine and narcophine are examples of this. Finally, during more recent months no fewer than three other new ergot alkaloids^{10 11 12} (unlikely to have any clinical significance) have been discovered, a circumstance which makes the name "ergonovine" a particularly unfortunate choice.

Characteristics of Ergometrine

Ergometrine has the formula $C_{19}H_{23}O_2N_3$; the molecule is therefore much smaller than that of the ergot alkaloids previously known. It is remarkable for the rapidity with which it is absorbed from the alimentary canal, a feature clearly differentiating it from the other ergot alkaloids. It is also reasonably stable, is resistant to boiling, and keeps well in crude ergot extracts. Prepared in the form of the hydrochloride or certain other salts, it keeps well in the purified form in dry state or in ampoules of solution. It is highly active in promoting contractions of the puerperal uterus, and even in large doses is free from undesirable side effects—again a feature which distin-

* Read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Oxford, 1936.