The Harveian Oration

ON

HARVEY: THE MAN, HIS METHOD, AND HIS MESSAGE FOR US TO-DAY

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In the short time at my disposal I propose to direct attention to some aspects of Harvey's character and personality, to the intellectual atmosphere in which his great discovery came to birth, and to the message which he has for our own day.

The main biographical facts of Harvey's life are well known to everyone here, and Sir Wilmot Herringham, in his fascinating Oration two years ago, gave us some interesting details about the Harvey family. When all is said and done, however, we really do not know very much about him, for, as Sir Wilmot said, Harvey had a singular capacity for slipping through life unnoticed. We do not even know whether he attained that happiness at home which, according to Dr. Johnson, is the ultimate result of all ambition; for he was childless, and Mrs. Harvey is only a shadowy figure in the background of his life. It is a pity that he had no Boswell. If he had, we should not only have known many more details of his walk and conversation, but we should have had more of his pregnant sayings, such as those recorded by Aubrey: "that man is but a great mischievous baboon," and "that the Europeans know not how to order or govern their women, but that the Turks are the only people who use them wisely," and of those *obiter dicta* scattered throughout his writings—"Many things are discovered by accident"; "Men were first let to cultivate philosophy by wondering at what they saw," and so forth. As it is, we might say of Harvey as the present Poet Laureate has said of Shakespeare:

"That we know little of his human relationships is one of the blessed facts about him. That we conjecture much is the penalty a nation pays for failing to know the genius when he appears."

CHARACTER OF HARVEY

Fortunately, however, the main outlines of Harvey's character are writ large in his works, indeed few scientific writers are more self-revealing.

And first of the characteristics so revealed I would put his *love of truth*. There is no word commoner in his writings than "truth," and we may be sure that none was oftener on his lips. "My trust," he boldly declares, "is in my love of Truth"; or again, "I avow myself the partisan of Truth alone." Like all great discoverers he seems to have had a flair for truth, and that "fanaticism of veracity" of which Huxley spoke, and doubtless he was ready, as Huxley also was, to follow the truth into whatever abyss it might lead him. It was one of the greatest compliments that he ever paid to the Fellows of this College that he assumed that in this matter they were like-minded with himself. "I even ventured to hope," he says, "that I should have the comfort of finding all that you had granted me in your sheer love of truth, conceded by others who were philosophers like yourselves."

Next perhaps to his love of truth was his *reverence for Nature*, which seems to mean in him the same thing as reverence for the Creator. He appears to have had what Einstein calls a truly religious feeling in face of Nature. "Nature, perfect and divine, is ever in the same things harmonious with herself." "Nature ever labours with foresight and intelligence." "That which is in

conformity with Nature is right." "There is nothing either more ancient or of higher authority than Nature." "In Nature, just as there is nothing lacking, so there is nothing superfluous." These, and many similar quotations which might be made from his writings, reveal his attitude. In his reverence for Nature he reminds us indeed of some of the great poets. He would have perfectly understood Nature as the "Old Nurse" and would have subscribed heartily to the affirmation that "she never yet betrayed the heart that loved her."

Equal to his love of truth and his reverence for Nature was his *charity*, using the word in the scriptural sense. Of no man can it more truly be said that he envied not, vaunted not himself, was not puffed up. "Whilst I think the industry of everyone deserving of commendation," he says, "I do not remember that I have anywhere bepraised my own." He did not "behave himself unseemly," for, as Willis pointed out, all his public actions known to us were marked not only by propriety but by grace, and it was as true of him as it was of his royal master on the scaffold, that he "nothing common did nor mean." He sought not his own and was not easily provoked. Even when his papers and scientific records were destroyed by the mob—which he says was the worst crucifixion he ever had to endure—his only comment is: "Let gentle minds forgive me, if, recalling the irreparable injuries I have suffered, I here give vent to a sigh." Finally, he thought no evil ("to return evil speaking with evil speaking I hold to be unworthy of a philosopher," he said), but, as we have seen, rejoiced in the Truth.

Imagination, if by that we mean the creative faculty of the mind whereby it moves outside experience, was not so conspicuous in Harvey as it has been in many famous discoverers. The *De Motu* shows little of it. His argument in that great book proceeds forward, almost in pedestrian fashion, from position to position, till at last he is driven, as it were against himself, to see the truth; and his other book, the *De Generatione*, shows fancy rather than imagination. He was not one of those who saw a truth before he proved it. His mind did not take a sudden imaginative leap from the particular to the general, as Darwin's did, nor did he use all his faculties together to reach a result intuitively by a process hardly to be observed or analysed. He was more like Hunter in his love of facts, but he saw quickly the significance of facts within his experience, and perhaps that also is imagination.

Few great men, said Dr. Arnold, have lacked *humour*, and there are indications that Harvey was not wanting in this priceless gift, though his humour was probably of a sub-acid and rather sardonic sort, and his laughter would not be the "sudden glory" of Hobbes. There is humour in his description of his discovery of an egg in the dead body of Mrs. Harvey's parrot, which had all its life been supposed to be a male, and his account of his visit to the reputed witch at Newmarket is also full of it in a quiet way. His contemporaries evidently had some trust in his humorous sense, as is shown in Selden's amusing description of the cure of a person of Quality "with two devils in the head" in which he secured Harvey's co-operation. He was able also to see humour even in little things.

"How pleasantly are we moved to laughter," he writes in the *De Generatione*, "when we see the poor hen following to the water the supposititious brood of ducklings she has hatched, wandering restlessly round the pool attempting to wade after them to her own imminent peril, and by her noises and various artifices striving to entice them back to the shore."

His sense of humour must have been of value to him, not only in furnishing him with hints of truth, but in enabling him to face with equanimity the prejudices of

his Galenic contemporaries, just as Galileo, no doubt, found it helpful in facing the Inquisition and in enabling him to murmur, as he rose from his knees after his recantation, "*Eppur se muove.*" For humour, as Mr. Graham Wallas reminds us, is a powerful instrument for clearing away what Carlyle described as "the dead pedantries, inveteracies, and accumulated dung-mountains" of scientific as well as of social, political, and religious thought; nor need we have any doubt that Harvey was always able to recognize in himself what W. K. Clifford called the still small voice that whispers "Fiddlesticks."

Reflecting upon the sense of humour in Harvey, it is permissible to regret that it is a quality not more abundant in scientific workers and writers. It would save us from much pedantry and dullness, from much solemn trifling calling itself research, and it would make scientific literature immeasurably more readable.

Love of truth, reverence, and charity, with some tincture of imagination and humour—these were the chief features of Harvey's personality; but to complete the picture we must add moral courage—which Michael Foster said is an essential part of the scientific character—patience, and reflectiveness. It must have required much moral courage to attack the Galenic stronghold, and it is no wonder that Zachary Wood apostrophized him as "Truly a bold man, indeed, O disturber of the Quiet of Physicians! O Seditious Citizen of the Physical Commonwealth!" His patience was shown not only in the carrying out of his investigations, but in his reluctance to make them public. He always bided his time. He was like Darwin, who waited twenty-nine years for the results of a single experiment, and all of whose work on evolution was published after he was 50. In his slowness to publish he resembled other great men of his time and of the next century—Galileo, Newton, Bacon, Cavendish, and Gauss. How different from us to-day, with our "preliminary notes" and disputes as to precedence in discovery! Lastly, he was a reflective philosopher. Like Hunter, his delight was to think. We are told that he would withdraw himself to the leads of his house in town, or to caves in his garden in the country, in order to indulge in contemplation. Surely in this, also, he has a lesson for our unreflective time.

PERSONALITY IN SCIENCE

I have dwelt at some length upon the main features of Harvey's character because, in so doing, I believe that I am strictly fulfilling the injunction laid upon me to-day to commemorate the benefactors of this College. For, whilst we are grateful to our material benefactors, we owe an equal debt of gratitude to those who have conferred upon us the benefaction of their example. Of these Harvey himself is chief, but the College has reason to be thankful that it has never wanted amongst its Fellows men who were like-minded with him, but who—mute, inglorious Harveys as they were—lacked the touch of genius, or perhaps only the opportunity, which would have made them famous as he is.

In these days, when it is the fashion to denigrate great men, it is pleasant to remember that no one has yet seriously attempted to belittle Harvey. William Hunter, it is true, tried to depreciate his share in the discovery of the circulation, but he made no reflections on Harvey's character, whilst the curious statement made in a letter from Isaac Walton to Aubrey that Mr. Warner had told Lord Winchester that he (Warner) "had first found out the circulation of the blood and discovered it to Dr. Harvey, who said that 'twas he himself that found it," may probably be dismissed as apocryphal. No, on this our festival let us boldly praise famous men, and on St. Luke's Day let us be grateful, not only for the great

discoverer, but for the man who exhibited in his character so many of the virtues of the Beloved Physician.

Apart from these domestic reasons, peculiar to this College, there are wider considerations which make the study of the character and personality of Harvey, as of those of all great discoverers, of interest. What part, we may ask, does personality play in the highest scientific work?

In art, of course, the personality of the artist is everything, and the same is true of literature—the style is the man himself. But in the case of science the influence of personality is not so obvious. There is a tendency, indeed, to regard scientific men as machines who discover facts and laws by a purely intellectual process with which character has nothing to do. This, surely, is too narrow a view. Truth is as many-sided as human nature, and requires the whole man to discover it. The great scientist must not only love truth as Harvey did, but he must have a feeling also for the beautiful and for the good. For truth is perceived by the emotions as well as by the intellect, and the poet and the discoverer are to some extent one. Moral qualities also are required, such as honesty and a sense of justice. Of course, all scientific men do not possess these qualities. There is no type of mind which can fairly be described as scientific, for there is no intellectual specialization *ab initio*, and scientific men are as full of prejudices and weaknesses as others; Harvey himself, let us be thankful, was neither saint nor sage. In proportion, however, as the emotional and moral elements in his personality are developed and cultivated will be the likelihood of the investigator attaining to the truth. In the words of Pascal, "It is only the great souls who attain to the utmost limits of science," or, as Harvey himself put it, "Nor does God give that which is most excellent and chiefly to be desired—wisdom—to the wicked." The real investigator must have faith, hope, and charity: faith in the object of his quest and in his power to reach it; hope to enable him to overcome all obstacles in his way; and charity, that is love of the truth, and, in medical science especially, love also of mankind.

And if personality is important in the attainment of truth it is surely equally important as Truth's advocate. The comparative absence of opposition to Harvey's discovery was no doubt partly due to the disarming modesty with which, like Lister, he gave it to the world, just as on the contrary Pasteur's aggressive cocksureness aroused the resistance of his contemporaries. But if personality is of importance in science in general, it is even more important in medicine, which is both a science and an art, and in the application of medical science in practice the personality of the doctor is as dominant as that of any other artist. Nor is its importance likely to lessen in future, for as investigation ceases to be individual, and becomes more and more collective, so will it be essential to have leaders who, by their personality, can attract and control the subordinate workers.

If, then, personality is so important both in our science and in our art, it is surely matter for congratulation that our College, in selecting Members for the honour of its Fellowship, has always considered not intellectual attainment alone, but the character and quality of the whole man.

THE INTELLECTUAL CLIMATE OF THE SEVENTEENTH CENTURY AND OF TO-DAY

But Harvey's gifts of character and intellect, notable though they were, would not alone have enabled him to make his great discovery, and, like all innovators, he owed much to his predecessors. It is not usually difficult to trace the pedigree of great ideas—Einstein's theory is, perhaps, an exception to-day—for discoveries rarely spring to life full-grown like Minerva from the head of

Jove. What Harvey owed to his predecessors in antiquity, and especially to Aristotle, has been shown by our learned registrar, Dr. Raymond Crawford. He derived much from the Italian anatomists, and no doubt also from his contemporary Galileo, the real founder of modern science, while his probable debt to Bacon and to Gilbert has been pointed out by Sir William Hale-White. All this is now familiar ground, and I do not propose to go over it again, but as "we are more children of the age we live in than of our own fathers," Harvey must be regarded as having been fortunate in the climate of opinion, to use Glanvil's phrase, in which his discovery came to birth. It has not always been so, of course. It is possible for a discovery to be born into an uncongenial mental climate, as Servetus and Semmelweis, to mention only two examples, found to their cost. But in Harvey's case the time was ripe for the man. Standing between the sixteenth and the eighteenth centuries, the seventeenth partook both of the credulity of the one and the scepticism of the other. It owed much to the Renaissance and more, perhaps, to the Reformation. It was a time of great awakening and renewal—the *Instauratio Magna* of Bacon. Scepticism and doubt, the active doubt which Goethe praised, were replacing credulity and dogmatism. Men were learning to trust reason rather than authority, to assert the liberty of individual judgement, to set the natural above the supernatural, and to look to the future rather than to the past. The imagination of the age had been kindled by the Copernican Theory and by the new orientation of man to the universe which it brought about, as well as by the geographical discoveries of the preceding epoch. The century owed much, also, to its great poets. It has been well said by Buckle that it was no accident that Shakespeare preceded Newton, for the poets not only stimulated imagination, but led men back to nature. Finally, as Dr. R. O. Moon has shown, it was an age greatly indebted to its philosophers, to Bacon, Descartes, and Spinoza especially, who created a spirit of scepticism and inquiry. Stimulated by their ideas, more men than ever before were turning away from the barren controversies of religion and devoting themselves to scientific pursuits, and these men animated and encouraged one another.

The practical results of the new outlook were also becoming apparent. Modern anatomy and physiology had already come to birth with the publication of Vesalius's great work only a generation before Harvey. Chemistry was emerging from alchemy, just as astronomy had already done from astrology, and in the early years of the century the science of physics also sprang into being. Nor was the revolt from authority seen only in science; it was being carried by Bacon into philosophy, by Hobbes and Glanvil into metaphysics, by Cromwell into politics, and by Harrington and Algernon Sydney into the theory of government. It was a time, in short, when anything seemed possible.

It is interesting to contrast the spirit of the age of Harvey which I have depicted with that of to-day. Like him we live in a period of great unrest—political, social, and economic—but in our own age there has been a destruction of values, a throwing down of standards, and a removal of moral and intellectual landmarks of which the seventeenth century knew nothing. As a recent writer has said:

"Behind both the good and the evil manifestations of that age lay a philosophic absolutism and a certitude of conviction now lost. Even those men who had shaken off some prejudices and particular beliefs retained the conviction of the eternal and absolute validity of truth and duty—a conviction of the dignity of man and of the worth of his work still illuminated human thought."

The effect of the moral and intellectual chaos of our age has been disastrous to the arts, and to some extent to literature, but it has not yet affected science. It may be, as Sir Frederick Andrewes suggested in his Oration more than ten years ago, that Western civilization is now in a state of decline, but that science, as has always happened before, is affected last. We may even have to look in future to science for our poetry—and indeed there is more of the spirit of true poetry in the writings of the modern cosmogonists than in all the anthologies of neo-Georgian verse. But if the march of science shows no signs of slackening, at least we have lost the scientific optimism which inspired Bacon's *New Atlantis*, and which was shown even more conspicuously by the scientific writers of the mid-nineteenth century. We are to some extent disillusioned with the results that science has yielded us. We are not so sure that the "Universe is friendly" after all, and that human life may not be merely "a discreditable episode in the history of one of the meaner planets," nor have we yet adjusted ourselves to the discoveries of modern astronomy any more than many men of Harvey's time had adjusted their beliefs to the great discovery of Copernicus. But this attitude is not likely to diminish the zest with which medical science in particular is pursued to-day. Never, on the contrary, has there been a time when conditions were more favourable for it, or when it and the practical benefits it brings were more sought after, for in our day the doctor has replaced the priest. This very popularity, however, has its own dangers. What we have to fear is the influence of the mass-mind, of the increasing importance attached to quantity rather than to quality in life, the undervaluation of knowledge for its own sake, and the exploitation of discovery for commercial ends. We may suffer, also, from the deflection of science by the pull of the politician, the philanthropist, and the press.

On the other hand, in all that concerns the apparatus of knowledge we have immense advantages compared with the seventeenth century. In Harvey's day there were no laboratories; scientific societies were only being founded, and scientific journals did not exist. The diffusion of new knowledge was slow and difficult, and investigators communicated their ideas and discoveries mostly by correspondence. How different it is to-day, when we have more laboratories than trained men to work in them, when societies have multiplied to a point when it is difficult to get audiences to attend them, and when our scientific periodicals are counted by the thousand. But these things also have their drawbacks. In Harvey's time Latin was the *lingua franca* known to workers in science in all countries. To-day anyone who aspires to be a scientist must know two or three modern languages besides his own—to say nothing of American. The accumulation of knowledge, too, is overwhelming. Look round this room in which we are met. It is a noble library indeed, but is it not also a mausoleum? And how many facts which men are at present hunting for, and theories which are even now being put forward as new, lie already buried in these shelves? No, we do not suffer to-day from starvation of the intellect: our danger rather is that science may become suffocated in its own secretions; and that a remedy should be found for this congestion and plethora of the scientific body is one of the most pressing needs of our generation. Again, in the time of Harvey there was no specialism, and it was still possible for a man to say that he took all knowledge as his province. Now specialism has been carried to the point of a vice, and the right hand of science does not know what the left is doing. We may agree with Sir Arthur Keith that specialism is inevitable as medical science evolves, but none the less we may be permitted to regret it. For specialism, however favourable to the

accumulation of facts, is bad for the philosophy of knowledge. The worker in one province is too absorbed to notice what those in other provinces are about; indeed, the terminology of the different specialties is now become so esoteric that other workers cannot understand it if they would. There is, in consequence of this, too little speculation and too little use of the imagination, and, compared with the wealth of knowledge and the brilliance of observation which it exhibits, most scientific literature is barren in ideas. It would be good for us all, perhaps, if there was a close time in laboratory work and the publishing of papers for, say, five years, in order to give us leisure to digest the huge accumulation of knowledge which we already possess, and to think out new lines of advance.

Certainly the men of the seventeenth century, considering their inferior opportunities, did in this respect much better than we. They showed more imagination, they were less afraid of speculation, and, alike in the solidity of its substance and in the perfection of its form, their work compares favourably with ours. It is true, of course, that our times are unpropitious to reflection, and we may well say, with the Victorian poet, though with better reason even than he:

" But we, brought forth and rear'd in hours
Of change, alarm, surprise—
What shelter to grow ripe is ours?
What leisure to grow wise? "

But let us take courage again from the example of Harvey. He also lived in troublous times, yet he was able to abstract himself from the turmoil around him, and in thought and meditation to possess his soul in quiet.

CONSERVATISM IN MEDICINE

It might have been supposed that Harvey's great discovery, born into such a congenial intellectual climate, would have been accepted everywhere and at once; yet we know that, in fact, some time elapsed before the truth was generally recognized. There was nothing new, however, in this. Truth has always had to fight its way. "How difficult it is," said Pasteur, "to obtain the triumph of truth." Jenner, Simpson, Lister, and Darwin all had the same experience. It may be, as Mr. Wilfred Trotter would have us believe, that the truly scientific mind is altogether unafraid of the new; but, if so, the truly scientific mind must be rare. For history shows that prominent men of science have often themselves been the chief opponents of new truth. Simpson opposed Lister; Liebig opposed Pasteur; Owen opposed Darwin. In the seventeenth century Bacon rejected the Copernican theory, and poured scorn on the work of Gilbert on the magnet. Even Harvey, as we know, refused to recognize the demonstration of the lymphatics. We may flatter ourselves that new truth would have a better chance to-day, but the long neglect of Mendel's work, and that of Henri Fabre, should be a warning to us.

This conservatism of science is at first sight surprising, and it is of interest to inquire into the causes of it. Archibald Pitcairne ascribed the opposition to Harvey's discovery simply to ignorance and jealousy, whilst a recent American writer, Mr. Stern, using the language of modern psychology, has attributed it to such mental factors as "fear reactions in the presence of the unknown," and "difficulty of reconditioning behaviour patterns" along with cultural influences such as the power of tradition and authority, and ignorance of the experimental method. On the other hand, a modern English critic of science, Dr. Murray, thinks that the excessive conservatism of medical men is largely due to our habit of "laying down the law," as he puts it, to our patients. I prefer, however, to all these explana-

tions, the simple one of Bagehot that "the greatest pain to human nature is the pain of a new idea."

But, none the less, a great deal may be said in defence of the conservative attitude. It may be a good thing for truth to fight for its existence, for it is only by prevailing that it is proved to be truth. As Dr. Johnson said, "It is open to any man to state what he believes to be the truth, and it is open to any other man to knock him down; martyrdom is the test." We may even call Harvey himself as a witness in the defence of conservatism. "The authority of the ancients," he says, "is not to be readily thrown off," and again, "Everything is not to be received at once with an unthinking credulity." We speak with approval of the virtue of the open mind, but there is also something to be said for the closed mind, for it is often forgotten that an ever-open mind is like an open drain; it is apt to be the receptacle of a great deal of rubbish. There are times when we should have the courage to say of the new, "This is not true, or, if it is, it has no right to be." Especially in medicine is a reasonable conservatism to be commended. We dare not hazard the lives of the patients entrusted to us on the chance of a new theory being sound, or a new drug both useful and safe. We must first prove all things—and that takes time—and if there were more conservatism and less credulity in our profession we should be saved from those ephemeral fashions in pathological doctrine and in methods of treatment which do so much to bring contempt upon our art.

I would therefore venture to claim it as not the least of the services of this College to Medicine, that we have always, alike in matters of policy and of practice, adopted an attitude of wise conservatism.

OBSERVATION VERSUS EXPERIMENT

It is one of the duties of the Harveian Orator to remind his hearers of Harvey's injunction that they should "study and seek out the secrets of Nature by way of experiment." However necessary in Harvey's day, this exhortation has become superfluous in our own. The experimental method has gone from one triumph to another, and now dominates the whole field of science, and its services to medical science in particular were eloquently brought before us by our late President, Sir John Rose Bradford, when he delivered his Oration four years ago. But to those whose work lies in the clinical field, Harvey's advice must always have seemed a counsel of perfection. For how is one to apply the experimental method at the bedside? The imperious demands of practice leave little leisure for the planning and carrying out of experiments, whilst the claims of humanity restrict the application of the method in the case of the individual patient. It need excite no surprise, therefore, that some of the most earnest investigators in our science have suggested that a special class of clinicians—spoken of as research physicians—should be called into existence, who should devote their whole time and energies to searching out the secrets of disease by the experimental method, both in the laboratory and in the ward. This is not the occasion on which to discuss this proposal in detail. It is easy to see practical difficulties and objections, but on this day of all others it is a proposal which, in principle, should secure our sympathy. We may be certain that Harvey would have approved it. Indeed, it is difficult to imagine a position which would have been more to his own taste and more adapted to his abilities than that of a "research physician."

But whilst we welcome any plan which offers a chance of increasing the application of experiment in practical medicine, it does not follow that we must turn our backs

upon the old traditional clinical method of observation. The respective merits and scope of the two methods, experimental and observational, have lately been discussed by some of the acutest minds in our profession, and I do not intend to reopen the controversy, though it may be well to point out that the two methods are not mutually exclusive. Harvey himself was a great observer. This is apparent in all his work as an investigator, and had his projected volume of medical observations ever seen the light of day we may be sure that he would have appeared as a great clinical observer also. Devoted though he was to the experimental method, he frequently urges the duty of observation. "Diligent observation is requisite in every science," he says, "and the senses are frequently to be appealed to." And again, "We are of opinion that for the acquisition of truth we cannot rely on the theories of others, except there be added thereto a diligent course of observation." It has been said by someone that in experiments we question Nature; in observation we only listen to her. True, but we shall question Nature in vain unless we listen to her replies. In other words, there is no real opposition between experiment and observation, for experiment is only observation carried out under artificially limited conditions and on a selected group of phenomena.

Nor can we agree with those who would have us believe that no further advances by purely observational methods are to be looked for. It may be that in countries of the temperate zone the clinical field has been so thoroughly gleaned that there would seem to be little chance of anything which mere observation can detect remaining unknown. We must remember, however, the saying of Bacon that, "noble inventions may be lying at our very feet and yet mankind may step over without seeing them." Even in recent years new diseases and "clinical syndromes" have been discovered and their natural history described by the observational method. It will suffice to mention epidemic encephalitis and acrodynia (pink disease) as examples. The fact also that such an obvious and striking phenomenon as the Babinski reflex has only been recognized since many of us here present were students should suffice to give us pause. No, the possibilities of clinical observation are not yet exhausted. In the domain of tropical medicine, for instance, great though the advances in recent years have been, there is still much field-work to be done. Clinical observation, going hand-in-hand with experiment, is throwing fresh light on the problems of epidemiology, whilst the enormous progress which this century has seen in psychological medicine has, from the nature of the material, been almost entirely along observational lines, and there is also scope for the study, by observation, of purely subjective symptoms, such as pain. Of the three members of the clinical triad—diagnosis, prognosis, treatment—the first is certainly coming to depend more and more upon the help of laboratory methods, but pure observation can still do much in the other two. The comparative neglect of prognosis especially is surprising, and any young Fellow of the College who is prepared to devote a lifetime to the collection of his observations, might, in his later years, produce a treatise on the subject which would make our whole profession his debtor. It is the same with therapeutics. Pharmacology has done much for us, and many recent advances we owe to laboratory experiment, but in the last resort any method of treatment must stand or fall by its actual results in practice, and it is here that we are in need of more extensive, accurate, and controlled observations. For if the observational method is to yield results of any value, either in the sphere of treatment or in any other, the observations must be accurate and controlled. It is a just reproach to clinical medicine that so often what passes for observation is really only an "im-

pression," and that observation, even when accurate, is not checked by a sufficient number of controls. This, however, is not the fault of the method, but of those who employ it.

NEO-HIPPOCRATISM

I have mentioned some special directions in which the observational method can still render us good service in the advance of knowledge, but, taking a wider view, I think there is reason to believe that in the immediate future still greater demands will be made upon it.

If one surveys the field of medical science to-day, and tries to estimate the direction in which the currents of contemporary thought are moving, one cannot help being impressed by the signs of a return towards the Hippocratic outlook. This new way of looking at medicine, or rather this revival, with modifications, of an old way, is called by its adherents by various names—"constitutional medicine," "the science of the individual," or "neo-humoralism," according to the element in it which seems most important to the particular observer, but it may perhaps be conveniently described as "neo-Hippocratism." The Hippocratic doctrine was founded, it will be remembered, upon the four humours and upon the *vis medicatrix naturae*, and careful clinical observation was its method of investigation. The doctrine of the humours, though it dominated medicine for centuries, has long been abandoned, but neo-Hippocratic medicine deserves the title of neo-humoralism in so far as it attaches a great importance to the body fluids. It is in this respect to be regarded as a revolt against the solidism preached by Cullen in the eighteenth century, and later established on a scientific basis by the work of Virchow and of Bichat. It recognizes that all the phenomena of life are derived from physico-chemical reactions in the fluids of the body, and that a disease is often due, not, as the morbid anatomy school teaches, to the changes found in the organs after death, but rather to subtle alterations in the physical and chemical properties of the fluids, to which the changes in the tissues are secondary; and it sets itself as one of its tasks the early recognition by biochemical methods of the changes in the fluids, with a view to arresting the disease before structural modifications have taken place.

Neo-Hippocratism also attaches great value to the *vis medicatrix*. It is vitalistic as Hippocratic medicine was, and not mechanistic like the medicine of Harvey's epoch. It sees in adaptation a principle as important in biology as the principle of the conservation of energy is in physics. It regards this purposive striving of the organism to adapt itself to the environment, and to heal and restore itself when diseased, as marking off all living things from the inorganic world, and is in sympathy with Sydenham's definition of disease as "an effort of Nature, striving with all her might to restore the patient by the elimination of the morbid matter." It finds in the cause of a disease not a single agent, but a "constellation of conditions" in the environment to which the organism is seeking to adapt itself, and it attaches just as much importance to the soil as to the seed. In this, also, it is true to the Hippocratic tradition, which always regarded disease as endogenous rather than exogenous.

It lays great stress, too, on the fundamental unity of the living body, and on the interdependence or integration of its parts. It considers it to be the essential vice of specialism that it tends to concentrate attention on the parts and to ignore the whole. It holds that the very unity of the organism limits the value of the experimental method as opposed to the observational, in so far as it proceeds by an arbitrary isolation of phenomena in order to investigate them.

The circulation of the blood is, for the neo-Hippocratist, one of the chief modes by which the integration of the

body is achieved, for through the medium of the blood every cell is able to influence every other, even the most remote. Integration is also maintained by the endocrine hormones carried by the blood, and to an even greater extent by the vegetative nervous system.

Upon the degree of perfection of the integration of the individual organism thus brought about, and its constitutional balance, depends in large measure, according to this view, its capacity for adaptation, and therefore its power to resist those unfavourable conditions in the environment which make for disease. Disease is regarded as a disintegration of the organism; healing as a reintegration of it.

But whilst the body is in this sense one and indivisible, it is not a mere sum of its constituent parts. The organism is more than this—it is a resultant or synthesis, a *quid novum*, which must be studied both in health and in disease as a whole. This individualistic outlook is characteristic of Hippocratism, both new and old. It is, however, another plank in the neo-Hippocratic platform that whilst the human body is one and indivisible, no two human beings are alike. Man is not one, but a diversity of creatures. One man differs from another, not only in his inborn hereditary character, but morphologically in his "anatomical personality," functionally in his "physiological personality," and, most of all perhaps, psychologically, in his mental and nervous reactions and peculiarities. Hence there arises a restoration of the idea of constitutions, which played so large a part in Hippocratic practice, and which has never entirely disappeared from medical thought. It is a doctrine of constitutions, however, no longer based upon the supposititious four humours, but upon measurable morphological and functional differences in individuals, and upon the results afforded by biochemistry and endocrinology.

Of the three factors which go to make up personality, or the "human biotype"—morphological, neurochemical, and psychological—by no means the least importance is attached by the adherents of neo-Hippocratism to the last. It is, indeed, one of the most significant dogmas of the school that the mental factor in disease must never be lost sight of, as it has so often been both by the "solidists" and by the exponents of "experimental medicine," but that, on the contrary, it is of the first importance to consider it in any effort to restore the whole man to health.

If this is the direction in which contemporary medicine is moving, it follows, surely, that fresh demands will be made upon clinical observation, though we may have to look at our material in new ways. The clinician will be restored to his pride of place, for it is he alone who can consider the patient as a whole. Clinical intuition and judgement, so often disparaged by the experimentalist, will rise again in esteem as the faculties by which alone the different factors concerned in the disintegration of the personality can be evaluated, whilst the methods of the laboratory will be reserved for confirmation and correction.

The new outlook will also demand a new anatomy—an "individual" anatomy—which will take account of the great morphological variations which may yet fall within the limits of the normal; and a new clinical physiology, which will study the functional variations in human beings and the reactions of different individuals to changes in environment. In this way the material will be gathered for what the neo-Hippocratists call "the science of the individual."

New methods of treatment also must follow, along with a reintroduction of older methods which have fallen too much into disuse. Treatment by protein shock and by blood transfusion, and a revived interest in blood-letting, are some of the results of neo-humoralism, and the

employment again of what used to be called anti-dyscrasic methods, and of alteratives, may follow. At all events, the neo-Hippocratic attitude to disease is more hopeful than the feeling of therapeutic impotence engendered by the doctrines of the morbid anatomy school.

THE NEED FOR BRIDGE-MAKERS AND GENERALIZERS

I have dwelt at some length on what appears to be the orientation of Medicine to-day and the fresh scope which it offers for observational methods, but, of course, all prophecy is vain. The invention of a new instrument, or of a new method, might suddenly do as much for medicine as the telescope did for astronomy or the introduction of logarithms for mathematics. It may be that we are on the eve of some such revolutionary development. If it comes, it will probably spring from outside our own science, and from the sphere of physics or chemistry, and we may have difficulty at first in apprehending it. We need, therefore, at the present day, not only observers and experimentalists, but bridge-makers, who will mediate between the laboratory and the bedside, and who will interpret and apply the work of the pure physiologist, physicist, or chemist, in so far as it bears upon practical medicine. Such men have always been few, and they must tend to get fewer as the sciences ancillary to medicine become more and more specialized; but the greater the divorce of medicine from pure science the more are such bridge-makers necessary. How they are to be found and trained, and what position they are to occupy, are questions for the future, but that men capable of acting as liaison officers in the scientific army are necessary there can be no doubt. Nor can it be doubted that they could contribute materially, if not spectacularly, to the advance of medicine.

But most of all we need thinkers. Observation and experiment can give us facts—have, indeed, given us too many facts. What we require is men with imagination, men of the contemplative type of Harvey, fertile in hypotheses, who can see the interrelation between the facts, and who can bind them into manageable sheaves and induce from them those generalizations which we call natural laws.

Great generalizers, of course, are men of genius, and cannot be produced to order. They flourish in some epochs more than in others, for there are, as Bacon said, waste tracts in time as well as in space. It may be that we are in such a waste tract now. Certainly men of great imaginative genius do not seem to be relatively so abundant as they were in the time of Harvey; perhaps the intellectual climate of to-day does not favour their appearance. I have already spoken of the restlessness and distractions of our day and their unfavourable effect on thought, and one might add to this obstacle the contempt for the humanities and for pure knowledge characteristic of a civilization directed to merely material ends. It may be doubted, too, whether our present methods of education are favourable to the production of men of the type we most need. To give up early the humane studies and take to specialism is not the way to train the imagination, and tends to result in the production of skilled technicians rather than of educated men. Be this as it may, there is reason to expect that the clinical atmosphere will be more favourable to the production of generalizations than that of the laboratory. For the gifts of judgement and insight, the power to see the wood and not merely the trees, so necessary for fruitful generalization, are just those required by the diagnostician. The clinical atmosphere, however, must be a wide one, for specialism is not conducive to the large and general view.

I would conclude, Mr. President, by urging upon all the toilers in the field of medical science the necessity

for unity. We need every worker, whether at the bedside or in the laboratory, who is sincerely seeking the truth as Harvey understood it, for in the house of Science there are many mansions. Let us not say I am of Paul, and I of Apollos, and I of Cephas; let the experimentalist not despise the clinical observer as superficial, nor the clinician the laboratory worker as narrow; nor let both condemn the thinker as visionary and unpractical. Let me rather exhort all, as I am bidden this day in Harvey's name to exhort the Fellows of this College, that they continue in love and affection among themselves.

TOXIC GOITRE: THE COURSE OF THE DISEASE, AND ITS TREATMENT*

BY

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During the last ten years, much study has been devoted to the problems of exophthalmic goitre, and much has been written on the subject. There are three lines along which developments have occurred that seem, especially, to have affected our conceptions of this disease and the treatment of the patients. These three lines are:—(1) the correlation of the morbid anatomy of the thyroid gland with the clinical conditions of the patients, (2) the therapeutic use of iodine, (3) the development of surgical treatment. The changes in the thyroid gland that accompany the clinical conditions are very varied, and the numerous histological studies of material removed at operation, and obtained by experiments on animals, have proved of value. Following the work of Marine^{1,2} on animals, Rienhoff and Lewis,³ working on patients, have been able to clarify this subject and to present a conception of the structural changes in the gland that can be correlated with the clinical pictures seen in patients. The relation of iodine to the pathology of toxic goitres is still unsolved, but the empirical employment of this substance in the management of cases has been a valuable step forward in treatment; and the development of surgical skill and judgement now offers possibilities of successful treatment that are among the most dramatic in medicine.

MORBID ANATOMY AND SYMPTOMATOLOGY

The suggestion, made by Plummer,⁴ that the cases could be divided into those of true exophthalmic goitre and those of adenoma with hyperthyroidism or toxic adenoma, was of value in the development of our knowledge, but it now appears that this separation is arbitrary and artificial, and that the changes which the thyroid gland has previously undergone are the essential factor in deciding the clinical picture and the gland structure in a case of goitre with symptoms of intoxication or toxic goitre. Marine showed that increased activity of the gland is accompanied by hypertrophy and hyperplasia, and that involution to the normal resting condition occurs when the activity diminishes. Rienhoff⁵ removed portions of the thyroid gland from patients who were suffering from typical exophthalmic goitre, who had had no previous thyroid disturbance, and who had not received iodine; iodine was then administered, and at a suitable time partial thyroidectomy was performed, and the material removed compared with that removed previous to the iodine treatment. In this way he showed that the clinical improvement that resulted from the iodine, the

so-called iodine remission, is accompanied by an involution of the gland, a change in its structure that brought it nearer to a normal gland, but he demonstrated also that, while the gland in general showed this involutionary change, portions of it, usually lobules, might show hyper-involution, with the formation of areas of acini distended with colloid and resembling colloid goitre, or of colloid cysts, or of areas of degeneration with loss of acinar arrangement and with colloid diffused throughout the area. On the other hand, there were areas where involution failed to take place, where islands of gland remained in the stage of hypertrophy and hyperplasia typical of the condition before the remission occurred, while the surrounding gland showed the general involutionary changes and approach to the normal structure. To these islands remaining in the stage of hyperplasia he applied the term hypo-involution. Around the areas of hyper-involution the gland structures are compressed, and there is fibrous tissue giving the appearance of a capsule, formed possibly by interlobular and intralobular septums, and possibly by replacement fibrosis. These areas of hyper-involution may be single or multiple, and the gland then resembles the nodular gland, commonly found in patients of middle age with toxic goitre. These structural appearances, found by Rienhoff in the iodine remissions, are identical with those found in patients following spontaneous remissions.

There are patients, usually young women, who, with no evidence of previous thyroid trouble, develop the typical picture of exophthalmic goitre, and in the course of a few months, or longer, recover apparently completely. There are others, with a similar onset and initial recovery, who relapse, perhaps repeatedly. There are others who never quite recover, but in whom the condition subsides only to light up again and again with greater or less severity over a number of years. In those with repeated relapses or exacerbations the thyroid gland is usually found to be nodular. There are still other patients, who, when they come under observation for the first time because of toxic symptoms, present a nodular gland. We know that the gland responds to physiological stimuli, such as puberty, pregnancy and lactation, by increased activity; and it responds in a similar way to pathological stimuli, such as infections; but in both conditions signs of thyroid intoxication are rare, and the gland usually returns by involution to a normal condition. If the involution is not perfect, and areas of hyper-involution and of hypo-involution result on repeated occasions without the occurrence of symptoms of intoxication, then a nodular gland might be expected to develop in time. This accounts for those patients in whom such a gland is found on the first appearance of toxic phenomena. The absence of nodules and of fibrosis is not evidence that hypertrophy, hyperplasia, and involution have not occurred, but a nodular goitre is good evidence of a past history in which the thyroid gland has had to respond to stimuli and then has involuted, perhaps repeatedly and over a number of years. These nodules are not adenomas, but true adenomas may occur, though much more rarely; and pathological processes, other than those that result from the involutionary changes described by Rienhoff, are met with in glands associated with toxic goitre, such as the small fibrous gland described by Williamson and Pearse⁶ as primary arterio-capillary sclerotic goitre, and the large gland resembling that of simple colloid goitre. But an advance has been made, and we are in a better position to understand the condition of our patients.

The cause of the disease is unknown, but it cannot be doubted that there is some stimulus that causes increased activity, with hypertrophy and hyperplasia, of the gland, and manifestations of hyperthyroidism or thyroid intoxication. The stimulus, whatever it may be, will vary in

* Read in opening a discussion in the Section of Medicine at the Annual Meeting of the British Medical Association, Eastbourne, 1931.