THE HARVEIAN ORATION, DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS Friday, June 25th, 1880.

By JOHN W. OGLE, M.D., F.R.C.P.,
Consulting Physician to St. George's Hospital.

[Continued from page 9 of last number.]

SUCH, given very roughly and cursorily, and in a very condensed manner, is the course of the general progress of our approaches towards the full and proper discovery and presentation of the circulation of the blood.

One step led on to another, as is the case with all truth and all science, each the inevitable and irresistible result of the former.

Summarising in chronological order the most salient anatomical facts which had been established respecting the circulation, we may regard

1. The distinction between arteries and veins as demonstrated by Galen;
2. The non-communication between the two ventricles of the heart in man as demonstrated by Vesalius;
3. The true nature of the valves of the veins as arrived at by Sylvius, St. Estienne, Fabricius, and others;
4. The pulmonary or smaller circulation as determined by Servetus.

These great facts, these scattered limbs of truth, being recognised, the wonder surely is, not that they led up to anything further, but that the goal and consummation was not earlier reached, and that the world should still have had to wait for fifty years after Fabricius had published his views on the valves. The tree of knowledge at length fructified.

At last appeared the master mind, the interpreting genius, and the glory of his generation and century—the immortal Harvey, *Decus et desiderium nostrum*, the bright unclouded constellation standing out in relief from the dark background, never to be extinguished. It was, as Daremberg observes, “as at the dawn of creation chaos cleared up, the light separated from the darkness. Harvey considers a long time, and he finishes by seeing; he makes few experiments, but they are decisive; he uses arguments, but they are conclusive”.

Renouncing the to-and-fro, or, as it may be termed, the tidal, theory of the circulation, and reasoning upon already ascertained facts, and upon his own observations, and direct, varied, and reiterated experiments on living and dead animals, foetal and adult, Harvey changed everything. With a mind trained by the study of physics and classics, he was enabled by a wise insight, and by his powers of analysis and comparison, to trace a new route for the blood, to establish by precise demonstration its general circulation as we now know and understand it, and thus, by giving a foundation for rational physiology, he achieved for medicine an entire transformation.

But the greatest, perhaps the chief, support of his theory is obtained from his accurate observation and demonstration on the mechanism and use of the movements of the heart itself.

The ulterior demonstration of the circular movement of the blood by Harvey, as Daremberg points out, rests on the following three arguments. In the *first* place, the blood arrives under the impulsion of the heart in such quantity and in so continuous a manner from the vena cava into the arteries, that it is impossible it can be furnished by the food, and in such a manner that it should pass as a whole in a short time from the veins into the arteries. In the *second* place, the blood, constantly and uniformly propelled by the arteries into the limbs and other parts, enters in much greater quantity than is necessary for nutrition. *Finally*, from each limb the veins are constantly returning the blood to the heart; proving that the arteries receive nothing from the veins, but that, on the contrary, the veins receive blood from the arteries.

His predecessors had well-nigh reached the point which he attained, but they were all hampered, fettered, and prepossessed by false theories and assumptions, and were thus so blinded to the full import of their own discoveries that they failed to solve the great enigma of the world. They had hewn and polished the materials, but to him it was reserved to crown the edifice. “The true inventor”, it has been said, “is he who definitely places the world in full possession of knowledge and of facts of which one can every day and at will verify the reality and accu-

racy. Let us not confuse the works of chance, which, finding some of the wheel-works of a machine, leave them, not knowing what to do with them, in a state of isolation. Let us not confound them with the works of a genius who searches, discovers, gathers, mates, and binds together all the parts of the machine and puts it in motion. Chance shows the chyliferous ducts to Aselli, but leaves them at the entrance of the liver. Chance shows to Pecquet the receptaculum chyli, but it was experimental research which conducted this skilful anatomist to the left subclavian vein, and permitted him to dispossess the liver of its functions.”

It has been said by Dr. Willis, who has written the life of Harvey in so able and interesting a manner, that the discovery of the circulation of the blood came from him, as did Minerva from the brain of Jupiter, fully formed. This view surely cannot be held. The discovery was like that of so many others: it was the result of the growth of germs sown long before. It was not the work of one mind.

In many cases, no doubt, discoveries appear to have been anticipated, when, indeed, there has been no real anticipation, only happy guesses, just as the atomic theory of Dalton may be said to have been anticipated by Epicurus or Leucippus. But in the case of Harvey the discovery was not merely adumbrated, but was led up to in a proper scientific sense; just as, in the case of Lavoisier's chemical theories, he was duly and properly preceded by Becker, by Jean Rey, Robert Boyle, and John Mayow. Most inventors inherit from their ancestors.

It is to be noticed, in passing, that Harvey heard the passage of the blood by applying his ear to the cardiac region, and that Dr. Robert Hooke, towards the close of the seventeenth century, enunciated the philosophy of the stethoscope. From the writings of this admirable thinker, Tyndall, in his work on *Sound* (third edition, p. 40), quotes a most interesting passage, showing that Hooke was quite familiar with the sounds of the heart and of the lungs and intestines; and yet Laennec's name is the one inseparably and pre-eminently associated with the use of this instrument. Eck de Sulzbach proved experimentally that metals when they oxidise increase in weight, and attributed this augmentation of weight to a spirit, which is united with the metal, and is disengaged afterwards by distillation. In this, of course, he nearly anticipated Lavoisier and Priestley in their discovery of oxygen by three hundred years, as Draper observes.

It is interesting here to notice, in passing, that Harvey, like other discoverers and benefactors of the race, had his detractors and objectors; and the literature on the question of priority is something very considerable. It has been well handled by Flourens, by Huxley, and by very many others. Some professed that he was entirely mistaken. Others said the thing was true, but it was so simple and self-evident that no praise attached to the discovery; but, as Biot observed, quoted by Daremberg, “Rien n'est plus clair que ce qu'on a trouvé hier; rien n'est plus difficile à voir que ce qu'on trouvera demain.” Others, again, asserted that he had been anticipated, and had pilfered and palmed off the wares of others as his own.*

In any case, it appears that Harvey's contemporaries in the practice of his profession, as we say, fought shy of him in consequence of what they thought to be his quixotic and impractical views; but Harvey at last triumphed, as did Jenner, and in a measure Sydenham also after him; and, like them, he lived to see, though late, the entire acceptance of his teaching.

Of the full effect and manifold applications of Harvey's discovery resulting hitherto, the time at my command will only permit a very superficial glance. It paved the way for other knowledge, by which it was in turn corroborated; for internal acts, as they have been termed, of plastic life, as well in health as disease; and upon that discovery rests all our knowledge of pathology, and of the action of remedies.†

The work of Harvey which transformed the face of physiology, as the teaching of Dalton did chemistry, or that of Sydenham practical therapeutics, and that of John Hunter surgery, had yet to find its completion.

After his discovery followed that of the lymphatic and chylous system, the result of direct observation and experiments by Aselli (by him noticed accidentally) and by Pecquet; then, as a direct result, the observations by the two friends Wharton and Glisson, the latter our Anatomy Reader at this College, on nutrition, etc.

* I am sorry to find Hecker, the historian of the Middle Ages, so anxious as he seems to be to diminish the fame of Harvey. See a pamphlet of his, but little known, “Die Lehre vom Kreislauf vor Harvey, eine historische abhandlung”, Berlin, 1831 (T. H. Herbig). He considers Galen to be the true discoverer of the circulation.

† Referring to such consequences, Harvey himself observes (see chapter xvi of his work on the Action of the Heart and Blood):—“Finally, reflecting on every part of medicine, physiology, pathology, therapeutics, when I see how many questions can be answered, how many doubts resolved, how much obscurity illustrated, by the truth we have declared, the light we have made to shine, I see a field of such vast extent, in which I might proceed so far, and expatiate so widely, that this my tractate would actually swell into a volume which was beyond my purpose, but my whole life, perchance, would not suffice for its completion.”

But the brightest corollary to Harvey's teaching came with the era of descriptive anatomy, in which the names of Malpighi, a Fellow of our Royal Society, who first had ocular demonstration of the circulation of the blood,* of Ruysch, and of Leeuwenhaeck appear, when, by means of the microscope and of injections of the blood-vessels, the characteristics of the various textures of the body, and the nature of the blood, of the minute vessels, and of the capillary circulation in the substance of the tissues, were recognised.

Harvey had demonstrated the direct communication between arteries and veins in three situations, viz., the choroid plexus, the spermatic vessels, and the umbilical vessels. But the capillary circulation, of course, Harvey had never witnessed, and this could not have been seen until the microscope was revealed.

Later on, and following the discovery of Hales as to the nature of the alkalies, showing the importance of the relations of quantity in explanation of chemical facts, came the grand discovery by Black of Edinburgh, who explained the source of animal heat; the discovery of oxygen in 1774 by Priestley; and of Lavoisier on the theory of respiration and the process of combustion. The latter, by observation of the rôle played by the air in combustion and decomposition, overthrew the phlogistic theory, became the author of a new doctrine, and the originator of a new and the only true method in chemical research, viz., that of adapting the balance to the elucidation of chemical phenomena. All these theories could only have followed upon the discovery of the minute circulation of the blood, and upon these discoveries our knowledge and treatment of so many affections of the lungs depend.

To show in anything like a complete manner what practical and therapeutical benefits have grown out of Harvey's great discovery, or to attempt to inquire what still is to come, would require much time. Suffice it to say that our knowledge of diseases of the lungs and heart, of the use of the stethoscope; our acquaintance with embolism and its effects; our knowledge of the subcutaneous use of remedies; of the inhalation of anæsthetics; of transfusion of blood, first resorted to by Lower in the case of man after employing it on the lower animals (in cases of hæmorrhage and other affections); and of the transfusion of milk, first practised on dogs, rabbits, and then used on man by Dr. Hodder of Toronto, in 1850, then by Dr. Home of New York, and others, in cases of cholera, of phthisis, of anæmia, etc., and recently carried out successfully by Mr. Austin Meldon, are due to this discovery.†

What would Harvey have thought could he have foreseen the use of the sphygmograph, the cardiograph, and the corroboration afforded by their use to his teaching, and the possible service they may supply to the physician—the knowledge of the vasa vasorum, of the relation of the nervous system to the smaller blood-vessels and capillaries (and consequently of secretion), first apparently noticed by Nicholls about one hundred years ago,‡ and the consequent neurodynamic medicine, and the now universally necessary use of the thermometer?

I need hardly say to any one here present that, although Harvey's name is more particularly associated with the doctrine of the circulation of the blood and the heart's movements, his work on *Generation* is one of equal originality and of overwhelming interest, notwithstanding that since his time observation has shown that his proposition "*omne vivum ex ovo*" is, though of general, yet not of absolute and universal application. The subject and the merits of that work have been put before this College in a very graphic, interesting, and instructive manner by Dr. Arthur Farre in his Harveian Oration for 1872. I will, therefore, do no more than allude to it, nor to other published products of Harvey's mind.§

We are almost left to conjecture the loss which both he and the whole world sustained in the destruction of other of his writings. Our College edition of his works (1766) shows that he wrote on several subjects, including the generation of insects, besides those treated of in his works; and we know that he had put materials together under the heading of Medical Observations and Pathology. As it was with Galen, who bitterly regretted the loss by fire of some of his valuable Observations, Harvey had reason to complain of the loss of these writings by the fury of a revolutionary mob. Whether he lost the Medical Observations and Pathology in this way, or whether he be-

queathed them to the College, and they were afterwards burnt in the fire of London, or dispersed, is uncertain. The matter has been discussed by Dr. Paget in his pamphlet on the MSS. of Harvey.* It is, of course, impossible to ascertain what are contained in his lost Observations; but it occurred to me that it would be interesting and instructive to adduce any indications of his knowledge of practical medicine which may exist in his extant works. This may be the more profitable, as during his life he had, as we know, enemies who declared that his professional skill was most scanty, and by no means equal to his knowledge of anatomy.† It is very clear, from what is recorded of his *clientèle*, that he must at one time have had considerable private practice. We learn that Descartes, Cowley, Hobbs, Dryden, and Boyle were amongst his patients; and he may have known Shakespeare, Vandyke, Rubens. He must have had a certain amount of practice amongst the poor whilst occupying the office of Physician to St. Bartholomew's Hospital. Still the hospital was very small at that time; and moreover, as there was no medical teaching in those days—an element so useful in perfecting the knowledge of the teachers—he might or might not have been as perfect and successful in his art as his colleagues.

The first practical matters to which I will ask your attention, as being referred to in his published works, are of a surgical nature; for Harvey did not disdain to practise surgery, and also midwifery, as well as his own special branch of the profession; and he was Professor, as we know, to this College, both of Surgery and of Anatomy. He describes cases in which he removed tumours, having first ligatured the main artery, and thus cut off the nourishment or "spirit", in order to facilitate the removal, especially one of the scrotum of enormous size: a procedure which modern skill still adopts.

We may in some degree picture to ourselves the enthusiasm with which, after determining the true nature of an artery, and to a certain degree of arterial blood, he first availed himself practically of that knowledge, and applied it for the relief of his kind.

The above case reminds one of the case of a scirrhus and cerebri-form tumour on the side of a girl's head, which Dupuytren tried in vain to remove. M. Magendie sawed off large portions at different times, and the wounds healed. Nevertheless the patient became worse; and Magendie therefore ventured to tie the carotid artery, the result of which was that the tumour ceased to grow and the patient's life was preserved. The operation was successful as regards the tumour; but hemiplegia and permanent lesion of mental faculties followed.‡

With respect to tumours—illustrating the principle of the difference between the papillæ of the ovary, and *à propos* of the existence of a vital principle—Harvey observes that we frequently meet with cancers, sarcomas, melicerides, and other tumours of the same description, which increase as it were by their own inherent vegetation, taking up nourishment to themselves, and defrauding other parts of the body of their nutritive juices or proper genius: whence the ancient terms *phagedæna* and *lupus*.

With regard to bloodletting, he tells us that daily experience satisfies us that it has a most salutary effect in many diseases, and is indeed the foremost among all the general remedial measures; and in practising it we imitate nature, which, in indolent high-living people, by critical discharges of blood from the nostrils, hæmorrhoids, and in shape of menstrual flux, delivers us from serious disease—from fever, small-pox, headache, etc.

He notices the death from hæmorrhage in a short time, of animals after division of the vessels of the neck, and the occasional occurrence of rapid death from the same cause after amputation in man; these facts being adduced in support of his doctrine of the blood flowing in

* Malpighi's observations on the circulation of the blood in the frog's lungs appeared about thirty years after Harvey had published his treatise on the motion of the heart and blood. His more advanced observations on the circulation (frog's mesentery) were published in 1697.

† See the Transactions of the British Medical Association, 1879; and the BRITISH MEDICAL JOURNAL for 1880.

‡ See Dr. Munk's *Roll of the Royal College of Physicians*, ii, 126.

§ In addition to the great works on the motion of the heart and blood, generation, conception, parturition, uterine membranes, umbilical cord, and letters to various people, he wrote papers or treatises on the following several subjects, but these are not known to be extant: Observaciones de usú lienis, Observaciones de motú locali, Tractatum Physiologicum, De Amore, libidine, et coitu animalium.

* Fuller, in his *Worthies*, vol. ii, alludes to the good progress which Harvey had made to lay down a practice of physic conformable to his thesis of the circulation of the blood, but was plundered of his papers in our civil war, which not only murdered many men alive, but destroyed more not yet born, whose diseases might have been prevented or removed if Harvey's worthy name had come forth into public. He hopes that grateful posterity will, by superstructure on bad foundation, thankfully pay the fruit to his memory who watered and planted (not to say made) the root of his discovery. Fuller, who observes that Harvey's father had a week of sons, alludes to his general work as follows: "The doctor, though he is a bachelor, may be said to have left three hopeful sons to posterity—his books. 1. De Circ. Sanguinis, which I may call his son and heir, the doctor living to see it at full age and generally received. 2. De Generatione: as yet in its minority; but I assure you growing up apace into public credit. 3. De Ovo: as yet in its nonage thereof, but infants may be men in due time."

† Fuller, *op. cit.*, vol. ii, page 504, observes that his doctrine of the circulation of the blood "entered into the world with very great disadvantage. For first none will be acquainted with strangers at first sight as persons generally suspected, as if to be unknown were part of being guilty. Secondly, the grandeur of the profession were of the opposite judgment, and heavy enough without any argument to overlay (and to stifle) any infant opinion and partly consent thereto. But truth, though it may be questioned for a vagrant, carries a passport along with it for its own vindication. Such have since shaken friendly hands with Dr. Harvey, which at first tilted pens at him."

‡ See Magendie's *Leçons sur les Phénomènes de la Vie*, Paris, 1836-8.

a circle. He notices that oftentimes in divisions of arteries in operations, the blood juts out from the vessel, not *per saltum*, because the smaller arteries do not pulsate, especially if a tourniquet has been applied; and that, in fainting fits or alarm, when the heart beats more languidly, there is a diminution or arrest of hæmorrhage.

He observes that impediment, or perversion, or excessive excitement of the blood's circulation in the veins, leads to varices, abscesses, pain, hæmorrhage; in the arteries, to enlargements, excruciating pains, aneurisms, sarcoses, fluxion, asthma, stupor, apoplexies, and many other affections, many of which are often remedied and dispelled as if by enchantment. He notices the interesting fact that, when an extremity has been so ligatured that it has become swollen, cold, and livid, especially if it be cooled by snow or cold water, and the fillet be unbound, the person becomes aware at once of a feeling of cold rising along with the return of blood towards the trunk; and this cold blood returning to the heart he looks upon as the probable cause of the fainting which often occurs after bloodletting. This also, he thinks, may account for the accidents to many who die in travelling over snowy mountains.

He mentions the case of a man with aneurism at the lower part of the neck on one side, in whom the pulse in the corresponding arm was very small, owing, as he thought, to the greater part of the blood being directed to the tumour, and thus intercepted. He records the case of a gentleman who had been the subject of pain in the chest, dyspœa, and dropsy, in whom, after death, the wall of the left ventricle of the heart was found extensively ruptured, although the wall was sufficiently thick and strong. This laceration he attributed to an impediment to the passage of the blood from the left ventricle to the artery.

He notices the absorption of pus and blood from the cavity of the pleura, and the discharge with the expectoration of liquids thrown into the cavity of the thorax.

As illustrations of his allusions to therapeutics, speaking of the effects of the action of remedies applied endermically, he says that colocynth and aloes used externally move the bowels, cantharides excites the urine, garlic applied to the soles of the feet arrests expectoration, and cordials give strength.

These illustrations occur in a passage demonstrating the circulation of the blood. In the same chapter, his pathological knowledge induces him to describe the morbid cause of tertian ague as seeking the heart in the first instance, and hanging about the heart and lungs, thus rendering the patient short-winded and disposed to sigh—the vital principle being oppressed, and the blood rendered thick and forced into the lungs.

He comments on the relief obtained in dangerous states of asthma by the application of cupping-glasses and of cold water affusion on the chest (I refrain from quoting his physiological views as to the action of respiration, in proof of which these facts are adduced); and, in speaking of the functions of the diaphragm, he alludes to the possibility of the heart and lungs being invaded by distension of the stomach and intestines by food and flatus; life itself, as he says, being oppressed in its citadel.

These observations recall to our mind certain cases of disease in which the diaphragm does not suffice to protect the contents of the thorax, and indicate how fatal such cases may prove unless promptly and timely relieved by puncture of the stomach or bowels.

In Harvey's works, I fail to meet with much material bearing on what was termed by Aubrey, when hinting at his supposed inability as a practical physician, his "therapeutic way". He mentions a curious case of one suffering from oppression and pain of the heart and breast, whose jugular arteries were large and like aneurisms, who only found relief when the whole of his chest was pummelled or kneaded by a strong man, as a baker kneads dough, and in whom arteriotomy was performed, but without good result.

He also mentions cases of ulcer of the womb and of sterility treated by uterine injections, and alludes to their use in cases of occlusion of the uterus requiring opening of the os uteri.

The treatment of himself in illness on one or two occasions was somewhat noteworthy. Thus he states that, in the attacks of gout (from which he eventually died), he was in the habit of applying cold water to the affected limb. "He would then sit", we are told, "with his legges bare, tho' it were frost, on the leads of Cockaine House, putt them into a payle of water till he was almost dead with cold, and betake himself to his stone, and so 't was gone." When he could not sleep, he would "rise from his bed and walk about his chamber in his shirt, till he was pretty cool, and then return to his bed and sleep very comfortably". Again, in his fatal illness from the effects of gout, when aged—eighty "*annorum et fæmæ satur*"—he found on the day of his death that he had lost the power of utterance; that, in the language of the vulgar, he had the dead palsy in his tongue. He did not lose

his faculties, but, knowing that his end was approaching, and having made disposition of certain of his effects, he made signs to Sambroke, his apothecary, "to let him blood in the tongue". He died in the evening, "the palsy", as Aubrey has it, "giving him an easy passport".

Dr. Paget, in his notice of an unpublished MS. of Harvey's (1850), in the British Museum, refers to some notes on the physiology of the muscles, in which he groups together mania and somnambulism, seeming to indicate that he recognised the resemblance 'twixt the state of dreamland and insanity. Dr. Paget also points out passages in Harvey's writings, showing that he had assiduously investigated the physiology of the lungs, and had obtained a glimpse at least of one of the true uses of air in respiration. The chemistry of the day Harvey did not value, and, as Willis says, he showed his wisdom in despising the opinions of the age on the office of the lungs; but he well knew the vivifying force of heat, and saw in it the immediate indispensable agent in the reproduction of a living, sentient being.

In connection with the subject of midwifery, he alludes to several highly interesting cases. Thus he cites the use of the "uterine speculum", an instrument not for the better inspection of the parts, but for assisting labour, and by which, as he says, the business of distension is effected by force.

He speaks of the "labour stool" used by parturient women, and of delivery in a state of coma effected by means of powerful sternutatories, and also of labour effected after the death of the mother—cases cited for the purpose of proving how much the foetus contributes to its own birth. He states that he has often seen the foetus extracted alive from the uterus when the mother had been dead some hours, and has known the rabbit and hare survive when extracted from the uterus of a dead mother—a subject of great interest in a medico-legal point of view. To show the power of the uterus in delivery, he cites the case of a poor washerwoman who was pregnant with a uterus greatly prolapsed and projecting from the vagina, at first like the scrotum of a bull, and afterwards of the size of a man's head. He at first mistook it for a case of cancer, and thought of using the ligature or the knife, but unexpectedly a dead foetus was expelled.

As regards the influence of affections of the uterus on the general health, and the sympathy of the whole body with it, he observes: "No one of the least experience can be ignorant what grievous symptoms arise when the uterus either rises up or falls down, or is in any way put out of place, or is seized with spasms; how dreadful then are the mental aberrations, the delirium, the melancholy, the paroxysms of frenzy, as if the affected person were under the dominion of spells, and all arising from unnatural states of the uterus"; and he shows the evil influence which retained and decomposing contents of this organ may occasion. He describes in a most practical manner the changes which take place in the female, corresponding with those of the uterus at different periods of life. He remarks on the long and creeping motion which the uterus exhibits directly after death in animals, surmising whether it may not be so in the case of hysterical women, and also whether it may not be so with the brain, in its actions and conceptions. The following references I find to the chemistry of the urine. After speaking of the serum of the blood being charged with mucus on being exposed to heat, he says that the watery portion of the urine, when lightly boiled, does occasionally run into a mucus which swims through the fluid. Again, he alludes to thick and turbid urine becoming clear, and transparent when heated, and also to the urine becoming altered in colour by the use of certain articles of food, as figs, rhubarb, asparagus, etc. He describes experiments showing the effect of animal poisons on the body, and of the communication of diseases like pestilence, leprosy, etc., by a zymotic element contained in articles of clothing and furniture, even the walls of a house, cement, rubbish, etc.

Many illustrations he adduces of hereditary transmission, both physiological and pathological, and he to a certain extent anticipates the use of auscultation when he describes the distinct noise made by articles in the stomach of birds, rubbing against each other, and which may be heard by applying their bodies to the ear.

In Dr. Aveling's *Memorials of Harvey* (1875), alluding to the contemporary estimate of Harvey's practice, is quoted a hitherto unpublished entry from the books of the Barbers' and Surgeons' Company, containing a complaint of Harvey's malpractice, overlooking a fracture of the skull, and mistaking the vomiting caused by it for a symptom of "foulness of the stomach". Again, our Harvey is quoted (from *Gideon Harvey's Art of Curing by Expectation*) as having mistaken an affection of the mesenteric glands for an abdominal aneurism. On the other hand, skill and acuteness are illustrated and mentioned with high approval by his contemporary Dr. Hall (in his *Select Observations on English Bodies of Eminent Persons in Desperate Diseases*).

Dr. Aveling points out that, however he was estimated by physicians and surgeons, he was highly appreciated and admired by obstetricians,

and that his was the first book on midwifery written in the English language.

It was Harvey who invented the dilator of the cervix uteri, and first used stimulating uterine injections.

The above references and quotations will suffice to show that Harvey's knowledge of disease, and of the offices of a physician, was probably equal to his physiological attainments, and will amply vindicate him from unjust allegations.

[To be continued.]

INTRODUCTION

TO A

DISCUSSION ON THE INFLUENCE OF MOUNTAIN AIR IN THE TREATMENT OF PULMONARY CONSUMPTION.*

By J. HENRY BENNET, M.D., Weybridge.

My object in bringing forward the subject which forms the title of this paper is not so much to enunciate individual opinions, as to bring forward facts and to elicit discussion. There are few subjects which occupy the professional mind more intensely at the present time than the treatment of phthisis. I think I am warranted in stating that it is now generally conceded, both at home and abroad, that the therapeutical views which reigned during the first half of this century, with reference to the influence of climate on phthisis, were erroneous. It was then generally believed that a mild and moist or a warm and moist climate, like that of Madeira or of the West Indies, was the most calculated to arrest phthisis, and to promote a recovery when recovery was possible. I believe that I may claim for my namesake, the late John Hughes Bennett, the eminent Edinburgh professor, and for myself, as his disciple on this pathological question, the merit of having contributed to establish the fact that tropical or even semi-tropical climates are inimical to the constitutional states which lie at the root of phthisis, and in most cases accelerate its progress, tending to prevent instead of to secure recovery. We, and those who have adopted these opinions, have taught, and teach, that the temperature the most conducive to the treatment of phthisis is a day temperature between 55° and 65° or 70° Fahr., and a night temperature between 45° and 55°. In other words, we assert that the climate and temperature which are the most conducive to the physiological well-being of the Caucasian race are also the most favourable to the treatment of phthisis, viewed as a disease of defective vitality and of morbid nutrition.

The tendency of the medical profession up to the present time has been to seek for a cure, a panacea for this disease, which in towns and in densely inhabited communities terminates the career of a considerable proportion of the population. The curative treatment sought has been "medicinal, principally", and has hitherto been sought in vain in this direction. My experience and teaching have been and are, that the disease is merely an expression of lowered or defective vitality, acquired or hereditary; that it is merely, as I have worded it, "a mode of dying". Following out therapeutically this train of thought, the inevitable deduction is that the chief remedy for phthisis is the strict application of hygienic laws, that is, of the laws that regulate and secure healthy life, and so I have found it. Medicine and climate are merely adjuvantia, not to be despised or neglected, but occupy a very secondary position as compared with the strict observance of hygienic laws. Climate is principally of use in enabling the sufferer to obey these laws, and to ward off any physiological strain on peculiar organs. Medicine is principally of use in removing, or helping to remove, morbid complications, which interfere with the physiological play of organs.

When we come to examine the therapeutics of phthisis, we find undeniable evidence that phthisical patients recover in every region of the northern and temperate climates, the regions where it has been more especially studied. I found undeniable evidence of spontaneous cure in Paris in 1840, when resident physician to the Salpêtrière, in the 300 *post mortem* examinations I made on old invalid women above 65, who died under my charge. Professor Bennett, of Edinburgh, found many cases of similar cure among the 800 *post mortem* examinations he conducted when pathologist at the Edinburgh Infirmary. All other pathologists, who since those days have had similar opportunities of observa-

tion, and who have given their minds to the subject, have found similar evidence of spontaneous cure in the dead. Thus phthisical sufferers are found to recover often, as far as we know, without special treatment, wherever the subject is studied. Our English sanatoria—Ventnor, Bournemouth, Torquay, Penzance; all the sanatoria of the north Mediterranean shores, with Malaga, Algiers, Madeira, produce cures every year, and are full of cured residents. Moreover, there is, I firmly believe, scarcely any experienced physician in Great Britain who cannot enumerate cases of cure in his own practice.

We are now told, however, that the highest inhabited regions of Europe—regions between five and six thousand feet high—constitute a specially desirable climate for consumptives, both in summer and in winter, and offer greater chances of cure than any other locality. That cures can and do take place in these regions, even in winter, may be conceded to theory as well as to practice, if the habits of the sufferers are rendered hygienic. Many of those who have done well there, especially Germans, have consented to live in fine weather out of doors, whereas in the plains they had been, and would have been, shut up in unhealthy rooms. Much more, however, is demanded. It is asserted that there is an actual curative virtue in mountain altitudes, and that the chances of recovery are immeasurably increased by passing the summer or the winter, or both, at these elevations. This is the question we have to analyse and discuss to-day.

Within the last twenty years, a considerable amount of information respecting the meteorological and health condition of high altitudes has been brought forward by French physicians, who have resided and practised on the high plains of Central America, at Mexico, on the plain of Anahuac, at Santa Fe de Bogota, Quito, Potosi, and on the sides of the Cordilleras mountains generally. (Dr. Jourdanet, Dr. Coindet, Dr. Domec.) They may be said to have established that phthisis is rare amongst the natives at these elevations, although common in the neighbouring sea-coast towns, such as Vera Cruz and Guayaquil; and that in imported cases the progress of the disease is frequently arrested. I have lately been in correspondence with Dr. Domec, now a professor in the new University of Lille, who has recently passed four years at Quito, in Ecuador—a town of 70,000 inhabitants, and nearly 10,000 feet above the sea. He was one of the professors at the medical school, physician to the hospital, and engaged in active private practice. He only saw two or three cases of spontaneous phthisis among the natives during that time, and in all the cases of imported phthisis from the sea-coast that he met with, the progress of the disease soon appeared to be arrested. He has published an interesting memoir on the subject in the *Montpelier Medical* of July 1878.

Different causes have been brought forward to account for this comparative immunity from phthisis on the healthy, bracing, but mild mountain plains of Central America, the most prominent one being the diminution of barometric pressure. The same immunity has been claimed for the mountain elevations of Europe, and the diminution of barometric pressure has been adduced as one of the chief reasons. The claim, however, proves to be an error, as far as the Swiss mountains are concerned, so the explanation falls to the ground. Last summer I spent nearly two months in Switzerland, examining various mountain stations, and I was referred by Swiss medical friends to a very interesting work published in 1876, at Winterthur, in German, by Dr. Emil Müller, *On the Statistics of Phthisical Mortality in Switzerland*. I had seen no notice of this book in our medical press. It at once disposes of the argument that the diminution in barometrical pressure in the mountain elevations of Switzerland secures to their inhabitants immunity from phthisis. The statement has clearly been made without authority, and has been repeated without investigation. From Dr. Müller's tables, quoted in the recent edition (the third) of my work on the treatment of phthisis, p. 115, it appears that phthisis destroys its victims at all elevations, pretty nearly at the same ratio as in the plains. Thus the mortality, which in Switzerland is 10.2 per cent. at 1,500 feet above the sea, is still 9.8 at an altitude from 3,400 to 4,400 feet for those who are engaged in industrial pursuits (lace and watches). But for those who are engaged in agricultural pursuits it is only about half, respectively 6 and 5 per cent. Above 5,000 feet elevation, with an exclusively agricultural population, it is still 4 per cent.; not very much below that of the agricultural population on the plains and at 4,400 feet. These figures speak for themselves. In London, one of the centres of phthisis, the mortality is 12 per cent. In the mountain regions of Switzerland, the mortality is everywhere nearly doubled for those whose occupations are industrial and sedentary.

It cannot either be extreme cold that can give to mountain elevations an immunity from phthisis. The elevated plains in Central America are in the tropics. Quito is on the line; the snow-level is many thousand feet higher, varying in the tropics from 14,000 to 17,000 feet, and the climate is mild, equable, and bracing both in winter and summer.

* Read in the Section of Medicine at the Annual Meeting of the British Medical Association in Cork, August 1879.