

Harveian oration on old and new views on the treatment of consumption : delivered before the Royal College of Physicians of London on October 18, 1911 / by C. Theodore Williams.

Contributors

Williams, Charles Theodore, 1838-1912.
Royal College of Physicians of London.

Publication/Creation

London : John Bale & Danielsson, 1911.

Persistent URL

<https://wellcomecollection.org/works/rzxcjx66>

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

271

J. 23

THE HARVEIAN
ORATION
DELIVERED BEFORE THE
ROYAL COLLEGE OF
PHYSICIANS OF LONDON
ON OCTOBER 18, 1911

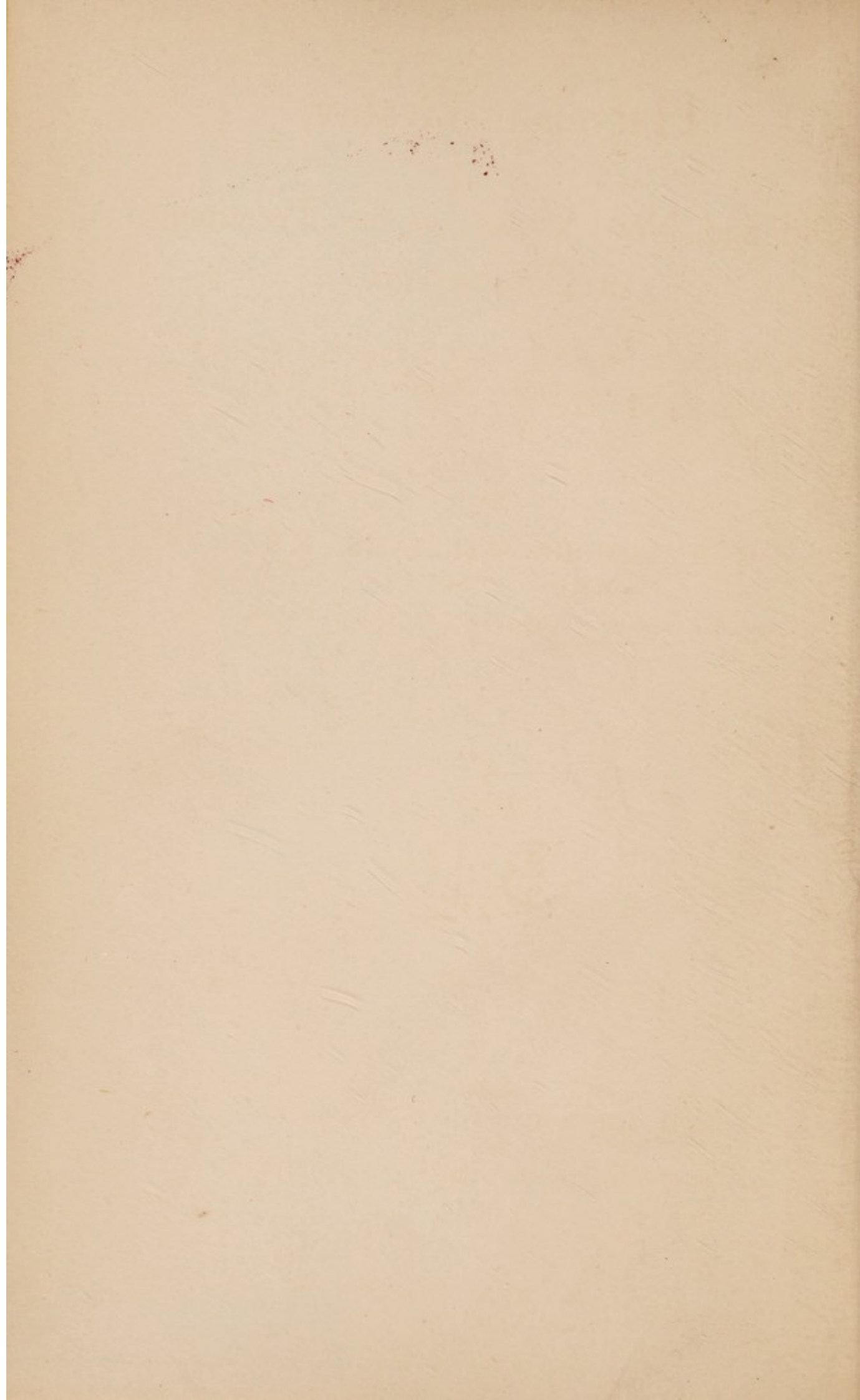
OLD AND NEW VIEWS
ON THE TREATMENT
OF CONSUMPTION

BY
C. THEODORE WILLIAMS



22500829672

Med
K31036



24950 271.2 23

Harveian Oration

Old and New Views on the Treatment of Consumption

*Delivered before the Royal College of Physicians of London
on October 18, 1911*

BY

C. THEODORE WILLIAMS, M.V.O.

M.D.Oxon., F.R.C.P.Lond.

*Consulting Physician to King Edward VII. Sanatorium and to the
Brompton Hospital*



London

JOHN BALE, SONS & DANIELSSON, LTD.

OXFORD HOUSE

83-91, GREAT TITCHFIELD STREET, OXFORD STREET, W.

1911

LONDON

JOHN BALE, SONS, AND DANIELSSON, LTD.

83-91, GREAT TITCHFIELD STREET, W.

11153 522

WELLCOME INSTITUTE LIBRARY	
Coll.	weIMOmec
Call	
No.	WF

TO
SIR THOMAS BARLOW, BART., K.C.V.O., F.R.S.
PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS
OF LONDON

IN GRATEFUL RECOGNITION OF THE HIGH
HONOUR CONFERRED ON HIM, AND WITH WARM APPRECIATION
OF THE PRESIDENT'S LABOURS FOR THE COLLEGE
AND FOR THE PROFESSION
THIS ORATION IS RESPECTFULLY DEDICATED

BY
C. THEODORE WILLIAMS



Digitized by the Internet Archive
in 2019 with funding from
Wellcome Library

<https://archive.org/details/b31363076>

MR. PRESIDENT AND GENTLEMEN,—Two hundred and fifty-five years have elapsed since William Harvey instituted this festival, directing that a Fellow of the College shall be appointed to make an oration in commemoration of all the benefactors of the said College, “with an exhortation to all Fellows and Members of the said College to search and study out the secrets of Nature by way of experiment; and also for the honour of the profession to continue in mutual love and affection among themselves, without which neither the dignity of the College can be preserved nor yet particular men receive that benefit by their admission into the College which they might expect, ever remembering that ‘*Concordi res parvæ crescunt, discordi magnæ dilabuntur.*’” Such are the words of Harvey, and such are the precepts which this College has, to the best of its ability, endeavoured to obey for centuries.

We have had many and distinguished benefactors, and these have been duly celebrated in the various orations, but as Harvey, by his immortal discovery, has outshone all the other luminaries, and as he was the founder of the institution, the numerous orations have been, for the most part, dedicated to the celebration and exposition of his magnificent labours and achievements. When we

bear in mind the numbers and the distinction of the past orators and the many periods of history in which they lived it will be obvious to all here to-day that it is impossible for me to say anything regarding the discovery of the circulation which has not been already said; for again and again the Harveian orators have eloquently set forth its originality and importance, the steps by which it was attained, and the work of previous labourers in the same field.

When you, Sir, appointed me Harveian orator and conferred on me the highest honour you have to bestow in this College, you accompanied the command with a desire that, after due and proper reference to the work of our great benefactor, I should dwell more particularly on the subject to which I have devoted a large portion of my life—viz., tuberculosis; and I will endeavour to carry out your wishes to the best of my ability.

First, to comply with my orders, let us briefly contemplate the state of knowledge concerning the circulation of the blood before Harvey commenced his investigations.

Knowledge of the Circulation in Early Times.

Aristotle had taught that in man and the higher animals the blood was elaborated from the food in the liver, whence it was carried to the heart and distributed through the veins over the body. His successors of the Alexandrine School of Medicine,

Erasistratus and Herophilus, further amplified his system, and explained that while the veins carried blood from the heart to the members, the arteries carried a subtle kind of air or spirit. According to Dr. Pye-Smith's admirable epitome of the subject, only two changes had been made, for the practical physician, in this theory of the circulation between the Christian era and the sixteenth century.

Galen had discovered that the arteries were not, as their name implies, merely air tubes, but that they contained blood as well as vital air or spirit, and it had been gradually ascertained that the nerves (*νεῦρα*) which arose from the brain and conveyed animal spirits to the body were different from the tendons and sinews (*νεῦρα*) which attach themselves to bones.

The state of knowledge may be summarized as follows:—

(1) At the time of Linacre (1524) physicians knew that the blood was not stagnant in the body, for this had been apparent even to the ancient augurs when they inspected the entrails of a victim and, as Dr. Pye-Smith remarked, to every village barber who "breathed" a vein; but no one had a conception of a continuous stream returning to its source—*i.e.*, of a circulation in the true sense of the word—either in the system or lungs, for they were only cognisant of some slow and irregular movement of the blood.

(2) Physicians, before Harvey, supposed that

one kind of blood flowed from the liver to the right ventricle of the heart, and thence to the lungs and the general system by the veins, and that another kind flowed from the left ventricle to the lungs and general system by the arteries.

(3) They supposed that the heart's septum was pervious and allowed blood to pass directly from the right to the left side.

(4) They had no conception of the functions of the heart as the motor power of the movement of the blood. They doubted if its substance were muscular; they supposed its pulsations to be due to the expansion of the spirits it contained. They believed the only dynamic effect which it had on the blood to be that of sucking it in during its active diastole; they supposed the chief use of its constant movements to be the due admixture of blood and spirits.

When we come to the sixteenth century we find that Jacobus Sylvius discovered the valves of the veins, more fully described later by Fabricius, and that Vesalius ascertained that the septum between the right and left ventricle was complete in the adult. Servetus, whose works, having been burnt, were probably never seen by Harvey, had certain theories of the existence of the lesser circulation, which were confirmed later by Realdus Columbus, for the latter taught that blood and spirits pass from the right to the left ventricle, not through the septum, but through the lungs.

Discovery of the Mechanism of the Circulation by Harvey.

Such was the state of knowledge when Harvey commenced his long and painstaking series of researches and observations, and he prefaces his account of them with the following words, with which all students of cardiac pathology have probably some time or other felt sympathy:—

“When I first gave my mind to vivisections as a means of discovering the motions and uses of the heart, and sought to discover these from actual inspection and not from the writings of others, I found the task so truly arduous, so full of difficulties, that I was almost tempted to think with Frascatorius that the motion of the heart was only to be comprehended by God. For I could neither rightly perceive at first when the diastole took place, nor when and where dilatation and contraction occurred by reason of the rapidity of the motion, which in many animals is accomplished in the twinkling of an eye, coming and going like a flash of lightning, so that the systole presented itself to me now from this point, now from that; the diastole the same; and then everything was reversed, and motions occurring as it seemed, variously and confusedly together.

“At length by using greater and daily diligence, having frequent recourse to vivisections and employing numerous observations, I thought I had

attained to the truth that I should extricate myself and escape from this labyrinth and that I had discovered what I had so much desired, both the motion and the use of the heart and arteries. Since which time I have not hesitated to expose my views upon these subjects, not only in private to my friends, but also in public in my anatomical lectures, after the manner of the Academy of old."

Then after many years of demonstrations, in his Lumleian lectures, he published his well-known "*Exercitatio de Motu Cordis et Sanguinis*," a work of 67 pages, marvellous for its conciseness, in which he proves for all time—

"(1) That it is the contraction, not the dilatation of the heart which coincides with the pulse, and that the ventricles, as true muscular sacs, squeeze the blood which they contain into the aorta and pulmonary artery; (2) that the pulse is not produced by the arteries enlarging and so filling, but by the arteries being filled with blood and so enlarging; (3) that there are no pores in the septum of the heart, so that the whole blood in the right ventricle is sent to the lungs and round by the pulmonary veins to the left ventricle, and also that the whole blood in the left ventricle is again sent into the arteries round by the smaller veins into the *venæ cavæ*, and by them to the right ventricle again, thus making a complete double 'circulation'; (4) that the blood in the arteries and that in the veins is the same blood; (5) that

the action of the right and left sides of the heart, auricles, ventricles, and valves is the same, the mechanism in both being for reception and propulsion of liquid and not of air, since the blood on the left side, though mixed with air, is still blood; (6) that the blood sent through the arteries to the tissues is not all used, but that most of it runs through into the veins; (7) that there is no to-and-fro undulation in the veins, but a constant stream from the distant parts towards the heart; (8) that the dynamical starting-point of the blood is the heart and not the liver."

One part of the circulation Harvey did not discover—viz., the capillaries. He had demonstrated the communication between arteries and veins in three situations—the choroid plexus, the spermatic vessels, and the umbilical vessels—but having no microscope he had to leave the discovery of the capillaries to others, and four years after his death Malpighi, by the use of a newly invented microscope, showed in the lungs of a frog how the blood passes from one set of vessels to the other. Thus was the wondrous cycle made complete and the circulation of the blood, both lesser and greater, manifested to mankind.

Though Harvey's discovery was attacked and subjected to the severest criticism, he lived to see it firmly established in the annals of medicine and to witness the conversion of the greater number of his opponents, but this is not to be wondered at

when we consider the mass of evidence from observations and experiments on all classes of creation on which the discovery rests, the splendid and convincing logic of Harvey's arguments, and the modest and unpretending simplicity with which the discovery was put forward.

Some Results of the Discovery.

With your permission, Mr. President, let us now picture Harvey contemplating some of the scientific truths which have been revealed as the result of the great discovery. Harvey himself sanctions such speculation, for in his second disquisition to John Riolanus, Junior, he remarks: "How speedily is pain relieved or removed by the detraction of blood, the application of cupping glasses, or the compression of the artery which leads to the part. It sometimes vanishes as if by magic." He then refers us to his medical observations, where his views will be found at length exposed and explained; observations which were, alas, destroyed when his house was sacked by Cromwell's soldiers. He could then see local abstraction of blood and the use of the tourniquet set forth, but when our great master glanced over ages to come he would soon have perceived a harvest of new facts, physiological, clinical, pathological, and therapeutical, which might all be traced to his grand discovery! What would he have thought of the phenomena of embolism of

the arteries, which is the key to so many conditions of the brain and other organs, or again, of thrombosis and the inflammatory conditions of the walls of the veins and their effects on the circulation?

How delighted Harvey would have been with the discovery of mediate auscultation by Laennec and the consequent provision of a ready method for ascertaining and of estimating the sounds and murmurs of the heart! With what interest would he not have followed the experiments carried on in this city by Hope, C. J. B. Williams, and Glendinning, which, to use the terms of the report, concluded "that the first or systolic sound is essentially caused by the sudden and forcible tightening of the muscular fibres of the ventricles when they contract, and that the second sound, which accompanies the diastole of the ventricle, depends solely on the reaction of the arterial columns of blood on the semilunar valves of the arterial orifices."

Harvey would also have welcomed the graphic method introduced by Ludwig and his disciples, and applied by Volkmann, Chauveau, and Marey to the registration of the pulse in the form of the cardiograph, sphygmograph, and to the measurement of the blood-pressure, and probably, if he could have availed himself of such help, he would further have enriched our field by fresh discoveries of no small importance.

When we come to the practical uses of the knowledge of the circulation, what would Harvey not have thought of transfusion of blood, of the administration of anæsthetics, of hypodermic injections, &c., all which depend on this knowledge. Transfusion of blood¹ is only used in extreme and exceptional cases, and then is a procedure fraught with some danger, but the administration of anæsthetics is one of the greatest boons that have ever been granted to human and animal suffering, and has, in Sir James Paget's words, more than any other discovery, added to the sum of human happiness.

"Past all counting is the sum of happiness enjoyed by the millions who for the last years have escaped the pains which were inevitable in surgical operations, pains made more terrible by apprehension, more keen by close attention, sometimes awful in a swift agony, sometimes prolonged beyond the most patient endurance and then renewed in memory or in terrible dreams."

What a delight to Harvey to feel that his discovery had been the foundation of such blessed advances in medicine and surgery!

Intravenous injections of medicines, according to Sir Lauder Brunton, were first practised by Sir

¹ Transfusion of normal saline solution is practically free from danger, and has proved of the greatest value in saving life in cases of profuse hæmorrhage.

Christopher Wren, the famous architect of St. Paul's, who was a medical graduate of Oxford and a very successful experimenter, and, according to Bishop Spratt,¹ "by his injections divers creatures were immediately purged, vomited, intoxicated, killed, or revived according to the quality of the liquor injected." Intravenous injection was certainly an outcome of Harvey's discovery, and the process has been perfected by successive experimenters, and largely employed. But perhaps more important and certainly more useful has been hypodermic injection, the first instrument for which was devised by Dr. Alexander Wood, and which is so simple a procedure that it is employed not only by medical men and nurses, but too frequently by patients themselves and often to their disadvantage. Not only are drugs of various kinds administered in this way, but the different vaccines, tuberculin, and the like ; and this method, to which Harvey's discovery opened the door, presents a vista of possibilities of which the master could hardly have dreamed.

Tuberculosis.

I will now proceed according to your wishes, Mr. President, to give some account of the know-

¹ "History of Royal Society of London for the Improving of Natural Knowledge," by T. Spratt, late Bishop of Rochester.

ledge of tuberculosis which existed at the time of Harvey, and, with your permission, will trace the steps by which that knowledge has been extended and increased in the centuries which separate us from Harvey. The tale is not altogether a pleasant one, but one moral, at any rate, can be drawn—viz., that no satisfactory progress can be made in the investigation of disease unless the Harveian system of searching out the secrets of Nature by way of experiment is employed.

Scrofula.

When I take up my parable concerning tuberculosis of various kinds a smile of contentment would, I think, spread over Harvey's philosophic countenance as he realized the successive advances in knowledge; for in his time the principal treatment for "*les scrofules dites écrouelles*"—i.e., cases of scrofula or king's evil—was the royal touch, which was held to be of special virtue when the sovereign had just been consecrated. One of the first acts of Henry IV. of France when he entered his new capital, Paris, was to administer his royal touch to 600 scrofulous patients who flocked to him. According to Laurens, who published a book in 1609 on the subject, and also according to Professor Landouzy, to whom I am much indebted for information, the king's evil was regarded as a disease both hereditary and con-

tagious, for the suppurating sores were held capable of contaminating healthy people, and their healing was difficult. In 1645 a pious lady founded in the Isle of France a hospital dedicated to St. Marcoul reserved for contagious scrofulous cases ("réserve au mal des écouelles qui se communique"). The practice of the royal touch began in France with Clovis and in England with Edward the Confessor, and continued to a late period, in France till Charles X. (1824). In Spain the practice was in great vogue, and the Spaniards who were scrofulous would crowd to any city visited by their king, for "le Roy les touchant, Dieu les guérit." According to Dr. Pettigrew,¹ in no reign in the history of England did the practice prevail to such an extent as it did in that of Charles II., and it is not a little remarkable that more people died from scrofula, according to the bills of mortality, during this period than in any other. It was even recommended by the faculty, for at the instigation of Sir John Floyer, a physician of eminence, Samuel Johnson was "twice touched by Queen Anne," and, as Boswell remarked, "evidently without success." Both William III. and George I. declined to touch for king's evil, the latter referring the child of an English gentleman to the Pretender as possessing the hereditary power of the Stuarts. The English gentleman took his advice.

¹ Sir Richard Quain's "Harveian Oration," 1885, p. 13.

His son was touched and recovered, and the father was converted to the Stuart cause.¹

I will say no more on the king's evil, as it has been the subject of the Fitz-Patrick lectures at the College this year and has been ably and exhaustively treated by Dr. Raymond Crawford, whose book I have read with much interest.

Some Early Writers on Tuberculosis.

Harvey's writings do not contain many references to tuberculosis, though it is possible the lost "Medical Observations" treated of the subject, but I have taken the pains of going carefully through that remarkable document, the "*Prælectiones Anatomiae*," published by the College, which, owing to the deciphering skill of Mr. Scott of the British Museum and the liberality of the College, supplies us with Harvey's Latin notes of his famous lectures, interspersed with sundry English expressive annotations. These contain much that is remarkable and instructive, but I failed to find any reference to consumption or other forms of tuberculosis. The "*Prælectiones*" contain a good description of the anatomy of the lungs and of the process of respiration—so that, although we are acquainted with Harvey's views on many diseases, we do not know what doctrines he held on tuberculosis.

¹ Chambers's "History of the Rebellion."

The first writer on this and other kindred subjects after Harvey's period was Dr. Christopher Bennett (Benedictus), a Fellow of this College, who published (in 1656) a little book in Latin entitled, "*Tabidorum theatrum sive Pthisios Atrophiae et Hecticae Xenodochium*," which gives an account of several forms of tabes or wasting, and devotes some 30 pages to phthisis, basing the diagnosis of that disease on the character of the sputum, its frequency, the fact of its being tinged with blood, the pains in the chest and the shortness of breath, and colliquative night sweats. He dwells on the weak, small, and frequent pulse, on the falling off of hair and the curving of the nails, and above all on the so-called "Hippocratic" countenance, "*seu ipsa mortis imago, viz., facies lurida ac emortua, oculi subsidentes, nares acutae, gena depressiores, collapsa tempora, corpusque totum strigosum sceleto finitimum*." And to complete the horrors of the poor patient he adds as a characteristic, "*omnium virtutum deficientia*." The descriptions are picturesque, though often obscure, but the treatment proposed is bleeding, cough mixtures and inhalations, with hygienic and dietetic rules some of the latter excellent, but there is no mention of fresh air, tonics, or exercise.

Dr. Gideon Harvey, a Dutchman who settled in London and became physician to Charles II., published in 1666 a book entitled, "*Morbus Anglicus, or the Anatomy of Consumptions*, containing

the Nature, Causes, Subjects, Progress, Change, Signs, Prognostics, Preservatives, and several Methods of Curing all Consumptions, Coughs, and Spitting of Blood." Dr. Gideon Harvey wrote several books in a racy, scurrilous style, but they appear to have been of no scientific value. He mixed up a number of wasting diseases, which had not much to do with each other, under the head of Consumption, and the result was considerable confusion. Dr. Gideon Harvey appears to have had strong notions on the subject of climate and diet for consumptives, of which a good account will be found in the *British Medical Journal*, October 21, 1911.

Morton's "Phthisiologia."

The next work of importance on consumption in this country was published at the beginning of the eighteenth century, to wit, Richard Morton's "Phthisiologia, or Treatise of Consumption." It was originally published in Latin, afterwards translated into English, and ran through more than one edition, being evidently widely read and approved in the eighteenth century. The author treated of "Consumptions," not only of pulmonary consumption, but of many kinds of wasting disease, such as that arising from discharging abscesses, from diabetes, from loss of blood, and from excessive diarrhoea due to various causes, but he devoted his chief attention to pulmonary consumption,

of the acute forms of which disease he certainly was an attentive observer, and had a considerable experience. Some of his distinctions are shrewd, such as those between the different kinds of cough prevailing in consumption and catarrh, and his remarks on the "prognosticks" are occasionally quite sound, as, for instance: "Every Consumption, though it be cured, is apt to return, and he that has once been in a Consumption, unless he governs himself very regularly, falls back into the same Condition, even upon the least Occasion. For not only the Lungs, being already impaired by a former Attack from the Distemper, are the more apt to receive a new Impression, but there is likewise a greater Inclination and Disposition to this Distemper from the Habit of the Body itself in these than in other Persons. Yea, moreover, even after the most perfect Cure of a Consumption, there is reason to suspect that there are some crude Tubercles yet remaining, which at length may, by often meeting with an Occasion, be inflamed, and ripen into Apostemes (abscesses), and so at last become Ulcers." What, however, can we say of his view of the etiology as thus set forth?—"The cause of a Consumption of the Lungs in general is a vitiated Disposition of the Mass of Blood and of the Spirit in the Nerves, contracted gradually from several procatartick or predisposing Causes, in which the sharp or malignant Serum or Water of the Blood being separated by the soft and

glandulous Substance of the Lungs, does stuff, inflame, and at length also exulcerate the Lungs themselves, which is the immediate Cause of this Distemper." Morton maintained that the dry cough of consumption was caused by tubercles in the lobes of the lungs which cause a tickling in the upper part of the windpipe, and stated that the same dry cough may be caused by "chalky stones" generated in the substance of the lungs. He also observed the same symptoms arising "from 3 Nails, that slipt by Chance" (as the person was laughing) "through the Windpipe down into the Lungs and Continued for a whole Year, the sick Person being in other respects very well"! Morton was a believer in the doctrine of phthisis ab hæmoptoe and does not seem to attribute the hæmoptysis to pre-existing tubercle. He also gives illustrations of phthisis by contagion, for which, according to him, the prognosis is very unfavourable. Morton's pathology is very obscure and somewhat indefinite, but when we come to treatment of his cases, most of which are acute, he begins by bleeding "to prevent the hectick and colliquative Heat or Catarrhous State of the Blood"; then, in order to carry off the load of the dispirited and diseased humours lodged in the habit of the body with convenient medicines, he recommends vomits, purges, diuretics, and sweating medicines. Finally, he administers woodlice, crab's eyes, the simple powder of crab's claws, red coral, and white

amber in the form of powders or julep to "temper the Sharpness of the Blood." Poor consumptive! who might well exclaim with the Frenchman "Laissez-moi mourir, mais ne me tuez pas!"

Treatment advocated by Sydenham.

Sydenham,¹ the great physician of gout and fevers, dismisses phthisis in a few pages of his epistles. After a short and rather striking sketch of an advanced case he describes a less acute case, and considers that the treatment "which would suffice would be to abstain from meat and wine for a few days and to take a balsam of sulphur and anise with sugar in the form of tablets and then a cough mixture of oil of sweet almonds, syrup of maidenhair, and syrup of violets; this to be taken off a stick of liquorice. If the cough do not yield to these remedies, or if it have arisen from peripneumony or pleurisy, or is accompanied by fever, and this is generally the case, it is folly to trust to pectorals," the disease must be attacked by bleeding and purging; but if, "notwithstanding the latter method, the cough not only continue, but do shake the lungs as to have paved the way for phthisis," he recommends balsam of Peru; but Sydenham concludes "that of all the remedies for phthisis, long and continued journeys on horseback

¹ "Works of Sydenham," Sydenham Society, vol. ii.

bear the bell, in respect of which must be noted, that if the patient be past the prime of life, more exercise of the sort in question must be taken than if he was a youth or boy. Bark is no surer a cure for ague than riding for phthisis."

Later Views.

In Mr. Ancell's² "Treatise on Tuberculosis" (1852) will be found a list of the different theories which have prevailed in bygone ages to explain the occurrence of tuberculous diseases. These are fifty-four in number and extend from the time of Hippocrates to that of Dr. Hughes Bennett, and they are as diverse as they are numerous. They show the large amount of attention bestowed on the subject in all ages and, in many cases, testify to the lively imagination of their authors. Most of these theories refer the cause of the consumption to errors of digestion and errors in the formation of the lymph or chyle, or blood, or to defective respiration, or they assign an origin from inflammation, and as a rule mistake predisposing causes for the *vera causa*, which, though long suspected, was never actually discovered till Robert Koch appeared on the scene.

Laennec's benefit to this department of medicine was twofold. He successfully applied his great discovery to the clinical phenomena of pulmonary

² Ancell: "A Treatise on Tuberculosis," p. 552.

consumption and he also gave us the first good account of the morbid anatomy of tubercle, and insisted on what has been definitely proved since his time—viz., on the unity of the disease.

Matthew Baillie had in 1795, from observations on children, stated that tubercles were the essential cause of consumption and demonstrated their seat in the cellular tissue, distinguishing them from lymphatic glands, but the first to properly describe miliary tubercle was Bayle, the friend and contemporary of Laennec, and to this day the miliary tubercle found in the serous membranes is called in France “granulations de Bayle.”

Bayle, like Laennec, denied an inflammatory origin to miliary tubercle, and held it to be a product *sui generis*.

Broussais,¹ on the other hand, considered that tubercle had an inflammatory origin and that consumption depended on a chronic phlogosis, inflammation of the lungs, or catarrh, parenchymatous or bronchial, which, if prolonged by the cause that produces it, could impress the lymphatics of the lungs with a certain impulse, leading to the formation of tubercle or various deposits of tuberculous matter.

Anyone studying the writings of Andral and Bayle will soon come to the conclusion that they, with Laennec, had grasped the main truth of the

¹ Ansell, *loc. cit.*, p. 553.

nature of tubercle and its close association with consumption, proving that they were opposed to Broussais's opinion that tubercle originated from inflammation; but, unfortunately, whatever their pathology might be, they, in common with other pathologists of the time, founded all their *treatment* on an anti-inflammatory basis, and did not seem to have been able to contemplate any treatment for any serious disease without anti-inflammatory measures.

Treatment by Blood-letting, &c.

Concerning blood-letting, Morton, Donar, Mead, Pringle and Munro all recommended it for the early stages of consumption to subdue inflammation. Cheyne advised bleeding in hæmoptysis, where it certainly has great effect, in order to reduce the inflammatory state of the lungs produced by the irritation of tubercle and to arrest the progress of the disease. Even Sir James Clark, who was a very cautious physician, counsels bleeding under certain restrictions, as the following extract will show. He was of opinion¹:—

“That keeping before us the condition of our patient, the nature of his constitution, and the pathological condition of his lungs, and considering the utmost benefit which we can generally expect to derive from the practice is the removal, or the

¹ “Treatise on Pulmonary Consumption,” p. 340.

diminution, of congestion or inflammation, complicated with, and often dependent on, the presence of tubercles, keeping all these circumstances in view, blood may be abstracted with advantage at any stage of consumption, when the symptoms require it. After pulmonary congestion has been diminished by general bleeding, the abstraction of blood by cupping or leeches, where further depletion is necessary, has a very beneficial effect."

Most of the above authorities advised bleeding on the ground of reducing inflammatory conditions of the lungs, but some of the French physicians entertained other views of its possibilities. Laennec's opinions on the subject are highly interesting, and are evidently more shrewd than those of his contemporaries. He says:—

"The most rational indications for the treatment of phthisis are, first, to prevent the secondary eruption of tubercles: as in this case, if the primary tubercular masses were not extremely large or numerous, which they very seldom are, a cure would necessarily take place after they, the masses, are softened and evacuated; secondly, to promote the softening and evacuation or absorption of the existing crop of tubercles."

Laennec remarks that bleedings and derivatives have been used to prevent the development of tubercle, the greater number of physicians, however, not considering these a means of curing or even of preventing phthisis, but only calculated to

allay the inflammatory affections with which it is complicated, but he adds that Broussais maintained that by bleeding he stopped the inflammatory conditions and rendered the occurrence of phthisis rare. Laennec himself held that bleeding could neither prevent the formation of tubercles nor cure them when formed. He says: "It ought never to be employed in the treatment of consumption except to remove inflammation or active determinations of blood, with which the disease may be complicated; beyond this its operation can only tend to a useless loss of strength." Laennec doubted if any one of the remedies reported to promote the softening of the tubercles really did so, but he thought the alkalis, including the carbonates of ammonia and soda, helped expectoration. He considered the best means of opposing the disease was by sea voyages or a residence on the sea coast in a mild climate, and he attempted to establish an artificial marine atmosphere in the Clinical Hospital in Paris, where he placed twelve consumptives in a ward the air of which was impregnated with fresh seaweed. He states that in all these patients the disease remained stationary, and in some the emaciation and fever were sensibly lessened, and that nine left believing themselves to be cured.

Louis seems to have been sceptical about the treatment of phthisis generally, and only believed in palliative measures.

Another method of treatment which was much

in vogue in the eighteenth and the beginning of the nineteenth century was by emetics, as we know by the evidence of Morton, Parr, Bryan, Reid, Marryatt, Young, and Sir James Clark himself, for the latter cites the cures of De Vettis at Naples by emetics of tartarised antimony, and states the benefit derived from this form of treatment is chiefly in threatened consumption, explaining that the repeated action of emetics may prevent the deposition, or at least the retention of tuberculous matter in the bronchial ramifications and air-cells, and thus prevent the localization of the disease.

Comparative Duration of Life of Consumptives.

I have dealt rather fully with the treatment of consumption at the time of Laennec, Louis, James Clark, and others, because I wished to show that the short duration of life in their cases was clearly connected with the depressing measures then in vogue, and that the disease was not, as has been urged, of an utterly different type from that which prevails now, when the duration of life is much greater, and this can be proved by a comparison of some of the clinical descriptions. The best evidence on this point is that of Dr. C. J. B. Williams,¹ a favourite pupil of Laennec, who in 1871 gave the following facts:—

“In the first ten years of my practice (1830-40)

¹ “Pulmonary Consumption,” first edition, 1871.

the beneficial effect of treatment was limited to incipient cases, and especially to those who were able at an early stage to take long voyages, such as those to Australia and to India."

He adds:—

"My general recollection of the histories of the developed disease at that time is that of distressing tragedies, in which no means used seemed to have any power to arrest the malady; and life was rarely prolonged beyond the limit of two years, assigned by Laennec and Louis as the average duration of the life of a consumptive.

"In the next period of ten years (from 1840 to 1850) a marked improvement took place in the results of treatment, apparently in connection with the allowance of a more liberal diet, and the habitual use of mild alterative tonics, as they might be termed, particularly iodide of potassium with sarsaparilla, or other vegetable tonics. Several of the early cases recorded were treated in this way and with improved results in respect of the general health of the patients and diminution of cough and expectoration.

"It was in the latter part of this period that chemists began to produce cod-liver oil of sufficient purity and freshness to be fit for the human stomach; and I have no hesitation in stating my conviction that this agent has done more for the consumptive than all the other means put together."

Tonic Treatment of Phthisis.

When I entered London practice in 1866 the tonic treatment of consumption had commenced, and according to the evidence of the first Brompton Report, and of Dr. Hughes Bennett, Dr. C. J. B. Williams, and others, cod-liver oil was at the head of all consumption treatment, and was in extensive use in hospital and private practice. The prevalent idea of treatment was, at that time, partly tonic, including a liberal dietary, and partly sedative to subdue symptoms. The climatic treatment was changing from the warm moist atmosphere of Madeira and the cold moist one of Pau to the dry, warm and more bracing air of the Mediterranean shores. Sea voyages were still in vogue, and a few patients wintered in Egypt, while the English winter resorts were also in fashion. To live in an equable temperature, to sleep in a well-warmed room, and to winter in a more or less warm climate was the order of the day, and the era of unlimited open air by day and night had hardly dawned. The Brompton Hospital experiment of sending patients to Madeira, and my statistics drawn from my father's cases, demonstrated that Madeira was undesirable for nearly all forms of consumption, as in spite of most of these patients being especially selected as suitable, they lost appetite and became languid, while the disease progressed rapidly and excavation proceeded.

That the introduction of cod-liver oil into the treatment of the consumption exercised a wonderful effect on the outlook of the disease was well seen in the raised average of life among Dr. Pollock's out-patients at Brompton, in contrast to former estimates, and this seemed due to the oil alone, as these patients enjoyed no other special advantages in the way of food, exercise, climate, or sanitation, and my statistics also showed that the patients who persevered in the use of cod-liver oil at home did better than those who were sent to warm climates for the winter and did not persevere in its use.

In the Medico-Chirurgical Transactions of 1870 were published my statistics on the "Duration of Life in 1,000 Cases of Pulmonary Consumption among the Upper and Middle Classes." These patients were selected with the limitation of having been under treatment for one year and upwards, thus excluding most of the acute cases, which group was calculated to amount to 3 or 5 per cent. of the whole number. Of the 1,000, 198 had died, and the average duration of their life since the onset of the disease was 7 years and 7 months; 802 were living, with a good expectation of further life in 72 per cent., and a present duration of 8 years 2.19 months since the first attack. This was the result arrived at before the era of sanatoriums, high altitude treatment, and vaccines. Now let us consider sanatorium treatment.

Introduction of Fresh-air Treatment by Bodington.

It is well known that the open-air and sanatorium treatment was originated in 1840 by Bodington of Sutton Coldfield and supported by Henry MacCormac, but it had been practically ignored in this country until a much later date and until after it had been adopted by Brehmer, of Görbersdorf, 15 years after Bodington's time, and later on by Dettweiler, of Falkenstein.

It is curious to see in Bodington's original essay on the "Treatment and Cure of Pulmonary Consumption on Principles, Natural, Rational, and Successful," how completely its author grasps the principles of open-air treatment when he says "the only gas fit for the lungs is the pure atmosphere freely administered; its privation is the most constant and frequent cause of the progress of the disease. To live in and breathe freely the open air without being deterred by wind or weather is the one and essential remedy in averting its progress." Bodington, as the late Dr. Bulstrode,¹ whose admirable Milroy lectures this College had the privilege of listening to some years ago, points out, had a clear insight into the requirements of the consumptive working man, for he says "provision

¹ Thirty-fifth Annual Report of the Local Government Board: Supplement on Sanatoria for Consumption and Certain other Aspects of the Tuberculosis Question.

should be made for the employment of the convalescent and cured patients who, if possible, should not return to their former occupation " (presumably an unhealthy one), "but should be employed as agricultural labourers or gardeners." Bodington furnished a suitable house for the reception of patients, engaged a medical superintendent to give them "almost hourly watchfulness," and made all necessary arrangements, but he was before his age. His views were ridiculed, and his sanatorium was soon emptied of patients and converted into a lunatic asylum! He lived long enough to see the establishment and spread of sanatoriums, at least in Germany, where it had been whispered that the need for fresh air was the sorest, and he prophesied that when he was dead and buried perhaps the medical profession would be more disposed to do him some justice than when he lived. Now, as a kind of posthumous justice to Bodington's memory, the City of Birmingham has erected the first municipal sanatorium for consumption in England a few miles from the pioneer's original institution, and Birmingham is now proud of her once neglected son.

Sanatoriums in Germany.

On German soil the sanatorium idea, after weathering opposition, slowly developed; the first example being Brehmer's at Görbersdorf in Silesia, in which methodical hill-climbing up graduated

ascents were specially enjoined with the object of furthering the development of the heart—a small heart, according to Brehmer, being one of the greatest predisposing causes of phthisis. This sanatorium grew and prospered, and at present there are no less than four at Görbersdorf.

Dettweiler, a patient, and afterwards an assistant, of Brehmer, established at Falkenstein, in the Taunus Mountains, a sanatorium, where for Brehmer's graduated ascents he substituted the *Liegehalle* system, in which patients lie for several hours together in open shelters, and this system continues in general use in German sanatoriums.¹ Dettweiler fed his patients largely, proclaiming the kitchen to be the true pharmacy of the sanatorium, and he established a high ideal for the medical superintendent of such an institution, for he contends that it must be "all in all to him, his Religion, his Politics, his Despair, and his Delight." Dettweiler held for a long time a foremost position as the head of Falkenstein, which was a leading German sanatorium.

Dr. Walther, of Nordrach, strongly opposed the *Liegehalle*, which he nicknamed "quarrelling halls"—I presume in consequence of what he observed among the occupants, and he advocated instead a species of solitary confinement during the

¹ "Sanatoria for Consumptives," by von Jaruntowsky. Translated by E. Clifford Beale.

rest hours, but enjoined outdoor walks in all weathers with a stuffing dietary, and his example has been followed in several of the British sanatoriums.

Statistics of German Sanatoriums.

Many of these institutions were established in North and South Germany, some for the poor from charitable funds, some for the well-to-do classes as private speculations, and some to supply the requirements of the German Insurance Society, the present result being a total of 137 with 16,548 beds for the working classes alone.

Whatever difference of opinion may exist as to the need for sanatoriums in this country, there is in Germany no doubt about their success, not only for the insured and for workers but for all classes of society. Dettweiler was, I believe, the first to start a sanatorium for the poor at Ruppertshain, in the Taunus, and was followed by von Leyden, B. Fraenkel, Pannwitz, and others, who organized Belzig, while Bielefeldt and Gebhart stimulated the insurance companies to erect sanatoriums for their consumptive members, of which at present there exist 38 with 3,169 beds for men and 1,314 for women. The records of these sanatoriums, kept for a number of years and classified for the Imperial Health Office by Dr. Hamel and Dr. Englemann, show decidedly favourable results both as regards general and local conditions, but as the

German authorities in their statistics make the capacity for work the standard of improvement rather than tabulating cases as arrested or cured, comparison with most of the English statistics is difficult. According to these German tables 44 per cent. male and 51 per cent. female consumptives were capable of work four or five years after leaving the sanatorium. The statistics of the Hanseatic Towns sanatoriums, where the proportion of early cases was apparently greater, give 47 per cent. of male and 57 per cent. of female, and the Prussian and Hessian Railway employees sanatoriums yield still better results, for they show 59·6 per cent. of patients at work five years after leaving the sanatorium. Naturally the results of sanatorium treatment greatly depend on the amount of disease present when the patient is admitted and the length of the consumptive history.

The statistics of the German sanatoriums are instructive and important, as they are based on thousands of cases of the working classes, but as they treat of the subject only from the point of view of capability for work and wage-earning they are incomplete. When a comparison was once attempted between these and my statistics, which are fairly complete, I was asked what proportion of my cases returned to work, and I had to explain that they belonged to a different class and few did manual work as wage-earners, so that a comparison

was not possible ; but what is really wanted is a whole-life comparison to see how long these patients lived.

Acute Cases.

As Sir R. Douglas Powell and Dr. P. Horton-Smith Hartley emphasize in their recent work,¹ every effort should be made to persuade those suffering from phthisis to apply for treatment in the early stage, and it will be noted that the result of treatment depends largely upon the proportion of early cases, though we must not accept the popular statement that all cases of phthisis, if taken early, are curable. The dictum may be said to be true if applied to the ordinary types of chronic phthisis, but we must except acute cases, which all pass through an early stage to a fatal issue.

Acute miliary tuberculosis, for instance—sometimes primary, sometimes secondary—often presents the signs and symptoms of an early case of consumption, but speedily develops and destroys the patient in a few weeks. Acute pneumonic phthisis, or galloping consumption, is another hopeless form, when the patient's power of resistance is feeble and the dose of bacillar poison overwhelming. In the early stages the symptoms are often obscure and mask the true nature of the disease, which

¹ "Diseases of Lungs," Powell and Hartley, 5th edition, 1911.

declares itself gradually; the lungs become consolidated with tubercle and rapidly break down into suppurating cavities, whole lungs being destroyed, and the victim perishes in a few weeks or months. It is true that in some of these cases the disintegrating process comes to a standstill and fibrosis sets in, the patient living on with a greatly diminished lung surface, though the disease is incapable of cure. Fortunately, acute tuberculosis and acute phthisis (galloping consumption) form only a very small percentage of the cases of consumption.

Sanatoriums in Great Britain.

Though the open-air treatment has spread everywhere in Great Britain, the number of public and private sanatorium beds is comparatively smaller than in Germany, and, exclusive of Poor-Law infirmaries, cannot exceed 3,000, whereas Germany counts tens of thousands. This is chiefly due to the enormous increase of these institutions under the German Workmen's Insurance Act. We have some very good specimens in this country, as, for instance, King Edward VII. Sanatorium, founded by His late Majesty, an ideal establishment beautifully situated, and Frimley, the Brompton Hospital Sanatorium, well adapted for the working classes, to mention two among many others in the United Kingdom. These institutions are doing great good, both in the way of treatment and instruction, and

recent complaints against sanatoriums seem exaggerated and unreasonable, though they may partly be accounted for by the nature of the cases admitted, which are generally too advanced and fitter for consumption hospitals, and many more such hospitals are needed in this country.

A comparison has recently been made by Messrs. Elderton and Perry, under the auspices of Professor Karl Pearson, F.R.S., between the results from sanatorium treatment and those obtained in pre-sanatorium days by Dr. Pollock and myself. As far as I am concerned, I highly appreciate the care and attention which have been bestowed on my laborious figures, and I am pleased to note that Messrs. Elderton and Perry's conclusions agree so well with my facts; but I do not consider that sanatoriums have been long enough established in this country to furnish the information required for reliable statistics, and I hold that a fair and useful comparison is not yet possible. I would deprecate also comparison of American sanatoriums, such as the Adirondacks, with records of private patients in Great Britain, necessarily under different conditions.

I propose later to offer an opinion as to the needs of this country with regard to sanatoriums, hospitals, dispensaries, and labour colonies, but for the present will only say that the successes achieved at some of the working-class sanatoriums and the results of certain private sanatoriums

justify a steady continuance of work, which is first curative and secondly educational.

We note how the patient with a limited tubercular pulmonary lesion is removed to the thoroughly hygienic surroundings of a sanatorium and is compelled to live a healthy life, his food, his room, his exercise, his rests being all placed under minute direction. Here he slowly but gradually recovers, losing his symptoms, regaining his strength, until he is able to return home, where he presents himself not only fit to do work but to act as an apostle of fresh air and wholesome living.

Graduated Labour.

The introduction of a system of graduated labour into the treatment of consumption as a substitute for walking exercise has been an important addition and forms a prominent feature at Frimley, the Royal Victoria Hospital, Edinburgh, Maltings Farm Sanatorium, and at King Edward VII. Sanatorium and other places.

Dr. M. S. Paterson,¹ who has introduced the system so successfully at Frimley, lays down as a condition of any work being undertaken that the patient's temperature shall not reach 99° F. in case of males, or 99·6° F. in case of females, and that if there be any rise of temperature after

¹ "Auto-inoculation in Pulmonary Tuberculosis," by Marcus Paterson, M.D., 1911.

even the lowest grade of work, the patient should be placed in a state of complete immobilization until the register returns to the normal. It is found that after a few days the same grade is accomplished without rise of temperature, and in a week's time a higher grade is attempted with success, until by degrees the highest is reached and the patient is able to perform several hours of pick-axe, shovel, or wheelbarrow work without any unfavourable symptoms.

There are six grades of work besides walking, commencing with carrying small baskets of earth a certain distance and ending with pickaxe work, shovelling, hauling stones, and general heavy navvy work; while for the women patients the grades of exercise and work are similar, but the baskets and shovels are of smaller size, and they are not allowed to work as hard as the men.

Dr. Paterson holds that in these working consumptives there occurs "an artificial inducement of auto-inoculations adjusted to the resisting power of the protective substances, and that it is possible to control the auto-inoculation by complete immobilization." According to Sir Almroth Wright,¹ "it is by the agency of these auto-inoculations that the protective mechanism of the blood is set in motion, so that whenever bacterial products escape

¹ "Studies on Immunization and their Application to the Diagnosis and Treatment of Bacterial Infections."

from localized foci and pass into the circulation, intoxication phenomena and immunizing responses must necessarily supervene." Thus after inoculation from a tuberculous focus a large production of protective substance is calculated to take place. Whatever the theory may be to account for the change, it is most interesting to see patients become gradually accustomed to labour without any rise of temperature, and while the system does wonders for the bodies, and especially for the muscles of our patients, it also has a most beneficial effect on their minds. Depression and gloom give way to cheerfulness and hope. The discovery that they can do honest work without suffering, and that day by day their working powers increase, has a most encouraging effect on their spirits, which rise proportionately with their returning strength.

Treatment at High Altitudes.

Probably one reason why sanatorium treatment was not more quickly taken up in this country was that, at the time, the attention of the medical profession was much occupied in considering the high altitude treatment of consumption, introduced to special notice by Sir Hermann Weber in his well-known paper read before the Royal Medical and Chirurgical Society on May 11, 1869, which set us about investigating these climates and their effects. In the following summer I visited Davos,

and through the kindness of the late Dr. Spengler and Dr. Unger I examined a number of German patients who had passed some months at an altitude of 5,000 ft. At the time there were no English, though some had been there during the winter. What I saw of the patients and of the climate induced me to give a full trial to the high altitude treatment for consumption, and I have watched its effects on over 400 of my patients, sending them not only to the mountain resorts of Switzerland, such as Davos and St. Moritz, but also to North and South America and South Africa, and the statistics of most of these cases have been published in my Lumleian lectures delivered before this College on Aero-therapeutics. They confirm the results of Archibald Smith, Jourdannet, Guilbert, Lombard, and of Hermann Weber as regards mountain climate, of which the characteristic features are: (1) Diminished barometric pressure and consequent rarefaction of the atmosphere; (2) diathermancy of the air, or the increased facility by which the sun's rays are transmitted; and (3) asepticity or freedom from pathogenic germs, as proved by the researches of Pasteur and others.

The effect of mountain air on the organs and functions of healthy and of sick persons has been ascertained by repeated careful observations to be as follows: The skin is tanned by the solar rays and, according to Dr. Bowles, principally by

the ultra-violet rays in the attenuated atmosphere. The circulation is at first quickened, the heart's impulse becomes more powerful, but the pulse-rate at the end of six or eight weeks falls to normal, or even below normal; the respiration is at first quickened, but after a similar interval it gradually slows and is reduced to normal or below normal. The breathing becomes deeper, the inspiration longer, and the expiration more complete, and thus is explained the slowing of the respiration. There is reduction in the blood-pressure and in the amount of urea excreted by the kidneys, but more carbonic acid and water are eliminated by the lungs. When acclimatization is complete the urea appears in full quantity in the urine, and the blood-pressure again increases. Accompanying and exactly coinciding with the reduction in the pulse and respiration the thorax expands in several directions, causing an increase in circumference at various levels of from 1 to 3 in. and even more, also an augmentation of the spirometric record and increased mobility of the chest walls.

Effects of Mountain Climates in Chronic Cases.

The effect of mountain climates on selected cases of chronic tuberculosis is remarkable. Cough and expectoration vanish. There is considerable gain of weight, the general appearance is greatly changed for the better, and it is difficult to recog-

nize in the bronzed and vigorous individuals the pallid invalids of a few months before. Muscular power is largely increased, and many of the patients walk 10, 15, or even 30 miles a day and climb mountains.

The local improvement is more striking. Tubercle bacilli are generally banished from the sputum. Respiration, at first increased in rate by the elevation, becomes deeper and easier. The physical signs show, in cases of consolidation, resonance over both lungs, the disappearance of all signs of dulness, bronchophony, and crepitation, and the substitution of harsh breathing, like the compensatory breath sound heard over the unaffected lung in pleuritic effusion.

In many of these earlier cases of consolidation the disappearance of the physical signs is so complete that the physician has to refer to his notes to discover which lung was originally attacked.

In softening and excavation cases the improvement takes the form of disappearance of moist râles and often of cavernous sounds, and hyper-resonance becomes evident owing to the large development of emphysema around the lesions.

Of all my statistics of consumptive patients the high altitude cases yielded the most favourable results and, what is most important, showed the fewest relapses.

The climate of high altitudes does most for the

tubercular consolidation patients, for a large proportion of these become cases of arrest. Those with limited cavities do not derive the same amount of advantage as patients with only consolidations, though they also are much benefited.

I am glad to find that my favourable experience of the high altitudes is confirmed by the statistics of the Basel-Davos Sanatorium at Davos (5,200 ft.). Comparison with the German sanatoriums before alluded to, the proportion of severe cases being much the same in both institutions, shows that the percentage of the patients able to work five years after their discharge is to the advantage of the Swiss, the Swiss capables being almost double those from the German sanatoriums.

Serum and Vaccine Treatment.

I must now say a word on the treatment of consumption by anti-tuberculous serum and vaccines.

Many attempts have been made to produce an anti-tuberculous serum by inoculating with tuberculin animals believed to be immune from tubercle, and then using the serum of that immune animal for hypodermic injection into consumptive patients. This was done in France by Richet and Héricourt, by Bouchard, Daremberg and Bernheim, and by Marmorek, in Italy by Maragliano, and in the United States by Trudeau and Baldwin, Sternberg, and others, also by Dr. Horrocks and myself at

the Brompton Hospital under the auspices of the Lister Institute, but though we all succeeded in obtaining a special serum and scored a certain amount of success this was never sufficient to warrant perseverance on a large scale on my part.

Vaccines, in the form of tuberculin, were started by Koch himself, as we know, in 1890, and the first form, known as the old tuberculin, had an extensive trial in most countries. This old tuberculin was pronounced to be a failure by the majority of observers, and, according to the Brompton Hospital Report on the cases treated in the wards, the tuberculin caused breaking-down of the tubercular masses in the lungs and the formation of cavities, and even sometimes led to the extension of the disease; but it was noted later on that this appeared to be often followed by contractile changes due to increase of fibrosis. I was one of those who drew up this report and I visited Professor Koch at Berlin to obtain his instructions as to the carrying out of the tuberculin treatment, so that the experiments should be fairly tried. My colleagues and I tested it both in hospital and in private practice, and came to the conclusion that it did more harm than good, and this was the general verdict, confirming that of Koch's own colleagues, Virchow, Gerhardt, von Leyden, Senator, and Ewald.

But it has since been suggested that Koch used too large a dose of tuberculin, producing a powerful

reaction, which is better avoided, and that a smaller dosage is desirable. There are now several tuberculins, two of which, T.R. and B.E., have different effects from the old tuberculin of Koch, and these are generally employed in greatly reduced quantities. My colleague, Dr. Hector Mackenzie, who has a large experience on the subject, reports : " Whether one uses old tuberculin T.R. or B.E. for treatment the initial dose is about the same, 0.00001 c.c. This is given at intervals of two to eight days. If a local or general reaction occurs the interval should be increased and the dose diminished. The dose is gradually increased, avoiding reaction, until after some months doses of 0.1 c.c. up to 1 c.c. can be given without local or general reaction." Bovine tuberculin is also used for cases of human tuberculosis.

There is still much conflicting evidence, and medical men are by no means unanimous as to the advantage of tuberculin treatment, yet the testimony of Trudeau, Bandelier, Möller, and Ritter indicates that carefully selected tubercular patients treated in a sanatorium with tuberculin make better progress than similar cases treated in sanatoriums without tuberculin.

It may be that tuberculin, which we know to possess a wonderful faculty for penetrating tubercular tissues, has also the power of exciting the antibodies in the neighbourhood, such as the opsonins and other protective substances, and of

stimulating their production, so that a system of defence is thereby organized. The fact that tubercle bacilli disappear earlier from the sputum during this treatment is very remarkable, and everything points to the necessity of further investigation in the matter. But such investigation ought to be carried on in a hospital or sanatorium rather than at a tuberculin dispensary, where there is no means of observing the effect of the tuberculin on the patient's system or of controlling the inoculations and their results.

Effects of Improved Hygienic Conditions.

To sum up, What are the prospects of the crusade against tuberculosis in this country, and how can we further them? We must bear in mind the blessed agencies of prevention which, when set in motion, go on pursuing their beneficent course independently of fashion and caprice. Such are improved drainage, more cubic space and less overcrowding, better food and more of it, more air and sunlight, cleanliness of house and person, and greater opportunities for play and exercise. It is probable that a large proportion of the two-thirds reduction in our phthisis mortality during the last fifty years is due to such agencies, and as the standard of public opinion is raised these ought to be more widely spread and to act more powerfully. What a splendid effect a good town-planning scheme ought to exercise on the public health!

Then comes the education of all classes, including the children, by tuberculosis exhibitions and by popular lectures and tracts, which now permeate and enlighten the country, showing the people how they can help themselves. We may count on these hygienic, sanitary, and educational agencies to contribute effectively to the prevention of tuberculosis and to the further reduction of the phthisis death-rate.

Means for Dealing with Consumptives.

And what is our means for dealing with the consumptive patient? The great difficulty, especially among the poor, is to detect and separate for treatment *early* cases of tubercular disease; and here, undoubtedly, the dispensary system introduced by Dr. R. W. Philip is of the greatest use, as home visitation of the consumptives and connecting them with philanthropic and other agencies is thus secured. Out-patient departments of consumption hospitals ought, if well organized, to fulfil the same functions, and it is possible in this way to classify the patients according to their requirements. For when we come to the consumptive patients themselves we most of us find that few are fit for admission into a sanatorium, and many require the care, treatment, and nursing of a hospital. The working classes, and especially those who have families to support, do not leave off work until compelled to do so from sheer

inability, or unless they have been early alarmed at the danger of persistence in their occupation. Consequently medical men when called in find they have to deal with cases of more or less active disease involving a considerable amount of lung surface and often in advanced stages. The consumption hospital is the proper place for such patients, where they can be treated with all the approved method of modern medicine and where they may in time improve sufficiently to be able to benefit by the sanatorium, or where, if they deteriorate and sink, their last days can be passed in comfort. Another great advantage of the consumption hospital is that it isolates from the rest of the population those advanced and acute cases which are the most likely to become centres of infection.

England was the first country and London the first city to recognize the need for consumption hospitals, and our metropolis had established four special hospitals before other cities had done anything in the matter.

The sanatorium is intended to receive consumptives in early stages with limited lesions, free from pyrexia and able to take exercise. If such patients are submitted to the complete system of sanatorial treatment for at least six months, though often a longer period may be necessary, they frequently leave the institution with disease arrested, or greatly reduced, and are able to undertake work

again. Where, as at Frimley, the mass of patients undergo, during their stay, training in various grades of labour, they generally return to their former occupation, if a healthy one, or change it, if unhealthy, for one more suitable.

Change of occupation is, however, one of the difficulties for the consumptive, for if he returns to an unhealthy calling he may have a relapse, and if he undertakes new and healthy work his earnings will probably be at first too small for his support. In the middle classes, which fill the King Edward VII. Sanatorium, the problem of providing healthy occupation has been largely overcome, and we get excellent reports from old patients who still carry out essential parts of their sanatorium *régime* in their different callings.

Besides home institutions we have now in the Queen Alexandra Sanatorium at Davos a high-altitude sanatorium where with sanatorium life the great advantage of mountain climate is combined.

I am convinced that any comprehensive scheme for dealing with consumption in this country should include the establishment of a large number of consumption hospitals scattered over the country in close connexion with dispensaries and sanatoriums, and as a further link in the chain some form of labour colonies and exchanges should be available.

The task of further reducing and abolishing tuberculosis is not a hopeless one, but it does not

lie wholly with the doctors. It lies also with those who have it in their power to remove or to lessen the principal causes of tuberculosis—viz., the overcrowding of our cities, the want of open spaces and ventilation, the insanitary houses, the lack of a good supply of water and of pure milk. If all these defects were remedied the number of phthisis cases would be comparatively small. The Government and the local authorities could insist, too, on the removal of advanced cases of consumption to a hospital or infirmary, and thus do away with one chief source of infection, and we should soon see a rapid fall in the number of contact cases and in the mortality tables.

Benefactors During Past Year.

And now at the close of my oration I must not forget to mention the benefactors to the College during the past year.

On October 27, 1910, the Medical Committee of Guy's Hospital, through Dr. Herbert French, presented to the College an excellent portrait of a former President, Sir Samuel Wilks.

Among the books presented were seven valuable manuscripts and two printed books bequeathed to the College by the late Harveian Librarian, Dr. J. F. Payne. Dr. R. Crawford gave Prayer Books of Queen Anne and of George I., containing the Service for the Healing, two pamphlets on the King's Evil, and a silver touch-piece of James III.;

and other old and valuable books were presented by Dr. J. A. Ormerod, Dr. William Ogle, Sir Dyce Duckworth, Sir William Osler, and the present Harveian Librarian.

Sir George Sutherland Mackenzie, K.C.M.G., C.B., bequeathed, contingent on a life interest of of his two brothers, a legacy of £30,000, free of duty, to the Royal College of Physicians and the Royal College of Surgeons for enabling them to assist students in scientific medical research.

I take this opportunity of recording my obligations to the Harveian Librarian, Dr. Norman Moore, and to the Registrar for kind help in preparing this oration.

I would conclude by exhorting the Fellows and Members of this College to continue in that mutual love and affection which Harvey enjoins, and I would offer my sincere thanks to you, Mr. President, for the great honour you have conferred on me in appointing me Harveian Orator, and to the Fellows and Members for giving me so attentive a hearing.



