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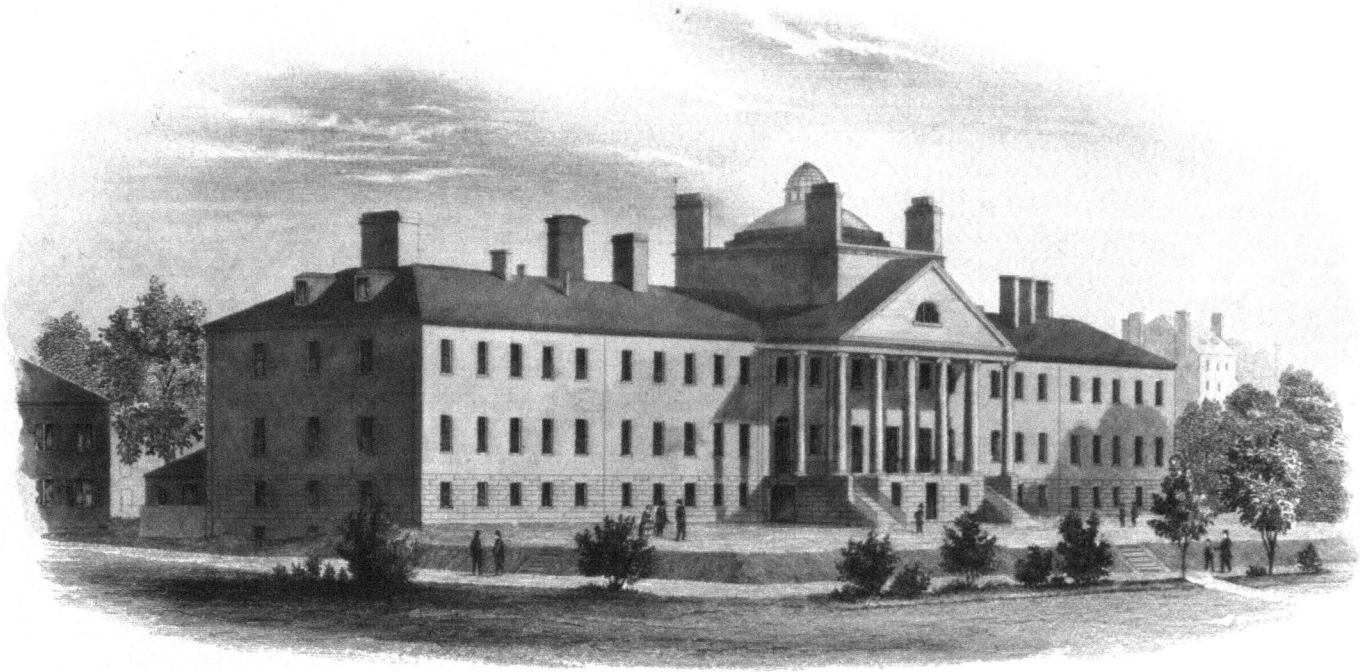
SURGICAL ANÆSTHESIA

1846–1896



Massachusetts General Hospital, Boston

1846–7

THE SEMI-CENTENNIAL OF ANÆSTHESIA

OCTOBER 16, 1846

OCTOBER 16, 1896

BOSTON

MASSACHUSETTS GENERAL HOSPITAL

1897

CAMBRIDGE, MASS., U. S. A.
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COMMEMORATION
of the
Fiftieth Anniversary
of
The First Public Demonstration
of Surgical Anaesthesia
at the
Massachusetts General Hospital
Boston October 16th 1846.

The Honour of your Company is requested
October 16th 1896 at Ten o'clock.

Wm Sturgis Bigelow
For the Trustees

J. Collins Warren
For the Staff

PROGRAMME

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ADDRESS OF WELCOME

BY CHARLES H. DALTON, Esq.

PRESIDENT OF THE
MASSACHUSETTS GENERAL
HOSPITAL

ADDRESS OF WELCOME

GENTLEMEN AND LADIES: It is my privilege, on behalf of the Corporation of the Massachusetts General Hospital, to welcome you here to-day as guests of this venerable institution. Though somewhat less than a century old, the hospital is one of the earliest in the country. It has long passed its infancy and youth, and has reached a period in its life already rich in history and traditions.

In 1810 two distinguished members of the profession, being impressed with the importance of founding a general hospital in this growing city and neighborhood for the better care of the sick and wounded, for the larger opportunities for the study of the art of healing and scientific investigation of the causes of disease, addressed a letter to their fellow-citizens asking their coöperation for this purpose.

In the following year the Commonwealth gave a charter and a generous grant, known as the Province House Estate, and the merchants and other citizens responded with equal liberality to the appeal of Drs. James Jackson and John Collins Warren, which resulted in the building of the central part of the hospital, — a structure which, both in respect to its architectural dignity and its honest workmanship, as well as its fitness for its purposes, is a fair monument to the characters of its first projectors.

Since then, for three generations, the institution has never failed to have at its service the highest professional skill in all its constantly growing departments and scientific development, and the sympathy and confidence of the public.

During these eighty-four years there has been an annually increasing procession of patients seeking its protecting shelter, who have been tenderly cared for, whether on free beds or otherwise, and in this most important function the hospital has amply realized the purposes of its enlightened and humane founders.

I do not refer to this record as being in any degree peculiar to this hospital. It is simply the story of the performance of its duty to the public, and for which it was chartered by the Commonwealth. It is, in general, the common history of all similar institutions, illustrating perhaps, in the most sincere form, man's humanity to man. But it is, nevertheless, a record which has amply justified its foundation, and should insure its preservation in the years to come.

If, however, we could imagine all this record erased; if all the intelligence of the physician, the skill of the surgeon, the watchfulness of the nurse, the benefactions of the public, and, more than all, the saving of life and relief of suffering, were as naught, — there would still remain one page in its history which of itself alone would be more than a recompense for the loss of all the rest, inasmuch as of what was inscribed thereon the whole world has been the beneficiary, and incidentally has raised the name of The Massachusetts General Hospital to an honorable distinction at home and abroad.

Fifty years ago to-day in the operating theatre, then under yonder dome, Sulphuric Ether was first used for the prevention of pain to a patient undergoing a serious

operation. This application was made by Mr. W. T. G. Morton. The experiment was a success.

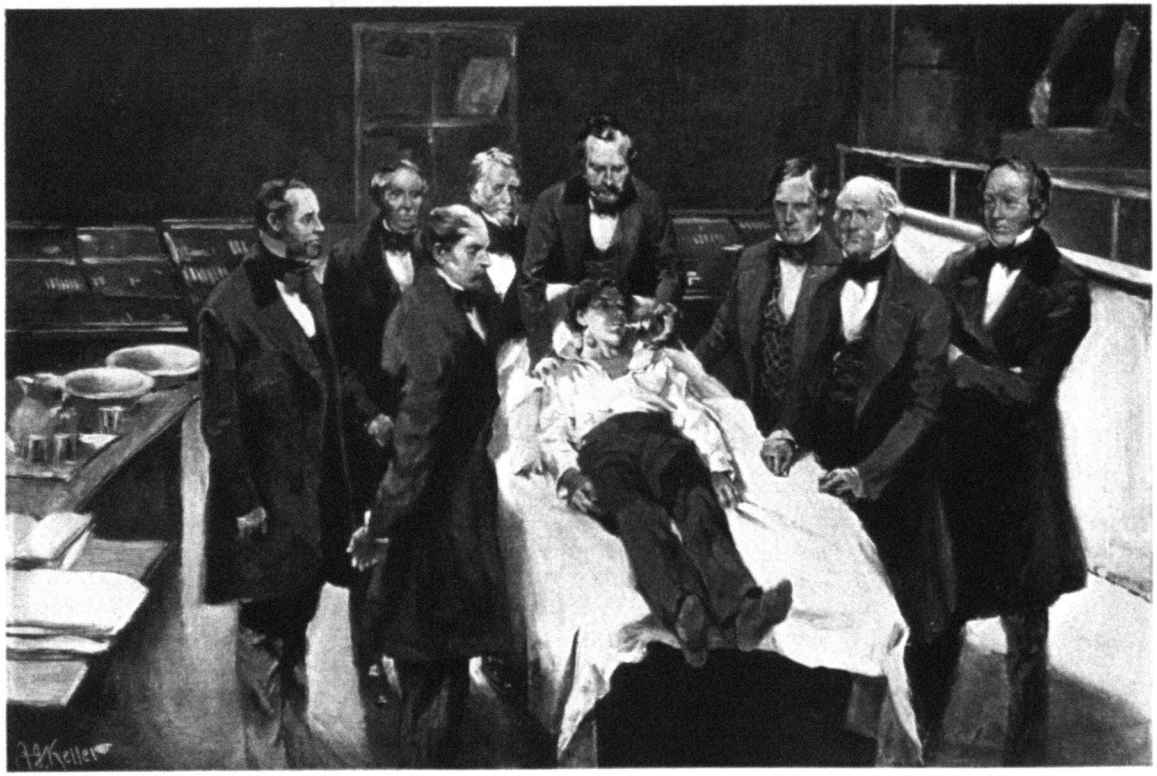
Of the infinite blessings which followed this the greatest gift of the century to mankind, of its contributions to the relief and safety of suffering humanity, to the surer confidence and success of the physician and surgeon in his efforts for the saving of human life, and in scientific investigation, it is not my function to speak. These themes are for the scholar and scientist.

I have simply to express to you the cordial welcome of the Corporation to this celebration of the fiftieth anniversary of the first surgical operation under which the patient suffered no pain, no discomfort, no anxiety.

The occasion is unique.

REMINISCENCES OF 1846

BY ROBERT T. DAVIS, M. D.
OF FALL RIVER



DR H J BIGELOW DR A A GOULD DR J C WARREN DR W T G MORTON DR SAMUEL PARKMAN DR GEORGE HAYWARD
DR J MASON WARREN DR S D TOWNSEND

The First Public Demonstration of Surgical Anaesthesia
Boston October 16 1846

REMINISCENCES OF 1846

MR. PRESIDENT AND GENTLEMEN: Fifty years ago to-day occurred the first authentic, unquestionable, public exhibition of anæsthesia during a surgical operation. As one of the few surviving witnesses of that memorable event, the most important in surgical, and one of the most important in human history, I have been invited to state my recollection of the incidents attending it, and very gladly comply with the request.

The operation in which the anæsthetic was administered was performed in the surgical amphitheatre of the Massachusetts General Hospital by Dr. John C. Warren, in the presence of a number of distinguished surgeons and physicians, including Dr. Hayward, the elder Dr. Bigelow, one of the wisest and greatest men who have adorned our profession with their multifarious gifts and accomplishments, and his celebrated son, not then arrived at the zenith of his fame. The Harvard medical class was also present. After some delay Dr. William Morton appeared with his apparatus, when Dr. Warren addressed the medical class, which had not been previously notified of the proposed experiment, stating in substance that there was a gentleman present who claimed that he had discovered that the inhalation of a certain agent would produce insensibility to pain during surgical operations with safety to the patient, and he added that the class

was aware that he had always regarded that condition as an important desideratum in operative surgery, and he had decided to permit him to try the experiment.

The patient, who was a young man, was suffering from a vascular tumor of the neck on the left side, occupying the space from the edge of the jaw downward to the larynx and from the angle of the jaw to the median line. Dr. Morton proceeded to apply to the lips of the patient a tube connected with a glass globe. After the inhalation had continued four or five minutes he appeared to be asleep, and the operation was commenced and completed without further inhalation of the ether. It consisted of an incision about three inches in length over the centre of the tumor, and through the skin and subcutaneous cellular tissue, and the removal of a layer of fascia, which covered the enlarged blood-vessels. A curved needle armed with a ligature was then passed under and around the tumor, and considerable compression was employed.

During most of the time occupied by the operation the patient gave no sign of sensibility, and appeared to be sleeping quietly. A short time before its completion he moved his head, body, and limbs, and muttered words which I could not hear distinctly, but upon recovering consciousness he declared that he had suffered no pain, but simply a sensation like scraping the parts with a blunt instrument.

The exhibition of the anæsthetic was admitted by those present to be a complete success. The operating surgeon expressed his satisfaction in these emphatic words: "Gentlemen, this is no humbug." From that time forward it became the practice to employ it at the hospital in all operations of importance.

Dr. Morton continued to administer it until it was proved that it could be easily and safely administered by others. The apparatus which he had used in the first

and a few subsequent instances was soon abandoned as unnecessary and attended with possible risk, and a concave sponge was substituted. Sulphuric ether as an anæsthetic very promptly passed into general use in Boston and throughout the State, and soon afterward in public and private practice in the large cities of other States, followed by its employment all over the country wherever scientific surgery was practised. Its fame crossed the ocean, and it rapidly became a necessary adjunct to surgery in Europe as well as here, and beyond, even to the utmost limits of civilization; it did not stop there, but among savage tribes and barbarous races in distant continents and islands it followed the footsteps of the explorer, the trader, and the missionary on its divine errand of mercy to mankind.

It is impossible to estimate or comprehend the importance of this beneficent discovery. It safely and absolutely secures insensibility to pain, unconsciousness and immobility for long periods of time, conditions which are essential to the successful performance of prolonged and delicate surgical operations. We know the pain and terror which accompanied ordinary surgical operations before the advent of anæsthesia. I cannot forget the impression produced by the case of a naval officer, upon whom a painful operation was performed at this hospital. The suffering was so great that he repeatedly screamed, and was quite unable to suppress the exhibition of his agony. He afterward apologized to the gentlemen present, and stated that he could not control the expression of unendurable pain he had experienced, and to which his haggard features and shaking frame bore undoubted testimony.

It was fitting that the discovery of anæsthesia should be ushered to the world from this historic institution, dedicated to the service of humanity, in the broadest

spirit of charity, by the gifts of noble men and women. It was fitting, also, that the most eminent surgeon of his day in New England permitted the experiment and performed the operation. His name will be always honored and gratefully remembered, by the profession and the public, for his courage and wisdom in assuming the responsibility of sanctioning what might have proved a hazardous experiment, whose failure would have compromised his great reputation. Such considerations had no terrors for him; he thought only of the lasting and limitless blessings which would follow success. These qualities he inherited from an illustrious ancestry. He was the son of a Revolutionary patriot and military surgeon, who was for forty years the most distinguished member of our profession in New England, and a nephew of the heroic Warren, who left a profession, whose duty it is to save human life, to offer up his own in defence of American liberty in the first pitched battle of the Revolution, and whose name is on the lips of every schoolboy who has read the immortal story of our nation's birth. Blessed forever be the memory of Joseph Warren, who fell at Bunker Hill, and that of John Collins Warren, who aided so signally the renowned discovery of anæsthesia, to whom all generations will be debtors, in conferring that unequalled boon upon his fellow-men.

Let me add that discoveries of such permanent and universal interest and importance are not accidental. Such an assumption would be an impeachment of the order of the universe and the designs of Providence. They are the natural and indeed inevitable result of the progress of scientific thought and investigation. The eager quest of previously unknown facts which distinguishes our age reaches the very threshold of discovery, when some fortunate explorer takes a step in advance, ascertains the new truth and proclaims it to the world.

J. C. Warren

The history of surgical anæsthesia furnishes no exemption from this general law. In the noon of this grandest of the centuries, the spirit of humane science whispered these glad tidings; the attentive ear of Morton heard the message and transmitted it to mankind. Thenceforth this matchless discovery was destined to bestow its blessings, so long as the race shall endure, wherever in all time human suffering cries aloud for succor or languishes in silent despair, and the divine attribute of mercy, aided by the wisdom of science, flies to its relief.

SURGERY BEFORE THE DAYS OF ANÆSTHESIA

BY JOHN ASHHURST, JR., M. D., LL. D.
OF PHILADELPHIA

SURGERY BEFORE THE DAYS OF ANÆSTHESIA

MR. PRESIDENT and Gentlemen of the Board of Trustees and Hospital Staff, Ladies and Gentlemen: A study of the condition of operative surgery before the days of anæsthesia reveals on the one hand a picture of heroic boldness and masterly self-control on the part of the surgeon, and on the other a ghastly panorama, sometimes of stoic fortitude and endurance, sometimes of abject terror and humiliation, but always of agonizing wretchedness and pain, on the part of the unhappy victim, man or woman, whose necessities required a recourse to the surgeon's aid. And from our vantage ground of a half century's experience it is difficult for us to understand why, with the constant and persistent efforts made by surgeons in past ages to lessen the pain of operations, and with the gradual but continuous accumulation of facts showing that by certain agents pain could be temporarily abolished without danger, the eyes of all — patients as well as practitioners — yet seemed to be holden, and why, science and art working with a common object, if independently, though the whole world seemed to be trembling on the verge of the discovery, it yet was not until fifty years ago to-day that the crucial experiment was made in this hospital, and that surgical anæsthesia became a glorious reality.

SURGERY BEFORE THE DAYS OF ANÆSTHESIA

It is somewhat difficult to obtain an accurate picture of pre-anæsthetic surgery from the patient's point of view, probably for a similar reason to that indicated by the lion in the fable, when he criticised the artist for always representing a combat between lions and men as terminating in a human victory, — lions do not paint; and so, as operations are habitually reported by surgeons and not by patients, we read of the skill and intrepidity of the operator, of difficulties met and overcome, and of victories snatched as it were from the very jaws of impending defeat; but we hear little of the tortures of the victim under the life-saving process, or, in an unsuccessful case, of the gradual subsidence of agonizing cries hushed in the silence of death. And yet we sometimes catch, incidentally, a side-glimpse of an operation from the patient's standpoint, and can thus form some faint notion of the shades as well as of the high lights of capital surgery in days gone by.

Those who are familiar with the history of British surgery seventy years ago will recall the famous case of Cooper *vs.* Wakley, in which the enterprising founder and proprietor of the "Lancet" was sued and mulcted, though in but nominal damages, for the report of an operation for lithotomy performed by Sir Astley Cooper's nephew, Mr. Bransby B. Cooper. The report opens with a quotation from John Bell, referring to "long and murderous operations, when the surgeon labors for an hour in extracting the stone, to the inevitable destruction of the patient," and then, having described in terms as graphic as uncomplimentary the operator's prolonged efforts to remove the calculus, and the words which showed his own anxiety and discomposure during the process, adds: "Such were the hurried exclamations of the operator. Every now and then there was a cry of 'Hush!' which was succeeded by the stillness of death,

broken only by the horrible squash, squash, of the forceps in the perineum. 'Oh! let it go — pray let it keep in!' was the constant cry of the poor man." The patient was on the table nearly an hour, and after a night and a day of great pain "death," adds the reporter "ended the poor fellow's sufferings, about twenty-nine hours after the operation." The fatal result appeared to have been due to peritonitis. It is, indeed, not an unheard-of thing that a surgeon's presence of mind should fail him in a difficult operation, even at the present day; but at least the patient, unconscious through the blessing of anæsthesia, does not know it, and this complication is spared, to the great comfort of all concerned.

The "pitilessness" which Celsus urged as an essential trait in the operative surgeon — though Percy and Laurent declare that this pitilessness was meant to be apparent only — was, indeed, before the days of anæsthesia, a feature in the surgeon's character which impressed very strongly the public generally, as well as those immediately connected with the operation; and it may be feared that there are not wanting, even at this nineteenth century's end, some who would echo the comment of the younger Pliny upon the operative surgeons of his time: "They make experiments through deaths, and no head is secure from them."

It is interesting to recall that Sir James Simpson, of Edinburgh, shortly after beginning his professional studies, was so affected by "seeing the terrible agony of a poor Highland woman under amputation of the breast," that he resolved to abandon a medical career, and seek other occupation; happily, his intention was reconsidered, and he returned to his studies, asking himself, "Can anything be done to make operations less painful?" and, as every one knows, in less than twenty years

became himself a high priest of anæsthesia, and the introducer into surgical and obstetrical practice of ether's great rival, chloroform.

Not only did delicate women and tender children dread the ordeal of the surgeon's knife, but strong and brave men also recoiled from its use in horror: Buffon preferred death to relief from the agonies of calculus by the operation of lithotomy; and case after case is narrated by Monfalcon and other writers in which men submitted themselves with the utmost calmness and fortitude to the hands of skilful operators, instantly falling into collapse after the first incision, and, without undue loss of blood, quickly succumbing to the depressing effects of simple shock and pain.

No braver or more gallant gentleman ever lived than Admiral Viscount Nelson, and, after his right elbow had been shattered by a French bullet in the assault at Teneriffe, he manifested the utmost courage, refusing to be taken to the nearest ship lest the sight of his injury should alarm the wife of a fellow-officer whose own fate was uncertain, and when his own ship was reached, climbing up its side without assistance, and saying, "Tell the surgeon to make haste and get his instruments. I know I must lose my right arm, so the sooner it is off the better." "He underwent the amputation," we learn from a private letter of one of his midshipmen, "with the same firmness and courage that have always marked his character;" and yet so painfully was he affected by the *coldness* of the operator's knife that though, when next going into action at the famous battle of the Nile, he could after calmly finishing his meal say to his officers, "By this time to-morrow I shall have gained a peerage or Westminster Abbey," yet he gave standing orders to his surgeons that hot water should always be kept in readiness during an engagement, so that if another oper-

ation should be required, he might at least have the poor comfort of being cut with *warm* instruments.

But the most striking picture of which I am cognizant, showing the way in which an intelligent patient looked upon a surgical operation, is to be found in a letter written to Sir James Simpson by a friend, himself a member of the medical profession, who had had the misfortune to lose a limb by amputation before the introduction of anæsthesia: "I at once agreed," he says, "to submit to the operation, but asked a week to prepare for it, not with the slightest expectation that the disease would take a favorable turn in the interval, or that the anticipated horrors of the operation would become less appalling by reflection upon them, but simply because it was so probable that the operation would be followed by a fatal issue that I wished to prepare for death, and what lies beyond it, whilst my faculties were clear and my emotions were comparatively undisturbed. . . . The week, so slow and yet so swift in its passage, at length came to an end, and the morning of the operation arrived. . . . The operation was a more tedious one than some which involve much greater mutilation. It necessitated cruel cutting through inflamed and morbidly sensitive parts, and could not be despatched by a few strokes of the knife. . . . Of the agony it occasioned I will say nothing. Suffering so great as I underwent cannot be expressed in words, and thus fortunately cannot be recalled. The particular pangs are now forgotten; but the blank whirlwind of emotion, the horror of great darkness, and the sense of desertion by God and man, bordering close upon despair, which swept through my mind and overwhelmed my heart, I can never forget, however gladly I would do so. Only the wish to save others some of my sufferings makes me deliberately recall and confess the anguish and humiliation of such a personal experi-

ence; nor can I find language more sober or familiar than that I have used to express feelings which, happily for us all, are too rare as matters of general experience to have been shaped into household words. . . . During the operation, in spite of the pain it occasioned, my senses were preternaturally acute, as I have been told they generally are in patients under such circumstances. I watched all that the surgeon did with a fascinated intensity. I still recall with unwelcome vividness the spreading out of the instruments, the twisting of the tourniquet, the first incision, the fingering of the sawed bone, the sponge pressed on the flap, the tying of the blood-vessels, the stitching of the skin, and the bloody dismembered limb lying on the floor. Those are not pleasant remembrances. For a long time they haunted me, and even now they are easily resuscitated; and though they cannot bring back the suffering attending the events which gave them a place in my memory, they can occasion a suffering of their own, and be the cause of a disquiet which favors neither mental nor bodily health."

On the side of the surgeon, we find throughout the ages a constant effort to diminish the terrors of operations, and a continuous reprobation of the distressful, not to say cruel, modes of practice adopted by preceding generations. "Who can read without a kind of horror," cries Monfalcon, "the account of those frightful operations which were then practised? And yet the time is not very far distant from ours when they lopped off a limb by striking it violently with a heavy knife; that time when they knew neither how to stop nor how to prevent hemorrhage but by burning the part whence the blood jetted with boiling oil or the red-hot iron; that time when surgeons armed themselves at every moment with pincers, with burning cauteries, and with a thousand instruments the representations even of which cause ter-

ror." Will it happen that on the occasion of some future anniversary our successors will speak of our operative triumphs with the same scorn and abhorrence with which writers of the present day sometimes refer to the great deeds of our surgical forefathers?

The belief that operations might be rendered painless, and the hope that some means might be discovered by which this end should be accomplished, appear to have been present in the minds of surgeons from the earliest periods. Witness the accounts of the Memphis stone, described by Dioscorides and Pliny, which Littré surmised to have been merely marble, which by steeping in vinegar was made to give forth the fumes of carbonic acid; and of the mandragora, employed according to Theodoric, when mixed with other narcotics, by inhalation, and causing a sleep from which the patient could only be aroused by the fumes of vinegar: so profound was the stupor induced by this drug that Bodin assures us that under its influence a man submitted without consciousness to a painful operation, and continued to sleep for several days thereafter.

Vigo speaks of the whole body being "brought asleep by the smelling of a sponge wherein opium is," but warns his readers that the practice is dangerous, because the use of opium is sometimes followed by gangrene. In his work on "Natural Magic," Baptista Porta speaks of a volatile drug, kept in leaden vessels, which produced sleep when applied to the nostrils; and Perrin suggests that this may actually have been ether, or some other of our modern anæsthetic agents.

Others endeavored to prevent the pain of operations by mechanical means. The Assyrians, Hoffman assures us, compressed the veins of the neck, apparently by tying a band around the part, before practising circumcision, and compression of the carotid arteries was suggested as

an anæsthetic measure in more modern times by Dr. Fleming; while still more recently Dr. Augustus Waller has shown that insensibility may be induced by compressing the cervical vagi. Garroters have, indeed, clearly shown, as remarked by Simpson, that a person may readily be choked into unconsciousness, but it is not surprising that their mode of practice has not commended itself to surgeons for general adoption.

Compression of the limb by a fillet or tight ligature, before amputation, is referred to by Paré as a mode of alleviating the suffering which attends that procedure; and Benjamin Bell tells us that, "in amputating limbs, patients frequently desire the tourniquet to be firmly screwed, from finding that it tends to diminish the pain of the operation." The same writer refers approvingly to the suggestion of Mr. James Moore, that pain should be controlled by the application of a screw compressor to the principal nerve of the part, but surgeons generally appear to have agreed with Monfalcon that the inconveniences of such an apparatus fully equalled its very slight advantages.

Mental preoccupation was sometimes sought as a means of preventing pain. Richard Wiseman found that soldiers dreaded the loss of a limb much less if it was removed immediately, while they were "in the heat of fight," than if the operation was postponed until the next day; "wherefore," he says, "cut it off quickly, while the soldier is heated and in mettle;" and Renauldin recalls the case of the amiable Dolomieu, who, exposed to the pangs of starvation in a Neapolitan dungeon, measurably alleviated his own distress by engaging in the composition of a Treatise on Mineralogy, while his unfortunate servant and fellow-prisoner, who had not the same intellectual resources, was hungry enough for both.

But the presence of pain was not the only evil

dreaded by our predecessors in attempting important operations: the great risk of fatal accident from some involuntary movement of the patient was constantly present to the mind of the conscientious surgeon. "How often," says Dr. Valentine Mott, "when operating in some deep, dark wound, along the course of some great vein, with thin walls, alternately distended and flaccid with the vital current, — how often have I dreaded that some unfortunate struggle of the patient would deviate the knife a little from its proper course, and that I, who fain would be the deliverer, should involuntarily become the executioner, seeing my patient perish in my hands by the most appalling form of death! Had he been insensible, I should have felt no alarm." So greatly was the responsibility of using the knife felt by the best-informed surgeons of pre-anæsthetic days, that many, like Haller, distrusted their own manual dexterity, and declined to perform operations which, while recognizing their necessity, they felt should be left to other surgeons differently constituted from themselves. Would that a little of this Hallerian diffidence might affect some tyros of the profession in our own day, who, without the slightest preliminary practical training, do not hesitate to undertake the most hazardous procedures, and seem to consider themselves disgraced if they cannot count one or more abdominal sections, even if terminating fatally, within the accomplishments of their first year's practice!

Coming down to the days more immediately preceding the date of the great discovery, we find that opium and alcohol were the only agents which continued to be regarded as of practical value in diminishing the pain of operations, though the attendant disadvantages of their employment were of course recognized. "Previous to every painful operation," says Dorsey, "a dose of lauda-

num should be administered." "I was in the habit," says Dr. Mott, "of giving opiates freely before the introduction of anæsthetics, both before and after operations, . . . and opium and its preparations are the only anodynes well adapted to surgical use. No substitutes are worthy of confidence." Demme tells of a woman who, under the influence of opium, submitted to amputation at the hip-joint, and emitted but a single cry; and I myself recall distinctly patients who, in the hands of that excellent surgeon, the late Dr. George W. Norris, had limbs amputated with almost no manifestation of pain when well charged previously with opium and whiskey. Alcohol, pushed to the point of producing intoxication, was employed as an anæsthetic by some surgeons; and Dorsey tells us that Dr. Physick, following Richerand's suggestion, used it successfully for its relaxing effect in a rebellious case of dislocated jaw, in which, on account of the patient's "extreme debility," it was not thought prudent to resort to the usual remedy, "blood-letting *ad deliquium animi*."

Meanwhile facts were accumulating, the significance of which we can now plainly recognize, but which excited no attention at the time. Sir Humphry Davy had, in the very early days of the nineteenth century, experimented with nitrous oxide gas, afterwards employed by Horace Wells, and had in so many words suggested its use as an anæsthetic in minor operations; its power of preventing the sensation of pain was well known to many persons, and it was the custom at some of our medical schools — at the University of Pennsylvania for one — for students to breathe the "laughing gas," as it was then called, for diversion. The use of ether by inhalation had been still earlier recommended by Beddoes, Pearson, and Thornton as a remedy for certain diseases of the lungs, and in 1805 your own Warren had employed it "to

relieve the distress attending the last stage of pulmonary inflammation." Its intoxicating qualities when inhaled, and its power, when in sufficient concentration, to produce stupefaction, had been recognized, in 1839, in Pereira's well-known treatise on Materia Medica, and were quite familiar to American medical students; and it is no doubt possible — I certainly have no wish to deny it — that in isolated cases it may have been used as a means of relieving pain by individual practitioners, as by Dr. Long, of Athens, Georgia, whom Perrin, with that happy disregard of the geography of all countries except their own which is characteristic of French writers, calls the " Greek physician."

But yet — and yet — surgeons went on, in every country, cutting and burning, and patients went on writhing and screaming, until on the sixteenth day of October, in the year 1846, in the Massachusetts General Hospital, Dr. John C. Warren painlessly removed a tumor from a man who had previously been etherized by Dr. William T. G. Morton — and Surgical Anæsthesia became the priceless heritage of the civilized world.

WHAT HAS ANÆSTHESIA DONE FOR SURGERY

BY DAVID W. CHEEVER, M. D., LL. D.
OF BOSTON

WHAT HAS ANÆSTHESIA DONE FOR SURGERY

WHAT victim of surgery, who, under ether, sinks into a calm and dreamless sleep, during which his abdomen can be cut open, his bowels taken out, handled, and replaced, his nerves cut, his veins or arteries tied, and his skin sewed up, and who is made so absolutely oblivious as to ask on awakening, "Are you not ready to begin?" but concedes with gratitude, on realizing the result, that this is the greatest discovery ever made for the happiness of mankind?

In proportion as anticipation is worse than reality, must be estimated the mental relief brought about by anæsthesia. To dread the knife, to shrink from an operation, to fear pain,—is there a more universal instinct? It is next to the vital instinct of self-preservation. What iron will, what previous agony, must induce that fortitude which can bring the sufferer to lie down and be cut without stirring!

All this is annulled by anæsthesia. How much mental shock is thus removed!

What is surgically termed the "shock of the operation," or the disturbing effect on the nervous system of violence done the flesh and nerves, is also largely diminished. Anticipation is done away with; pain is prevented; shock is reduced.

The patient consents to operation earlier; he does not wait until life becomes unbearable, but calmly contemplates surgery as the natural and easy channel of relief. Hence his chances of benefit from an operation are much increased; he averts destructive processes, shortens disease, is more likely to recover. So much is done for the patient.

To the surgeon anæsthesia gives the patient asleep, motionless, senseless. He need not hurry; he need not sympathize; he need not worry; he can calmly dissect, as on a dead body; heedful only that the etherizer is competent, the breathing and pulse watched, the operation not prolonged beyond the verge of exhaustion.

The surgeon, then, can do better work; he can be more careful; he can pause and consider; he can choose his steps; he can be deliberate, if not dexterous. He can even summon the aid of the pathologist and his microscope, who in ten minutes, while the patient sleeps, can decide the nature, the innocence or malignancy, of the tumor he is removing.

It is also just to believe that the moral fibre of the surgeon is less strained; judicial callousness is no longer called for; he need not steel his heart, for his victim does not feel.

For surgery and for diagnosis, anæsthesia has done even more. It has enlarged its domain by rendering justifiable, and even promising, severe and delicate operations.

The tyranny of misguided conscience drove the inquisitors of the Middle Ages to rack the joints apart: so, too, the surgeon was formerly obliged to use the rack to tire the muscles and disrupt the capsule, to reduce a dislocation. Now anæsthesia relaxes the muscles, and manipulation rolls the bone into the socket.

Homeric strength was needed to bear Homeric sur-

gery. Strong men and calm women endured desperate mutilations and recovered. But at what a cost!

Such surgery must necessarily have been largely traumatic, or the result of emergencies threatening death if not relieved.

It is not too much to say that all the finer work of plastic, conservative, and abdominal surgery dates from the discovery of anæsthesia. It could not have been done before. Neither surgeon could persist, nor patient endure it. Perhaps one thousand ovariotomies were done by Sir Spencer Wells before asepsis was much practised, but they were all done since anæsthesia was known. The tedious details in a radical cure of hernia were mostly mechanical before anæsthetics, and the operative measures have been adopted since.

Formerly the surgeon was estimated for dexterity and quickness. Now he is esteemed the great surgeon who to judgment adds dexterity, and to dexterity patience.

Anæsthesia was the necessary precursor of asepsis. Without the former the latter would not be what it now is. Even if antiseptic agents were used in dressing wounds, the operations which caused the wounds could not have been done aseptically without anæsthesia.

The essence of asepsis is detail, tedious rules and precautions, prolonged and accurate dressings. All this requires time, immobility, unconsciousness. To stitch the most delicate tissues with accuracy, to match the bowel or bladder so that it will not leak, — how could this be done on a conscious and quivering patient?

First, anæsthesia; second, asepsis. They must be inseparable for success.

All visceral surgery, which deals with the great serous cavities, and which constitutes the proud distinction of modern surgery, depends on anæsthesia first, and on asepsis afterward. The latter is as beneficent a discovery as

the former. Hand-in-hand, equal benefactors, anæsthesia and asepsis march calm and triumphant. Together they have altered life, enlarged what is worth living for, postponed death. May we not claim now as fulfilled for surgery that old saying which our fathers regarded as the acme of success and skill in curing the patient, *Tuto, cito et jucunde* (Without danger, without delay, without pain)?

Is there no reverse to this brilliant picture? There is if we allow it, but most dangers and mischances can be averted by care. The danger of immediate death from anæsthetics is no greater than the ordinary risks of life in the daily pursuits of civilized communities. The use of power, whether steam or electric, surrounds the life of cities with hourly perils; and the chance of succumbing under the inhalation of ether is no greater than the risk of a street accident or a railway journey. Of those who inhale sulphuric ether, about one in fifteen thousand die. I formerly believed that chloroform was ten times more fatal than ether; larger statistics have modified that opinion, and it may now be fairly stated to be five times more dangerous, or of those who inhale chloroform about one in three thousand die.[1]

Since neither anæsthetic is given to the well and sound person, but always to the sick or injured, we cannot eliminate the chances of death from inhalation, which may be increased by infirm hearts, lungs, or kidneys. The patient is forced to take those chances. And yet how few perish from these pain-dispelling agents!

An elementary alcohol, sulphuric ether acts like alcohol in its effects when inhaled. A quickened pulse, a stimulated heart, a vivid capillary blush, congestion of the brain, mental exhilaration, confusion, intoxication, a lethargy which is not lethal.

[1] Appendix I.

Ether is fatal unless breathed with the oxygen of atmospheric air; nay, more, provision to have the carbonic acid exhaled must also be provided for. An uncovered sponge for an infant, and a sponge covered with a porous towel for the adult, are still among the best — and surely the safest — inhalers: rigidity, lividity, stertor, only emphasize the need of more air.

Chloroform affects the heart more suddenly and surely than the respiration. It is a heavier gas, pleasant to take, less bulky, quicker in producing unconsciousness, less irritating to the lungs, less followed by vomiting; but, when fatal, suddenly fatal, without premonition. Its primary effect is depressing; the skin is cool and pale; the pulse not stimulated; sleep follows speedily.

The distinction of danger from safety in the inhalation of both anæsthetics may be described in the words of Shelley: —

> "How wonderful is Death,
> Death and his brother Sleep!
> One pale as yonder waning moon,
> With lips of lurid blue;
> The other rosy as the morn
> When, throned on ocean's wave,
> It blushes o'er the world."

A secondary danger is from prolonged anæsthesia. Sulphuric ether inhaled the first half hour is stimulant; the second half hour, tolerable; the third half hour, depressant. The pulse creeps up from the eighties to the one hundred and twenties; the skin cools; color fades; sweat rains from the surface; respiration becomes shallow or sighing, — all signs of exhaustion, collapse, and death. Intent on a delicate, and as he thinks necessary and final, step in his operation, the surgeon may persist too long, and the patient sink too low for recovery. This danger is emphasized by the delays of aseptic precau-

tions, of minute embroidery of serous membranes with sutures, of too long an exposure of the vital cavities.

A common, but not constant, effect of the inhalation of ether, and of chloroform to a less degree, is nausea and vomiting, both while asleep and after wakening. If only of brief duration, its only danger is in disturbing the wound, as the humors of the eye or the ligatures on the pedicle of an ovarian cyst. This danger is, however, to be counted. If of long duration, it marks a condition of secondary shock, which is often fatal.

No agent has been found to be a specific to prevent vomiting. An empty stomach is an essential in inhaling anæsthetics. As remedies, the bromides, the subcutaneous injection of morphia and atropia, the inhalation of oxygen, have each given a certain success. Much vomiting may be prevented by giving ether only to the verge of insensibility; not filling the blood too full of the vapor; taking the ether off permanently as early as possible; for unconsciousness persists for fifteen to twenty minutes after apparent rousing, and the patient's motions and moans are automatic, and not remembered after waking.

Sulphuric ether irritates the mucous membrane of the bronchi and minute air-passages. We know how it congests the eyes if it runs into them. It provokes a large and sometimes dangerous secretion of sero-mucous fluid from the bronchi; this gets churned up with air, and fills the throat with a bubbling-fluid like soapsuds. It is both annoying and dangerous. Chloroform causes much less of this condition.

Acute bronchitis, pulmonary edema, broncho-pneumonia (but not true lobar-pneumonia)[1] may follow, and turn the scale against the patient. It is claimed that a previous injection of atropia will often dry the throat and

[1] Appendix II., Dr. Prescott.

bronchi, and avert this excessive secretion. Light inhalations, plenty of air, watchfulness to swab the throat, care to remove the ether early, are the best remedies.

Both sulphuric ether and chloroform congest the kidneys, and produce albuminuria in more than one half the cases.[1] This albuminuria is usually of short duration; but one can readily see that a diseased kidney might be overwhelmed by it, just as a feeble heart would succumb to chloroform, or diseased lungs to an increased bronchial secretion. Bright's disease, diabetes, any inflammation of the air-passages, pleuritic effusion, acute bronchitis, valvular disease of the heart, croup, — all are unfavorable conditions for an anæsthetic.

The thermo-cautery about the face demands chloroform.

If in spite of these unfavorable conditions only one person in fifteen thousand succumbs to the inhalation of ether, we may conclude that we shall not find a safer agent to produce unconsciousness, though we may a more agreeable.

[1] Appendix III., Dr. Blake.

APPENDIX

I. Mortality

Combined statistics of Gurlt, of Berlin, and Juillard, of Geneva: —

Chloroform. — 691,319 cases, 224 deaths. One death in 3,082 cases.

Ether. — 341,058 cases, 23 deaths. One death in 14,828 cases.

II. Lungs

Prescott believes that ether cannot produce true lobar pneumonia. He gives only two cases in about 40,000 ether inhalations.

Boston Medical and Surgical Journal, March 28, 1895, vol. cxxxii. No. 13, p. 304, W. H. Prescott, M. D.

III. Kidneys

Examination of 50 cases, before and after ether. Urine filtered, and nitric-acid test used. In 36 cases out of 50, ether produced albumin, or increased that already existing. But the German authorities believe that chloroform irritates the kidneys more than ether. Albumin after ether was slight in amount and of short duration.

Second Lyman Prize for 1894, John Bapst Blake, M. D. Boston Medical and Surgical Journal, vol. cxxxii. p. 560.

RELATION OF ANÆSTHESIA AND OBSTETRICS

BY JOHN P. REYNOLDS, M.D.
OF BOSTON

RELATION OF ANÆSTHESIA AND OBSTETRICS

IN the welcome that greeted anæsthesia in this city fifty years since, its promise to women in labor was not overlooked. Oliver Wendell Holmes, recounting its blessings, rejoiced that it lifted "the primal curse;" Walter Channing, our honored first professor of midwifery, devoted an important volume, his "Etherization in Childbirth," to its early triumphs. To-day, after the half century, it is my glad office to lay before you the priceless worth of anæsthesia in obstetrics.

In operative obstetrics, in the high and difficult use of instruments, in the introduction of the hand for version and extraction, anæsthesia resembles at all points that of the graver procedures of general surgery. It brings the same admirable results: a patient in blissful unconsciousness; an operator delivered from all concern for another's suffering, with ample time for exact and thorough diagnosis, and free to work with all desired accuracy, delicacy, and caution. In obstetrics there is often a further gain of great moment: loosing the formidable grip of the uterine muscle. Mention must also be made of the induction of premature labor, in which the power of safely maintaining for many continuous hours profound etherization is rapidly securing for the method of passive

manual dilatation a deserved preëminence. It may be added that five minutes only of deep anæsthesia, rapidly induced, prove at times no mean resource in softening the thin, wiry edge of a tardily dilating uterine mouth. After profound anæsthesia during delivery, increased watchfulness against hemorrhage is always wisely enjoined; but where the precautions which are in all labor indispensable are duly enforced, any added risk is perhaps rather inferred than proven.

The service of ether in puerperal convulsions is still more striking. Used in the manner now to be described, it prevents any new seizure. An eclamptic patient is brought with all possible rapidity to complete unconsciousness. During many consecutive hours this is firmly kept up, always under strictly professional care; there can be no delegation of the physician's authority to any hands less qualified than his own, not even to those of the best trained nurse. An utterly passive condition is secured; and then, on the least restlessness, agitation, indication of pain or uneasiness in any region,—above all, at any slightest tremor of an eyelid, or other known premonition of a fresh attack,—the remedy must be instantly pushed to full, snoring anæsthesia. No evil effects will ensue from continuing this state for many successive hours, and these can seldom be fewer than eight or ten. Under anæsthesia food is, of course, withheld. It must be distinctly understood that such an employment of ether has no power of cure. In exhibiting it we absolutely prevent fresh paroxysms, each of which strikes a new blow at the brain and nervous centres, and we gain at the same time the all-precious opportunity for treatment. This latter must be meanwhile actively pressed: first and foremost, unless already accomplished, the emptying of the uterus; to temporize with that does no good whatever, and may bring incalculable harm. Improve-

ment in the renal condition is the best proof of amendment. When to withdraw the ether is always a most anxious problem, steady continuance of it being in all doubtful cases the far safer alternative.

In making these strong assertions in regard to etherization in eclampsia I weigh well my words. Carelessly or ignorantly followed, they may work mischief. But the subject is of extreme importance. In my results there has not been the slightest variation, and I am confident that I do not stand alone. The time has come to present these views to the medical profession, and to press their general acceptance.

For the prolonged use in eclampsia just described, and even for that already suggested in the induction of premature labor, I dare not approve chloroform.

Would that any words of mine could bring home, as I feel it, the inestimable blessing of ether in all labor, silence groundless excuses for its neglect, and so rouse professional interest that no one should lightly forbid it to any woman in childbed! "Bless God for ether!" has burst from the lips of thousands on thousands of suffer. ing women. It might well be made the cry of countless thousands more.

In normal labor due anæsthesia is free from every shadow of danger. The alleged after-evils do not exist; on the contrary, the gain in safety outweighs the expressible comfort and relief. It is indispensable that the anæsthetic be administered only within the limits now to be laid down; on this is conditioned the truth of all that follows.

Ether, when properly given in normal obstetrics, never contents the patient. She incessantly cries for more, and, if in first labor, indignantly claims to be forthwith put asleep, and to know nothing till after the birth. The anæsthetic is allowed only during the uterine contrac-

tion,— the time of positive pain. In the interval it is withdrawn. Consciousness should then return, and there is often intelligent speech. Ether may be given at any period, and might be continued from the beginning of labor to its close. There should be here no question of the so-called "stages" of labor. Only one rule governs its use. Whenever the attendant sees that the woman's endurance of pain begins to tell upon her patience and courage, the moment for ether has come. It is to be kept up so long as this need lasts; no longer. In an appreciable minority of cases, a mother who in her early suffering has been clamorous for relief will herself, when the so-called "real" pains appear and conscious progress is made, put it away: "I can do without it now." On its first employment, a lull often comes in the uterine action, the patient sinking into a much-needed repose, to which soon succeeds a yet more vigorous advance. The extremely rare case in which no such renewal occurs must plainly forego anæsthesia. It should be noted that, in the earliest pains, some careful observers hold that chloral in suitable doses gives still greater relief.

With even these limitations, the value of ether can hardly be overestimated. It is something that in the distress a good and decorous deportment is no longer enjoined; it is everything that tender hands can now, as in other nursing, solace each access of suffering with positive help; but far, far beyond this, that we thus uphold in the patient that vital resistance which mental and nervous tension and the long endurance of pain, more than all other causes combined, destroy,— that which soothes becoming likewise a chief guarantee of safety, a help against hemorrhage.

Unhappily, a frequent resort to ether may not be asked from lying-in hospitals and the great public charities. These establishments, burdened with enormous and ever-

enlarging cost for the first needs of the destitute, — shelter, food, warmth, nursing, — cannot add the great increase of responsible attendants which general anæsthesia would require. But, even for private practice, anæsthetics are not, in simple labor, extensively used. The medical profession does not accept what has just been said of ether. Its benefits are sturdily denied. Men declare that it promotes flooding; that it wastes important time; that it presents them, in place of a woman bearing her pain with dignity and fortitude, a creature regardless of appearances and only clamoring every moment for ease.

These charges come mainly, I believe, from those who, under varying motives, content themselves with a tardy, perfunctory, or even deceitful resort to ether; "refusing it," as women sometimes say, "when we most need it, and allowing it when we could most easily do without it." Later, one may readily ascribe to the anæsthetic, which has in no true sense been tried, those common disasters of childbed which its proper use would largely ward off; and these assertions, once made, supply a ready excuse for that numerous, and it is to be feared increasing class who do not so much oppose ether as willingly evade and neglect it.

We have seldom possessed an accoucheur of wider experience, or a teacher of greater gifts of tongue and pen, than the late famous Fordyce Barker, of New York. Several years ago, I listened with eager interest as he, in this city, before the American Gynecological Society, deeply condemned the growing disuse of ether in obstetric practice. "Through a long series of years," he said, "I have rarely attended labors without ether. I have never seen from it any evil effects. Especially has it not caused a tendency to hemorrhage. Indeed, I should say that instances of flooding that I have seen have rather occurred in cases where ether had not been em-

ployed." Years have but deepened my conviction of the exact truth of the words that I then so heartily welcomed.

The time of an obstetric attendant is no longer his own; he may not condemn the extra half hour that etherization will now and then compel. His approval or his dislike of his patient's attitude in her distress is of trivial importance. Objections like these have no weight unless urged by the sufferer. She was never known to advance them.

The charge that anæsthesia increases flooding cannot be thus lightly set aside. As matter of opinion it has been to-day claimed that the due use of ether saves the mother's courage and strength; that it preserves, not breaks down, uterine contractile power; that it thus lessens the risk of hemorrhage. It will be found that clinical facts do not belie this theory. They wait for other observers as they did for Barker. Those in search of them are prayed to make trial of ether in all confinements, not, indeed, forgetting the due limitations, but ungrudgingly, thankfully, gladly.

One remembers tender hearts that doubted their right to evade, under ether, Heaven-sent pain. How marvellously the words graven beneath our cherished Ether Memorial send down, in reply, their adoring praise! —

"This also cometh forth from the Lord of Hosts, who is wonderful in counsel and excellent in working."

THE INFLUENCE OF ANÆSTHESIA UPON MEDICAL SCIENCE

BY W. H. WELCH, M. D., LL. D.
OF BALTIMORE


Wm T. G. Morton

THE INFLUENCE OF ANÆSTHESIA UPON MEDICAL SCIENCE

MR. PRESIDENT, Gentlemen of the Board of Trustees and of the Medical Staff of the Massachusetts General Hospital, Ladies and Gentlemen: Five months ago was celebrated the centennial anniversary of that grand discovery by Jenner which brought under subjection the most prevalent and horrible scourge of former centuries. To-day we have assembled in this famous hospital on the very spot, made memorable for all time, where fifty years ago William Morton first demonstrated to the world the art of surgical anæsthesia, the happiest gift ever conferred upon mankind by medical science or art. We may add to vaccination and anæsthesia the more recent introduction of antisepsis by Lister; and we can truthfully say that all the previous centuries can show no achievement of the art of the physician or surgeon comparable in beneficence to any one of these triumphs of the last hundred years.

It is in consequence of their enduring utility and benefit to humanity that these discoveries, which have led to the mastery over a pestilence, the annulment of pain, and the safe healing of wounds, merit the everlasting gratitude of the world. But it is fitting on such a commemorative occasion as this that, while these practical aspects receive their due consideration, we forget not the debt

which these great discoveries owe to science, nor the debt which science owes to them. It is, therefore, most appropriate that those who arranged the programme to commemorate this fiftieth anniversary of the first public demonstration of surgical anæsthesia should have chosen, as one of the themes to be here presented, "The Influence of Anæsthesia upon Medical Science." Their wisdom I am sure was less conspicuously manifested in their selection of the medium for the presentation of this subject, highly as I esteem the honor of being invited to speak upon this occasion.

In the limited time allotted to an individual speaker, I cannot hope to do more than to present in outline some of the salient aspects of my theme.

I shall not attempt to trace the history of the discovery of surgical anæsthesia, a history which affords a lamentable illustration of how the awards of generous gratitude may be sacrificed to fruitless efforts to mete out equal and exact justice. I wish in this connection to call attention only to the fact that this discovery was made in the only way in which it possibly could have been made, and that is by the method of experimentation. The opponents of animal experimentation have endeavored to utilize for their purposes the alleged absence of experiments upon animals as the basis of this discovery. As a matter of fact, even leaving out of account the pioneer experiments upon animals by Humphry Davy with nitrous oxide, the first successful trial of ether as a general anæsthetic for human beings by Morton was preceded by his demonstration of the power of this agent to produce in dogs unconsciousness and insensibility to pain. It would be strange, indeed, if these striking results of experiments upon animals had no influence in inducing him to test their applicability to human beings.

It must, however, be admitted that the production of anæsthesia in man by inhalation of ether was not preceded by such numerous and properly conducted experiments on animals as were required to afford any adequate conception of its effects or its possibilities of danger. We now know that such experiments would have yielded knowledge of this character. We know also that the anæsthetic sleep induced by ether in man as well as in animals is not attended with more than a minimal amount of danger; but suitable experiments upon animals would have afforded more knowledge than Morton could have possessed as to whether there was to be sure awakening from that sleep so like unto death. Hence it is that, when that patient fifty years ago to-day in this hospital was placed under the profound influence of ether, he was made the subject of a scientific experiment of immense practical import and of unsurpassed boldness. This was the decisive experiment from which dates "the continuous and consequent history" of anæsthesia.

The discovery of surgical anæsthesia is, I repeat, a triumph of the experimental method, albeit man himself was made the subject of experiment and thereby exposed to unknown possibilities of danger.

If my theme embraced the consideration of all of the relations of artificial anæsthesia to medical science, and did time permit, it would be proper for me to direct attention to the part played by animal experimentation in the discovery and introduction of new anæsthetics, and to the numerous physiological and pharmacological experiments, mainly upon animals, which have shed so much light upon the mode of action of aænsthetics, particularly of ether and chloroform, and the sources of danger in their employment. Although not all of the questions involved have yet been solved, these experi-

ments have furnished a large amount of knowledge of great scientific value and of much practical interest concerning the properties of anæsthetics,—knowledge which it is certainly desirable to possess, and much of which could not have been gained otherwise than by experiments upon animals.

I might speak also of the broad biological interest which attaches to the universal susceptibility of living matter to the sleep-producing influence of ether and chloroform, a susceptibility extending even to vegetable cells and the simplest unicellular organisms; also of how the gentle killing of certain bacteria by chloroform enables us to detect in their bodies toxic substances which are destroyed by more violent modes of death; and further of interesting properties of nerve and of muscle which have been revealed by studying under various conditions the action upon them of anæsthetic agents. But I do not interpret the subject assigned to me as including the consideration of such matters as these, interesting as they are, and it is certain that time would not permit even their sketchy presentation upon this occasion.

What I especially desire to emphasize in these brief remarks is, that the utility of the discovery of anæsthetics is not limited to their practical application to the surgical and medical and obstetrical arts, but that this discovery has been of great service also to medical science, upon which these arts in large part rest.

Anæsthetics appeared upon the scene at a time when the experimental medical sciences were entering upon an epoch of activity and success far surpassing anything previously known in the history of medicine. The shackles of philosophical speculation and dogma which bound medicine at the opening of this century had been broken by the work of such men as Bichat, Magendie, Johannes Müller, Rokitansky, Laennec, and Louis.

Their work was based upon exact observation and experiment, and there had come to be a general realization of the fact that these are the only trustworthy sources of knowledge. Animal experimentation, which, as a fruitful method of investigation, began with Harvey's discovery of the circulation of the blood, had in the hands of Charles Bell, Magendie, Müller, and others yielded abundant proofs of its value. It was during the fourth decade of this century that those great experimenters, Claude Bernard, from the school of Magendie, and Du Bois-Reymond, Helmholtz, Brücke, and Ludwig, from the school of Müller, started their epochal investigations in physiology. It was at the same period that Virchow and Traube began those researches which established animal experimentation, already successfully employed by John Hunter, as a most important aid in the development of pathological physiology. It was then also that experimental pharmacology, which had been inaugurated by Magendie, was first cultivated as a distinct branch of medical science by Buchheim. The need of suitably equipped laboratories where experimental investigations could be conducted was now felt more keenly than ever before. By being the first to supply these essential instruments of fruitful scientific activity, Germany took the lead in scientific discovery, a position which her enlightened policy in the establishment and support of laboratories has enabled her ever since to retain.

The introduction of artificial anæsthesia came at this auspicious period of awakened activity, which gave such promise of the rapid development of scientific medicine through the aid of exact observation and experiment. And how brilliantly has this early promise been fulfilled by the discoveries of the last fifty years, which have witnessed the creation of cellular pathology, the rapid development of physiology to a biological science of the first

THE INFLUENCE OF ANÆSTHESIA UPON MEDICAL SCIENCE

rank, conferring great benefits upon medicine, but extending far beyond the boundaries of medicine the establishment of pharmacology upon a broad scientific basis; and the birth of the science of bacteriology, which has unlocked the gates to new fields whose brief exploration has already proven of such immense importance to preventive and curative medicine and practical surgery! It is true that, when we consider all that we may reasonably hope to learn concerning the structure and functions of living beings in health and in disease, and how they may be influenced for good or for ill, only a corner of the curtain has been lifted; but when we compare the advance of medicine during the last fifty years with what was previously known, we can truthfully say that this advance has been greater during these years than during all the previous centuries.

A large and important part of this progress is attributable to the results obtained by means of experiments upon animals. One has only to imagine blotted out from the records of physiology, pathology, pharmacology, hygiene, bacteriology, and other medical writings all of the facts which have been derived from animal experimentation to realize how immense would be the loss to both scientific and practical medicine had investigators been deprived of this indispensable method of research. To point out in detail how broad and deep would be this gap cannot be even attempted in the short time here allotted, and would be surely unnecessary before this audience.

The use of anæsthetics has been such an important aid in the performance of these experiments upon animals during the past fifty years that it is eminently fitting on this jubilee that medical science should also pay its tribute to the beneficence of the great discovery here celebrated.

The ways in which anæsthetics have been serviceable to animal experimentation are essentially similar to those in which they have benefited surgery.

The great majority of painful vivisectional experiments upon the higher animals are of such a nature that the object of the experiment is not defeated by the employment of anæsthetics. In experiments of this class, all trained experimenters should and do use anæsthetics, and there is no evidence that there exists to-day any abuse of vivisection on this score in any properly conducted laboratory. The dictates of humanity demand that we shall gain, for the benefit of man, knowledge which can be acquired only from experiments upon animals; and they demand also that this knowledge shall be gained without the infliction of needless suffering. Humane instincts are not less active among those who devote themselves to acquiring knowledge in this way than among other classes of men, but these instincts in the former are controlled, not by false sentiment but by reason and duty. It is a source of immense gratification to experimenters, as it should be to all with humane impulses, that, in consequence of the discovery of artificial anæsthesia, so large a part of the useful knowledge which can be derived only from experiments upon animals can now be acquired without the infliction of pain. To cite the animal experiments of pre-anæsthetic days, as for example those of Magendie, as illustrations of present methods of experimentation, is as unwarrantable as would be a similar procedure in describing surgical operations.

The advantages of anæsthesia are not limited by the mere abolition of pain. In animal experimentation, as well as in surgery, the insensibility to pain and the cessation of voluntary movements induced by anæsthetics have rendered many operations easy which would

otherwise have been difficult, many practicable which would otherwise have been impossible. The success of the experiment is made much more certain when the operator can work at ease and without undue haste, undisturbed by the thought that he is inflicting pain. There are physiological experiments which, so far as I am able to judge, make greater demands upon the patience and operative skill and delicacy of manipulation of the operator than any in surgery, and these never could be performed upon a sensitive and struggling animal. Sensations of pain are in themselves a disturbing factor which would defeat the purpose of not a few delicate physiological experiments. The experiments to determine the functions of the brain, which have yielded results of great importance to practical medicine and surgery as well as to science, may be mentioned as one out of many illustrations of this fact. The antiseptic management of wounds, which is essential to the success of some experiments and which alleviates subsequent suffering when it is necessary that the animal should survive the experiment, is greatly facilitated by the use of anæsthetics.

I trust that I may be pardoned if I pause here for a moment to correct a misconception which does not exist among well-informed medical men, least of all among practitioners of medicine, but which plays a considerable rôle in anti-vivisection literature. I refer to the distinction there made between the use of anæsthetics and that of narcotics for the purpose of rendering animals insensible to pain. So far as the point in question is involved, this distinction is ridiculous, and seems to be based upon a misunderstanding of some old physiological experiments. For prolonged experiments it is often advantageous to place the animal in the sleep induced by morphine or chloral, instead of that of ether or chloro-

form. These drugs are administered in much larger doses, and often in different ways, than is customary in human beings. That under these circumstances the animal is rendered insensible to pain is a fact the knowledge of which might have been gained from ordinary medical experience.

Curara is a drug which has important uses in a certain class of experiments upon animals. It has never been claimed by any scientific man that it is an anæsthetic, although it has been found capable of affording great relief from pain in some spasmodic affections of human beings. Its use has led to important physiological discoveries which could not well have been made without it, and in a limited class of cases its employment, either with or without the coincident administration of anæsthetics, is indispensable.

There are, of course, experiments upon animals in which there is no occasion to employ anæsthetics. Animal experimentation and vivisection are not coextensive terms. There is a large group of experiments, mostly of a painless character, in which there is no cutting, or other operative interference whatever with the animal. Here belong many of the experiments upon metabolism, upon diet, upon the fate of drugs, etc. There are others in which the operative act is so slight or transitory that the animal would suffer far more discomfort from the administration of an anæsthetic than from the operation itself. There are, finally, painful vivisection experiments, relatively few in number, however, whose purpose would be defeated by the use of anæsthetics. A striking example of such an experiment is that of Charles Bell in determining the motor and sensory functions of the nerve roots of the spinal cord, an experiment which, with those of Galvani, laid the foundations of modern nerve physiology.

THE INFLUENCE OF ANÆSTHESIA UPON MEDICAL SCIENCE

Experiments upon animals have been and must continue to be an indispensable aid to the progress of scientific and practical medicine. In the performance of a large number of these experiments the use of anæsthetics is of priceless service. I trust that without presumption I may here express, in behalf of the great body of scientific workers in medicine throughout the civilized world, their feelings of gratitude for the great boon conferred upon medical science by the discovery of artificial anæsthesia, which, in the form of a safe, useful, and effective method, was first promulgated from this hospital fifty years ago to-day.

THE SURGERY OF THE FUTURE

BY CHARLES McBURNEY, M. D.
OF NEW YORK

THE SURGERY OF THE FUTURE

WE worship to-day at the shrine of the Goddess of Anæsthesia, whose gentle sway over the surgical world of all civilized countries has so beneficently displaced the reign of terror which existed only two generations ago. What anæsthesia has done for surgery has been already most eloquently told, and we all realize that without it the best of modern work would be impossible.

It seems but yesterday, and yet it is already a matter of history, that the wonderful discovery of the aseptic treatment of wounds was given to us, through whose agency countless thousands of human lives have been preserved.

Through these two discoveries surgery has become a gentle art: for the agonies of operations and the fatal diseases of wounds have given way to a painless sleep, and an awakening to a safe recovery. And bacteriology, which in its infancy gave birth to aseptic surgery, has penetrated with its brilliant light a darkness which our predecessors believed would last forever.

So generous, indeed, has the recent past been to surgery with gifts which make our science rich almost beyond belief, that the future may well be modest in telling us what it will do. It would almost seem as if the toilsome ascent had been accomplished, and as if the future

could hold for us no obstacles that could tax our powers. That such a comfortable view is not shared by the ever-active surgical worker and his numerous collaborators is fortunate, and we are thus assured that difficulties, perhaps not so large as those already conquered, but both grave and numerous, will, by increasing effort, be swept away and relegated to the past.

It seems to me that in the immediate future the greatest surgical victories are to be won by the aid of bacteriology, which has already unlocked so many mysteries. Through it diphtheria and tetanus have been brought within the list of frequently curable diseases. Why should we not soon be able to say even more of general sepsis, tubercle, and cancer? We have already reached a high degree of perfection in preventing the entrance of sepsis through the surgical or the accidental wound; but, given a case where sepsis has already deeply invaded the body, through whatever point of entrance, and we are well-nigh helpless. We may empty an abdomen of pus, and even remove the cause of the disease, but we know nothing in regard to overcoming the sepsis already widespread throughout the body. Is it not in store for us that the discovery will soon be made by which we shall be able to destroy the sepsis-producing organism, no matter what its source, no matter how widespread? I believe it is, and that we will, in the not distant future, be able to render the body immune to the existence of sepsis even of internal origin.

All of the general surgeons, and many of the special ones, are devoting a large amount of their time to the treatment of tubercle. Operative surgery has attacked it very successfully, but we need the help of the bacteriologist and of the physician to enable us to prevent its recurrence and to treat it in many localities. Surely the day is close at hand when the surgeon's knife, which

so readily removes the products of tubercle, will be aided by the remedy which destroys the bacillus itself.

Cancer in all its forms is still our worst enemy. Operative surgery has done much, very much, to overcome it, aided by greatly improved diagnosis, and by means of more scientific and more radical operations. But the discovery of the true nature of the disease, the solution of the question as to whether it owes its existence to a living organism, and therefore one capable of death or not, are still in the hands of the future, and most eagerly awaited by all of us. The best energies of the bacteriological and the surgical world cannot be devoted to a worthier object. But the future of bacteriology is, and ever will be, in the hands of the most brilliant men, and surgery is destined to achieve many of its greatest triumphs through the aid of this ever-growing army of invaluable co-workers. With their help will the aseptic making and treating of wounds be brought to a far higher state of perfection than even the elevated one of the present day, and the exact reasons for disturbances in wound-healing, some of which are still but partially understood, will become part of the knowledge of every true surgeon.

The possibilities for discoveries of enormous value to both the theory and the practice of surgery, through more perfect study of the blood, are certainly very large, and are already foreshadowed by what has been so recently learned in regard to the blood-corpuscles and the organisms of disease which invade and develop in the blood current. We may confidently expect through this means a very exact, and, what is of the utmost importance, a very *early* diagnosis, in many surgical disorders which we now at first appreciate at a stage too late for efficient treatment.

When one considers the very great value of the recent

addition to our resources, the infusion into the blood-vessels of hot saline solution, which has so beautifully supplanted the difficult and dangerous process of blood-transfusion, one grows impatient for the day when at the same moment disease shall be drained from the body through one opened vessel, and life and health poured in through another. Some of us will see the day when death as a result of hemorrhage will be always avoidable.

In spite of the large contributions that have been made by scientific workers during the last few years, it may fairly be said that we have been living in an age of operative surgery, the growth of which has excited the interest and admiration of all classes of men.

The public at large, and all branches of our profession, have become deeply infected with the idea that there are almost no limits to what can be done in the cure of disease by a skilful surgeon; and the belief is much too widespread that almost any professional man, with a little knowledge of antisepsis, may properly practise surgery. This exaggerated feeling of confidence is the natural sequel to the discovery of asepsis, which, with its incalculable benefits, has scattered some harm. Every region and organ of the human body has been investigated by the operating surgeon, and far be it from me to say that this has not been wise and necessary. Conclusions cannot precede experience; and it has required courage, hope, and even blind faith, to explore and learn what we may accept and what we *must* discard.

The operating surgeon of the future will have a most important and delightful task. Proud of his ability to do any operation, and to secure a perfect wound-healing with unfailing regularity, he will know when to withhold his hand. He will sacrifice his ambition to multiply the number of cases he has operated upon, and will devote

his energies to increasing only the number of those he has actually cured of disease. He will know better than we do who are the actually moribund, and he will leave them untouched in the hands of the priest.

He will not be tempted by the plea that the patient must die as he is, and that therefore he should rightly be operated upon. He will not attempt to cure with the knife the poor little microcephalic child, or the advanced case of carcinoma of the stomach, uterus, or larynx. Our knowledge, acquired by much labor and sacrifice, will be his at the outset; and the errors which we have made through over-enthusiasm will excite, not his contempt, but his gratitude.

He will have at his disposal the large experience of the surgeons of to-day, and, unhampered by the views held in the pre-antiseptic era, he will draw conclusions and deduce principles sounder and clearer than our own.

We may confidently look forward to vastly improved diagnosis of surgical disease, more especially such as will enable the surgeon to attack pathological processes in their *incipiency*. Especially in cases of malignant disease is there much to be desired in this direction. Great advance has been already made in the wide removal of infected areas, and of the channels through which malignant disease is carried to other parts of the body. How much more efficient must such measures be when applied at the very beginning of a cancer! Perhaps we are justified in looking forward to such a development of the Röntgen light that the surgeon will be able to appreciate the location and character of all neoplasms while they are still young enough to be radically curable by operation.

The future surgeon will enjoy a much closer and more intimate relation with his brother the physician than has ever existed between them before, for what be-

longs to medicine, and can be cured by surgery only, will be far better appreciated by both surgeon and physician than it is to-day.

Few operations will then be done as a last resort, for the only remedy that can cure in a given case will be eagerly demanded by the one and willingly applied by the other at the beginning of disease.

Above all, Mr. President, will the surgery of the future attract to its enthusiastic study and practice finer and finer men, in whose hands we may safely leave the development of our science. A single glance at the faces of the students who collect daily in your operating-room will show you what a change has occurred in the last twenty-five years. For this, too, we must ever be grateful to anæsthesia, which, in removing the torture of surgery, has robbed it of what repelled many sensitive natures. And the science of asepsis, by rendering complete success in surgical work possible, will excite the most devoted enthusiasm from many scientific men, who soon would have become sick at heart over the failures of former times. What more attractive opportunity could possibly exist than will be offered by surgery to the well-educated, refined, able, and ambitious student? Through the vast experience of the recent past he will find many of the coarser problems already solved, and those that remain will stimulate him by their difficulty. He will be an accomplished anatomist and a physiologist; he will study medicine and pathology first, and then general surgery. If he specializes his practice, he will do so only after a large general experience; and he will borrow from every science all that can contribute to the perfecting of his work.

THE BIRTH AND DEATH OF PAIN

A Poem

BY S. WEIR MITCHELL, M. D., LL. D.
OF PHILADELPHIA

THE BIRTH AND DEATH OF PAIN

FORGIVE a moment if a friend's regret
Delay the task your honoring kindness set.
I miss one face to all men ever dear;
I miss one voice that all men loved to hear.
How glad were I to sit with you apart
Could the dead master use his higher art
To lift on wings of ever lightsome mirth
The burdened muse above the dust of earth,
To stamp with jests the heavy ore of thought,
To give a day, with proud remembrance fraught,
The vital pathos of that Holmes-spun art
Which knew so well to reach the common heart!
Alas for me, for you, that fatal hour!
Gone is the master! Ah! not mine the power
To gild with jests, that almost win a tear,
The thronging memories that are with us here.

The Birth of Pain! Let centuries roll away;
Come back with me to nature's primal day.
What mighty forces pledged the dust to life!
What awful will decreed its silent strife!
Till through vast ages rose on hill and plain,
Life's saddest voice, the birthright wail of pain.
The keener sense and ever-growing mind
Served but to add a torment twice refined
As life, more tender as it grew more sweet,
The cruel links of sorrow found complete
When yearning love, to conscious pity grown,
Felt the mad pain-thrills that were not its own.

What will implacable, beyond our ken,
Set this stern fiat for the tribes of men!
This none shall 'scape who share our human fates:
One stern democracy of anguish waits
By poor men's cots, — within the rich man's gates.
What purpose hath it? Nay, thy quest is vain:
Earth hath no answer: if the baffled brain
Cries, 't is to warn, to punish — Ah, refrain!
When writhes the child beneath the surgeon's hand,
What soul shall hope that pain to understand?
Lo! Science falters o'er the hopeless task,
And Love and Faith in vain an answer ask,
When thrilling nerves demand what good is wrought
Where torture clogs the very source of thought.

Lo! mercy, ever broadening down the years,
Seeks but to count a lessening sum of tears.
The rack is gone, — the torture chamber lies
A sorry show for shuddering tourist eyes.
How useless pain both Church and State have learned
Since the last witch or patient martyr burned.
Yet still, forever, he who strove to gain
By swift dispatch a shorter lease for pain
Saw the grim theatre, and 'neath his knife
Felt the keen torture in the quivering life.
A word for him who, silent, grave, serene,
The thought-stirred master of that tragic scene,
Recorded pity through the hand of skill,
Heard not a cry, but, ever conscious, still
In mercy merciless, swift, bold, intent,
Felt the slow moments that in torture went
While, 'neath his touch, as none to-day has seen,
In anguish shook life's agonized machine.
The task is o'er; the precious blood is stayed;
But double price the hour of tension paid.
A pitying hand is on the sufferer's brow, —
"Thank God 't is over." Few who face me now
Recall this memory. Let the curtain fall,
Far gladder days shall know this storied hall!

Though Science, patient as the fruitful years,
Still taught our art to close some fount of tears,
Yet who that served this sacred home of pain
Could e'er have dreamed one scarce-imagined gain,
Or hoped a day would bring his fearful art
No need to steel the ever kindly heart?

So fled the years! while haply here or there
Some trust delusive left the old despair;
Some comet thought flashed fitful through the night,
No lasting record and no constant light.
Then radiant morning broke, and ampler hope
To art and science gave illumined scope.

What Angel bore the Christ-like gift inspired!
What love divine with noblest courage fired
One eager soul that paid in bitter tears
For the glad helping of unnumbered fears,
From the strange record of creation tore
The sentence sad each sorrowing mother bore,
Struck from the roll of pangs one awful sum,
Made pain a dream, and suffering gently dumb!

Whatever triumphs still shall hold the mind,
Whatever gift shall yet enrich mankind,
Ah! here no hour shall strike through all the years,
No hour as sweet, as when hope, doubt, and fears,
'Mid deepening stillness, watched one eager brain,
With God-like will, decree the Death of Pain.

How did we thank him? Ah! no joy-bells rang,
No pæans greeted, and no poet sang,
No cannon thundered from the guarded strand
This mighty victory to a grateful land!
We took the gift, so humbly, simply given,
And coldly selfish — left our debt to Heaven.
How shall we thank him? Hush! A gladder hour
Has struck for him; a wiser, juster power

Shall know full well how fitly to reward
The generous soul that found the world so hard.

O fruitful Mother! — you whose thronging states
Shall deal not vainly with man's changing fates,
Of freeborn thought, or war's heroic deeds, —
Much have your proud hands given, but nought exceeds
This heaven-sent answer to the cry of prayer,
This priceless gift which all mankind may share.

A solemn hour for such as gravely pause
To note the process of creation's laws!
Ah, surely He whose dark, unfathomed Mind
With prescient thought the scheme of life designed,
Who bade His highest creature slowly rise,
Spurred by sad needs and lured by many a prize,
Saw, with a God's pure joy, His ripening plan,
His highest mercy brought by man to man.

REMARKS OF LORD PLAYFAIR

AT the close of the programme, Lord Playfair, who was present, was asked to speak.

Lord Playfair expressed special interest in the celebration now in progress, partly due to the fact that he himself in the course of his life's work had made numerous experiments relating to means and methods of anæsthesia.

On every occasion of this sort the name of Sir James Simpson must be mentioned with gratitude. The disinterested enthusiasm with which Dr. Simpson worked, regardless even of actual danger to himself, was most praiseworthy.

Lord Playfair told an amusing story of an experiment which he was about to conduct with Sir James Simpson in the direction of a supposed new anæsthetic method. Sir James came to him one day and told him that he was disgusted with chloroform, and would thank him very much for the discovery of a satisfactory substitute. Lord Playfair a few days later announced to him that he had made the required discovery. The material that he intended to use was bi-bromide of ethylene. Sir James Simpson smelled the compound, and forthwith said that it was the very thing wanted. He was very anxious to repair immediately to Lord Playfair's private room and experiment upon himself.

Lord Playfair was unwilling that the experiment should take place before further trial, and finally induced Sir James to have the anæsthetic tried on some rabbits first. The rabbits were accordingly treated, and were put away to await developments.

On the next day Dr. Simpson appeared at Lord Playfair's laboratory, propped himself up with two chairs, and asked Lord Playfair for the solution. Lady Simpson, who was present, advised her husband to see how the rabbits had fared under the treatment before he applied it to himself.

"When the attendant came in," continued Lord Playfair, "we saw him holding by the ears two rabbits — perfectly dead!"

APPENDIX

APPENDIX

HOSPITAL RECORD OF THE FIRST PUBLIC ADMINISTRATION OF ETHER

GILBERT ABBOTT, age twenty, painter, single; tumor on face. This man had had from birth a tumor under the jaw, on the left side It occupies all space anterior to neck, bounded on the inside by median line, on the outside is even with the edge of jaw; below, on a level with the Pomum Adami, and in front tapers gradually as far as anterior edge of jaw; integuments not adherent to it; skin smooth and of natural color; it is uniformly soft, except in centre, where a small, hard lump can be felt, corresponding in size and situation with submaxillary gland; can be made to disappear by compression, but seems rather to be displaced than emptied. The edge of the lower jaw-bone can be felt, through the tumor, to be irregular. On examination of the inside of the mouth, find a soft, smooth tumor, a hemisphere about five lines in diameter, of a livid color, on the left lobe of tongue, about an inch behind tip. That portion of the organ in front and underneath the tumor is of a dark purple color. This tumor is readily emptied by slight pressure, but it fills again in one or two seconds, but not sooner when pressure is made simultaneously upon the external tumor. For distance of five lines from angle of mouth on right side the lower lip is of a livid hue. This seems to be a continuation of a stripe, similar in appearance, which extends from angle of jaw on right side about on level of lower teeth; it is about four lines wide and slightly raised; its color seems to depend on small spots like granulations, of a livid color, set on mucous membrane of ordinary appearance.

This case is remarkable in the annals of surgery. It was the first surgical operation performed under the influence of ether.

Dr. Warren had been applied to by Mr. Morton, a dentist, with the request that he would try the inhalation of a fluid which, he said, he

had found to be effectual in preventing pain during operations upon the teeth. Dr. Warren, having satisfied himself that the breathing of the fluid would be harmless, agreed to employ it when an opportunity presented. None occuring within a day or two in private practice, he determined to use it on this patient. Before the operation began, some time was lost waiting for Mr. Morton, and ultimately it was thought he would not appear. At length he arrived, and explained his detention by informing Dr. Warren that he had been occupied in preparing his apparatus, which consisted of a tube connected with a glass globe. This apparatus he then proceeded to apply, and after four or five minutes the patient appeared to be asleep, and the operation was performed as herein described. To the surprise of Dr. Warren and the other gentlemen present, the patient did not shrink, nor cry out, but during the insulation of the veins he began to move his limbs and utter extraordinary expressions, and these movements seemed to indicate the existence of pain; but after he had recovered his faculties he said that he had experienced none, but only a sensation like that of scraping the part with a blunt instrument, and he ever afterward continued to say that he had not felt any pain.

Note. — The results of this operation led to the repetition of the use of ether in other cases, and in a few days its success was established, and its use resorted to in every considerable operation in the city of Boston and its vicinity.

Operation by Dr. Warren. — The patient having been placed in the operating chair in the amphitheatre, an incision, two and one half inches in length was made over the centre of external tumor, just beneath the edge of jaw, extending through skin and subcutaneous tissue. A layer of fascia was dissected off and disclosed a congeries of large veins and small arteries. Hemorrhage was slight, no vessel requiring ligature. A curved needle, armed with a ligature, size No. 6, was passed under the mass, and the tumor included, under a knot with considerable compression. The wound was then filled with a small compress and lint, and the patient returned to bed.

Patient continued to do well, and was discharged well, December 7th. Cicatrix perfect; tumor same size as on entrance, but no vessels to be detected in it. Tumor on tongue not altered, nor is appearance on inside of right cheek. General health much improved.

ACCOUNT OF AN EYE-WITNESS[1]

THE day arrived; the time appointed was noted on the dial, when the patient was led into the operating-room, and Dr. Warren and a board of the most eminent surgeons in the State were gathered around the sufferer. "All is ready — the stillness oppressive." It had been announced "that a test of some preparation was to be made for which the *astonishing* claim had been made that it would render the person operated upon free from pain." These are the words of Dr. Warren that broke the stillness.

Those present were incredulous, and, as Dr. Morton had not arrived at the time appointed and fifteen minutes had passed, Dr. Warren said, with significant meaning, "I presume he is otherwise engaged." This was followed with a "derisive laugh," and Dr. Warren grasped his knife and was about to proceed with the operation. At that moment Dr. Morton entered a side door, when Dr. Warren turned to him and in a strong voice said, "Well, sir, your patient is ready." In a few minutes he was ready for the surgeon's knife, when Dr. Morton said, "*Your* patient is ready, sir."

Here the most sublime scene ever witnessed in the operating-room was presented, when the patient placed himself voluntarily upon the table, which was to become the altar of future fame. Not that he did so for the purpose of advancing the science of medicine, nor for the good of his fellow-men, for the act itself was purely a personal and selfish one. He was about to assist in solving a new and important problem of therapeutics, whose benefits were to be given to the whole civilized world, yet wholly unconscious of the sublimity of the occasion or the part he was taking.

That was a supreme moment for a most wonderful discovery, and, had the patient died under the operation, science would have waited long to discover the hypnotic effects of some other remedy of equal potency and safety, and it may be properly questioned whether chloroform would have come into use as it has at the present time.

The heroic bravery of the man who voluntarily placed himself upon the table, a subject for the surgeon's knife, should be recorded and his name enrolled upon parchment, which should be hung upon the walls of the surgical amphitheatre in which the operation was performed. His name was Gilbert Abbott.

The operation was for a congenital tumor on the left side of the

[1] Dr. Washington Ayer, of San Francisco.

neck, extending along the jaw to the maxillary gland and into the mouth, embracing margin of the tongue. The operation was successful; and when the patient recovered he declared he had suffered no pain. Dr. Warren turned to those present and said, "Gentlemen, this is no humbug."

LETTERS FROM INVITED GUESTS

LONDON, September 14, 1896.

MY DEAR DR. WARREN: I beg you to allow me thus to thank you and the other members of the staff and the trustees of the Massachusetts General Hospital for the invitation with which they have honored me. I am deeply sorry that I cannot be present at the proposed commemoration of that which was certainly one of the most notable events in the history of surgery.

I am sincerely yours, JAMES PAGET.

EDINBURGH, September 16, 1896.

DEAR DR. WARREN: Boston does well to commemorate the fiftieth anniversary of the day on which Dr. Morton first gave a public demonstration of the practicability of surgical anæsthesia, and so put into the hands of his professional brethren the means of saving the patient from untold suffering.

I thank you for your courteous invitation to the Massachusetts General Hospital on such a great occasion, and regret that my University duties make it impossible for me to avail myself of your kindness. Believe me,

Yours very faithfully, A. R. SIMPSON.

DETROIT, September 18, 1896.

DEAR DR. WARREN: I regret very much that I shall not be able to avail myself of the privilege of attending the exercises in commemoration of the first public demonstration of surgical anæsthesia. The occasion is one which cannot fail to excite an universal interest. It commemorates not only the birth of a procedure which has been an unspeakable blessing to the human race, but also the first great contribution made by American surgeons to the surgical science.

It would seem highly proper, therefore, that every American surgeon who cannot be present in person should express his warm congratulations to the trustees and staff of the great hospital, which was the scene of this great surgical exploit, in writing.

Please accept, my dear doctor, my sincere sympathy with you in your coming celebration.

Yours cordially, THEODORE A. MCGRAW.

TORONTO, September 30, 1896.

DEAR DR. WARREN: The idea of celebrating in your hospital the fiftieth anniversary of the first public demonstration of surgical anæsthesia is a happy conception, and I should be delighted to attend the proposed function if it were possible for me to get away at the time.

To no city in America is surgical science a greater debtor than to your own, and I would gladly take part in any procedures tending to the acknowledgment of debts that we can never hope to pay. There are no boundary lines limiting the spread of such beneficent discoveries as have been given to the world by the members of our profession in Boston. When I think of what the discoverers of anæsthesia, of what Holmes and Bigelow and Bowditch, and those who have borne and now bear the honored name of Warren, have done for us, our obligation weighs heavily, and we can but rejoice that through Lister and through the grand traditions of British surgery we are able in part to make a return.

I wish you heartily a celebration worthy of the occasion and of the men who will take part in it, and am

Yours sincerely, N. A. POWELL.

FRANKFURT A. M., 27 Sept., 1896.

HOCHGEEHRTE HERREN: Ihre sehr ehrenvolle Einladung zu der Commemoration of the Fiftieth Anniversary of Surgical Anæsthesia ist mir zugegangen. Sie war mir um so erfreulicher als ich selbst eine der ersten war, der im Jahre 1846 in Berlin selbständige versuche mit der Æther-Narkose gemacht hat. Niemand kann mehr als ich selbst von der Wichtigkeit dieser entdeckung überzeugt sein, und ich würde mich glücklich schätzen, wenn ich Ihnen persönlich meine Glückwünsche aussprechen könnte. Aber die zeit gestattet mir nicht so kurz vor der Wieder beginnen meiner Vorlesungen Europa zu verlassen.

Nehmen sie daher meine herzliche grüsse und die Versicherung meiner aufrichtiger Hochschätzung der Amerikanische Heilkunst entgegen. RUDOLF VIRCHOW.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH,
5th October, 1896.

DR. J. COLLINS WARREN. MY DEAR SIR: I beg to thank you and the hospital staff for the honor of the invitation to the commemoration

of the fiftieth anniversary of that great discovery, surgical operation without pain. Distance alone prevents my being among you on the occasion. I had the pleasure of visiting Boston twelve years ago, and I hardly think it would be quite prudent at my age (now three years over the proverbial threescore and ten) to venture again across the great Atlantic. Among the pleasures I had in visiting America, as compared with the countries of Europe, was that of realizing that we are the same people. I admired Boston as, among American cities, reminding me most of home; and I can recall the beautiful view of the Charles River from the window of dear old Oliver Wendell Holmes, one of those who have made Boston famous in literature and science.

This commemoration brings up memories to me of the days of pre-anæsthetic surgery in our old Royal Infirmary here, — the operating theatre ringing with the groans and shrieks of the patient, the distressed faces of the crowd of students, and the haste of the operator to be done. I well remember, when the news came across the Atlantic, the first use of ether in that great theatre by my old masters, Syme and Miller. The change was wonderful; no longer pain, the patient lying nearly as quiet as the sleeper, and the operator undisturbed and risking nothing by haste.

It is well that this commemoration should be held, not merely that such a great event deserves celebration, but in order to remind the young generation that has since grown up that these benefits which they (patients and surgeons alike) now enjoy were not always. I may add that the celebration is more particularly required among us here. Ether, or a mixture of ether and chloroform, seems to be the anæsthetic most commonly employed in England; but here, and in Scotland generally, it is so almost invariably chloroform that the word "chloroform" has come to be identified in the public mind with painless operation, as if chloroform had been the discovery. I do not mention this as in diminution of the merit of Sir James Simpson, one of my old teachers, in the subsequent discovery of the anæsthetic property of chloroform; but *magna est veritas*, and it is well to keep our public in mind that we owe the great discovery to our American brethren.

In return, we have sent you the no less great boon of antiseptic surgery. We were but last month, at the meeting of the British Association at Liverpool, paying renewed honor to Sir Joseph Lister, my former colleague on the surgical staff of the old Royal Infirmary here, as the man to whom we and the world owe this great boon in surgery. It is quite wonderful for me to see, when I visit our new Royal Infirmary, what can now be done under antiseptic treatment, — things we

would not have ventured on in the old days. And now we are having the Röntgen rays, letting us actually see the bones in the living body. It has, indeed, been a half century of wonderful progress.

But I must bring this too long letter to a close. I beg to congratulate the Massachusetts General Hospital on having been the scene of the first public demonstration of the great discovery; and, if I am right in my impression that it was by your hands, I no less congratulate you on having lived to see half a century of the fruition of your example. I have the honor to be,

Yours very sincerely, JOHN STRUTHERS,
President of the College.

SAN FRANCISCO, CAL., October 7, 1896.

DEAR DR. WARREN: Great events make memorable history. The eventful discovery of ether owns the most brilliant page in the history of medicine, — a page full of the recorded blessings of anæsthesia; and yet at the close of the nineteenth century who can tell what other great discoveries will soon follow to relieve human suffering? While being thankful for the past, let us be hopeful for the future.

California sends greeting to Boston upon the semi-centennial anniversary of the discovery of ether. While steel and iron ties bind the shores of the Pacific and Atlantic together, still stronger ties unite the Occident to the Orient in bonds of unity, — the ties of fraternal love and good-fellowship for the members of the noble profession of medicine. I well remember the simple preparation made in the amphitheatre of the Massachusetts General Hospital for the most important surgical operation the world ever witnessed, which gave painless surgery to the world. There was no display, no ostentation, but the profound silence told the importance of the occasion. Then Dr. W. T. G. Morton administered the ether, and Dr. John C. Warren performed the operation, and the anxious suspense was over when the apparently lifeless body of the patient began to move. A new revelation was then given to the world, and the scene that followed no pen will ever be able faithfully to describe; but, after fifty years, it is fresh before me, like a living picture daguerreotyped on the memory, there to remain forever.

I hoped to revisit the scenes of my youth and be present at this grand jubilee, held in commemoration of the most important event in the history of medicine, but sickness compels me to forego the pleasure, while the world rejoices in the benefactions bequeathed to suffering humanity by the discovery of ether.

Yours sincerely, WASHINGTON AYER.

SIR RICHARD QUAIN sincerely regrets that distance renders it impracticable for him to attend the fiftieth anniversary of the public demonstration of surgical anæsthesia at the Massachusetts General Hospital on October 16, 1896. He heartily congratulates the institution whence has emanated one of the greatest blessings ever conferred upon mankind.

He sends a copy of an address which he once gave the students of University College, London, in which a brief statement is made as to the introduction of anæsthesia into Europe: —

"Robert Liston was one of the greatest of modern surgeons. I would, however, desire especially to emphasize the fact that it was Mr. Liston who in our hospital performed the first operation under anæsthetics in this country. The facts, of which I was a witness, will be found fully recorded in the first volume of the 'Lancet' for 1847. The story briefly told is this: that Mr. Morton, a dentist in Boston in the United States, used sulphuric ether to produce insensibility to pain during the removal of teeth. Subsequently some capital operations were performed in the Massachusetts Hospital without pain. This success was communicated through Dr. Boott, a retired American physician who resided in Gower Street, and who was a zealous member of the Council of our College, to Mr. Liston, who, influenced by the statement, saw Mr. Robinson, a dentist in Gower Street, remove a tooth, as Mr. Morton had done on several occasions in Boston, and the result is told in the following note from Mr. Liston: —

"'CLIFFORD STREET, December 21, 1846.

"'MY DEAR SIR: I have tried ether inhalation to-day in a case of amputation of the thigh, and in another requiring evulsion of both sides of the great toe-nail, with the most perfect and satisfactory results. It is a very great matter to be thus able to destroy sensibility to such an extent and without any apparently bad result. It is a fine thing for operating surgeons, and I thank you most sincerely for the early information you were so good as to give me of it.

"'Yours faithfully, ROBERT LISTON.'

"Thus anæsthesia, that great boon to mankind, was introduced in this country at University College Hospital by one of its surgeons. The nature of the anæsthetic, of which there are now, as you know, several, was really a subject of secondary importance. The 'oil of wine' and also 'choric ether' had been tried in America."

CONGRATULATIONS BY CABLE

The following cablegrams were read by the Chairman, Dr. J. C. Warren, at the opening of the exercises celebrating the semi-centennial of anæsthesia on October 16th: —

CHRISTIANIA, October 16, 1896.

TRUSTEES AND STAFF MASSACHUSETTS GENERAL HOSPITAL, BOSTON: Best congratulations on fiftieth anniversary.

CÆSAR BŒCK.

MOSCOW, October 16, 1896.

BOSTON, MASSACHUSETTS GENERAL HOSPITAL. COLLINS WARREN: The Moscow Surgical Society, at a special meeting held in honor of the fiftieth anniversary of the introduction of anæsthetics, celebrates the memory of Morton and Simpson, the great benefactors of mankind. It greets the committee, and wishes it every success in its labors on behalf of science, which knows no geographical boundary.

DIAKON, *President.*
WARNECK, *Secretary.*