

Benjamin Matthias Read,  
With the kind regards of  
William H. Welch.

# A Consideration of the Introduction of Surgical Anæsthesia

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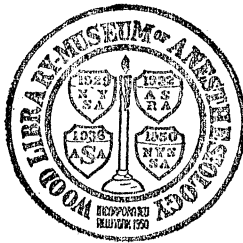
# A Consideration of the Introduction of Surgical Anæsthesia

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BY

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## A CONSIDERATION OF THE INTRODUCTION OF SURGICAL ANÆSTHESIA. \*

BY WILLIAM H. WELCH, M.D., LL.D.

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It is a happy conception of the trustees and staff of the Massachusetts General Hospital to set apart the sixteenth of October as "Ether Day," and to provide for the annual public celebration, in this historic place, of the anniversary of that most beneficent gift of medicine to mankind, — the introduction of surgical anæsthesia. I esteem it a high honor to be invited to deliver the annual address in commemoration of the great event which took place within these walls sixty-two years ago to-day. Of the significance of this event there can be no question, whatever controversy there may be concerning the exact share of all who participated in the discovery of surgical anæsthesia.

The attendant circumstances were such as to make the operation performed on Oct. 16, 1846, in the surgical amphitheater of this hospital, by John Collins Warren, upon the patient, Gilbert Abbott, placed in the sleep of ether anæsthesia by William Morton, the decisive event from which date the first convincing, public demonstration of surgical anæsthesia, the continuous, orderly, historical development of the subject, and the promulgation to the world of the glad tidings of this conquest of pain.

Had this demonstration or any subsequent one of like nature failed of success, it is improbable that we should have heard much of claims to the prior dis-

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\* Address delivered at the Massachusetts General Hospital on the sixty-second anniversary of Ether Day.

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covery of surgical anæsthesia. Often as the story has been told, and full as it is of bitter controversy, I may be permitted to recall to your minds enough of the preceding discoveries and efforts to indicate the proper historical setting of the event which we celebrate.

When and by whom artificial anæsthesia was discovered is unknown. It is certain that the old Greek and Roman physicians were acquainted with the power of various narcotic drugs to produce insensibility to pain and that narcotic potions and even their fumes were frequently administered from ancient times onward before a surgical operation in order to lessen the sufferings of the patient. At a later period more limited use was sometimes made of certain devices for the same purpose, such as compression of the carotids, the tightening of a tourniquet and pressure upon nerve trunks. The Elizabethan dramatist, Middleton, even portrayed an age of surgical anæsthesia, when he wrote in one of his plays :

“ I'll imitate the pities of old surgeons  
To this lost limb, who, ere they show their art,  
Cast one asleep ; then cut the diseased part.”

But we know that none of these procedures, and “ not poppy, nor mandragora, nor all the drowsy syrups of the world ” were safe, effective and available agents to benumb the senses during a surgical operation.

The history of the events connected with modern surgical anæsthesia begins with the remarkable development of chemistry in the latter part of the eighteenth century, due in large measure to the discovery and study of gases, and especially with the discovery of nitrous oxide by Priestley in 1776 and the investiga-

tion of its properties by Humphrey Davy at the end of the century in Dr. Beddoes' "Pneumatic Institute" near Bristol, England. At this period there was widespread interest in England in the study of the effects of inhalation of gases of different sorts, particularly of the newly discovered "vital air," or oxygen and nitrous oxide, and exaggerated ideas were entertained of their medicinal virtues, so that there arose a school of pneumatic medical practitioners. The institute of the leader of this school, Dr. Beddoes, is now chiefly remembered as the place which afforded to Humphrey Davy, then a young man who had commenced the study of medicine, the opportunity for the first manifestations of his remarkable genius for discovery in the physical sciences.

The particular discovery which here concerns us is that of the intoxicating, and especially the anæsthetic, properties of nitrous oxide gas, made in Dr. Beddoes' institute and vividly portrayed by Davy in his "Researches, chemical and physical, chiefly concerning nitrous oxide and its respiration," published in 1799. Here is found the memorable and often quoted sentence: "As nitrous oxide in its extensive operation seems capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place." It seems to us to-day amazing that this pregnant suggestion from such a source should have passed unheeded and that the application of Davy's discovery should have been delayed for over forty years. Davy's interests and activities were soon transferred at the Royal Institution to fields remote from practical medicine, and it does not appear that

he made any further effort to bring the suggestion to the attention of surgeons.

Observations and tests of the intoxicating effects of the inhalation of nitrous oxide were from this time on frequently made, and there is repeated mention of its capacity to produce insensibility to pain. One of the most dramatic situations, unnoticed hitherto in the voluminous literature on the history of anæsthesia, is the occasion when, in March, 1800, William Allen, the accomplished lecturer on chemistry at Guy's Hospital, demonstrated, in the presence of Astley Cooper and others, the phenomena of inhalation of nitrous oxide, noting especially the loss of sensation to pain. The description was recorded by Allen in his diary and is quoted by Wilks and Bettany in their "Biographical History of Guy's Hospital." The great surgeon had eyes but he saw not the revelation which a similar observation brought forty-four years later to the poor and unknown dentist, Horace Wells, in Hartford, Conn.

The narcotic properties of ether — a body known since its production in the sixteenth century by the German physician, Valerius Cærdus — had been noted before those of nitrous oxide. In 1795, Dr. Richard Pearson recommended and employed the inhalation of ether in pulmonary consumption, and after him Thornton, John Collins Warren, Nysten and others used ethereal inhalation for the relief of painful affections, especially of the respiratory tract, including that caused by the accidental inhalation of chlorine gas. In 1818, Faraday pointed out that the inhalation of the vapor of sulphuric ether produces intoxicating and stupefying effects similar to those of nitrous oxide, and in Pereira's "Materia Medica," a widely read



and authoritative text-book in its day, first published in 1839-40, it is stated that "if the air be too strongly impregnated with the ether, stupefaction ensues."

The inebriating properties of both nitrous oxide and ether became widely known, not only to the medical profession, but also to the general public by their frequent exhibition, for amusement oftener than for instruction, in chemical, medical and popular lectures. The thirties and forties of the last century were the palmy days of the itinerant lyceum lecturer. In the laughing gas and ether frolics, associated sometimes with these lectures, and occurring also for private entertainment, an acute observer might note that intoxicated subjects in their antics often barked their shins or were otherwise injured without manifestations of pain. The first trials of anæsthetic inhalation to annul the pain of a surgical operation came from the incidental observation under such circumstances of the benumbing effects of ether and of nitrous oxide gas.

The great French surgeon, Velpeau, doubtless expressed the accepted opinion of surgeons before the discovery of surgical anæsthesia when, in 1839, he wrote: "To escape pain in surgical operations is a chimera which we are not permitted to look for in our day. Knife and pain, in surgery, are two words which never present themselves the one without the other in the minds of patients, and it is necessary for us surgeons to admit their association." In less than a decade this erring prophet hailed before the Academy of Medicine in Paris the discovery of what he had called a chimera as "a glorious triumph for humanity."

For several years before the invention of anæsthetic inhalation for surgical purposes, considerable popular

and some medical interest in the possibility of securing unconsciousness of pain during a surgical operation had been aroused by the claims of the mesmerists, and there seems to be no doubt that Esdaile, in East India, and others, had, in certain cases, succeeded in performing painless operations in hypnotic sleep. The method, however, was not widely applicable or successful, and the general attitude of the profession toward its employment is sufficiently shown by the joy of the eminent surgeon, Liston, the first after the dentist, Robinson, to verify in Great Britain the discovery of surgical anæsthesia, when he shouted, "Hurrah! Rejoice! Mesmerism and its professors have met with a heavy blow and great discouragement. An American dentist has used the inhalation of ether to destroy sensation in his operations and the plan has succeeded in the hands of Warren, Hayward and others, in Boston. In six months no operation will be performed without this previous preparation. Rejoice!"

It has been sometimes represented that the invention of anæsthetic inhalation for surgical purposes consisted in nothing more than the application to this particular use of knowledge which already existed. This view falls far short of the truth. What was known of the anæsthetizing properties of the two agents which here come under consideration—the vapor of ethyl-ether, commonly, although incorrectly called sulphuric ether, and nitrous oxide gas—was enough to suggest the possibility of their use in surgical operations, and, as I have stated, Sir Humphrey Davy published this definite suggestion as early as 1799. Much more knowledge, however, was needed of the physiological effects of these agents in order to

demonstrate their applicability as safe, efficacious and generally available surgical anæsthetics. The only possible sources for obtaining this additional knowledge, as well as that which had already been acquired, were experiments upon either animals or man. From both of these sources the desired knowledge was obtained, but with a larger use of experimentation upon man than we should to-day consider justifiable.

The honor of making the first trial of anæsthetic inhalation in surgical operations belongs to Dr. Crawford W. Long, a respected and honorable country doctor, then living in Jefferson, Jackson County, Ga., who, in March, 1842, removed painlessly a small tumor from the neck of James M. Venable, anæsthetized by ether. He seems to have performed at least eight minor surgical operations during the next four years upon patients under the influence of ether. Dr. Long is necessarily deprived of the larger honor which would have been his due had he not delayed publication of his experiments with ether until several years after the universal acceptance of surgical anæsthesia. It is also to be regretted that his published details of the mode of administering the ether and the depth of the anæsthesia are so meagre and unsatisfactory. While the accepted rule that scientific discovery dates from publication is a wise one, we need not in this instance withhold from Dr. Long the credit of independent and prior experiment and discovery, but we cannot assign to him any influence upon the historical development of our knowledge of surgical anæsthesia or any share in the introduction to the world at large of the blessings of this matchless discovery.

Until the prior work of Dr. Long became generally

known, largely through the publication of an article by Marion Sims in 1877, although the announcement had been made by Long in 1849, and more fully in 1852, the credit of first using inhalation of an effective anæsthetic for surgical purposes was generally assigned to Horace Wells, a dentist of Hartford, Conn. Impelled by the observation of apparent loss of sensation to pain in a person intoxicated with nitrous oxide gas, and exhibited at a lecture by Dr. Gardiner Q. Colton in December, 1844, Wells, the following day, at his own request, submitted to the extraction of a tooth while under the influence of the gas and experienced no pain. He at once began the use of nitrous oxide in extracting teeth, and other dentists in Hartford used it. Desiring to secure larger publicity for his discovery, Dr. Wells went to Boston in January, 1845, and was given the opportunity by Dr. Warren to demonstrate the value of his claims before him and the students, Dr. Morton, his former partner, being also present. Either from the too early withdrawal or the inferior quality of the gas this test was a tragic failure, which exerted such a depressing influence upon Wells that he soon withdrew from his profession, abandoned his experiments and four years later ended his own life under most distressing circumstances. From what we now know of the valuable anæsthetic properties of nitrous oxide, and from contemporary evidence, there is no reason to doubt that Horace Wells painlessly extracted teeth by its use, and that if he had persevered in his efforts, he would have been able to perfect the method of producing anæsthesia by this gas and to demonstrate to the world the art of surgical anæsthesia. While he did not achieve this complete success, the credit which

belongs to him is large and the name of Horace Wells should always be held in honored remembrance.

Unlike the pioneer work of Long, that of Wells forms a direct and important link in the chain of discovery which led through the event celebrated here to-day to the universal adoption of surgical anæsthesia. So far as was known then and for years afterwards to those concerned in the further development of the subject, Wells was the first to take the step to which the finger of Humphrey Davy had pointed forty-five years before, and the results and claims of Wells were familiar to his friend and former partner, Morton, and must have stimulated the interest of the latter in the possibilities of surgical anæsthesia, although Morton believed that the particular agent used by Wells was not adapted to secure this end.

The significance of the public demonstration of surgical anæsthesia in this hospital sixty-two years ago to-day does not depend upon the settlement of the bitter controversy between Charles T. Jackson and William Morton concerning their respective shares in this event. I deem it, however, fitting and only historical justice to say that in my judgment, after careful study of the evidence, the greater share of the honor belongs to Morton. This was the prevailing opinion of those most competent to judge and best acquainted with the facts at the time, the trustees and staff of the Massachusetts General Hospital and the leaders of the profession in this city, of such men as John Collins Warren, Jacob Bigelow, James Jackson, Henry J. Bigelow, Oliver Wendell Holmes, George Hayward, Henry I. Bowditch, George Shattuck, Walter Channing, John Ware and many others, although it is only fair to state that the petition in

favor of Jackson's claim was headed by the honored name of Morrill Wyman and contained the names of many respected physicians. This opinion has remained, I believe, the prevailing one, not only in this city, but throughout this country. The judgment of the Paris Academy of Sciences in awarding equal honors to Jackson and to Morton established European opinion to a large extent up to the present time.

Morton undoubtedly received helpful suggestions from Jackson, who was a highly-trained and eminent chemist and geologist. It is not wholly clear to what extent these contained information not accessible elsewhere, but the evidence seems conclusive that Morton was indebted to Jackson for valuable information which the latter had acquired by personal experience four years earlier concerning properties of ether, strongly suggesting its availability for surgical anæsthesia; also for suggesting the use of chemically pure rather than commercial ether, and for apparatus for administering the ether. There is, however, good evidence that Morton, while reaching out for all the information and assistance which he could obtain from different sources, acted independently and conducted experiments and tests with ether upon his own initiative and in accordance with his own ideas. The supposition appears to me irreconcilable with the facts that he was merely a hand to execute the thoughts of Jackson.

In the conflict of testimony, there is not likely ever to be entire agreement of opinion concerning the exact measure of Morton's indebtedness to Jackson, but assigning to it all possible weight, and remembering Humphrey Davy had suggested the use of nitrous

that

oxide for surgical anæsthesia in 1799, and that enough was already known of the anæsthetic properties of both ether and nitrous oxide to have led Long, in 1842, to apply the former, and Wells, in 1844, the latter to painless surgery with a considerable measure of success, it seems to me clear that the chief glory belongs not to Jackson's experiences of 1842, or his thought or suggestion, whatever these may have been, but to Morton's deed in demonstrating publicly and convincingly the applicability of anæsthetic inhalation to surgical purposes and under such fortunate circumstances that the knowledge became, as quickly as it could be carried, the blessed possession of the whole world.

There are circumstances in the conduct of Morton as well as of Jackson much to be regretted in connection with this great discovery, and especially is it to be deplored that Morton, the least heroic of great discoverers, should, if only for a short time, have kept secret the nature of his "letheon," and that he and Jackson should have patented it.

Participation in the gift of surgical anæsthesia to the world brought to none of the claimants to this honor any adequate material rewards or fame during their lives, but rather the stings of embittered controversy, resulting in mental derangement in the case of two of the participants. The boon of painless surgery is the greatest gift of American medicine to mankind and one of the most beneficent ever conferred. There is a growing tendency to celebrate the gift with too little thought of the giver. This easy procedure is doubtless due to the difficulty of meting out equal and exact justice to all concerned and to disinclination to stir the ashes of old controversies. This disposition of the

matter, however, is unjust, and it seems to me that every effort should be made to determine the share and the credit belonging to each contributor to the discovery and the introduction of surgical anæsthesia, and to secure, so far as possible, an agreement of opinion in this important matter. We are not likely to come into possession of important new facts, but their unbiased presentation in historical order, and the consideration of their relative values and significance, should clarify professional and public opinion and enable us to give honor where honor is due. One of the most attractive and instructive accounts of the ether controversy is the chapter on this subject in Dr. Mumford's charming "Narrative of Medicine in America," where references will be found to more detailed statements and the historical documents. I have endeavored in this brief and imperfect historical survey incidentally to express in some measure my personal judgment of the relative importance of the leading contributions, and my conclusions are in essential agreement with those of Dr. Mumford when he says that "time and history are at last placing the honor where it belongs, — with Morton, who for his errors most certainly was punished beyond his deserts." But whatever may be the differences of opinion, one fact of the first historical importance stands and will continue to stand unshaken: the world received the gift of surgical anæsthesia as the immediate and direct result of the convincing, public demonstration of its efficacy in this hospital on the sixteenth of October, 1846.

In the bestowal of honors the name of the eminent surgeon, John Collins Warren, should not be forgotten, who had the courage to subject his patient to



unknown risks in the hope, which was far removed from any assurance, that a great blessing was about to be conferred upon suffering humanity. Great indeed was his joy in the fulfilment of this hope.

Turning now from these historical considerations, permit me to direct your attention to certain attributes of the discovery of surgical anæsthesia, and certain lessons to be drawn from it.

It is to be emphasized that this discovery was a triumph of the experimental method, albeit man was made the principal subject of experiment. Animal experimentation played a part, for I see no reason to question, although this has been done, Morton's statements that during the summer of 1846 he successfully anæsthetized dogs and other animals with ether, and that the results of these experiments influenced his trial of the anæsthetic upon human beings. It must, however, be admitted that the production of unconsciousness in man by ether had not been preceded by such numerous and properly conducted experiments on animals as were required to furnish adequate conception of its effects or its possibilities of danger. Such experiments would have yielded knowledge of this character, and we know that at the present time as full information as possible would have been secured from this source before administering to man an agent with unknown possibilities of danger, one indeed in this instance stated in text-books of the time to be dangerous to life when pushed to the point of producing complete unconsciousness. If the opponents of animal experimentation attempt to utilize, as they have done, the relatively small share of this method of advancing knowledge in the discovery of surgical anæsthesia, the only implication of the argu-

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ment is that they would substitute experiments upon human beings for those upon animals, for only from one or the other of these sources could the discovery have been derived.

We place, then, the discovery of surgical anæsthesia with such other great discoveries as those of the circulation of the blood, of vaccination against smallpox, of antiseptic surgery, of antitoxin and many more among the great contributions to the welfare of mankind made by the use of that indispensable aid to the advancement of medical science art, — the experimental method of investigation. <sup>and/</sup> ^

A quite different line of thought suggested by the discovery of surgical anæsthesia is the aid to medicine which comes often in the most unexpected ways from discoveries in other sciences. Not only did chemistry furnish the anæsthetic agents, but the wonderful discoveries of pneumatic chemistry, which revolutionized the whole science of chemistry in the latter part of the eighteenth century, were the immediate stimulus to the study of the physiological effects of various gases, a study which led promptly to the recognition of the anæsthetic properties of nitrous oxide gas, and which, continued through half a century, resulted finally in the demonstration of the applicability of certain of these gases for surgical anæsthesia. Here, as for so many other gifts, medicine owes a large debt to chemistry, as she does likewise to physics, as may be exemplified by the applications of the Röntgen rays in medical and surgical diagnosis.

While it does not appear to us that the discovery, or, as some prefer to say, the invention, of surgical anæsthesia required any remarkable intellectual endowments or high scientific training, and it cannot be

said that Long, Wells or Morton were possessed of these, it was the outcome of a spirit of inquiry, of keen observation, of boldness, of perseverance, of resourcefulness, of a search for means to improve a useful art, of interest in the practical rather than the theoretical,—all traits more or less characteristic of the American mind, and I do not think that it was wholly an accident that our country should have given birth to the art of painless surgery. I find evidence of this view in the fact that not one but several Americans were working independently upon the same problem and that the solution of the problem is an exclusive achievement of our countrymen.

The circumstance that a long-awaited discovery or invention has been made by more than one investigator, independently and almost simultaneously, and with varying approach to completeness, is a curious and not always explicable phenomenon familiar in the history of discovery, and, as in the case of surgical anæsthesia, it has been the source of endless and often bitter controversy. Sooner or later, often long after the death of the participants, historical justice has usually come.

The approach to a great discovery is long and devious and marked by the capture of a barrier here and an outpost there ; when the fullness of time has come the final assault is often made by more than one person, and the victor stands upon the shoulders of many who have preceded him, ~~—it may be of many who have fallen by the way.~~

The period when surgical anæsthesia was discovered was one full of the spirit of scientific inquiry and the opening of new paths for medicine. There had come to be a general realization of the fact that

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the only trustworthy sources of knowledge are exact observation and experiment. The great impulse derived from the introduction of the new methods of physical diagnosis and the systematic anatomical study of disease had shortly before reached this country from France, and was especially active in this city. Experimental physiology and pharmacology had entered upon fruitful fields of exploration through the work of Magendie and of Johannes Müller and their pupils. The foundations of cellular pathology were soon to be laid. While it is not apparent that those directly concerned in the discovery of surgical anæsthesia were influenced by the new spirit and the new ideas, they contributed an aid to experimental research of immeasurable service. It was fortunate indeed for the public demonstration, reception and promotion of the discovery of surgical anæsthesia that it was revealed to that able group of surgeons and physicians then connected with this hospital, who were imbued with the new scientific spirit and with the best traditions of the profession, and were active in the advancement of the art.

A consideration of some interest connected with the introduction of surgical anæsthesia is the influence of environment and of material conditions upon discovery. Here we find illustrated the fact, of which there are many examples, that apparently adverse surroundings and average intellectual endowment without special scientific training constitute no barrier to the making of discoveries of the highest importance to mankind. The country doctor in Georgia, with only an ordinary general and professional education, and the two poor and previously unknown dentists of Hartford and of Boston, are the chief

actors in the drama. It is not surprising that dental surgeons should have been particularly eager in the quest of anæsthesia, for there is no more excruciating agony than the pulling of an aching and sensitive tooth, and the short duration of the operation and the suffering would suggest possibilities of success which might not be ~~variable~~ *avail* in a prolonged surgical operation. Nor is it surprising that American dentists should have been most active in this search, when we recall the remarkable inventiveness and skill which have characterized their work and have given to American dentistry a foremost position for this branch of surgery.

On the other hand, however, the share which the Massachusetts General Hospital and its surgeons had in the demonstration, promulgation and acceptance of surgical anæsthesia exemplifies the value of a favorable environment and was largely responsible for the complete success which Morton achieved over his predecessors in discovery. The manner in which the surgeons of this hospital at that time — including John Collins Warren, George Hayward, Henry J. Bigelow and J. Mason Warren — received and advanced Morton's demonstration of anæsthesia, must always be a source of pride, not only to this hospital, but to our country and the world. Especially are they to be commended for their insistence upon disclosure of the nature of the secret letheon. No better example can be found of the service which a great hospital and its professional staff can render in furthering discovery and in advancing and spreading new knowledge and new methods important to the medical and surgical art than that furnished by the Massachusetts General Hospital in its relations to the demonstration and introduction of surgical anæsthesia, and its officers and

staff have ever remained faithful to the high ideals then exemplified.

Worthy of especial mention are the first announcement to the world in a scientific journal of the great discovery, by Henry J. Bigelow, in an important paper read before the American Academy of Arts and Sciences, on Nov. 3, 1846, and published in the *Boston Medical and Surgical Journal* on Nov. 18, and likewise Oliver Wendell Holmes' delightful part in coining the word "anæsthesia," and, indeed, his whole attitude of lively, sympathetic and imaginative interest, as expressed in all that he said and wrote concerning the new discovery. A sentence often quoted will suffice to illustrate Dr. Holmes' appreciation of the benefits of the discovery, as well as his powers of vivid description :

"The knife is searching for disease, the pulleys are dragging back dislocated limbs, nature herself is working out the primal curse which doomed the tenderest of her creatures to the sharpest of her trials, but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed forever."

The reception of the joyful discovery was everywhere enthusiastic, although not without some of the mutterings which come from those petrified against all innovations, as appears from remarks made by Professor Miller to his class in London not long afterwards. "The profession," he says, "were surprised, excited, charmed in the mass, and more especially those on the junior side of the grand climacteric. The elderly gentlemen had their preconceived and heretofore settled notions sadly jostled and disturbed. Not

a few grew irritable and resented the interference ; they closed their ears, shut their eyes and folded their hands ; they refused to touch or in any way meddle with the unhallowed thing ; they had quite made up their minds that pain was a necessary evil and must be endured ; they scouted on the attempted innovation and croaked that ‘no good could come of it.’ On, notwithstanding, sped the movement.”

One of the most extraordinary aberrations of the human mind was manifested by the raising of religious scruples, particularly against the abolition of pain in childbirth. Sir James Simpson, the discoverer of the anæsthetic uses of chloroform, and of important service in advancing the art of anæsthesia, quotes from the letter of a clergyman, who declares that chloroform is “a decoy of Satan, apparently offering itself to bless women, but in the end it will harden society and rob God of the deep earnest cries which arise in time of trouble, for help.” If this clergyman remembered the primal curse, he forgot the earliest example of anæsthesia when, in the resection of a rib for the creation of Eve, “the Lord God caused a deep sleep to fall upon Adam.”

The immediate immeasurable benefits conferred by anæsthesia in the relief of human suffering were realized more fully and were expressed more adequately by the generation which knew by experience the contrast between the old surgery and the new painless surgery than is possible for us to-day. But of all the blessings which were to flow from this priceless gift there could be only a feeble conception sixty years ago, and as this flow is unceasing, we, ourselves, cannot fully estimate them. Anæsthesia and anti-sepsis, the two greatest boons ever conferred upon

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the surgical art, have made possible the marvelous developments of surgery during the last forty years, and only by their aid can surgery continue to advance.

I have somewhere seen a statement to the effect that the introduction of anæsthesia and of antisepsis have made the practice of surgery so certain and so easy that qualities of hand and of mind which were essential to high success in the practice of pre-anæsthetic surgery, and which were exhibited by the surgical heroes of old, are no longer necessary, so that even commonplace mortals can now become surgeons. There is perhaps a half truth in this, but it is more than compensated for by the demands upon the skill and judgment of the modern surgeon in the performance of operations vastly more difficult than any which were possible or were dreamt of in the old days.

What surgery was before the days of anæsthesia, and what anæsthesia has done for surgery and for obstetrics, are subjects which were presented at the semi-centennial anniversary of anæsthesia in this hospital by Dr. Ashhurst, Dr. Cheever and Dr. Reynolds, men far more competent to deal with them than I am. On the same occasion I had the privilege of speaking on the influence of anæsthesia upon medical science, and I shall not now consider this aspect of the subject, save to note again in passing that physiology and experimental medicine in their special fields have derived benefits from anæsthesia comparable to those enjoyed by surgery. That the useful knowledge which can come only from experimentation upon animals can now be acquired in by far the larger part without the infliction of pain is a source of immense satisfaction.

Ushered in by the discovery of vaccination against



smallpox at the close of the eighteenth century, the greatest practical achievements in our art during the nineteenth century were anæsthesia, antiseptic surgery and the power to control infectious diseases resulting from the discovery of their living contagia — achievements surpassing the heritage of all the centuries which had gone before in the saving of human life and the alleviation of suffering. Of all these gifts of medicine to mankind, the sweetest and the happiest is that “death of pain” so beautifully portrayed at the semi-centennial anniversary of anæsthesia by our beloved poet-physician, ~~Wier~~ Mitchell: *Wier*

“ 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 Godlike will, decree the Death of Pain.”

To these fine lines I can add in closing no more fitting words than those of John Collins Warren, who presided over the scene enacted here sixty-two years ago, a name ever to be honored in this place and throughout the civilized world. These words, spoken soon after the event which we celebrate, retain their vigor, freshness and truth to this day. He said :

“ A new era has opened on the operating surgeon. . . . If Ambrose Paré and Louis and Dessault and Cheselden and Hunter and Cooper could see what our eyes daily witness, how would they long to come among us and perform their exploits once more. And with what fresh vigor does the living surgeon, who is ready to resign the scalpel, grasp it and wish again to go through his career under the new auspices.

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As philanthropists we may well rejoice that we have had an agency, however slight, in conferring on poor suffering humanity so precious a gift. Unrestrained and free as God's own sunshine, it has gone forth to cheer and gladden the earth ; it will awaken the gratitude of the present and of all coming generations. The student, who from distant lands or in distant ages, may visit this spot, will view it with increased interest, as he remembers that here was first demonstrated one of the most glorious truths of science."