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ADDRESS IN SURGERY.

SOME RETROSPECTIVE AND PROSPECTIVE  
THOUGHTS ON SURGERY.

*Delivered at the Thirty-ninth Annual Meeting of the American Medical Association, Cincinnati, May 8, 1888.*

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OF DETROIT.

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Our generation has witnessed one of the most active and progressive eras in the history of that department of medical science to which the attention of this Section is especially devoted. It has occurred to me that a concise and candid statement of some of the impressions made upon my own mind and some of the conclusions at which I have arrived as the result of active experience, extending over a period of at least a quarter of a century, might not be altogether uninteresting to this Section, which has conferred on me the great honor of electing me its chairman; an honor which carries with it the responsible duty of delivering an address on the present occasion.

The vastness of the subject and the shortness of the time at my disposal necessitate a brevity and conciseness of style which might easily be construed as implying a spirit of dogmatism, which is now, once for all, emphatically disavowed. It is possible to hold well-defined opinions and still be tolerant of those who differ from us; and no one could approve or admire the spirit of scientific skepticism more than I do. So that it goes without saying that I freely and fully concede to every one the right to judge for himself how much or how little of what is here said he shall accept as true. Any one who will reflect for a moment how often he has had occasion to modify his opinions on important surgical matters will surely hesitate a good while before venturing to be censorious toward those who fail to accept his views or his methods of practice. Not only so, but as we look around us and observe the almost diametrically opposite views which authorities of equal eminence hold on the same subject, we cannot but feel that it is absurd and presumptuous for any one to attempt to dictate to his brethren in the profession what they shall accept as final truth in surgery.

One thing is certain, that the progress of surgery during the last quarter of a century has been unprecedented. To correctly analyze the methods and

the results of this wonderful period of activity, winnowing out whatever has proved to be false, misleading or unreliable, and giving proper significance and credit to the genuine and the permanent, is a profitable employment and a true labor of love for the scientific student and practitioner of surgery.

Without claiming for myself any special fitness for this work, the mere fact of my election to this honorable office encourages me in the hope which I have expressed, that a frank statement of some of the opinions which my observation and experience have led me to form may be listened to with interest by my present audience. Perhaps, too, the fact that I have been actively employed during almost the entire period of my professional life in the work of teaching surgery to large classes of medical students may add somewhat to the interest of such a summary of my views on a few of the great surgical problems of our day as I here propose to make.

The marvelous progress of modern surgery in our time is commonly attributed to two great agents, namely, anæsthetics and antiseptics. But with all due deference to these, it should not be forgotten that they themselves are only part of the fruits of a great general movement all along the line of the natural sciences, and that advances in anatomy, chemistry, physiology, histology, etc., have contributed in innumerable ways to the progress of surgery; and it is no more than just that the great army of able and enthusiastic laborers in these collateral departments should receive adequate recognition for the services which they have rendered, directly or indirectly, to surgery. Nor should the fact be overlooked that even before the beginning of the present surgical era, that is, before the introduction of anæsthetics, and long before antiseptics were dreamed of, surgery was a great scientific art, and many of the principles and the methods promulgated and taught by our fathers stand unchallenged and unchanged to this day. To those great minds who cultivated and practiced surgery without the aid of our "modern conveniences," it is impossible to concede too high a meed of praise. The least we can do is to acknowledge with grateful candor the extent of our indebtedness to them.

That the introduction of anæsthetics constitutes one of the most important events in the history of surgery is a fact generally conceded; and still it seems to me that, in trying to explain the rapid progress of our art in recent times, a mistake is often made in attributing to other causes a good deal that is really due to this. For example, it is a common thing now-

a-days to hear much, if not all the credit of the wonderful advances in the surgery of the abdomen, the surgery of the articulations, the surgery of the blood-vessels, etc., given to Listerism, or antiseptic devices. Now, the fact is that *antiseptics without anæsthetics could have had but a comparatively limited and insignificant field of usefulness*; and before attempting to decide or define the true value of antiseptic processes, let us try to do justice to some of the other factors in this interesting problem.

The introduction of anæsthetics at once enlarged the field of operative surgery, in the first place by enabling patients to undergo operative procedures which otherwise could not be endured; in the next place, by enabling many persons to cultivate and acquire operative skill and experience who, without the aid of anæsthetics, would have shrunk from the dread ordeal of performing a surgical operation. The introduction of anæsthetics inaugurated an era of unprecedented enthusiasm in the cultivation of every department of surgery. And out of this, as a necessary and natural consequence, has come the splitting up of surgery into subdivisions which are now dignified by the name of *specialties*; as, for instance, ophthalmology, otology, gynecology, etc., all of which must still be included under the head of *surgery*. The oculist or the gynecologist who is not a surgeon, in the largest and best sense of the term, is in great danger of becoming a charlatan.

To the introduction of anæsthetics, more than to any other agency, is due the credit of this wonderful extension of the boundaries of modern surgery. It should not be forgotten that this great movement had not only started, but had made considerable progress, before the theories of Pasteur and their practical application to surgery by Joseph Lister were thought of. Perhaps the best illustration of this assertion is derived from the history of abdominal surgery. Spencer Wells, Clay, Atlee, Peaslee, Dunlap and Keith, as well as others, had achieved world-wide fame as ovariologists long prior to the advent of antiseptic surgery. In his address on surgery to the British Medical Association in 1865, Prof. James Syme spoke as follows in reference to the operation of ovariectomy:

"The objections originally entertained with regard to both prognosis and diagnosis have been in a great measure removed through the careful discrimination of cases, while the operative procedure has acquired a corresponding degree of perfection, and the results are so satisfactory that the proportion of deaths does not exceed from 30 to 35 per cent. The most successful operator in Scotland is my friend and former house surgeon, Dr. Thomas Keith, who has operated in thirty-five cases and lost only nine of his patients."

In the United States and other countries to-day there are many ovariologists who are honestly of the belief that by the use of strict antiseptics they possess an immense advantage over those ovariologists of preantiseptic times. They certainly have the unspeakable advantage of the vast accumulations of the recorded experience of operators who, like those whom I have named, have been so careful and thorough in the publication of their cases, their obser-

vations and their methods; and still, I ask, can it be truly said that the mortality of ovariectomy has, on the whole, materially lessened since Professor Syme uttered the words which I have just quoted? When full and fair credit is given to the other aids which have come to the profession as a whole, through increase of knowledge and enlargement of experience during the period of wonderful surgical activity from 1865 to 1888, how much room is left for credit on behalf of antiseptics? In our reflections and calculations on this point it is only just to note the remarkable fact that among the most eminently successful of the abdominal surgeons of to-day we find men like Tait, Bantock and others who claim that, so far as their experience in abdominal surgery goes, antiseptics have been weighed in the balances and found wanting, and by whom they have been denounced as a delusion and a snare. It has been customary of late years, when a successful operation of a new or exceptional nature, such as resection of intestine, cholecystotomy, splenectomy, etc., is recorded, to claim the result as another argument or fact in support of antiseptic surgery. And it may be that the belief in the marvelous advantages of such safeguards as it is supposed to furnish has inspired confidence beyond that which our increased knowledge of pathology, our improved dexterity in manipulation and our faith in the generally recognized and approved principles of surgery independently of antiseptics can afford us. But is it not just possible that too much value has been attached to the influence of antiseptics and too little to the numerous other factors which enter into this complex and many-sided problem? Is it not just possible that even if Listerism had never been heard of, surgeons would by this time or, at all events, sooner or later, have come to appreciate the immense value of perfect surgical cleanliness and conceded to it its true position in relation to all the other essential requisites of successful operating, such as tenderness of manipulation, efficient drainage, healthy surroundings, judicious dieting, conservation of blood, prevention of shock, wise and skilful nursing, etc.? All honor to Lister as the great apostle of surgical cleanliness, no matter what the ultimate fate of his theoretical views may be. The germ theory of disease as applied to surgery may be materially modified, or even proved to be in certain important respects erroneous; the use of carbolic acid, bichloride of mercury and the other germicides may ultimately come to be regarded as worse than useless, and all the complicated paraphernalia which constitutes antiseptic surgery declared unnecessary and absurd; and still the fact must remain that, whether right or wrong as a matter of abstract scientific truth, the theories and the methods of Lister have done much to encourage the progressive modern surgeon in his righteous ambition to carry his beneficent labors to the furthest limit of possible usefulness. The simplest and most obvious truths are often the most difficult of apprehension and application by those most interested in their effects. It will be a most striking and wonderful exemplification of this old and true saying if it should ultimately appear that the sum and substance of the life

work of this great surgical prophet and his disciples is comprehended in the ancient scriptural admonition, "*Wash you, make you clean.*" Whatever the ultimate fate of the germ theory in surgery may be; whatever the fate of the so-called germicides like carbolic acid, bichloride of mercury, etc., may be, one thing is certain: that anything like a return to the old, loose and careless methods, as regards cleanliness, of conducting surgical operations and of dressing surgical patients is absolutely impossible; and for this the world will always feel grateful to Joseph Lister.

#### ANÆSTHETICS.

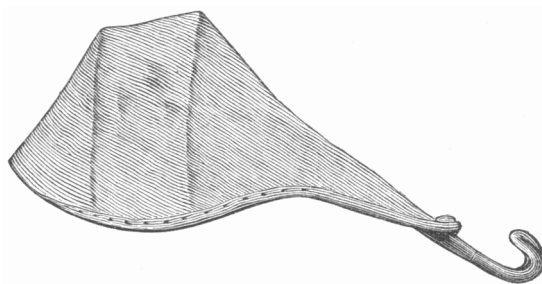
There are few subjects of surgical interest that have been so freely written about and discussed in our day as anæsthetics. Even the briefest review of this vast field of surgical literature would lead me far beyond the scope of this address. I merely refer to it for the purpose of declaring that, after very careful and respectful consideration of the views of those who have written and spoken on the subject, and after impartially testing the different substances recommended, I find myself irresistibly forced to the conclusion that, upon the whole, for all general purposes, chloroform possesses superior advantages. My own experience with it induces me to believe that, when carefully administered in suitable cases, it is little if at all more dangerous than other anæsthetics, and its advantages in other respects are too well known to require further illustration on the present occasion. Death under anæsthetics is in every case a great and shocking catastrophe; but when it occurs during some comparatively trivial procedure the circumstance is appalling. Fortunately, in the progress of surgery of late years, local anæsthesia by ether spray, cocaine, etc., has been found to constitute an efficient and altogether safe substitute in a large field of minor though painful operations. That in the near future other and better general anæsthetics than any yet known may be discovered, is surely not an



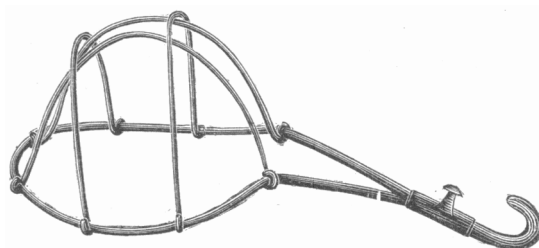
No. 1.—Chloroform Dropper.

unreasonable expectation, when we consider the ceaseless energy of earnest and brilliant students and experimenters in this as in all other departments of

medical science. As a justification for my own faith in the safety and general efficacy of chloroform, perhaps I may be allowed to state that it is very nearly thirty years since I commenced using it, and so far no accident that could in any way be attributed to its use has occurred to disturb the early impressions as to its trustworthiness made upon my mind by the eloquent teachings of James Young Simpson and the no less powerful utterances and example of James Syme. To the use of the simple little apparatus which I here present I have come of late years to attach great value in the administration of chloroform.



No. 2.—Chloroform Inhaler.



No. 3.—Frame of Inhaler, uncovered.

#### THE MICROSCOPE IN SURGERY.

Who of us is unable to recall the time when great things were hoped for by surgeons from this truly wonderful instrument, which has done so much in other departments of science? Who does not recall the confident predictions indulged in as to what would be accomplished by its means in the diagnosis and classification of tumors, in the diagnosis of the different morbid fluids, and so on? Can it be claimed to-day that these hopes have been realized, these predictions fulfilled? I fear not. How much has it done to enlarge our knowledge of the essential characteristics of different kinds of pus? Can we by its means distinguish with perfect certainty between the pus of gonorrhea and the pus from a chancre or any other source? In short, has the microscope added anything to our powers as practical surgeons so far as this and other common surgical fluids are concerned?

In the diagnosis and classification of tumors great things were expected of it, and it was also expected that by its means the prognosis of morbid growths would become a matter of actual and unmistakable demonstration. That much information interesting to the scientific surgeon has been obtained as the result of vast efforts in the investigation of the ori-

gin and the essential nature of morbid growths no one can deny; but for the practical purpose of deciding whether or not a given tumor should be removed by operation, or for the purpose of determining the prognosis in relation to the question of return or the danger of general infection of the system, I have not been able to persuade myself that the microscope has added much if anything to our resources. We must still depend upon the ordinary clinical signs and symptoms, the anatomical relations, and the facts of its history in determining our views as to the true nature and the best treatment of a morbid growth.

In certain departments of practical medicine nearly related to surgery, such as the examination of urine, etc., the microscope is invaluable; but to the ordinary practical surgeon its usefulness has not equalled the expectations of its early enthusiastic advocates.

#### ELECTRICITY IN SURGERY.

Electricity is another modern addition to the armamentarium of the practical surgeon; and although it has in some directions proved disappointing, still it can, I think, with truth be claimed that when used for suitable purposes, it has demonstrated its right to the respect and gratitude of the profession. Much harm has been done and much unfair prejudice excited against this useful agent by the absurd and extravagant claims which have from time to time been made in its behalf as the result of inaccurate observations or unscientific deductions, and there is reason to fear that this kind of obstruction to the proper recognition of electricity as a surgical agent has not yet entirely ceased. That certain forms and degrees of urethral and other strictures are capable of being remedied by electrolysis skillfully and carefully applied I am prepared to believe; but when we are told that all other methods of treatment of this large and important class of surgical cases are to be completely superseded, or nearly so, by this one, my belief is that our duty as rational practitioners is to suspend judgment.

Cases of far-advanced, long-neglected stricture, with fistulæ in perineo and large deposits of dense, inflammatory tissue, will, in my opinion, still furnish a useful field for the operation of external perineal urethrotomy, an operation which I have performed with the most satisfactory results in a large number of cases which I do not believe would have yielded to any other method of treatment. Some years ago I performed the old operation of urethrotomy without a guide in a case of complete occlusion of the urethra, the result of laceration from fracture of the pelvis. The patient had passed all his urine through a perineal fistula for five years, not a drop having passed by the natural channel in all that time. The occluded portion of the urethra extended to a length of more than two inches. The operation, in which I was assisted by my colleague, Prof. Frothingham, and my brother, Dr. A. C. Maclean, was a long and difficult one, but was crowned with *absolute success*. And surely it will not be claimed that either electricity or any other method of treatment could have

held out the least shadow of hope in such a case.

The testimony of Apostoli, Keith and others as to the efficacy of this agent in favorably affecting the growth and tendencies of uterine fibroid tumors, if confirmed by further experience, is certain to be regarded as marking a most important era in the history of this department of surgery.

In this connection the following very recent case appears to me sufficiently important and suggestive to give here in detail. Mrs. S. G., æt. 18, residing at Matamora, Ohio, was admitted to the University of Michigan Hospital April 18, 1888. She is of German extraction. Her father died in 1875 of acute consumption. During his early life in Germany he appeared to have been in hospitals for treatment of tumors on arm and shoulder. During latter years he suffered very much from rheumatism occasionally. Seven brothers and sisters died in childhood in Germany; cause of death unknown to the patient. The children born in America are healthy. Mrs. G. commenced to menstruate at 12 and has been regular since; was married in June, 1887. During the fall of 1886 she first felt a lump in the left breast, which was painful. The swelling was about the size of a walnut and was movable. It increased very much during the winter and she suffered from shooting pains, which were more acute at her menstrual periods. On examination by me the tumor was found to occupy nearly the whole of the gland. It was hard, nodulated, the nipple retracted, and, in short, presented every appearance of scirrhus. Moreover a dense mass of considerable size existed in the axilla. Had this patient been a woman over thirty years of age I should undoubtedly have recommended and performed amputation of the breast.

The resemblance between this breast and many which I have amputated for cancerous disease, and which have been proved by ulterior investigation to be malignant, was very striking indeed. The age of the patient was the only consideration which led me to entertain a hope that the prognosis might not after all be so grave, and that the tumor might be amenable to treatment by milder means; and I determined before doing anything else to make a fair trial of electrolysis with it. For that purpose I requested my assistant, Dr. George A. Hendricks, to take charge of the treatment, which he did on April 19. The applications were made with positive electrode over the growths and negative over the sternum, the positive electrode being a circular copper plate one and a half inches in diameter, covered with fine sponge, the negative electrode a copper plate two inches square, covered with sponge. When in use the sponges were wet with a strong solution of salt and before application the parts were well washed with alcohol. On April 19 nine cells, seven miliampères, were applied for ten minutes; on the 20th, 38 cells, 30 miliampères, for twelve minutes, applied over the tumor. Chloroform was given during these applications, as the patient could not tolerate them without anæsthesia. On April 21, 12 cells, 10 miliampères, for ten minutes. On the same day the same application was made for the same length of

time over the axillary tumor. The negative pole making the skin of the chest sore, a larger one was made, of an oval shape, five by eight, covered with fine sponge. On April 22, 38 cells, 30 miliampères were applied for ten minutes over the breast and for the same length of time over the axillary tumor. By this time the breast tumor was found to be reduced to a spherical nodule about the size of a walnut. Contraction of the nipple had to a great extent disappeared. On April 24, beginning with 9, increasing gradually to 24 cells, for twelve minutes on breast and axilla. On April 25, 26 and 27 the same application; on April 28, 30 cells; on April 29, 38 cells. After this the skin over the breast appeared somewhat irritated, but the tumor decidedly smaller. On April 30, 38 cells were applied over the breast and to the axilla. On May 3 the patient was menstruating, and the treatment stopped for the present; but the growth by this time in the breast and in the axilla had almost entirely disappeared and the patient, considering herself cured, was most anxious to return to her home in Ohio, which she was permitted to do.

In chronic enlargement of the prostate in old men I think I see in this direction a gleam of reasonable hope for a class of cases hitherto regarded as almost if not quite beyond remedy.

The value of electrolysis in the treatment of that common and important surgical condition known as naevus or aneurism by anastomosis is a triumph of surgery which belongs to our own generation. Previous methods of treatment, namely, excision, caustics, ligature, injection of astringents into the structure, are all inferior in every respect to the method by electrolysis. I have used and have seen used every one of these different methods, and have no hesitation in giving the preference to electrolysis on the score of safety, efficiency and ease of application. I here present for inspection a few photographs illustrative of a large number of cases of naevus, treated successfully by electrolysis at my public clinic.

#### SURGICAL HÆMORRHAGE.

Our generation has witnessed substantial advances in regard to the management of surgical hæmorrhage. Its prevention during long and extensive operations by means of Esmarch's bandage is one of the most striking and important of these advances. No surgeon would now like to dispense with this simple but truly valuable appliance.

The aortic compressor, invented simultaneously by Pancoast and Lister, by which, with the utmost safety and certainty, the circulation through the lower half of the body may be absolutely controlled during pleasure, is another device in which, from actual experience in many urgent cases, I have come to have perfect confidence. I am fully persuaded that no danger of injury to the abdominal organs is involved in its use.

Catgut, and other animal ligatures, properly prepared, constitute another substantial improvement. The abandonment of all the so-called styptics, as the per-salts of iron, tannin, etc., except in very rare and

peculiar cases, is another step in the right direction. They are dirty, irritating, and above all unreliable as hæmostatic agents. By means of acupressure Simpson and others claimed nearly if not quite as brilliant results in the healing of surgical wounds as the advocates of antiseptic surgery have since claimed for their methods. Now-a-days, however, acupressure, notwithstanding the strong theoretical arguments in its favor may almost be said to be a dead issue.

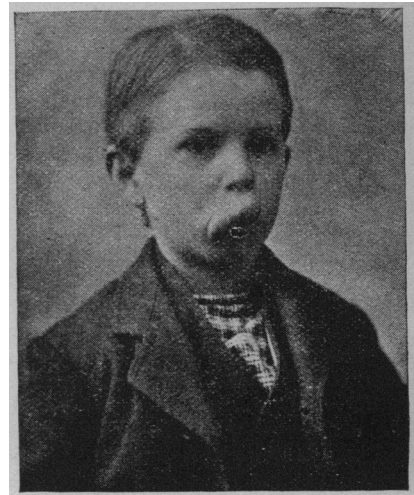
In regard to that interesting affection, aneurism, the revival of the old operation of Antyllus in certain suitable cases, and the restricting of the Hunterian operation to a somewhat more limited field of usefulness, is a most striking and interesting improvement, for which the credit is mainly due to Prof. Syme. The achievements of this truly great surgeon in this department of surgery were sufficient to shed peculiar brilliancy over the closing years of his peculiarly brilliant career. I hope I may be pardoned for suggesting in this connection that when the enthusiastic devotee of "all antiseptic precautions" heralds forth to-day as an additional proof of the value of his method a successful case of ligature of an artery for aneurism, the remarkable fact should be remembered that Prof. Syme, whose career was practically closed before antiseptics were discovered, ligatured the femoral artery for aneurism fifty-eight times without a single failure. If there has been any corresponding record made since the introduction of those methods, I have not heard of it.

The recently promulgated view that an artery may be securely ligatured by a broad animal ligature, without rupture of any of its coats and without the formation and organization of the classical coagulum between the point of ligature and the first branch, if true, is undoubtedly the greatest discovery relative to the surgery of the arteries that has been made in our day. Such a revolutionary doctrine ought to be accepted cautiously and after careful observations *on the human subject*. I am able to contribute one or two facts in its favor from my own experience. Two years ago I was compelled to ligature the common femoral artery immediately below Poupart's ligament, for urgent hæmorrhage, the result of ulceration of the artery in connection with an obscure abscess which originated in the interior of the pelvis. I used carefully prepared catgut ligature and with perfect success so far as the hæmorrhage was concerned. The patient, an old, worn out man, died some weeks afterward from a complication of diseases, but no trouble came from the ligature of this most dangerous of all the arteries. Unfortunately, no post mortem examination could be obtained in this interesting case.

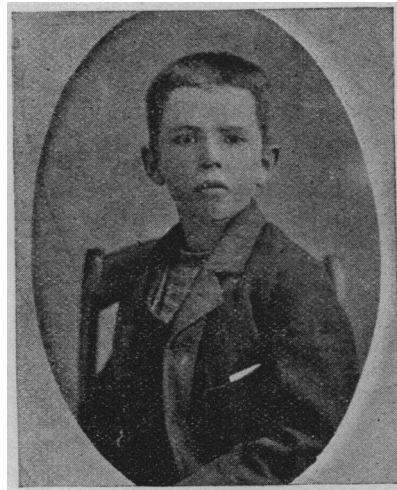
Some months ago I was compelled to ligature the superficial femoral under circumstances of urgent emergency for secondary hæmorrhage from the popliteal artery, the result of a pistol shot injury inflicted some weeks before the case came into my hands. Extensive burrowing of pus all through the tissues of the thigh had occurred, and the patient was nearly exhausted from septicæmia, from which death ultimately resulted nine days after the operation of ligature of the femoral. On post-mortem examination



No. 1.—Before operation.



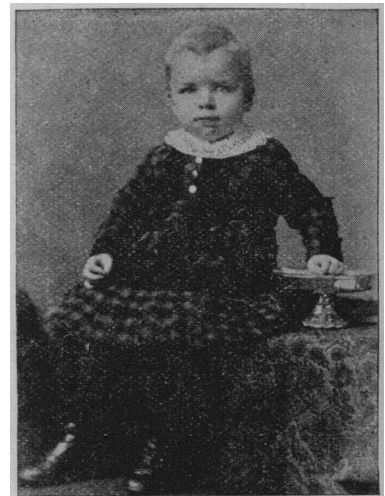
No. 2.—Before operation.



No. 3.—After operation.



No. 4.—Before operation.



No. 5.—After operation.

by the microscope the artery was found securely closed; the inner coats had not been divided and there was no trace of a clot.

These are not the only, though they are perhaps the most striking, cases in which I have been able to note the same state of affairs.

I venture to relate here the following recent case of a bloodless operation for traumatic aneurism, which seems to illustrate more than one of the points mentioned in connection with this subject:

F. S., æt. 17 years, son of a farmer, residing at Calkinsville, Isabella county, Michigan, was admitted to the University of Michigan Hospital at Ann Arbor on the morning of October 19, 1887. About two and one-half months previously he was boring a hole with a pocket knife through a strip of pine wood, when the wood, proving softer than he expected, the knife suddenly slipped through the wood and his clothes and penetrated the thigh, making an incision about three-quarters of an inch long obliquely outwards and downwards. The underlying artery was injured and dangerous hæmorrhage ensued, which was controlled by pressure. Upon admission to the hospital a considerable tumor was visible, occupying Scarpa's triangle, and over-lapping the lateral boundaries of that space. The aneurismal bruit could be heard with great distinctness all over the tumor, which, in short, presented all the characteristic symptoms of aneurism. The patient's father stated that the size of the tumor was rapidly increasing, but that the general health of the patient was good. Pulse, 116, temperature 99°. On October 20, in the presence of the medical class, Dr. T. J. Sullivan assisting me, he was placed under the influence of chloroform, the aortic compressor applied, an incision made about two inches in length over the surface of the tumor, the aneurismal sac exposed, and freely opened, and the coagulated contents evacuated. The compressor was then slightly relaxed, and the bleeding point by that means accurately determined. The artery was cautiously freed from its connections, and strong catgut ligatures applied above and below the point of wound and cut off short. In the primary incision two or three small vessels were divided, which were also ligated. No special antiseptic measures were used, other than perfect cleanliness. Suppuration was not altogether prevented. The highest temperature was reached on the second day after the operation, when the thermometer under the tongue reached 103°. After this the temperature fell below 100°, and at no time afterward exceeded that point. The case progressed favorably, and the patient was discharged cured on the 1st day of November, that is to say, just eleven days after the operation, and he has continued well to the present time. The ligatures which were applied to the femoral artery were never heard from in any way.

In contrast with the case just related, I desire to refer briefly to a case of traumatic aneurism of the common femoral artery, reported by myself in the *New York Medical Record*, for Jan. 4, 1882. In that case the wound was produced by a pistol shot, and was situated immediately below Poupart's liga-

ment. The patient was a boy, æt. 14. The accident happened on April 28, and on October 10, of the same year I performed the Hunterian operation, placing a carefully prepared catgut ligature upon the external iliac artery. Had there been a reasonable hope of the wound being in the superficial femoral as in the previous case, I should have performed the old operation; or had the external wound been unhealed or in any danger of opening up again, I should have felt compelled to treat the case as a wounded artery, and applied a ligature on the affected vessel above and below the wound. As it was, the situation of the scar excluded all hope of the superficial femoral being the wounded vessel. In the next place, the external parts were as perfectly healed as if they had never been injured, and the aneurism being comparatively small and well defined, although in reality, a false aneurism caused by an external wound had come to correspond very closely to a true aneurism, at least in so far as the question of treatment was concerned, so that the Hunterian operation seemed the best, and indeed, at that time, the only alternative. October 31, that is twenty-one days from the date of the operation, this patient was dismissed cured. In a similar case to-day, it would be at least justifiable to take into consideration the propriety of substituting the old operation for the Hunterian, as in the case of aneurism affecting the superficial femoral which has been described in a preceding paragraph of this paper.

#### DISEASES OF THE JOINTS.

The treatment of diseased joints has made solid and satisfactory progress in recent times. Those intractable cases, to the pathology of which Sir Astley Cooper, Sir Benjamin Brodie, and others, devoted so much attention, and which they so unsuccessfully endeavored to cure by different forms of counter-irritation and constitutional treatment, are now successfully managed by physiological rest, pressure, extension, and counter-extension, and especially by the operation of resection or partial resection. My own observation and experience have convinced me that this last method of treatment, that is, resection or partial resection, has a much larger field of usefulness, especially as regards the hip and knee, than has hitherto been generally believed. A mistake is in my judgment, often made in postponing the performance of this operation until the disease has extended far beyond the limits of the articulation, and the case has become hopeless by any means other than amputation. So soon as a case of articular disease refuses to yield to a fair trial by the milder methods, the duty of the surgeon, in my opinion, is to *open the joint and remove all of the diseased tissue*. By this course the danger to the life and the limb of the patient is reduced to a minimum, and the duration of the treatment materially abbreviated.

In certain cases of congenital or acquired deformity of joints, beautiful results are possible by resection, as well as by subcutaneous osteotomy. For example, on March 15 last, a young man, F. McM., æt. 16 years, came to my public clinic on account of a very peculiar deformity on his left knee joint, which had the following history:



The patient had malarial fever five years ago, which lasted for four or five months. During convalescence, when attempting to walk, he noticed a weakness in his left knee, which appeared to bend beneath his weight. This weakness increased steadily, and seven months before admission it became much aggravated. No medical advice until six months ago, when a doctor advised him to wear a splint for support, which he has since done. The tendency to luxation, however, continued to increase up to the time of admission when it was found to constitute a very unsightly deformity, and to almost entirely deprive the patient of the use of his limb. In walking there was a plainly apparent subluxation of the head of the tibia outwards, so that the leg formed an angle of about 120 degrees at the knee-joint. On March 22, he was presented at the clinic, placed under the influence of chloroform, and the ordinary operation of resection of the knee-joint performed, a slice being removed from the articular surfaces of the femur and tibia, with the saw. The bones were extremely vascular, but the hæmorrhage was speedily arrested by the application of hot water. The osseous surfaces and the edges of the wound were coaptated and secured with four silver wire sutures through the soft textures, down to but not including the bones. The wound was covered with iodoform gauze, and supported with splints composed of folded newspapers well covered with cotton batting maintained by bandages. Nine drachms of chloroform were used.

On April 23, he was presented to the clinic. The wound at that time had not been dressed for four days; but very little suppuration had taken place. The union between the bones was solid so that the limb could be lifted bodily by taking hold of the heel. On April 24, a light plaster cast was applied by Dr. Hendricks, and the patient walked into the clinical amphitheatre on his crutches, and was able to lean considerable weight on the affected limb. He was then dismissed from the hospital, *five weeks from the day of operation.*

In the treatment of the early stages of articular disease affecting the joints named, and especially the elbow and the knee, the plaster of Paris cast is, in my opinion, a useful appliance, but it requires much cautious judgment and careful observation in its management.

In any case of articular disease when the degeneration of tissue has extended, as it sooner or later does unless arrested by efficient treatment, beyond the limits of the articulation, inducing destruction of the medullary canal and other parts of the bones involved, the only efficacious treatment is amputation, and under these circumstances I have in several instances successfully performed amputation even at the hip-joint. One case in point, I had the honor to report to this Section, illustrated by a very striking specimen, at the annual meeting two years ago at St. Louis.

#### TREATMENT OF FRACTURES.

This is a department of surgery that has always had, for obvious reasons, a peculiar interest for the

practical surgeon; and in our generation, as in previous ones, much activity has been displayed, and much ingenuity exercised in efforts to improve methods and appliances for the management of these common and important surgical cases. It would take a long time, and be a tedious and unprofitable task to describe, discuss or even enumerate the many suggestions and inventions which have engaged the attention of surgeons during the memory of those listening to me. I will only take time to notice a very few of those which appear to me to be the most worthy of consideration here.

The first of these is the improved and simplified methods of securing efficient, continuous extension, and counter-extension in the treatment of fractures, especially of the thigh, the most difficult and hazardous of all fractures so far as the surgeon's reputation is concerned. The method known by the name of its inventor, Gurdon Buck, has attained to such universal acceptance that now it may be said to have no competitor for professional favor.

The abandonment of all complicated and mysterious machinery, and the substitution of the simplest forms of material, such as pasteboard, leather, and so forth, as coaptation splints, is another striking fact in the history of this department of surgery in our day. My own favorite splint for these purposes consists of folded newspapers surrounded by one or more sheets of cotton wadding. This constitutes a simple, cheap, light, safe, efficient and easily applied apparatus. I use it not only in the treatment of fractures of the long bones, but in the treatment of resections of the joints, and have every reason to feel entirely satisfied with it, and many of my former pupils have testified to its merits as a practical appliance.

The use of plaster of Paris as a dressing in fractures, notwithstanding the eloquent claims made for it some years ago, in certain high quarters, has now, I think, reached its proper position in the estimation of the profession. It is a suitable method of treatment *for a few fractures, under certain exceptional circumstances, but its field of usefulness is, in my opinion extremely limited.*

The treatment of Colles' fracture without any splints at all, and regarding the concomitant sprain of the wrist-joint, and the danger of adhesions and contraction of tendons as the chief indication after the fracture is once reduced, carefully eschewing immobilization (*which is improper in sprains everywhere*), according to the teachings of Bouchet, E. M. Moore, Le Comte, Gordon, Pilcher and others, I have had numerous opportunities of testing, and have had the pleasure of placing on record some of the results of my experience, which have been eminently satisfactory in every case in which I have tried it. Instead of regarding Colles' fracture with fear and trembling, as used to be the common feeling toward it on the part of surgeons, it may now, with our better understanding of its pathology and our improved methods of treatment be regarded as among the safest and most satisfactory of all fractures. And in this connection I may refer briefly to a comparatively new and very important principle of



practice as regards all fractures in the neighborhood of joints, namely, the cautious, efficient measures now adopted by the aid of anæsthetics, when necessary, to prevent ankylosis, and contraction of fibrous structures by the use of *passive movements*, cautiously applied to the articulation during the course of treatment of the fracture. The treatment of fractures of the humerus, when non-union seems to threaten, by placing the forearm in the straight instead of the rectangular position, on the principle laid down by the late Dr. Frank Hamilton, I feel bound to approve after some very satisfactory experience therewith. The main argument in favor of the rectangular position namely, the danger of ankylosis in the worst position, no longer holds good, since by the maintenance of judicious passive movements, this contingency is fully provided for.

In regard to the treatment of non-union of fractures, there are only three observations which it seems necessary for me to mention here. The *first* of these relates to the cause of non-union, about which great uncertainty has always existed in the minds of the profession. For some years past it has been my fortune to receive, at my public clinic in the University of Michigan, many cases of ununited fracture, mostly from the lumber camps and mining districts of the northern part of the State, and I have been struck with the fact that, in every instance, the fracture has been produced by direct and very great violence; so that it has seemed to me a reasonable explanation of this unfortunate accident that the violence of the injury, affecting injuriously the vital powers of the tissues involved, is responsible for the disastrous failure of the reparative efforts of nature.

In the *second* place, I have come to believe that it is possible for the surgeon to determine by actual examination whether or not there is any reasonable chance for union to be induced in any given case of this kind. If, on examination, the medullary canal is found enlarged, the cortical substance proportionately thin, the bone and neighboring tissues generally having undergone fatty degeneration, no operation and no method of treatment will, in my opinion, succeed in inducing union.

In the *third* place, experience has led me to discard entirely the expedient of wiring the ends of bone after the operation of resection for non-union. I am convinced that it does not improve the chances for union, and I have in cases of my own and of other surgeons frequently had occasion, months or years afterward, to operate for the removal of silver ligatures which had become a serious source of annoyance and danger to the patient. Within a few months I have performed resection of the femur for non-union in two extremely bad cases, and in an equally bad case in the lower jaw where the fracture was compound and comminuted; and in all three the result was complete success although no silver ligatures nor appliances of that kind were used. The fractures of the femur were treated simply as any ordinary case of compound fracture of that bone would be treated, namely: by newspaper coaptation splints, a modification of Liston's long splint, and Buck's extension and counter-extension apparatus by weight and pulley. In none

of these cases were any germicides or antiseptics used, although a strong effort in the direction of perfect surgical cleanliness was made, and in all the wounds healed rapidly and with very little irritation.

#### STONE IN THE BLADDER.

In regard to operations for the removal of urinary calculi great activity has prevailed and decided progress has been made in very recent times. If former generations were moved with admiration by the brilliant operations performed and the large ratio of successful results obtained by Cheselden, Liston, Dudley and others, our own generation has noted with at least equal gratification the practical results which have flowed from the persistent efforts and the wonderful scientific ingenuity of men like Thompson, Bigelow, Otis, Gouley and others, whereby it has been attempted to substitute for lithotomy safer and less formidable procedures.

The operation of lithotritry and the instruments by which it is effected, have been most completely revolutionized, and I think we may almost say perfected, under our own eyes, while litholopaxy, or the operation of Bigelow, constitutes one of the many valuable additions to the long catalogue of surgical procedures rendered possible by the aid of anæsthesia. So successful have these methods been in the hands of their inventors and others, and so ingenious and plausible the arguments urged in their favor, that there has seemed to me to be some danger of their being too universally resorted to, to the exclusion of the time-honored operation of lithotomy. Recent utterances, however, such as those of Mr. Reginald Harrison, of England, encourage the hope that moderate and reasonable views will ultimately prevail, and that full justice will be done to *all* of the procedures in question. For my own part I have always believed and taught that, while lithotritry and litholopaxy are valuable methods of getting rid of stone in the bladder, still there are substantial advantages in lithotomy which will always make it the best operation in a large and important class of cases. Mr. Harrison, in the article referred to (*The London Lancet*, February 4, 1888) says:

"Mr. Cadge, in his recent Hunterian lectures, pointed out that the recurrences of stone after lithotritry are lamentably frequent; and if there were added to the list those numerous cases of phosphatic deposit or concretions so often noticed after this operation, the relapses, he believed, would reach nearly 20 per cent. The state of the interior of the bladder, relative to its shape, its power of contraction and the presence or absence of inflammation, has a determining influence in the reproduction of stone, and we have, I think, been rather too much disposed to allow the physical properties of the stone to determine for us, as it were, the selection of the operation, irrespective of these relative conditions. Though a hard stone is, as a rule, best treated by lithotomy, this by no means implies that some small and soft ones are the less advantageously removed by the same proceeding. Let me take, for instance, the case of a stone in the bladder occurring in an adult, with some chronic cystitis and enlargement of the

prostate. The probabilities are that for many months, if we look at a section of such a stone after its removal, the bladder has been engaged in encasing it in a mould of phosphates just as completely as if it were done by plaster of Paris. I have examined a very large number of bladders with prostatic hypertrophy and, having regard to the pouched condition of the viscus as well as the condition of the mucous membrane, relative to the presence or absence of phosphatic deposit upon it, it has often struck me not that lithotripsy has its failures, but that, under these circumstances, its successes are so numerous.

"Reflections such as these induced me, some years ago, to greatly alter my mode of procedure in cases of this kind, where either it was clear that the stone was the effect rather than the cause of disease, or where this fact was demonstrated by the failure of lithotripsy. The bladder, under these circumstances, resembles a chronic abscess with a stone in it, and it is just as necessary to open and drain the one as the other. In a man of 60, from whom large masses of phosphatic stone had been removed by three lithotries, and who was never free from vesical irritation, I performed, two years after the first crushing, lateral lithotomy, and removed more phosphatic calculus of recent formation. His bladder was then drained and washed for eight weeks, until he voided normal acid urine, when the tube was removed and the wound healed in a month. This and similar instances are examples not merely of successful lithotomy, but of successful drainage. In the performance of lithotomy in cases of this description my aim is to make a wound into the bladder which will permit of very ready and efficient drainage, and which is not likely to close up before the interior of the viscus is ready for the reception and continence of the urine. Hence I am an advocate for lateral lithotomy, which best fulfils the conditions that are required. As a rule, cases of this kind require drainage to be continued from four to eight weeks, and I have drained them as long as ten weeks before the state of the bladder, as evidenced by the urine, was such as to allow the wound to heal up. . . . From a gentleman of 70, who for four years had passed his urine by catheter, I removed by lateral lithotomy three uric acid calculi of moderate size, coated with phosphates. I made a very free opening into the neck of the bladder, put in one of my largest-sized tubes and drained continuously for eight weeks, when the wound was allowed to heal. He can now expel his urine without assistance and has entirely discarded the catheter. It is remarkable that the bladder should have entirely recovered its power after so long a period of inaction as four years."

I have made this lengthy quotation from Mr. Harrison's lectures because it expresses very distinctly the views that have guided my own practice, and which I have been accustomed to teach for many years; and the following remarkable case from my own experience seems to me to furnish a strong argument in their support. In November, 1883, I was asked by Dr. Bennett to see a patient in the Wayne county house, who was suffering from stone in the bladder among other things. The history of the case

was briefly as follows: Five years previously, the patient had fallen from a building and injured his spine, causing complete paraplegia, with incontinence of urine. I found him confined to bed, suffering great pain from the presence of two very large stones in his bladder, and from all the disagreeable effects of complete incontinence of urine in a paralyzed man, including bedsores. I administered chloroform, removed the stones from his bladder by the left lateral operation, made provisions for thorough drainage and washing out of the bladder; and not only did the wound heal when permitted to do so but, when this took place, it was found, to the surprise of all, *that the patient had recovered complete control over his urine, which he retains to the present time.* The calculi were phosphatic and comparatively soft, so that they might easily enough have been removed by lithotripsy or litholopaxy. But will anyone say that either of these procedures could possibly have accomplished so great and beneficent a result for him as the operation which I performed did?

A good deal has been said in recent times in favor of the supra pubic or high operation of lithotomy; and no doubt there is an important field of usefulness for this method of opening the bladder. Still, I cannot believe that the advantages are sufficiently great to justify us in preferring it to the old operation of lateral lithotomy. On this subject also I think Mr. Harrison, in the lecture from which I have already quoted, has expressed himself in wise and conservative terms. Among other things he says:

"We must not be unmindful that experience has already shown us that supra-pubic cystotomy, like other procedures having the same object, has its own difficulties and dangers. Instances have been recorded where a weakened bladder under the pressure of distension has given way and death has then followed; and similarly the rectum has suffered in a corresponding manner, but without producing any serious consequences. To most of us the simplicity and ease with which lateral lithotomy can usually be performed is such as to strongly prejudice us in its favor in its absence of any special reason to the contrary such as I have indicated. Still, on the other hand, there are places for both the high and low operations in the practice of surgery which they can fill with relative advantage, and without fear of clashing."

The operation of cystotomy by the left lateral method, for chronic cystitis and chronic irritable bladder is one which I have practiced with most gratifying results in numerous cases, some of which are so striking in character that I would like to detail them here, but time does not permit.

One point of great practical importance in this connection must, however, be noted, namely the fact, long since pointed out by Sir Benjamin Brodie, that certain cases of chronic cystitis and chronic irritable bladder are associated with and dependent upon suppurating kidneys; and of course these cases should be carefully diagnosed and excluded from the class amenable to operation.

The undue length to which this paper has already extended compels me to omit all consideration of the

important fields of brain and thoracic surgery, in which, of late years, such brilliant results have been obtained, and in which there is strong promise of still greater progress in the near future.

Nor are these by any means the only subjects which the rapid flight of time warns me to omit the consideration of here, notwithstanding their great practical importance and their tendency to show forth the progressive nature of the surgery of our day. But here my discourse, fragmentary and incomplete as it unquestionably is, must stop. If the effect of anything that I have said should be to convey a favorable impression of the present condition and prospects of our beloved art, and to inspire even in the slightest degree hope and courage in the minds of those who, like myself, are struggling to promote and elevate its beneficent powers, I will be more than satisfied. In any event, I must always feel deeply sensible of the honorable trust reposed in me by my brethren of this section, and my highest ambition will ever be to prove myself in some degree at least worthy of the great honor conferred upon me. Certainly I know not any higher privilege or purer pleasure than that of contributing even in the least degree to the assistance, the gratification or the encouragement of the noble army of those who have enlisted for life in the arduous and beneficent service of surgery.

"Men my brothers, men the workers, ever reaping something new,  
That which they have done, but earnest of the things that they shall do."

#### RECTAL INSUFFLATION OF HYDROGEN GAS AN INFALLIBLE TEST IN THE DIAGNOSIS OF VISCERAL INJURY OF THE GASTRO-INTESTINAL CANAL IN PENETRATING WOUNDS OF THE ABDOMEN.

*Read in the Section on Surgery, at the Thirty-ninth Annual Meeting of the American Medical Association, May, 9, 1888, and illustrated by three experiments on dogs.*

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(Concluded from page 777.)

#### IV.—HYDROGEN GAS IS INNOCUOUS AND NON-IRRITATING WHEN BROUGHT IN CONTACT WITH LIVING TISSUES AND IS PROMPTLY REMOVED BY ABSORPTION.

##### a.—Peritoneal Cavity.

*Experiment 53*—Dog, weight 45 lbs. A circumscribed spot to the right of the linea alba was shaved and thoroughly disinfected and through this space a well disinfected medium sized trocar was plunged into the peritoneal cavity. To the cannula of the trocar the rubber tube of the inflation balloon charged with hydrogen gas was attached and the whole peritoneal cavity filled with gas by compressing the balloon. About four litres of gas were injected. No gas escaped upon the withdrawal of the cannula and the puncture was sealed with cotton and iodoform collodium. The animal appeared to suffer

but little pain, and the next day the tympanitis had disappeared and the dog was as frisky and lively as before the inflation. Two days after the experiment was made the dog was killed and the peritoneal cavity carefully examined. Not a trace of the gas remained and the peritoneum throughout presented a normal appearance.

##### b.—Pleural Cavity.

*Experiment 54*.—Dog, weight 25 lbs. After thorough disinfection an aseptic hollow needle was inserted between the seventh and eighth ribs in the axillary line into the left pleural cavity and hydrogen gas from rubber balloon forced through it until the pleural cavity was thoroughly distended. On making a physical examination of the chest at this time the apex of the heart was found to the right of the sternum; vesicular breathing on left side absent, and on percussion of this side abnormal resonance. The respirations became superficial and greatly increased in frequency. On withdrawing the needle no gas escaped externally, but a circumscribed subcutaneous emphysema which appeared showed that some of the gas escaped through the puncture in the pleura into the subcutaneous connective tissue. Twenty-four hours after the inflation the dog appeared to be in perfect health. The normal relations in the chest had become restored and the subcutaneous emphysema was less extensive. The animal was kept under observation for a considerable length of time, but at no time could symptoms of pleuritis be detected.

##### c.—Subcutaneous Cellular Tissue.

*Experiment 55*.—Old dog, weight 43 lbs. A small perfectly aseptic trocar was inserted through the skin into the loose cellular tissue in the right inguinal region and through the cannula two litres of gas were injected, the gas distributing itself through the loose connective tissue over a large surface of the body. Upon the withdrawal of the cannula the puncture was hermetically sealed with iodoform collodium and cotton. The subcutaneous emphysema disappeared completely in forty-eight hours, and no traces of inflammation could be found at the point of puncture, or at any place where the gas had come in contact with the tissues.

*Experiment 56*.—Dog, weight 25 lbs. Subcutaneous inflation of two litres of hydrogen gas through the cannula of a small trocar into the left side of the chest. The subcutaneous emphysema reached from the clavicle and axilla on that side to the crest of the ilium, the gas at some points elevating the skin at least four inches from the subjacent tissues. The gas was absorbed somewhat more slowly than in the preceding experiment, but three days after the inflation no trace of emphysema could be detected and the subcutaneous connective tissue was as pliable and movable as before the inflation.

#### V.—RECTAL INSUFFLATION OF HYDROGEN GAS IN THE DIAGNOSIS OF PENETRATING GUNSHOT WOUNDS OF THE ABDOMEN.

In these experiments the animals were strapped on one of Pasteur's operating tables. Abdomen shaved, and after complete etherization the shooting