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Presidential Address:

Major Contributions to Surgery from the South

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IN PRESENTING a review of outstanding contributions to surgery from the South, it is intended to emphasize the importance of the past in the development of achievements of the future. In other words, it is not the intent to present a solely historical account, but rather emphasis is placed upon the relationship of these major contributions to the present and future. My personal experiences in the teaching and practice of surgery have led to the firm belief that Santayana captured an enduring truth when he said, "Those who cannot remember the past are condemned to repeat it." It is from our appreciation of earlier contributions that incentive springs for new discoveries and in turn, a continuing stimulus is provided for each new generation of pioneers.

In discussing surgical contributions achieved in the geographic area below the Mason-Dixon Line as shown in an old map of this region (Fig. 1), it should first be emphasized that the Southern Surgical Association is a national organization. Unlike other regional societies, the Southern has a membership drawn from throughout the United States. It is interesting to seek the original basis for a regional organization placing such significance on national membership. In pursuing the subject, one finds that just 3 years after the organization of the Southern, the *Transactions* of the Association contain an opening statement at the 1890 meeting in Atlanta, which is as follows:

Mr. President and gentlemen: I rise on behalf of the Southern Surgical Association to acknowledge that this society, as its name implies, is distinctly Southern but it is far from being exclusively so,

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for it has opened wide its doors with a hearty welcome to distinguished men of ability from all sections of our common country. Although only in its third year, its membership has reached the phenomenal growth to a hundred members, among whom are some of the most distinguished to be found in the ranks of surgery throughout the nation.

Although everyone accepts this point of view today and fully understands its importance to the strength of the Southern Surgical, it is nevertheless significant that this philosophy and practice began at such an early date.

In the interest of a more circumscribed subject, these remarks concerning major surgical contributions from the South will be confined to those pioneering achievements by surgeons of the past. To include contemporary contributors would be an undertaking of such proportions as to be beyond the scope of this Address.

It is of considerable significance that, upon the organization of the Southern Surgical in 1887, Ephraim McDowell (Fig. 2) was chosen as its exemplary patron and his likeness appears in gold on the first issue of the *Transactions* of this Association. It becomes clear in pursuing the life and work of this surgical pioneer that he was descended from a courageous and public-spirited family. His father represented Augusta County in Virginia at the Convention of 1775 in Williamsburg. Ephraim was born in 1771 and later moved with his parents to Kentucky and entered the Transylvania Seminary at the age of 15. He studied medicine in Edinburgh where he fell under the strong influence of John Bell, the famed teacher of the day. Returning from Edinburgh in 1795, he

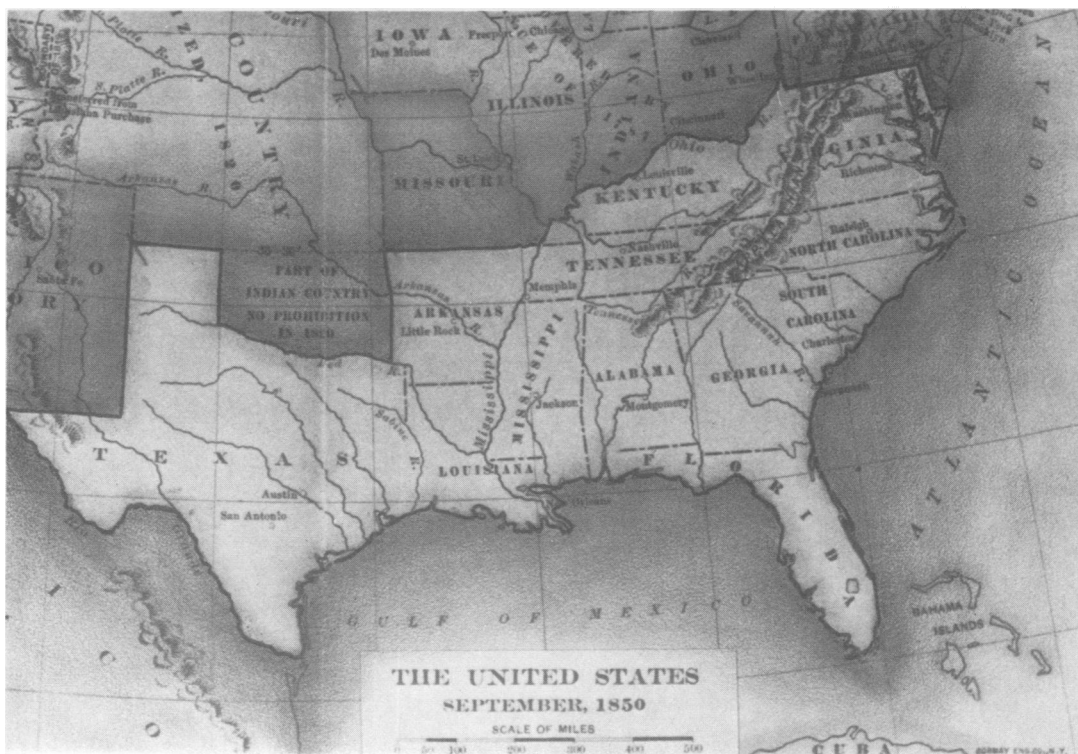


FIG. 1. Old military map showing the Southern States.

entered practice in his hometown of Danville, Kentucky, which at the time was described as “containing upwards of 150 homes and some tolerable good buildings.”

The records indicate that McDowell’s practice extended over a radius of 50 miles from the town of Dan-



FIG. 2. Portrait of Ephraim McDowell.

ville, and most of his calls were made on horseback and on many occasions through trackless regions. He was not only a medical practitioner but also a surgeon, being noted in the region for having performed 32 operations for removal of bladder stones (lithotomy) without the loss of a single life. One of his most celebrated lithotomy patients was James Knox Polk, the eleventh President of the United States upon whom McDowell operated in 1812, and who remained a friend for life.

On December 13, 1809, some 14 years after he had entered practice, Dr. McDowell was called to the home of Mrs. Jane Todd Crawford who lived about 60 miles from Danville. Mrs. Crawford had suffered for some time with massive enlargement of the abdomen, first thought to be a pregnancy. But when the mass persisted and the diagnosis could not be confirmed, McDowell stated:

Having never seen so large a substance extracted, nor heard of an attempt, or success attending any operation, such as this required, I gave to the unhappy woman information of her dangerous situation. She appeared willing to undergo an experiment, which I promised to perform if she would come to Danville, . . . ²⁰

It is interesting to note the choice of word “experiment” for indeed this was clearly the situation. Until that time there had not been a successful opening of the peritoneal cavity for removal of an intra-abdominal tumor, and this was well known to the thoughtful practitioner in the backwoods of Kentucky.

McDowell’s first report of this historic case is to be found in the *Eclectic Repertory and Analytical Review* in 1817 (Fig. 3). It can be seen that he waited until he had managed three such cases before reporting the first. In this paper, he states that Mrs. Crawford undertook the

ORIGINAL PAPERS.

Three Cases of Extirpation of diseased Ovaria.

By EPHRAIM MCDOWELL, M. D. of Danville, Kentucky.

IN December 1809, I was called to see a Mrs. Crawford, who had for several months thought herself pregnant. She was affected with pains similar to labour pains, from which she could find no relief. So strong was the presumption of her being in the last stage of pregnancy, that two physicians, who were consulted on her case, requested my aid in delivering her. The abdomen was considerably enlarged, and had the appearance of pregnancy, though the inclination of the tumor was to one side, admitting of an easy removal to the other.

FIG. 3. Title page of original publication of Ephraim McDowell reporting three experiences of extirpation of diseased ovaria. (From the *Eclectic Repertory and Analytical Review*, 7:242, 1817.)

journey from her home in Danville on horseback which required several days. On Christmas Day 1809, McDowell performed the now famous operation in his home (Fig. 4).

The following is McDowell's description of the procedure on Mrs. Crawford: (At this point, the author wishes to express much appreciation for the stepwise illustrations of this historic operation, drawn directly from McDowell's detailed operative note by Leon Schlossberg

especially for this occasion. In these beautiful half-tone illustrations, this distinguished medical artist has made a unique contribution to medical history.)

With the assistance of my nephew and colleague, James McDowell, M.D., I commenced the operation, which was concluded as follows: Having placed her on a table of the ordinary height, on her back, and removed all her dressing which might in any way impede the operation, I made an incision about three inches from the musculus rectus abdominis, on the left side, continuing the same nine inches in length, parallel with the fibres of the above named muscle, extending into the cavity of the abdomen, the parities of which were a good deal contused, which we ascribed to the resting of the tumor on the horn of the saddle during her journey (Fig. 5). The tumor then appeared full in view, but was so large that we could not take it away entire. We put a strong ligature around the Fallopian tube near to the uterus; we then cut open the tumor, which was the ovarium and fimbrious part of the Fallopian tube very much enlarged (Fig. 6). We took out fifteen pounds of a dirty, gelatinous looking substance (Fig. 7). After which we cut through the Fallopian tube, and extracted the sac, which weighed seven pounds and one half (Fig. 8). As soon as the external opening was made, the intestines rushed out upon the table; and so completely was the abdomen filled by the tumor, that they could not be replaced during the operation, which was terminated in about twenty-five minutes. We then turned her upon her left side, so as to permit the blood to escape; after which, we closed the external opening with the interrupted suture, leaving out, at the lower end of the incision, the ligature which surrounded the Fallopian tube (Fig. 9). Between every two stitches we put a strip of adhesive plaster, which, by keeping the parts in contact, hastened the healing of the incision. We then applied the usual dressings, put her to bed, and prescribed a strict observance of the antiphlogistic regimen. In five days I visited her, and much to my astonishment found her engaged in making up her bed. I gave her particular caution for the future; and in twenty-five days, she returned home as she came, in good health, which she continues to enjoy.²⁰

FIG. 4. Home of Ephraim McDowell in Danville, Kentucky. The home is preserved and contains the McDowell Museum.



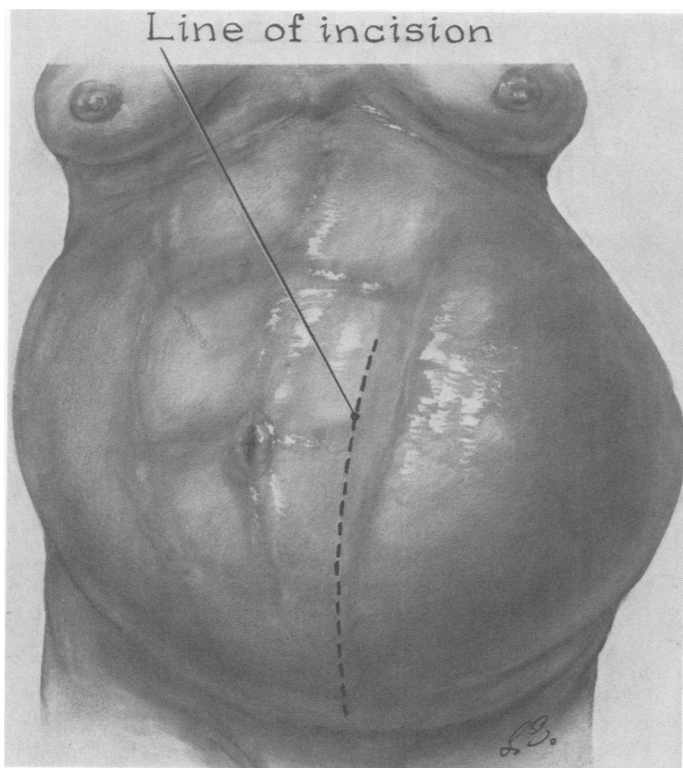


FIG. 5. Incision used to enter abdomen of the first patient operated upon by Ephraim McDowell. (This and the following four illustrations were prepared for this Address by Leon Schlossberg.)

For this operation there was, of course, no anesthetic and Mrs. Crawford's grandson later reported that she read the Psalms throughout the procedure. It is remarkable that this historic achievement, the first successful of its kind in the history of medicine, was ever performed in



FIG. 7. Incision into ovarian cyst with escape of 15 pounds of gelatinous substance.

the first place, was successful, was performed without anesthesia, and was completed in 25 minutes. Mrs. Crawford lived in excellent health with no evidence of return of her disease until her seventy-ninth year (Fig. 10). Her son, Thomas H. Crawford, became a successful businessman and ultimately was chosen as mayor of Louisville.

In 1829, the year before his death, McDowell wrote a letter to a medical student, Robert Thompson, describing a total of 11 patients upon whom he had operated for ovarian tumors with 10 survivors.²⁴ Fortunately,



FIG. 6. Exposure of large ovarian tumor illustrating escape of intestines from the abdominal cavity and ligature of the Fallopian tube.

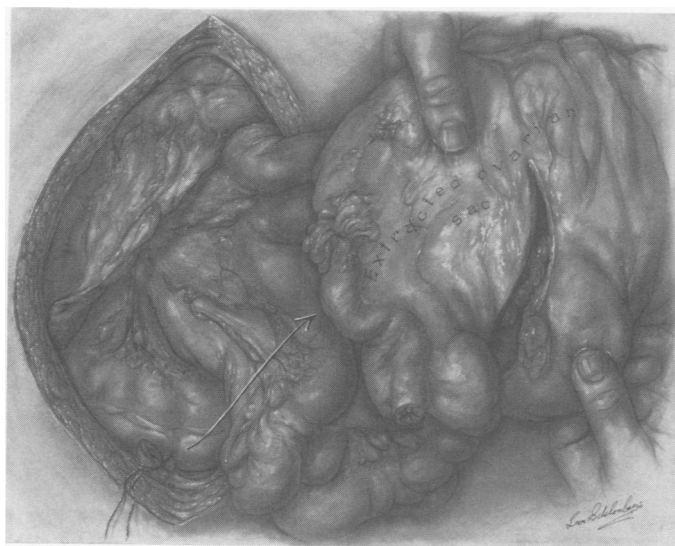


FIG. 8. Extraction of ovarian sac.

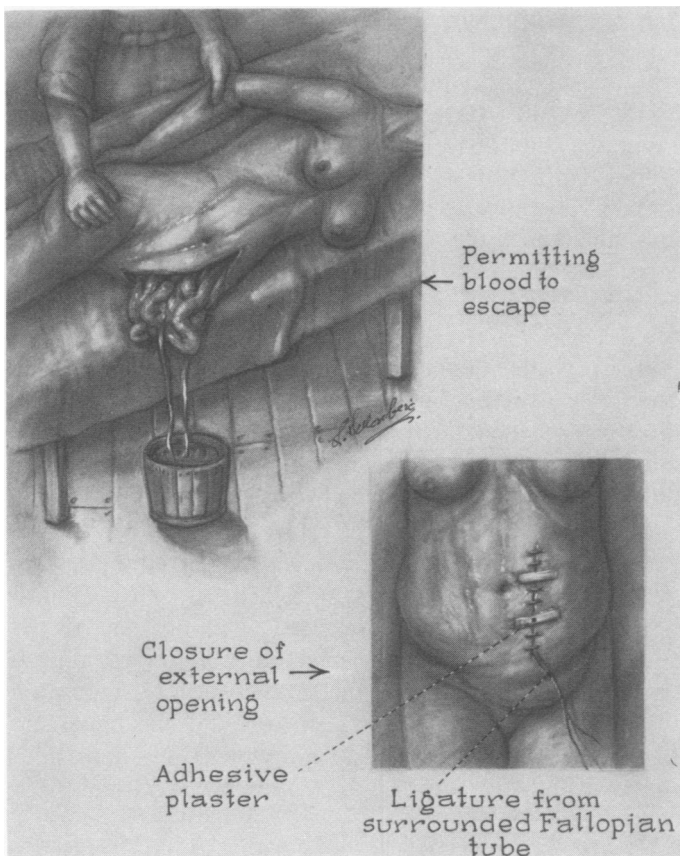


FIG. 9. Illustration of turning of patient to allow blood to escape from peritoneal cavity. Insert: Closure of the abdominal incision.

McDowell received considerable praise for these achievements during his life, and in 1825 he was awarded an Honorary Degree from the University of Maryland. In dedicating the McDowell monument some years later, the noted Samuel D. Gross of Philadelphia stated:

... he achieved that renown which so justly entitles him to be ranked among the benefactors of his race ... an operation which, in its aggregate results in the hands of different surgeons, has already added upwards of forty thousand years to woman's life, and which is destined, as time rolls on, to rescue thousands upon thousands of human beings from premature destruction.⁷

Of all the contributions to surgery, none ranks higher than the introduction of anesthesia, representing as it does a landmark achievement in the progress of medicine. Throughout the history of man, attempts have been made to find appropriate means for alleviation of pain, and while a number of drugs had been successful in part, the challenge remained to find a safe method of producing a state of unconsciousness.

On November 1, 1815, a son was born to the James Long family in Danielsville, Georgia. Young Crawford, as he was named, was a quiet, studious boy who was fond of horses, swimming and fishing. He entered the University of Georgia at the age of 14 and was graduated in 1835. His roommate in college was Alexander H. Stephens, who

was to become governor of Georgia and later Vice President of the Confederacy. Following graduation Long remained for a year in Danielsville, since his father thought he was too young at 19 to enter medical school. He first matriculated at Transylvania University of Lexington, Kentucky, in 1836, but then transferred to the University of Pennsylvania where he graduated in 1839.

In 1799, Sir Humphry Davy had written, "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may be used with advantage during surgical operations, . . ." However, this gas was used primarily by those who wished to demonstrate its more humorous and comical effects and was employed by traveling showmen, one of whom appeared in Jefferson, Georgia, during the winter of 1841. It was in that village that Dr. Crawford W. Long had settled, having only two years previously been graduated from the University of Pennsylvania. Also in this town was a private academy, and a number of the students there attended the session given by the visiting showman. The students were impressed that when under the influence of nitrous oxide they did peculiar things including the most ridiculous of antics. Since they knew and related well to Dr. Long, a young man of only 26, they approached him to



FIG. 10. Mrs. Jane Crawford.

Subsequently on revisiting Athens Dr. Long showed me his folio Journal, or account book, in which stand the following entries:

JAMES VENABLE	
March 30, 1842—Ether and excising tumor	\$2.00
May 13, 1842—Sulphuric ether25
June 6, 1842—Excising tumor*	2.00

FIG. 11. Data from Dr. Crawford Long's account book of 1842. (From Boland, F. K.: *The First Anesthetic. The Story of Crawford Long*. Athens, University of Georgia Press, 1950.)

obtain some laughing gas. He told them that he had none but mentioned the similar effects of ether. He recalled to them a lecture he attended in Philadelphia, where a showman induced inebriation, not with laughing gas, but with ether. The students returned to school with the news, and this marked the beginning of the now famous ether parties which were held two or three evenings each week in Crawford Long's office. As a matter of fact, the young ladies of the community soon heard of these sessions and finally were successful in persuading Dr. Long to allow them to attend. As might be expected, he was reluctant to let them inhale ether, saying one could not predict what might happen while they were under the influence and he would not want them to do anything which they might later regret. Instead of diminishing their interest, this apparently increased it, and they jointly replied that they didn't care what happened and wouldn't notice it. Moreover, they assured him that it would not be his fault but the fault of the ether should anything untoward occur. One writer said of this event, "Never had such a course of promises been heard under one roof in Georgia and with the utmost of solemnity."

The actual story of the first patient to whom ether was given as a planned anesthetic for a surgical procedure is carefully and authentically described.² One of the students in the local academy in Jefferson, James Venable, consulted Crawford Long about a tumor on the back of his neck, which was causing considerable discomfort. He had attended some of the ether parties, and after a long discussion they agreed that it should be removed using ether as an anesthetic. For historical purposes, it is interesting that the student permitted several of his classmates to see the procedure. Moreover, in order to lend proper respectability to the occasion, the principal of the academy was invited as well. On March 30, 1842, James Venable appeared in the office of Dr. Long together with three of his student friends and the principal of the academy. Venable was described as being rather nervous and lay down on the sofa while Long reached for the ether bottle which had been their companion in so many earlier sprees. He poured ether on a towel as he had done many times before, but on this occasion, it was

under different circumstances for he realized he was making an important experiment. The spectators gathered in a group at the back of the room and watched as the patient inhaled both ether and air intermittently. Long pricked his friend with a pin, and when Venable no longer felt it, he reached for the scalpel and removed the tumor. The entire operation took approximately five minutes and when the towel was removed from his face, Venable awakened in good condition. In fact, he had to be shown the specimen to be convinced that it had been removed.

In Crawford Long's account book for the year 1842, one finds a fascinating entry which was later published in the *Boston Medical and Surgical Journal* (Fig. 11). It is interesting to note the fee of this pioneering country doctor for both the anesthetic and surgical procedure.

Further search into these interesting original reports reveals that appropriate skepticism of anything new was just as true in 1842 as it is today, for there were many who said that the ether anesthetic was not directly responsible for the absence of pain in this historic case. It is clear that Long was an objective observer, since after this criticism he had a patient in whom it was necessary to amputate two fingers. One amputation was performed under anesthesia during which there was no pain. The

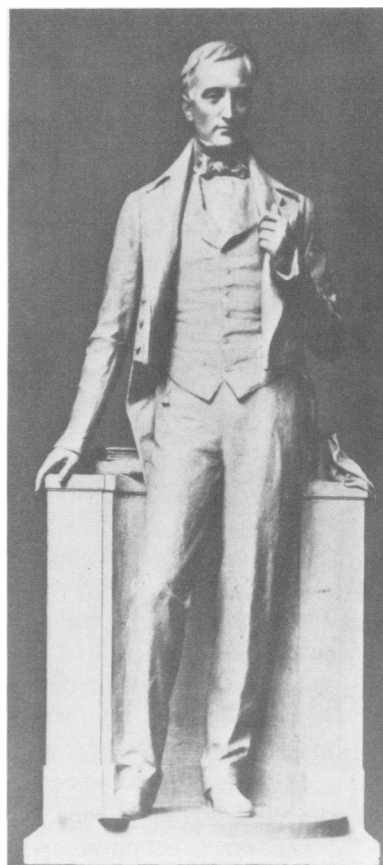


FIG. 12. Statue of Crawford W. Long which stands in Statuary Hall, the U. S. Capitol, Washington, D.C. (From Proceedings in Statuary Hall of the United States Capitol Upon the Unveiling and Presentation of the Statue of Crawford W. Long by the State of Georgia 69th Congress, March 30, 1926.)

other amputation was done in the usual manner of the day, that is, without anesthesia and the young boy cried loudly. To confirm this further, Long removed three tumors from the same patient in one day, the second with ether and the first and third without. Again, the procedure performed with ether was painless as opposed to the excruciating discomfort associated with the removal of the other two lesions.

When the State of Georgia was asked to select its two most distinguished sons to be placed in Statuary Hall of the U. S. Capitol in Washington, Crawford W. Long and another famed historical figure, Alexander H. Stephens, the Vice President of the Confederacy, were chosen (Fig. 12).

In addition to relief of pain, another major impact of this contribution can be best appreciated by citing the fears which surgeons had of the inadvertent movement of the patient during a critical part of an operation prior to the advent of anesthesia. For example, one of America's greatest surgeons, Valentine Mott, said:

... when operating in some deep, dark wound, along the course of some great vein, with thin walls, alternately distended and flaccid with the vital current—how often I have dreaded that some unfortunate struggle of the patient would deviate the knife a little from its normal course, and that I, who fain would be the deliverer, should involuntarily become the executioner, seeing my patient perish in my hands by one of the most appalling forms of death.

In 1912, Long received a medallion from his alma mater, the University of Pennsylvania, with the inscription: "To Crawford W. Long. First to use ether as an anesthetic in surgery, March 30th, 1842, from his Alma Mater."

The proper credit due William T. G. Morton and his associates in Boston is a matter of record, and it is unnecessary to emphasize the importance of their role in broadly disseminating the use of anesthesia throughout the practice of medicine. Nevertheless, the point seems historically clear that the first anesthetic ever to be intentionally administered to man for painless surgery occurred in Jefferson, Georgia, on March 30, 1842. In 1902 when King Edward VII of England awoke from the anesthetic which had been administered during an operation for appendicitis, he asked the surgeon, Sir Frederick Treves, "Who discovered anesthesia?" Sir Frederick answered immediately, "It was an American, your Majesty, Crawford W. Long."²

One of the greatest of the Southern surgeons, J. Marion Sims, has been celebrated worldwide for more than a century (Fig. 13). Born in 1813 in Lancaster County, South Carolina, he received early education in Charleston and later was graduated from the Jefferson Medical College in Philadelphia.

Sims originally began medical practice in his native town of Lancasterville but soon left to settle in Alabama. For a short period he practiced in Mount Meigs and later moved to Montgomery. In the summer of 1845 some



FIG. 13. J. Marion Sims. (From Sims, J. M.: *The Story of My Life* (Edited by his son, H. Marion Sims). New York, D. Appleton and Co., 1886.)

rather unique experiences occurring in swift succession were to greatly influence his professional career. In his autobiography *The Story of My Life*,²⁶ Sims said:

Early in the month of June (1845) Dr. Henry asked me to go out to Mr. Wescott's, only a mile from the town, to see a case of labor which had lasted three days and the child not yet born. He said, 'I am thinking that you had better take your instruments along with you, for you may want to use them.'

Sims found a young woman about 17 years of age who had been in labor for 72 hours with impaction of the head in the pelvis such that labor pains had almost entirely ceased. It was evident that matters could not remain in this condition without the pressure producing a sloughing of the soft parts of the mother, and so forceps were chosen for delivery. She recovered from the immediate effects of the delivery, but due to the prolonged engagement of the head, pressure necrosis and a fistula between the bladder and vagina developed. As Sims said:

Of course, aside from death, this was about the worst accident that could have happened to the poor young girl. I went to see her, and found an enormous slough, spreading from the posterior wall of the vagina, and another thrown off from the anterior wall. The case was hopelessly incurable.

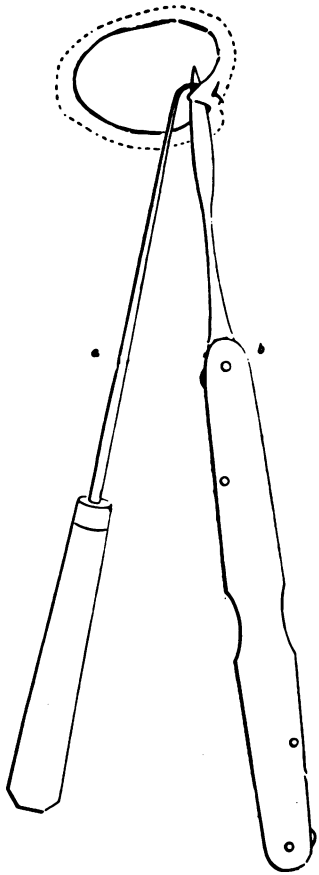


FIG. 14. Demonstration from Sims' original drawing of circumferential excision of the fistulous tract. (From *American J. of Med. Sci.*, 23:69, 1852.)

Sims made a thorough investigation of the literature concerning vesico-vaginal fistulas and continued in his autobiography:

Then, seeing the master of the servant the next day, I said: 'Mr. Wescott, Anarcha has an affection that unfits her for the duties required of a servant. She will not die, but she will never get well, and all you have to do is to take good care of her so long as she lives.' . . . Mr. Wescott was a kind-hearted man, a good master, and, accepting the situation, made up his mind that Anarcha should have an easy time in this world as long as she lived.

Sims considered the condition a medical curiosity since he had been in practice for 10 years and had not seen a single patient with a vesico-vaginal fistula. Strange to say, within a month Dr. Harris from Lowndes County referred Sims another 17-year-old girl, Betsey, who according to Sims, ". . . had a baby about a month ago. Since then she had not been able to hold a single drop of water." As fate would have it, the following month he was referred still a third similar patient, an 18-year-old girl, Lucy, who since childbirth two months previously had been unable to retain urine. Thus, Sims was faced with three young girls who were destined to be social outcasts because of the constant leakage of infected and malodorous urine. He became intrigued with the challenge to help these pitiful young victims and spent the next three years working diligently on each of them,

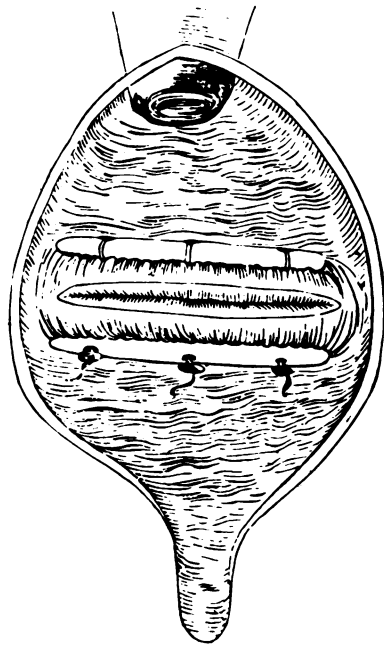
collectively performing more than 40 operations, all of which failed.

Gradually, however, Sims learned from each successive procedure some additional points. He obviously maintained an excellent rapport with his patients, since he states that "one of them alone submitted to more than 20 operations, not only cheerfully but with thanks." Rather poignantly, he summarized these experiences saying, "The history of these three cases is truly interesting in many points, and particularly as exhibiting the slow degrees by which my originally clumsy mechanical apparatus was gradually improved and brought to its present state of simplicity." He finally recognized the significance of several general features of the operation including adequate exposure. In the first procedure he used a silver spoon as a retractor, but to improve this situation he later developed the Sims' retractor, now a classic instrument in surgical practice.

The two surgical principles which Sims ultimately found to be essential for success were: First, after the fistula had been established, epithelium grew from the bladder into the rectum across the granulation site, and he finally seized upon the concept that this tissue must be removed in a circumferential manner such that when approximated there would not be bladder epithelium to rectal suture line. This is shown in his drawing illustrating a hook designed to grasp the ring at the fistulous site to permit excision of the epithelialized area directly by the scalpel (Fig. 14). The second basic surgical principle was the use of special sutures since he had tried all known forms of suture material, but in each instance erosion and infection of the sutures were a serious problem. Finally, he seized upon the idea of using a metallic suture and obtained the aid of a jeweler to make a wire of silver drawn as thin as a horsehair. Then arose the problem of tying such a suture in the limited space and awkward exposure available in the closure of a vesico-vaginal fistula. During the course of a sleepless night, when he was pursuing in his mind for the thousandth time the problem of tying such sutures, he said he suddenly conceived the idea of placing the sutures through a perforated birdshot pellet, pulling the threads tightly, and then compressing the malleable shot to stabilize the suture (Fig. 15).

Sims' dedication, both to his patients and to his dream, is illustrated by the fact that all of these developmental operations were performed in his own small hospital and at his own expense. Thus, in May 1849 he prepared Anarcha for her thirtieth operation. On this occasion the circumference of the fistula was excised and the edges were approximated with four of his fine, flexible new silver wires passing through small strips of lead to prevent cutting into the tissue. The wires were tightly fixed by securing each with a perforated lead shot. A catheter was placed in the bladder, and Sims spent a tedious week awaiting the outcome. On many earlier occasions he had

FIG. 15. Drawing from Sims' original illustration showing use of silver wires placed through metal bars and held in place with perforated lead shot. (From American J. of Med. Sci., 23:69, 1852.)



been certain that when the week came to a close he would witness a successful cure, and he was filled with anxiety and dread. This time, however, the operation was successful. He had shown clearly that the final answer had been achieved by the combination of excision of the circumference of the fistula and the use of silver wires. In rapid succession similar cures were achieved in Lucy and Betsey. Soon the success of his procedure on Anarcha and the others became known throughout Montgomery and surrounding areas.

Despite the medical aid he provided others, Sims himself fell victim to chronic diarrhea and became quite ill. His son contracted the same problem and succumbed from the condition. Sims naturally became alarmed and, thinking a change in climate might be beneficial, spent three months in New York. Upon return to Montgomery, however, he fell ill again. He then sought the curing waters at Cooper's Well in Mississippi, which had gained a reputation for being quite helpful for victims of chronic diarrhea. After trying several other places, he returned North and spent part of the summer in New York and part in Connecticut. Some of his Southern patients followed him to New York for treatment. Dr. Valentine Mott, the noted Professor of Surgery at Columbia, invited him to operate on a patient with a vesico-vaginal fistula, and within a short time Sims' fame had justly spread throughout the North as well as abroad.

Indeed, Sims received a call to attend the most prestigious royal family in Europe. Napoleon III urgently summoned him to his wife Eugenie, the beautiful and sensitive Empress, who had fallen ill. The imperial family was in residence at St. Cloud, and Sims was provided a suite there for his entire stay. He restored the Empress to

health, for which she was deeply grateful. Napoleon III was also extremely kind to Sims and made him a member of the Legion of Honor, a rare honor for a foreigner. Following this royal achievement, Sims experienced a quantum leap. The Emperor Napoleon invited him to serve as Surgeon-in-Chief of the Ambulance Corps in the Franco-Prussian War, and from these experiences he learned much about perforated wounds of the abdomen. His paper, "The Careful Aseptic Invasion of the Peritoneal Cavity Not Only for the Arrest of Hemorrhage, the Suture of Intestinal Wound, and the Cleansing of Peritoneal Cavity But for All Intraperitoneal Conditions," signaled a new era in the field of abdominal surgery. For this reason when President Garfield became the victim of a gunshot wound in 1881, a cable was sent to Sims in Paris for advice. He replied as follows:

If the President has recovered from the shock, and if there is undoubted evidence that the ball has traversed the peritoneal cavity, his only safety is in opening the abdomen, cleaning out the peritoneal cavity, tying bleeding vessels, suturing wounded intestine, and treating the case as we would after ovariectomy, using drainage or not as circumstances require.¹⁴

Although his advice was not followed and the President succumbed, his reply was obviously eloquent as well as succinct. Moreover, these comments are as contemporary today as a century ago.

Fortunately, Sims was honored not only in Europe but in his native country. A statue of Sims stands in New York in Central Park at Fifth Avenue opposite the New York Academy of Medicine, and another stands on the capitol grounds in Columbia, South Carolina. In February 1855, Sims began his drive to found the Woman's Hospital of New York which became a reality, much to his delight. As Wyeth concluded in his Southern Surgical Address in 1895:

It is safe to say that Marion Sims attained the highest position ever achieved in the history of our profession. He stands alone in this; his reputation as a surgeon was so world-wide that in any capital, in any country within the domain of civilization, he could command at any time a lucrative practice. Assuredly, there does not exist in the history of surgery another such distinction. In New York, London, Paris, Brussels, Berlin, Vienna, Rome, Madrid, Lisbon, and St. Petersburg, he found himself everywhere sought after, not only by the patients he could benefit, but by the leading members of his own profession, who were anxious to pay tribute to his wonderful genius.²⁸

Many interesting contributions in the development of vascular surgery originated in the South. In the early experiences, both in this country and abroad, ligation of arteries both for hemorrhage and in the management of aneurysms was fraught with much danger. Ligation of the innominate artery was first attempted by Valentine Mott in New York in 1818, but subsequent infection and ultimate hemorrhage resulted in the death of the patient. The operation was repeated by Hall in Baltimore in 1830 and again by Cooper of San Francisco in 1859, but both attempts ended fatally.

The first successful ligation of the innominate artery

was performed in New Orleans in 1864. In the first issue of the *New Orleans Medical Record*, Dr. Andrew W. Smyth of the Charity Hospital of Louisiana reported a 32-year-old male with an aneurysm of the right subclavian artery.²⁷ The tumor was the size of an orange, pulsed vigorously, and produced considerable pain as well as numbness in the forearm and hand. For two months the patient had been unable to lie down or to stand erect but was compelled to lean forward continuously for relief of the severe pain and to sleep sitting in a chair with his head resting on the side of the bed. Smyth placed a ligature on the innominate artery a quarter of an inch below its bifurcation and another on the carotid an inch above its origin. On tying the former, the pulsations in the aneurysm ceased. In the postoperative period, a severe hemorrhage from the wound occurred on the fourteenth day producing syncope. With continuing hemorrhage, Smyth elected to place lead shot in the wound in hope that compression produced by the weight of the shot would stop the bleeding. Despite this, the bleeding persisted and on exploration was found to originate from the right vertebral artery which was ligated. The wound healed with subsequent recovery of the patient, and thus another milestone in the history of surgery was achieved. The significance of this contribution is perhaps best described in Samuel Gross's own words when, in a superb monograph entitled "A Century of American Medicine,"²⁶ he said of this feat:

The case of Dr. Smyth is replete in interest, not only as illustrative of extraordinary ability of the operator, but as showing how recovery may occasionally occur under, apparently, the most desperate circumstances. It is proper to add, that, in all the other cases,

amounting to upwards of a dozen, in which the innominate artery was tied, the result was unfavourable, the immediate cause of death being secondary hemorrhage.

In 1852 a leader was born who was to greatly alter the course of surgery in the United States and the world. William S. Halsted entered Yale where he was not only a scholar but captain of the varsity football team. He attended the College of Physicians and Surgeons at Columbia and chose Bellevue for house training in surgery. Quite early he was struck by the important contributions being made in Europe where he spent the years of 1878, 1879 and 1880 attending the clinics of Billroth, Mikulicz, Von Bergmann, Volkmann, Schede, Esmarch and others. On return to New York he began the practice of surgery and in 1889, at the age of 37, was invited to become Surgeon-in-Chief at the newly opened Johns Hopkins Hospital (Fig. 16). There his attention was immediately drawn to the close relationship of laboratory investigation and clinical surgery, and many of his brilliant operations were performed in the amphitheater before students and surgeons from all parts of the world.

Shortly after his arrival at Hopkins, Dr. Halsted met Miss Caroline Hampton, who soon became his nurse assistant in the operating room. She was descended from the famous Hampton family of South Carolina and was born in the ancestral home of Millwood near Columbia, where she spent her early life. Her father, Frank Hampton, was a Confederate officer and was killed at the Battle of Brandy Station in 1863. Caroline was left in the care of her aunts and uncles including her father's brother, General Wade Hampton who was on General Lee's staff and who later became Governor and United

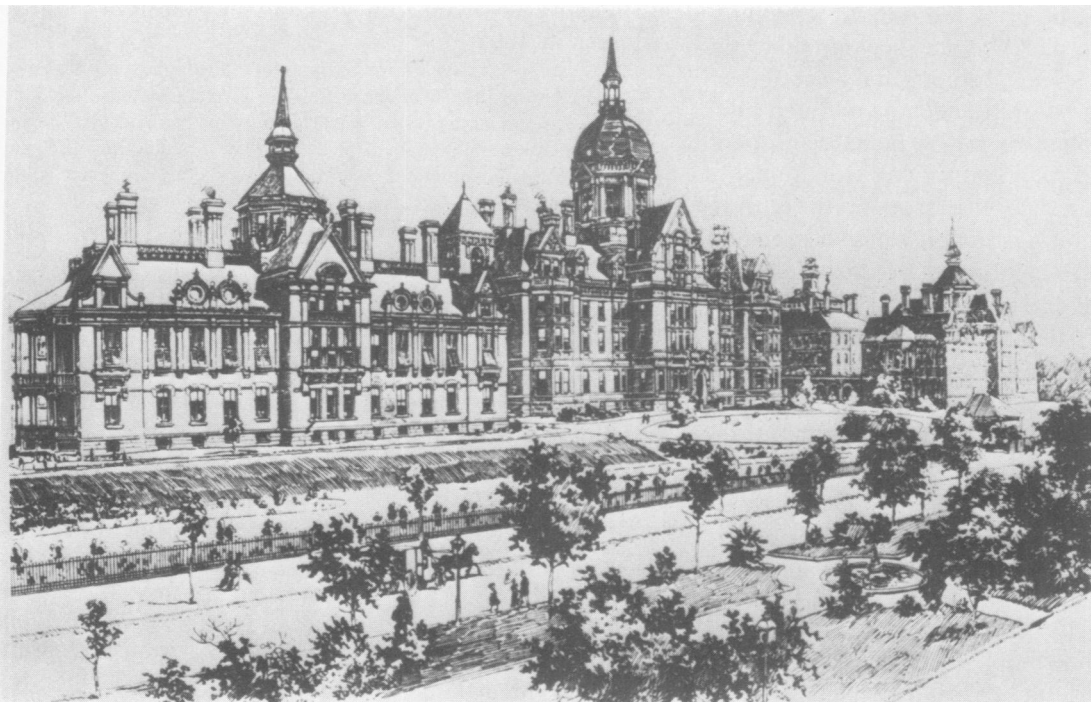


FIG. 16. Etching of Johns Hopkins Hospital at opening in 1889.

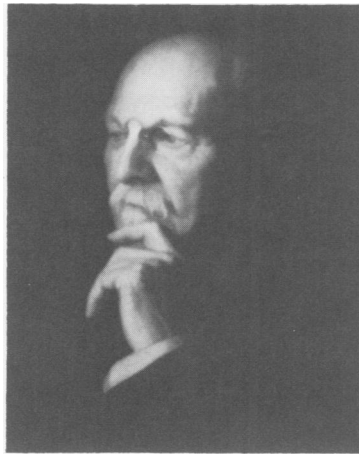


FIG. 17. William S. Halsted.

States Senator from South Carolina. Dr. Halsted became an adopted Southerner both by his move to Baltimore and through his marriage to Caroline Hampton. Moreover, he and Mrs. Halsted spent from May until October each year in Cashiers, in the mountains of western North Carolina, at the original summer estate of the Hampton family. Halsted often commented that the time he spent at their mountain home was the most productive part of his career, since it was there that he wrote and generated new ideas. (Fig. 17).

Mrs. Halsted, who had earlier been the Professor's scrub nurse, was quite prominent in the development of rubber gloves. According to Halsted's own account:

In the winter of 1889 and 1890—I cannot recall the month—the nurse in charge of my operating room complained that the solution of mercuric chloride produced a dermatitis of her arms and hands. As she was an unusually efficient woman, I gave the matter my consideration and one day in New York requested the Goodyear Rubber Company to make as an experiment two pairs of thin, rubber gloves with gauntlets. On trial

these proved to be so satisfactory that additional gloves were ordered. In the autumn, on my return to town, the assistant who passed the instruments and threaded the needles was also provided with rubber gloves to wear at the operations. At first, the operator wore them only when exploratory incisions into joints were made. After a time, the assistants became so accustomed to working in gloves that they also wore them as operators and would remark that they seemed to be less expert with the bare hand than with the gloved hands.¹⁰

It is an interesting fact that Halsted not only introduced the meticulous surgical approach as a fundamental principle of surgery but also used his practical mind to attack the greatest clinical challenges facing surgery in his day. For example, the simple inguinal hernia had resisted a successful operative approach for many years, and in the first report of his unique operation for its correction,⁸ he quoted Shuh who said, "If no other field were offered to the surgeon for his activity than herniotomy, it would be worth while to become a surgeon and devote an entire life to this service." In the current edition of Keen's Textbook of Surgery of that day, it was recommended that operation *not* be performed for hernia if it could be reduced, since the recurrence rate was 27 to 42 per cent within the first year following operation. In his report to the Medical and Chirurgical Faculty of Maryland in 1892, without knowledge of the report by Bassini, Halsted described 58 cases without a single recurrence in those cases which healed per primum in a study covering a three-year period beginning in 1889 (Fig. 18).

Halsted also directed his attention to the management of carcinoma of the breast, which at the time had an amazingly high local recurrence rate. For example, Billroth reported a local recurrence of 82 per cent in the first year following operation, whereas with the Halsted procedure, it was reduced to 6 per cent. When Halsted reported his series of 210 patients in 1907, there was a 1.7

THE RADICAL CURE OF INGUINAL HERNIA IN THE MALE¹

Shuh said, "If no other field were offered to the surgeon for his activity than herniotomy, it would be worth while to become a surgeon and to devote an entire life to this service." Quite as well, certainly, might this be said of operations for the radical cure of hernia. There is, perhaps, no operation which has had so much of vital interest to both physician and surgeon as herniotomy, and there is no operation which, by the profession at large, would be more appreciated than a perfectly safe and sure cure for rupture.

Just now, most of the so-called radical-cure operations are under a cloud. They have not withstood the test of time. Modern textbooks of surgery refer to operations for the radical cure of hernia with more or less misgiving. The newest American surgery² disapproves of operations for the radical cure of reducible hernia if a truss can be worn, and believes that Czerny's method is as good as any, should an operation be necessary.

FIG. 18. Title page from Dr. Halsted's original paper describing his technique for the treatment of inguinal hernia. (From Johns Hopkins Hosp. Bull., 4:17, 1893.)

THE RESULTS OF OPERATIONS FOR THE CURE OF
CANCER OF THE BREAST PERFORMED AT
THE JOHNS HOPKINS HOSPITAL
FROM JUNE, 1889, TO JANU-
ARY, 1894.

By WILLIAM S. HALSTED, M.D.,

OF BALTIMORE,

PROFESSOR OF SURGERY IN JOHNS HOPKINS UNIVERSITY.

FIG. 19. Title page from Halsted's paper reporting original operations for carcinoma of the breast. (From *Annals of Surg.*, 20:497, 1894.)

mortality and a 75 per cent survival when the axillary nodes were negative, and a 25 per cent survival when they were positive. These were remarkable achievements, especially in a day when the vast majority of patients had advanced lesions at the time of first examination (Fig. 19).

In writing about carcinoma of the breast in 1890,⁹ Halsted stated that he began 8 years earlier "not only to clean out the axilla in all cases of cancer of the breast but also to excise in almost every case the pectoralis major muscle or at least a generous portion of it to give the tumor on all sides an exceedingly wide berth."

Halsted also was quite interested in the healing of intestinal anastomoses, since in that day breakdown of such anastomoses was common. In early animal experiments, he demonstrated that in small intestinal anastomoses in which the sutures were taken only through the muscularis but did not penetrate into the submucosa, frequent dehiscence occurred producing suppurative peritonitis and death.¹² However, when sutures included the submucosa, the anastomoses healed perfectly. Dr. Halsted summarized these studies as follows:

1) It is impossible to suture the serosa alone, as advised by authors. 2) It is impossible to suture unfailingly the serosa and muscularis alone unless one is familiar with the resistance offered to the point of the needle by the coats of the intestine. Furthermore, stitches which include nothing but these two coats tear out easily, and are, therefore, not to be trusted. 3) Each stitch should include a bit of the submucosa. A thread of this coat is much stronger than a shred of the entire thickness of the serosa and muscularis. It is not difficult to familiarize oneself with the resistance furnished by the submucosa, and it is quite as easy to include a bit of this coat in each stitch as to suture the serosa and the muscularis alone (Fig. 20).

Halsted was a master of all forms of surgery and in 1899 was the first to successfully remove a carcinoma of the ampulla of Vater. He resected a part of the duodenum, pancreas, and a portion of the common bile duct with successful reanastomosis.¹³ The patient survived but ultimately succumbed to metastases. In 1884, he had shown that nerve trunks could be blocked with cocaine.¹¹ The first clear demonstration of the use of local infiltration anesthesia, and for this the American Dental Association gave him its Medal of Acknowledgment.

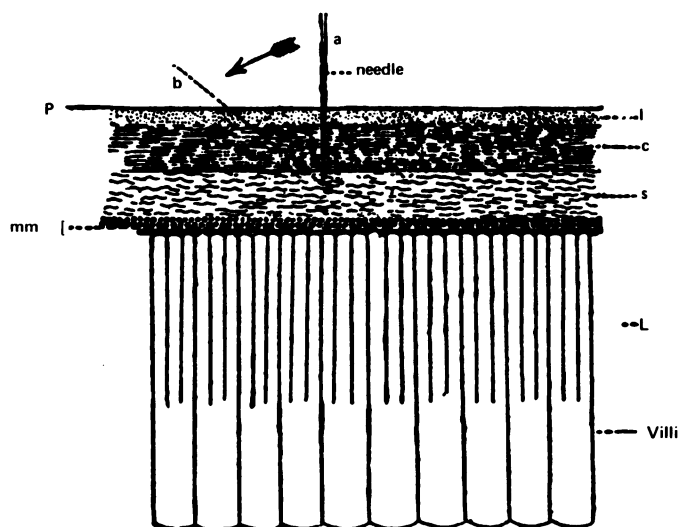


FIG. 20. Diagram from Halsted's work on inclusion of the submucosa in intestinal anastomoses. p. Peritoneum. l. Longitudinal Muscular Coat. c. Circular Muscular Coat. s. Submucosa. mm. Muscularis Mucosae. L. Glands of Lieberkuhn. (From Halsted, W. S.: *Surgical Papers*, "Circular Suture of the Intestine." Vol. I. Baltimore, The Johns Hopkins Press, 1924. pp. 185-211.)

Of all his contributions, many consider the training of surgeons the most significant achievement. Although he was Professor and Head of the Department for 33 years, only 17 Chief Residents completed his program during the entire period. This was due to the long tenure upon which he insisted, particularly in the early days. One is reminded of Mont Reid who, having been in the residency for 11 years, asked Dr. Halsted if he did not think it was time for him to finish the program. Dr. Halsted replied, "Reid, what's the rush?" If one considers the second generation of Halsted residents, one finds an equally impressive number with 37 Professors, 14 Clinical Professors, 18 Associate Professors, and 80 others in academic appointments with 99 in the practice of surgery. In his text on the history of surgery,²¹ Meade summarizes Halsted's career with this statement, "His teachings have had a greater effect on operating techniques in this country than those of any other person."

Few surgeons have achieved the worldwide acclaim accorded Rudolph Matas (Fig. 21). He was born in Bonne-Carre near New Orleans in 1860. At the age of 4 he was taken to Paris, where his father pursued post-graduate work at the Sorbonne. Thus, early in life he was exposed to a scholarly and academic environment and became a man of letters as well as science. Extremely well educated, he spoke English, Spanish, and French fluently and could also read several other languages. He entered Tulane in 1877 and graduated in 1880. In 1882 he became editor of the *New Orleans Medical and Surgical Journal*, a rare achievement for one of his age, and in

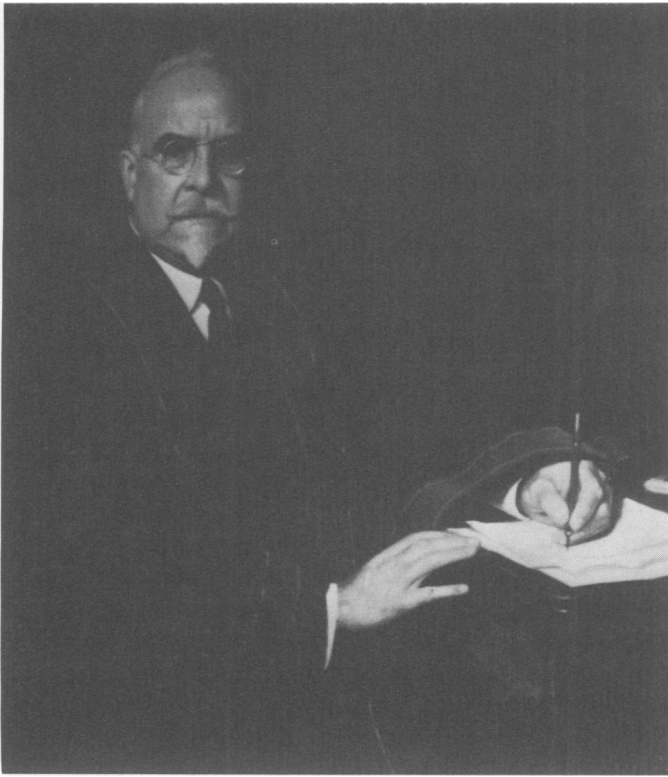


FIG. 21. Portrait of Dr. Rudolph Matas (courtesy of the American College of Surgeons).

1886 was elected President of the New Orleans Medical and Surgical Society. To all of his confreres and visitors from abroad, it was obvious that he was an exceedingly bright and capable young man.

The year 1888 was to become a very important one for Matas, for in that year Manuel Harris, a plantation worker, was admitted to Charity Hospital with a pulsating mass in his left arm, which had steadily increased in size following a hunting accident two months previously. At that time, the standard procedure for the treatment of such an aneurysm was proximal and distal ligation of the main arteries supplying the lesion. This was the procedure chosen, but Matas was quite disappointed some 10 days later to note that the aneurysm continued to pulsate as vigorously as before operation. Therefore, at the end of the second week he reoperated and upon opening the aneurysm, noted three large openings at its base, each bleeding retrograde into the sac. These were then separately closed with sutures with cessation of the bleeding. The procedure was successful, and Matas carefully stored this observation in his mind for future use.¹⁸

More than a decade passed and as the year 1899 drew to a close, Matas was busily engaged in the preparation of a paper for the Southern Surgical on the use of positive pressure apparatus for pulmonary insufflation during surgery. At this time he was asked to see a patient who had suffered a gunshot wound in the thigh while deer

hunting. A large femoral aneurysm had resulted, which was quite painful and was enlarging rapidly. Following standard practice, Dr. Matas ligated the femoral artery both above and below with immediate cessation of the pulsation in the aneurysm. However, the note states that "gangrene occurred immediately after the ligation," and a hasty amputation was required as a lifesaving measure.³ It is of interest that within a month an identical situation developed in another patient and Dr. Matas noted again, "Gangrene of the toes occurred as a sequel to the ligation." These events led him to consider again the possibilities of the procedure he had performed in 1888. The impact of this procedure was emphasized by a third patient, who sustained a gunshot wound to the brachial artery followed by an aneurysm which steadily increased in size and discomfort. Following ligation of the proximal brachial artery in the patient's home, all pulsations immediately arrested and the wound healed per primum. However, within two months the aneurysm returned and was as large as ever. He was fearful of ligating the vessel distally and stated, "I decided to incise the sac and suture the orifices as I had done in the previous case" (of Manuel Harris 12 years before).³ Since the patient would not be operated upon in a hospital, the procedure was done in his home. Two sawhorses were placed with two ironing boards atop them and the patient was strapped securely. The house did not have electricity so it was done by daylight with chloroform anesthesia. An Es-march tourniquet was placed just below the shoulder to occlude the proximal brachial artery, and an incision was then made over the aneurysm and the upper pole exposed. The sac was incised longitudinally and a large mass of mixed clot was evacuated. Two large orifices, one the inlet and the other the outlet of the artery, were now seen in the interior of the sac—orifices large enough to admit the tip of the little finger. These were quickly sealed with

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ORIGINAL MEMOIRS.

AN OPERATION FOR THE RADICAL CURE OF ANEURISM BASED UPON ARTERIORRHAPHY.

BY RUDOLPH MATAS, M.D.,

OF NEW ORLEANS,

Professor of Surgery in the Medical Department of the Tulane University of Louisiana.

FIG. 22. Title page of report of Dr. Matas describing surgical treatment of arterial aneurysms.

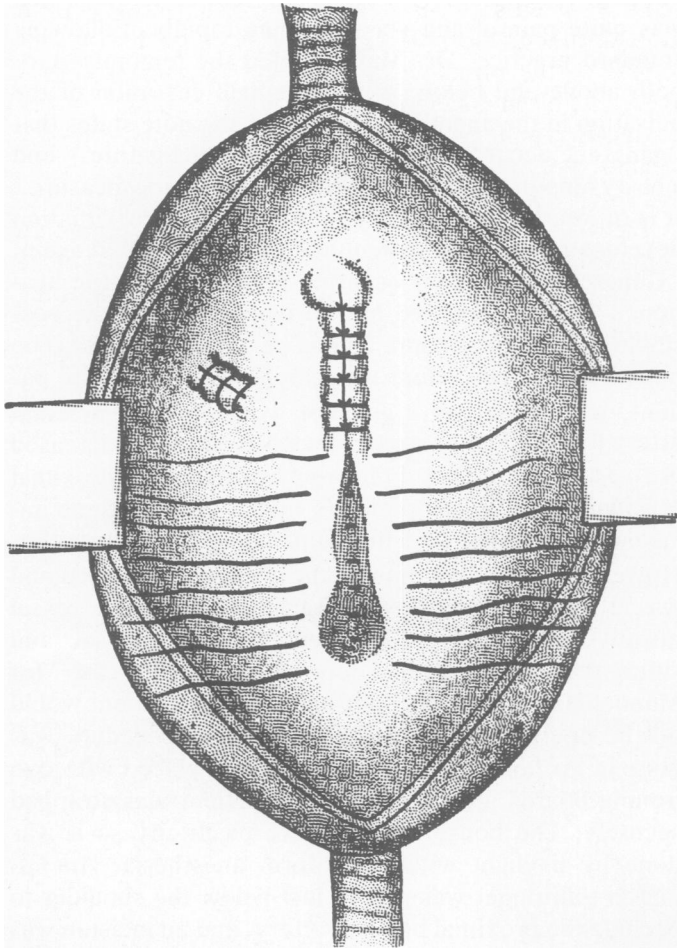


FIG. 23. Illustration of original Matas operation for arterial aneurysms. (From *Annals of Surg.*, 37:161, 1903.)

a fine continuous silk suture which penetrated the entire thickness of the sac wall and these sutures held perfectly. After this, the tourniquet was removed and he was pleased to see that not a drop of blood escaped. In the same year, another patient, a married saloon keeper aged 27, had a similar procedure on a popliteal aneurysm with cure by the newly described Matas endoaneurysmorrhaphy.¹⁹ With these contributions, the modern era of the direct approach to the management of vascular problems was initiated, and Matas formally presented this feat to the American Surgical Association in 1902 (Figs. 22 and 23).

Dr. Matas received many honors in recognition of his contributions, including the presidency of the American Surgical Association, the Southern Surgical Association, and the American College of Surgeons. He was also President of the American Association for Thoracic Surgery and received many foreign honors. It is remarkable to reflect upon the life of a man who was born before the outbreak of the War Between the States and who lived into the atomic age and appeared on television in

1955 at the age of 95. As Howard Mahorner has said of Matas, "He deserved all the adulation and devotion he received from his fellow citizens and from the profession."¹⁷

One of the finest and best known surgeons of this century, the late John M. T. Finney, was a true son of the South. He was born on a plantation near Natchez, Mississippi, in 1863, just three weeks before the Battle of Gettysburg (Fig. 24). His father, the Reverend Ebenezer Dickey Finney, was a Presbyterian minister who also served as principal of a school for boys. Dr. Finney was fortunate in being reared in an exemplary environment with a sound religious background which was obviously to influence him and his notable family for many years to come. He entered Princeton at the age of 17, and upon graduation went to the Harvard Medical School where he achieved an outstanding record and remained for surgical training at the Massachusetts General Hospital.

Shortly after his arrival in Boston, a close associate told him that he was very fortunate in securing a surgical residency there and confided: "From Dr. Porter you will learn how to operate, from Dr. Cabot you will learn how to take care of your patients after operation, and from Dr. Homans you will learn *what not to do*, and I fancy you will probably learn more from him than from either of the others." Later, when his Chief asked him about his

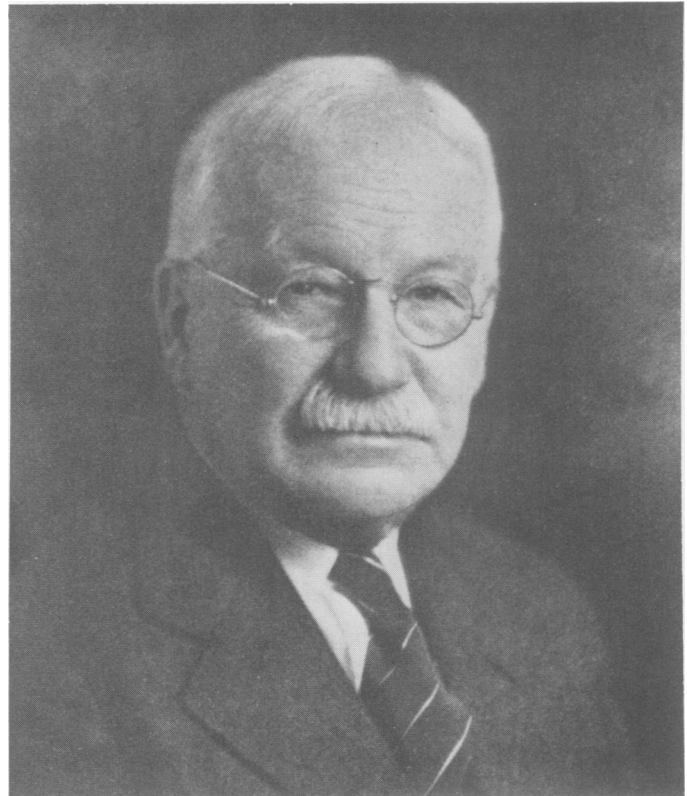


FIG. 24. John M. T. Finney.

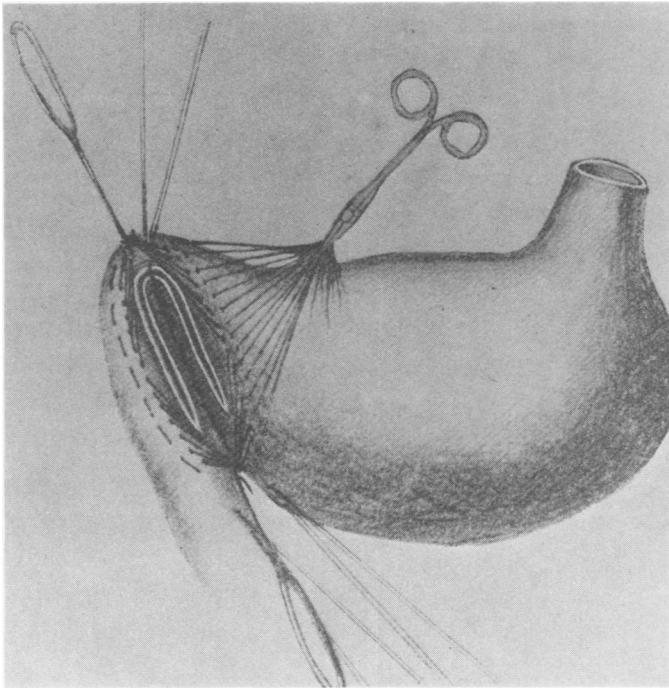


FIG. 25. Illustration of Finney's original pyloroplasty. (From *Trans. of the American Surg. Assoc.*, 20:165, 1902.)

career preference in terms of immediate position, he immediately replied that his first choice would be an appointment with Dr. Halsted at the newly opened Johns Hopkins Hospital.

J. M. T. Finney is particularly well known for his innovative concept of pyloroplasty. In 1902, he performed a gastroduodenostomy without a gastric resection, making a long horseshoe incision from the lower stomach across the pylorus to the duodenum.⁵ The procedure is shown from the original publication (Fig. 25). The two structures were then sutured together so that a large opening resulted between the stomach and duodenum, which he called a pyloroplasty. He emphasized that the advantage of the procedure over gastroenterostomy was the absence of regurgitation of bile and an unaccelerated evacuation of the stomach. It is interesting to reflect upon his own assessment of the procedure at the time he wrote his autobiography in 1940. He said:

But the contribution which I have made to surgical technique which strikes me as the most outstanding is the plastic operation on the pylorus suggested by me a number of years ago, and known as 'pyloroplasty.' . . . Certain it is that in selected cases, it is very useful in obviating a much more serious and mutilating operation.⁴

Dr. Finney was chosen as the President of the Southern Surgical Association in 1912 and a year later as the first President of the American College of Surgeons. He also received numerous other honors including an offer of the Presidency of Princeton and one from Hopkins to

be Dr. Halsted's successor as Professor of Surgery. Both were declined, the latter primarily because he did not believe in the principle of the full-time system with a fixed, and often inadequate, income. He regarded this of particular significance for those with extensive family commitments.

Clearly, Dr. Finney was one of the most highly respected of all American surgeons, and of his contribution of pyloroplasty, Dr. William J. Mayo was to state before the American Surgical Association that "it constituted the introduction of a new principle in surgery." In retrospect, it is unlikely that either Dr. Finney or Dr. Mayo could have realized at the time the subsequent impact and wide usage that this procedure was to enjoy in the future.

Many contributions to cardiac surgery have their origin in this country, and the first major achievement in this field was made in 1902 by Luther Leonidas Hill, Jr. of Alabama (Fig. 26). The son of a Methodist minister who had moved from Warrenton, North Carolina, some years

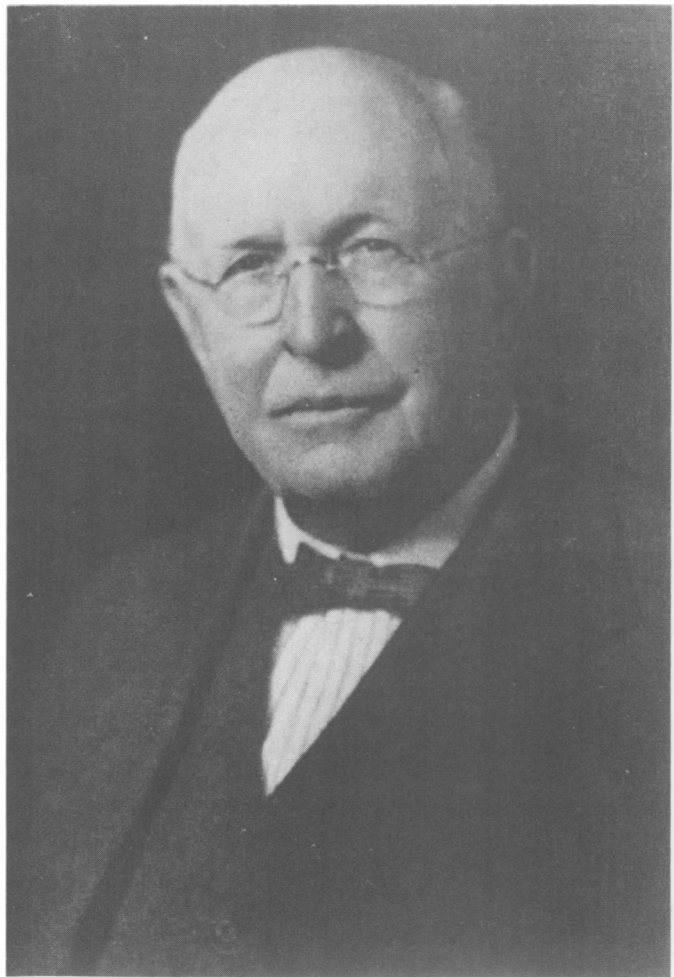


FIG. 26. Luther Leonidas Hill.

previously, Luther Hill was born in 1862 and was reared on a farm near Montgomery. He became a distinguished student receiving certificates of distinction in Latin and Greek and later chose to study medicine and was graduated from the New York University. Upon deciding to become a surgeon, he sought further courses at Jefferson Medical College where he studied under Dr. Samuel D. Gross and was awarded a second M.D. in 1882. He then went to King's College in London where he worked under Lister, a teacher who made a very deep impression upon him.

In the 1896 edition of Stephen Paget's "Surgery of the Chest," one finds the following statement:

Surgery of the heart has probably reached the limits set by Nature to all surgery: no new method, and no new discovery, can overcome the natural difficulties that attend a wound of the heart. It is true that 'heart suture' has been vaguely proposed as a possible procedure, and has been done on animals: but I cannot find that it has ever been attempted in practice.

In that same year Ludwig Rehn performed the first successful cardiac suture in Germany. As Pasteur noted many years before, "Chance favors the prepared mind," and so it was that about 1900 Luther Hill began an interest in heart wounds and investigated the subject thoroughly. On September 14, 1902, he was called to the home of Henry Myrick, a 13-year-old boy who had been stabbed five times in the chest. In his report, printed in the *Medical Record* in 1902, Hill wrote that he was called to see the patient about six hours after a knife blade had been driven into the left fifth intercostal space, about a quarter of an inch to the right of the nipple.¹⁵ The radial pulse was almost imperceptible and the heart sounds were heard with difficulty. The young boy was dyspneic, restless, with cold extremities and had to be aroused to answer questions.

Dr. Hill then proceeded to perform an operation which was the first successful closure of a heart wound in this country. The procedure was described in detail by the author, and again Leon Schlossberg has prepared some superb illustrations of this historic contribution. Dr. Hill's account is as follows:

The wound was about three-eighths of an inch in length, and from it came a stream of blood at every systole. . . . Securing two lamps, I removed the boy from his bed to a table, at one o'clock at night, eight hours after the stabbing, and proceeded to cleanse the field of the operation, and placed the patient in as favorable a condition as my surroundings in the negro cabin would allow. Commencing an incision about five-eighths of an inch from the left border of the sternum, I carried it along the third rib for four inches. (Fig. 27) A second incision was started at the same distance from the sternum and carried along the sixth rib for four inches. A vertical incision along the anterior axillary line was made, connecting them. The third, fourth, and fifth ribs were cut through with the pleura. The musculo-osseous flap was raised, with the cartilages of the ribs acting as the hinges. (Fig. 28) There was no blood in the pleural cavity, but the pericardium was enormously distended. I enlarged the opening in the pericardium to a distance of two and one-half inches, and evacuated about ten ounces of blood. The pulse im-

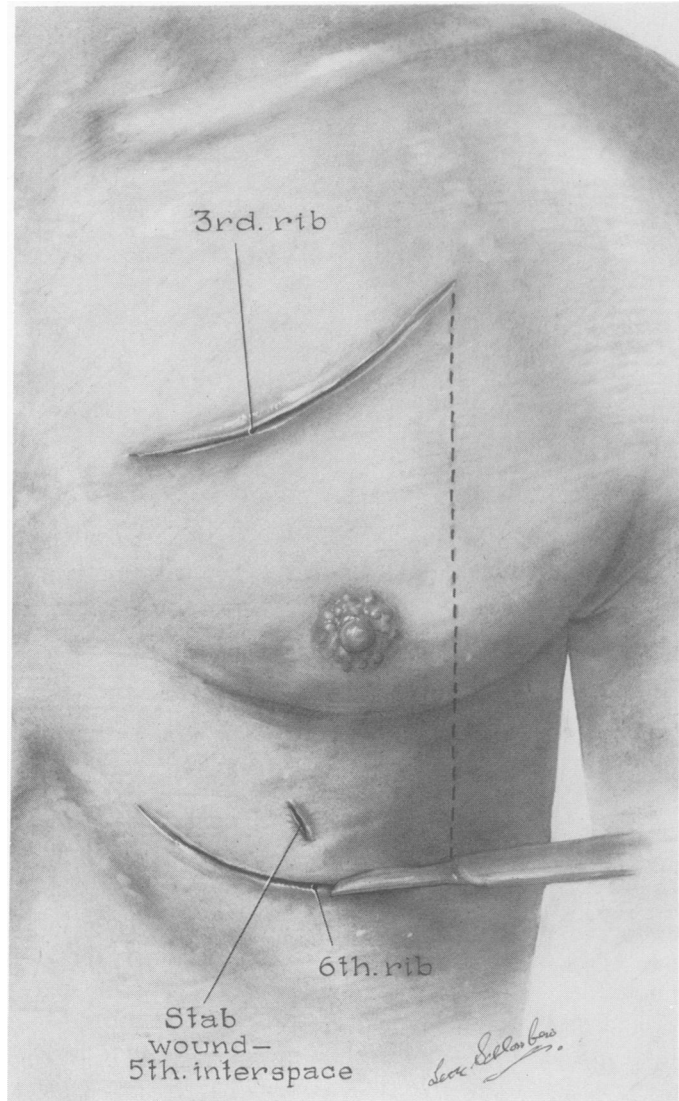


FIG. 27. Illustration of incision used by Dr. Luther L. Hill in first closure of a heart wound to be reported in the United States. (This illustration and the following five were prepared by Leon Schlossberg expressly for this Address.)

mediately improved, and was commented upon by Dr. L. D. Robinson, who so successfully and skillfully administered the chloroform. I had my brother, Dr. R. S. Hill, to pass his hand into the pericardial sac and bring the heart upward, and, at the same time, steady it sufficiently for me to pass a catgut suture through the center of the wound in the heart and control the hemorrhage (Fig. 29). I cleansed the pericardial sac with a saline solution, and closed the opening in it with seven interrupted catgut sutures (Fig. 30). The pleural cavity was also cleansed with a saline solution, (Fig. 31) and drained with iodoform gauze (Fig. 32). . . . On September 17 he commenced to improve, and his recovery has been uninterrupted.

Shortly after this remarkable feat, Professor Sherman wrote, "The road to the heart is only 2 or 3 centimeters in a direct line, but it has taken surgery nearly 2,400 years to travel it."

One cannot mention the name of Hill in the United

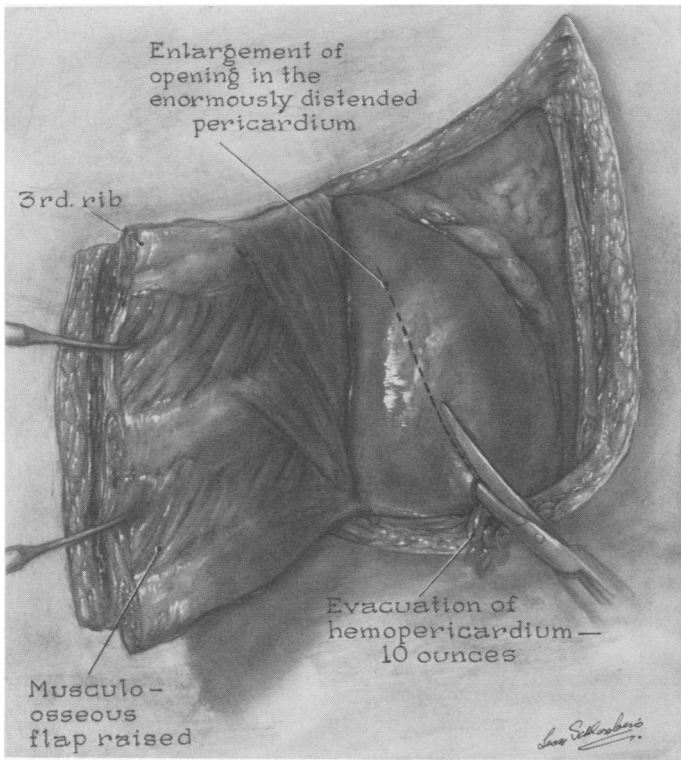


FIG. 28. Opening of musculo-osseous flap to expose hemopericardium with drainage of 10 ounces of blood.



FIG. 30. Irrigation of pericardial cavity with saline to remove blood and blood clots.

States without recognizing its more recent pertinence in the field of medicine. Dr. Luther L. Hill's son, Lister, named for Joseph Lister, was first sent to the United States Congress from Alabama at the young age of 28 and was later elected to the United States Senate in 1938 (Fig. 33). He was the original author of the Hill-Burton Act for

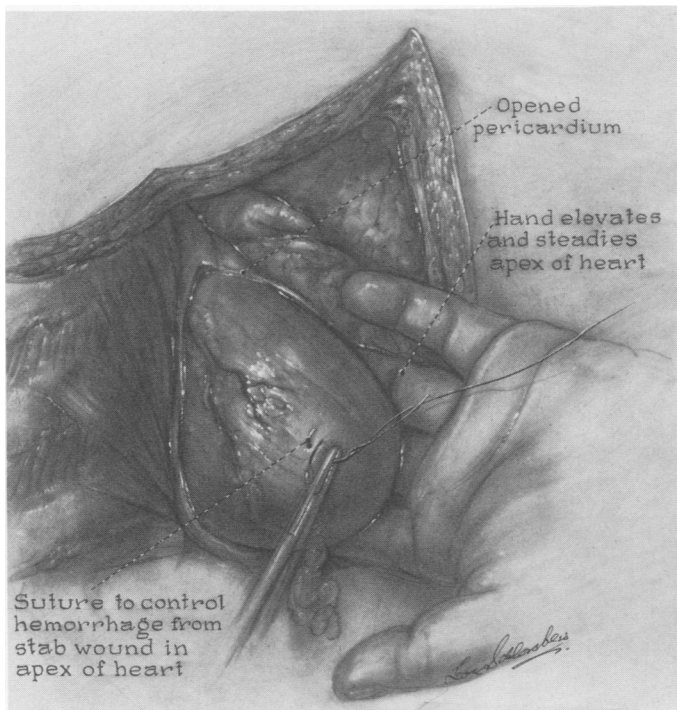


FIG. 29. Placement of suture in apex of heart to control bleeding stab wound.

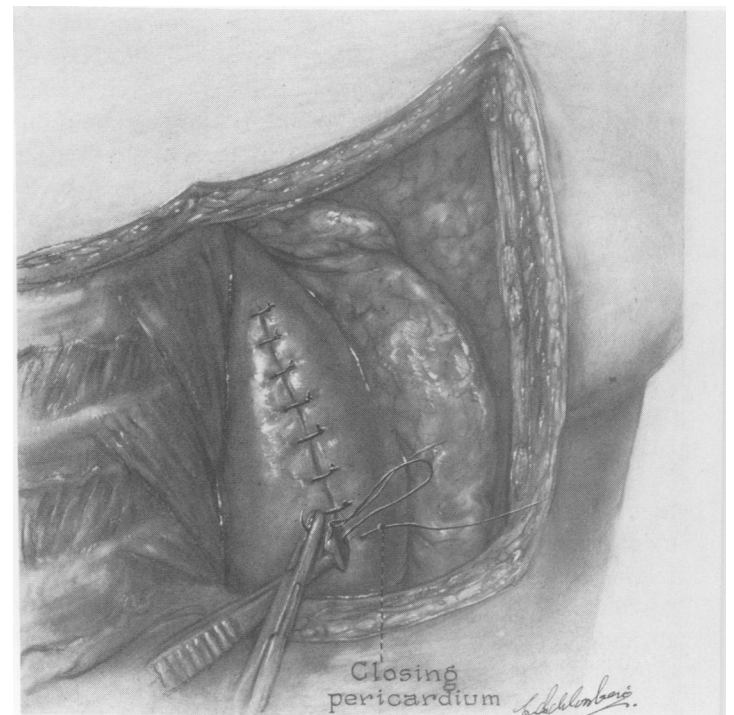


FIG. 31. Closure of pericardium.

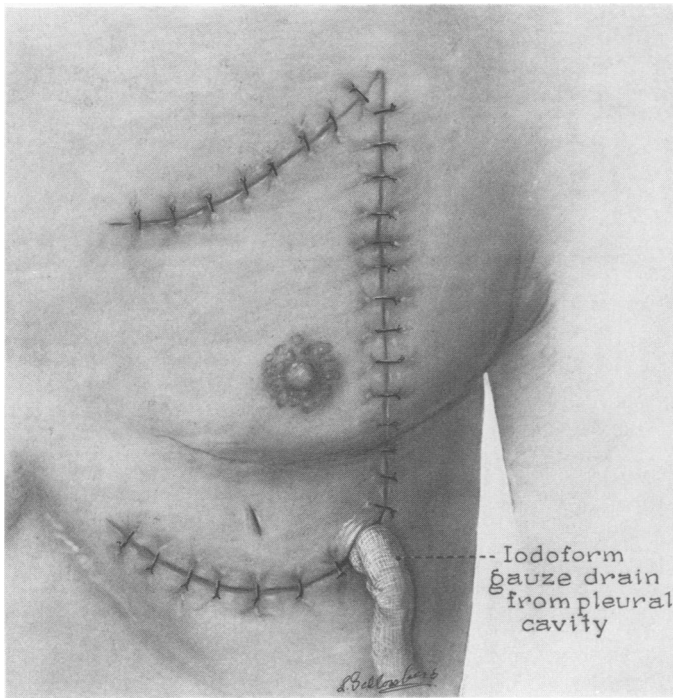


FIG. 32. Closure with drainage.

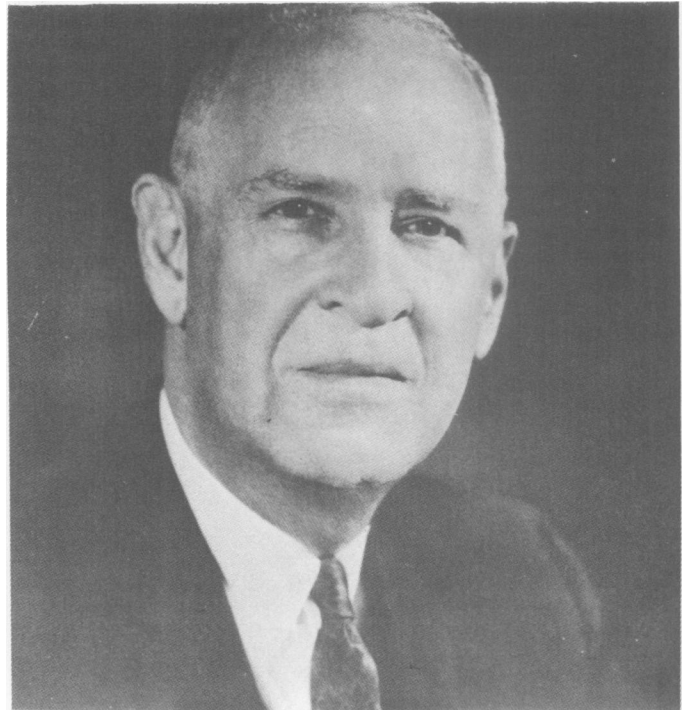


FIG. 33. Senator Lister Hill of Alabama.

the building of hospitals, which, together with his strong support of medical research through the National Institutes of Health, has brought the United States to first place among the nations of the world in medicine. Lister Hill served in Congress for 45 years and was consistently a champion of medical education, research, and patient care. Helen Keller said of him, "My heart grows warm every time I think of you, and that is ever so often."

James A. Shannon, the noted director of the NIH for many years said, "I know that I can express the admiration, respect, and gratitude of the research community for what he has done for medical research in our time."²⁵ In March of 1968, an appreciation dinner was held for him in Washington, D.C., and it was my privilege to have been in attendance. At the dinner, Russell A. Nelson said of him, "Let no one doubt for even a moment that this great man has done more for the building of hospitals in this country than any other person in his generation."²² At that time the President wrote, "If any one man could be called the father of our nation's health, it would be Lister Hill."

The final contributor to be discussed had strong affection, respect, and loyalty for this organization and its members. His original contributions to surgery have been recognized throughout the world, and he did much to advance the total image of the surgeon in this country and abroad. Alfred Blalock was educated at the University of Georgia and at Hopkins and later completed a surgical residency under Dr. Barney Brooks at Vanderbilt (Fig. 34). Remaining on the faculty in Nashville, he was able to

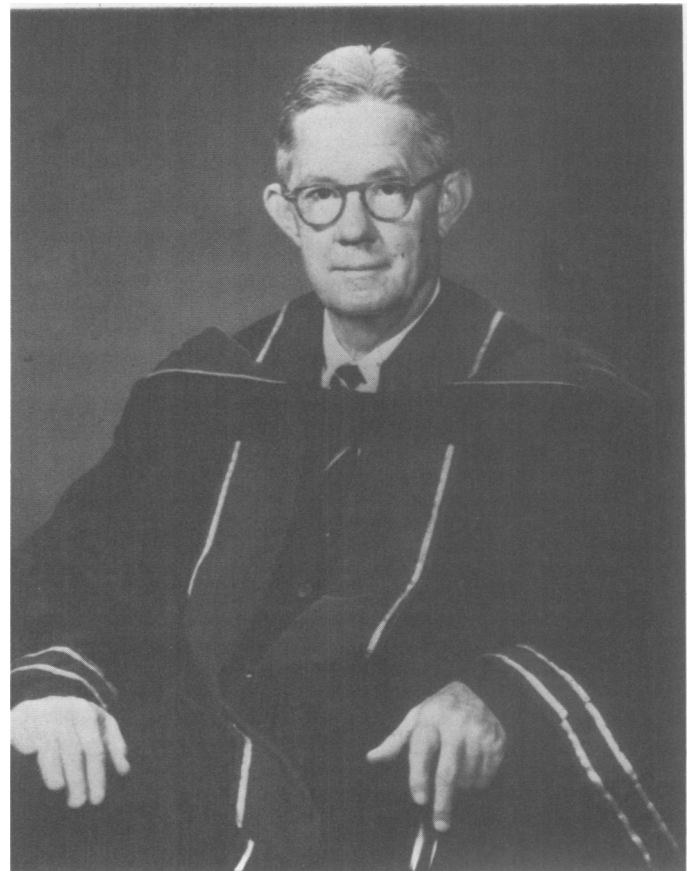


FIG. 34. Portrait of Dr. Alfred Blalock (courtesy of the American College of Surgeons).

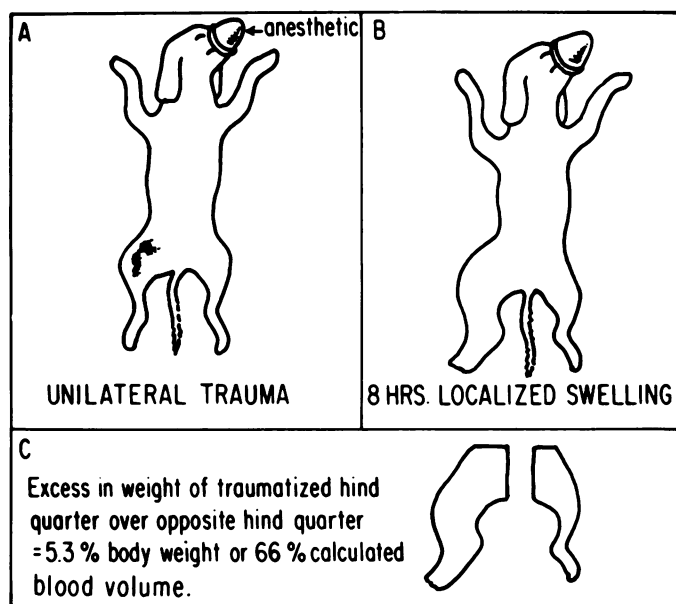


FIG. 35. Diagrammatic illustrations of experimental preparation used by Dr. Blalock to determine the pathogenesis of shock.

devote large segments of his time to basic investigation and quite early began his fundamental work on the pathogenesis of shock. At that time, the status of this important subject was in a total state of disarray with many conflicting views concerning its genesis. The basic experiment which Dr. Blalock designed was performed on the hind limb of an anesthetized animal. The thigh was injured by blunt trauma and eight hours later its weight was compared with that of the control limb after separate dissection (Fig. 35). The increased weight of the traumatized limb was shown to account for 66 per cent of the circulating blood volume and thus fully explained the state of shock. In this simple, yet clearly brilliant experimental study, Dr. Blalock showed that shock is due chiefly to the loss of circulating blood and plasma from the vascular compartment, either externally or into the tissues.

From his monograph "Principles of Surgical Care. Shock and Other Problems," Dr. Blalock summarized his work saying, "Shock was once a surgical complication to be dreaded, but now in the light of recent intensive investigations of its causes it would seem to be largely preventable."¹ For these unique contributions, no less an authority and able critic than Sir James Pickering, the Regius Professor of Medicine at Oxford, said, "The conclusion that emerged from World War I was that shock was a traumatic toxemia produced by the effects of vasoactive substances like histamine released from injured muscles. It needed the genius of your Alfred Blalock and the experience of the Second World War to show that this was not so."

Few investigators make more than one major contribu-

tion, but Dr. Blalock continued his research and proceeded to become a prime leader in the development of cardiac surgery with his brilliant operation for tetralogy of Fallot. It is important to emphasize that this major achievement came directly from his basic observations in the experimental laboratory and, in fact, as a result of experiments on an unrelated subject. In the late 1930s he became quite interested in pulmonary hypertension and attempted to produce this condition in an experimental model by creating a subclavian artery to pulmonary artery anastomosis (Fig. 36). This was published in 1939 and with some disappointment, since it was not possible to produce an elevated pulmonary arterial pressure by such an anastomosis.¹⁶ However, some seven years later, when Helen Taussig approached him about the need to augment blood flow to the lungs in children incapacitated with dyspnea and cyanosis as a result of pulmonary stenosis, he recalled these experimental observations and

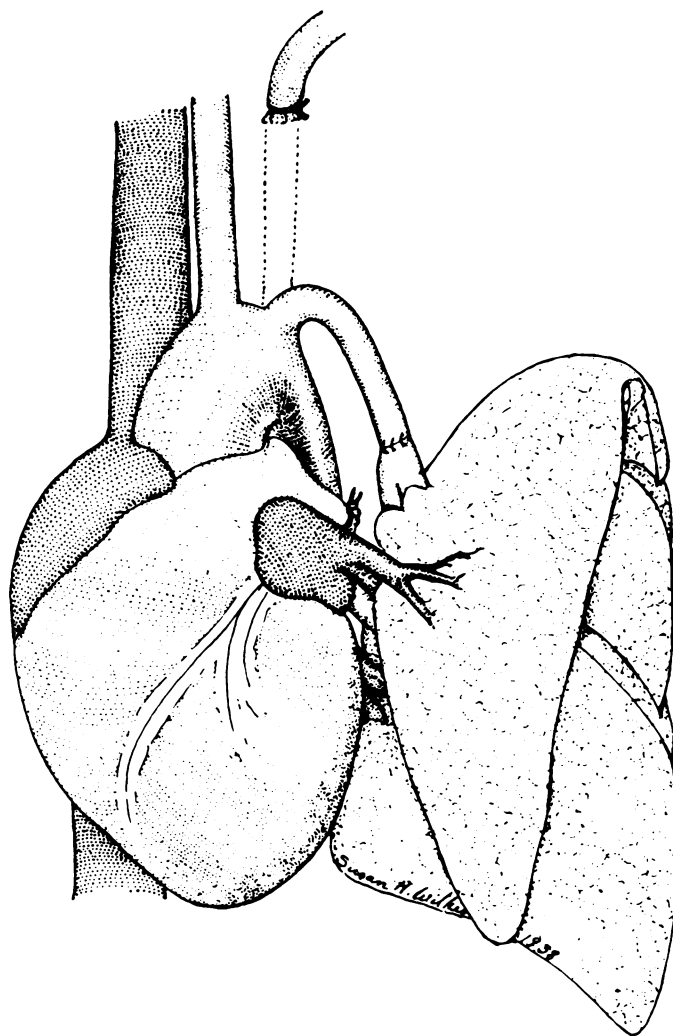


FIG. 36. Drawing showing original method of constructing an anastomosis between left subclavian and left pulmonary artery. (From J. Thoracic Surg., 8:525, 1939.)

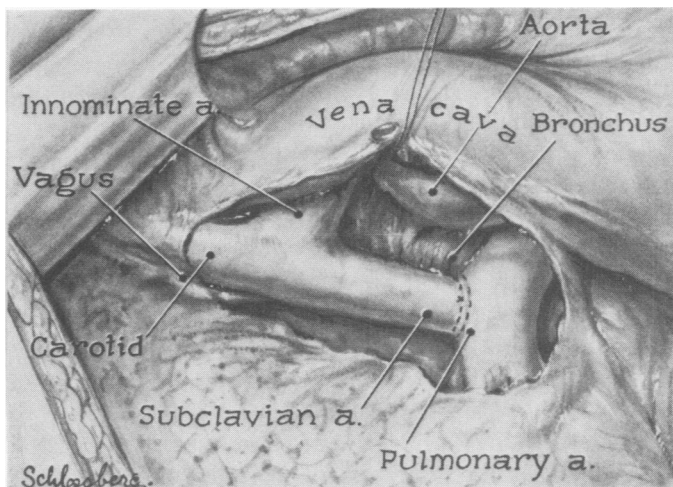


FIG. 37. Illustration of subclavian-pulmonary anastomosis (Blalock-Taussig operation) for pulmonic stenosis. (From Sabiston, D. C., Jr. and Blalock, A.: *The Tetralogy of Fallot, Tricuspid Atresia, Transposition of the Great Vessels, and Associated Disorders*. In: Derra, E., ed.: *Encyclopedia of Thoracic Surgery*. Vol. II. Heidelberg, Springer-Verlag, 1959.)

undertook the identical procedure in a severely ill 15-month-old patient on November 30, 1944 (Fig. 37). The result was superb and from that time forward, cardiac surgery began a period of remarkable progress.

In 1947, Dr. Blalock was invited to Guy's Hospital for a month's visit to introduce cardiac surgery in the British Isles. Concerning his impression of that visit, Evarts Graham was to say of him in a letter to President Isaiah Bowman of the Johns Hopkins University:

Dear Mr. Bowman:

I wish you could have been with me in London last month to have seen the acclaim which Alfred Blalock received. It did my heart good to see it. I could not help recalling some of the correspondence and conversations which you and I had about him a few years ago when he was being considered for his present post. I have always been sure of his ability and I have always been confident that he would go far in surgery if he had a good opportunity. I was tremendously proud of him in Europe, and I could not help getting a great deal of satisfaction out of the thought that my confidence had not been misplaced.

There has never been anything quite like Al Blalock's triumphal tour of Europe. The only thing that I can think of that remotely resembles it was a tour made by Marion Sims in the seventies or eighties of the last century. He had devised an operation and was received with great acclaim in the European capitals because of the success of his demonstrations. He came back loaded with honors from the various crowned heads. Al Blalock's tour has been no less dramatic and successful despite the fact that Europe is now down at the heel and there are few crowned heads left. The prestige of Johns Hopkins was enormously increased by Al's visit. All of us Americans were proud to claim him as a fellow American. His unassuming personality captivated everyone as much as his epoch-making surgical accomplishment.

Russell Brock,²³ the noted British cardiac surgeon, wrote of Dr. Blalock's visit to England in 1947:

... Dr. Blalock who presented his surgical contribution with his characteristic, apparently casual, drawl but really a forceful and incisive presentation of his brilliant and impressive results. The silence of the audience betokened their rapt attention and appreciation. The hall was quite dark for projection of his slides which had been illustrating patients before and after operation, when suddenly a long searchlight beam traversed the whole length of the hall and unerringly picked out on the platform a Guy's nursing sister, dressed in her attractive blue uniform, sitting on a chair and holding a small cherub-like girl of 2 and ½ years with a halo of blonde curly hair and looking pink and quite well; she had been operated on at Guy's by Blalock a week earlier. The effect was dramatic and theatrical and the applause from the audience was tumultuous. . . . No audience could fail to have been convinced or satisfied by this summation and no one there could possibly forget it. . . .

... the outstanding and important result of his visit was the firm introduction and launching of his operation in Great Britain and the Continent, acceptance of the immense possibilities of surgery in the alleviation of congenital heart disease in centres previously unconvinced and reluctant. The large numbers of visitors from the Continent and London for the International Meeting meant that they were also able to benefit and so the gospel was spread even more widely.

Upon his return from Europe, Dr. Blalock was to receive a letter from President Bowman which said:

I received such a heart-warming letter from Evarts Graham that I am enclosing a copy of it for your files. . . . Happily the letter comes on a day when the Executive Committee of the Board of Trustees meets and I shall read it to them and state that I am sending a copy of it to each member of the full Board of Trustees.

... It is with growing pride and deep personal satisfaction that I have witnessed your growth in this environment and your steady advance to the first position in surgery in the United States.

If these sentiments seem to be extravagant, please remember that I do not see you as often as I would like and it is sometimes a little embarrassing on both sides when things like these are spoken by one man to another. And remembering your broad interest in the School of Medicine and the University and all of your kind attentions . . . , I want to subscribe myself on this special occasion as,

Affectionately yours,

With all of his achievements and international acclaim, those who worked with him closely knew Alfred Blalock's first love. On the occasion of his sixtieth birthday when a large throng from this country and abroad gathered to honor him, in his closing remarks he expressed his feeling and with unconcealed emotion saying, "With the exception of my family and close friends of my own vintage, my greatest pleasure in life has come from the resident staff. Most of them are here tonight, much to my delight, and all are fine gentlemen and superb friends." There can be no doubt that this feeling was thoroughly reciprocated on the part of his residents who knew him as exemplary teacher, investigator, clinical surgeon, and loyal friend.

In bringing these remarks to a close, let me emphasize the great surgical heritage which has been ours. Quite clearly, there is much reason to take pride in these accomplishments of our forebears, provided we accept them as challenges for future achievements. While it is a part of our nature, particularly in the South, to cherish tradition, we must recognize that its most poignant mean-

ing is the standard which it establishes. Clearly, high standards represent our best hope for the future. This concept and its potential relationship to surgery is beautifully expressed in a statement made by the London Times in its edition announcing the successful expedition of Sir Edmund Hillary in the conquest of Mount Everest: "In an age whose heart is dulled by the leveling of standards to the mediocre measure of the masses, here is an aristocracy that all can admire without envy."

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