rule, absent. The eruption may begin on any portion of the body; it may be patchy or irregular, or it may be diffuse, with or without punctuation. The glands at the angles of the jaws are not apt to exhibit any pronounced enlargement; albuminuria is rare and otitis media does not occur.

It is thus seen that scarlatiniform erythema may be readily distinguished from a well-pronounced attack of scarlet fever; but the fact must not be overlooked that there are many mild cases of scarlet fever in which the fever is slight, the eruption poorly marked and the other symptoms correspondingly uncharacteristic.

The significant feature in scarlatiniform erythema, particularly when the rash is well pronounced, is that the intensity of the eruption is out of all proportion to the amount of constitutional disturbance. There is not present the prostration and high fever which would accompany a rash of similar severity in scarlet fever. Furthermore, there is never seen in scarlatiniform erythema a severe sore throat.

Another point of great diagnostic importance is the history as to previous attacks; the tendency to recurrence is a well-recognized feature of scarlatiniform erythema.

It may be remarked, in conclusion, that a proper sense of proportion must be cultivated in formulating the diagnosis of an obscurely developed disease. The various manifestations constituting the composite symptomatology of scarlet fever have each a relative value and their presence or absence must be given due weight in the conclusions that are drawn.

DISCUSSION.

DR. WILLIAM T. CORLETT, Cleveland—In my experience the strawberry tongue, which is quite characteristic at a certain stage of scarlatina, often develops so late that it is of little value as a diagnostic point. The tongue is often very much coated, and sometimes it has been two days before the coating has been sufficiently removed to make the picture of strawberry tongue complete, and in the meantime the rash has made its appearance. I agree with the essayist as to the difficulty in making a differential diagnosis between false scarlet fever and the true disease, and also in the recognition of many of the less frequent types of scarlet fever.

THE TECHNIC OF WOUNDS INCIDENT TO LAPAROTOMY.*

HENRY O. MARCY, A.M., M.D., LL.D.
BOSTON.

The currents and counter-currents of surgical opinion have nowhere better illustration than in the treatment of wounds. Through the warp and the woof of history there are continually appearing and disappearing, in the experience of the ages, many truths which have their demonstration only in this later day of crucial science. The Egyptians, the Greeks, the Romans, all used antiseptics, in varying degree of value. This we recognize in the balsams, vinous preparations, terebinthines and mineral oils. More or less obscurely they also recognized the value of drainage and cleanliness in wounds.

After amputations, the application of boiling oil or the actual cautery served an admirable purpose for primary disinfection. To my mind, one of the greatest evidences of the genius and power of Ambroise Paré lies quite as much in his overcoming of conservative

prejudice against the introduction of the ligature as a hemostatic as to the value of the discovery itself.

The late Henry J. Bigelow one day, about the beginning of the Civil War, introduced to us the famous Dr. Reuben D. Mussey as the leading exponent of surgery of the previous generation, with the statement that such a master could easily familiarize himself with all the improvements which the generation had contributed to our art, within the short period of three months.

Somewhat recently I have examined my old copy of Heister's Surgery, published in 1750, which served as the text-book of continental Europe for at least three generations, and am surprised at the favorable comparison of this book with the Surgeries of 1850, especially so far as concerns the technic of wounds. My own experience in the war of the rebellion differs not so very materially from that of a surgeon in the Napoleonic campaigns. It is, indeed, true that the surgical history of our late war, as written by my first master, George A. Otis, is the monumental contribution of military surgery, but as I re-read it and review my own military experience, I have only to lament our lack of knowledge as then exemplified in both military and civil surgery.

The immortal McDowell is justly accredited the father of ovariectomy. He has been sometimes called the backwoods surgeon, unhampered by the conservatism of surgical teaching, but such a critic forgets that he probably obtained his inspiration to perform this wonderful service from the Edinburgh school, then dominated by Dr. Young. He tied the pedicle with an Indian tanned deer-skin ligature, at that time more or less in common use for the ligation of arteries. The ligature was cut short and the pedicle dropped back into the abdominal cavity.

The subject was taken up with the interest belonging to novelty and its possible importance. The medical journals of this period are replete with contributions, but more especially with dissertations of warning from the seniors who saw little but catastrophe that could result from thus imperiling human life. American inventive genius was fertile in expedients with which to meet every complication. The mortality rate was necessarily high and infection the rule rather than the exception. Very naturally the cases operated on presented most formidable complications, since surgery was accepted as a last resort; more commonly, frequent tapplings had preceded the operation. Adhesions were the rule rather than the exception, and multiple hemorrhages common. Drainage was usually insisted on, even in the most simple cases. The treatment of the pedicle was emphasized as one of the most important factors of the problem. Since in amputations it was the almost undeviating rule that the vessels should be ligated with heavy silk, tied very tightly, left long to serve the purpose of drainage and subsequent removal, so it naturally followed, as a common practice, to ligate the ovarian pedicle and bring the ligatures, left long, out through the abdominal wound. By the process of sloughing, in both instances, the ligatures were ultimately to suppurate free and be removed.

A notable exception to this rule was a contribution by Dr. J. F. Miner of Buffalo, N. Y. He called it stripping the pedicle, since he had observed that the ovarian cystoma could be removed from its peritoneal envelope almost without hemorrhage, because the vessels were distributed through it and did not penetrate the cyst wall. The obvious purpose of this method was to avoid the ligatures and the resultant sloughing. The pedicle was

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Obstetrics and Diseases of Women, and approved for publication by the Executive Committee: Drs. J. H. Carstens, A. Palmer Dudley and L. H. Dunning.

returned within the abdominal cavity, often without drainage.

A modification of the treatment of the pedicle, as a distinct improvement, was that of Horatio B. Storer of Boston. He called it the pocketing of the pedicle. It consisted of a separate ligation of the vessels and the suturing of the pedicle to the peritoneum, including the free surface of it in the abdominal wound. This, as we see, was an extraperitoneal of the stump *from above*. The advantages claimed for this method were the control of bleeding points within easy reach, if secondary hemorrhage occurred, and the shutting off the peritoneal cavity, with drainage only of the wound in the abdominal wall.

More or less obscurely the surgeons recognized the occult danger of infection, called by them under the general name of inflammation or blood poisoning.

My old master, Dr. Marion Sims, laid special stress on the reddish serum which accumulated within the pelvic peritoneum as a source, or cause, of great danger. Obviously, to his mind, mechanical means must be provided for its removal. This, to many, seemed most easily effected by the introduction of a large glass drainage tube to the bottom of the pelvis, through the abdominal wound, which was to be followed, for a considerable period after the operation, by the withdrawal of the fluid secreted, by means of absorbent cotton, or sponge introduced, at short intervals, on a probe, for its absorption.

For a very long period the best operators in the world used the clamp and the cautery in the treatment of the pedicle, experience having taught them that there was a very considerable danger from hemorrhage, when the ligature alone was relied on. This obtained prominence especially from the teaching of Sir Spencer Wells, whose experience was far greater than any other contemporaneous operator and whose results were equaled or surpassed by no other except, perhaps, Keith of Edinburgh.

SUTURES.

During all this period the abdominal wound was closed by deep through-and-through silk sutures, usually tied very tightly. The profession is indebted to Sir Spencer Wells for especially pointing out the importance of including the peritoneum within the grasp of the suture.

This was the technic until modified by the teachings of antiseptic principles.

It seemed to me a safe deduction, based on the experience of Sir Joseph Lister, that if an artery could be occluded by an animal suture, cut short, and the wound closed, to be followed by primary union, the ligature being absorbed and disappearing, that it would be equally safe and advantageous to close all aseptic wounds with buried absorbable sutures, the subsequent danger chiefly to arise from infection. Given an aseptic wound, no matter how large, well-vitalized structures aseptically closed by aseptic, absorbable sutures, primary repair will follow.

As the result of my studies with Sir Joseph Lister, in 1870, I determined that the above premises were theoretically correct and that the demonstration should apply equally to wounds in all parts of the body. I made a long series of comparative studies on the lower animals, with the demonstration that an absorbable suture thus buried in well-vitalized structures was surrounded by leucocytes, slowly invaded by them, and that, little by little, *pari passu*, as absorption of the material took place, the leucocytes themselves became transposed

into connective tissue cells, leaving as a permanent result more or less well-defined vitalized connective tissue structures holding the coapted parts in firm union. It was also demonstrated that a silk suture was surrounded with leucocytes in a somewhat similar way, invaded in a measure by them, but that absorption and disappearance very rarely took place; in a word, *encapsulation* rather than *absorption* occurred. Of course, such teaching was revolutionary. There are still many doubting critics.

The use of silk even as a buried suture, unfortunately, as I think, is still common, although the buried absorbable suture is in daily use in every part of the civilized world. Aseptic methods and buried sutures have necessarily revolutionized the technic of abdominal surgery.

In all aseptic wounds, very naturally the drainage tube, so long maintained as necessary, is now demonstrated as not only useless but dangerous.

The pedicle of an ovarian tumor is sutured only sufficiently tight to control hemorrhage and the divided structures are covered by intrafolded peritoneum.

TUMORS OF THE UTERUS.

The removal of the solid tumors of the uterus presented a much more serious and dangerous problem. As a rule, there was no pedicle which could be treated easily by clamp and cautery as by the earlier, then advised, treatment of the pedicle of ovarian tumors. This, however, was attempted by many operators. In the seventies I recall an operation by the late Dr. Kimball of Lowell, where a fibroid tumor was removed and the stump of the tumor clamped with a large pair of strong forceps which were, advisedly, left for some days extruding through the abdominal wound. Suppuration was abundant and later death followed from tetanus.

It was a safe deduction that the cervical portion of the uterus could be closed over with healthy peritoneum, by means of buried sutures, after the removal of a uterine tumor, and the abdominal wound closed as in ovariectomy, without drainage. This operation was described, in its technic and results, in a paper by me, before the International Medical Congress at London, in 1881. The stump of the uterus was described as closed over by a layer of intrafolded pelvic peritoneum, leaving no open wound within the abdominal cavity, the stump or pedicle being extraperitoneal *from below*.

It would be a work of supererogation to detail to you the currents and counter-currents of opinion in surgical treatment of the pelvic structures during the last fifteen years.

I believe it to be generally accepted that drainage should be limited to septic cases and that here, better than ever, we understand its importance.

In order to avoid adhesions all pelvic lesions should be covered, so far as possible, by healthy peritoneum, which usually lends itself easily to intrafolding by fine, continuous, absorbable sutures.

The future comfort and welfare of the patient is greatly enhanced by the careful closure of the abdominal wall. There are many manifest advantages in the coaptation of the sundered parts by lines of buried sutures. The peritoneum is carefully coapted, including the delicate layer of connective tissue lying behind the recti muscles. The tendinous structures of the linea alba are similarly rejoined, both, preferably, by a double continuous tendon suture. The careful reunion of the combined tendons of the lateral muscles is by far the most important factor in the prevention of ventral hernia. For many years I have used a carefully selected rather

large kangaroo tendon chromicised suture, applied by the use of a needle with eye near point carrying the suture in opposite directions through the stitch hole, the sadler's or shoemaker's continuous sewing. This evenly coapts and holds firmly at rest the thick mass of rejoined structures. Avoid undue constriction. With proper technic ventral hernia does not supervene. A light running, subcuticular tendon suture completes the coaptation of the skin.

The wound is sealed with iodoform collodion, reinforced with a few fibers of absorbent cotton, and the work is completed, for good or ill, before the patient leaves the surgery. For good, since like structures are aseptically rejoined and are restored to their former completeness and strength.

Hemorrhage is scarcely possible, and if the tissues have been maintained aseptic, primary union will follow. It is worse than useless to punish your patient with an abdominal supporter, since the restoration will be complete and permanent. If imperfect coaptation and restoration follow, a bandage can by no means remedy the evil.

If such a wound is infected it is in the worst possible condition for restoration, as bacterial colonization is likely to follow the line of every buried suture, giving wide areas of septic infection. Therefore, the methods above outlined should never be attempted by one who is not the master of modern, aseptic, surgical technic.

DISCUSSION.

DR. A. GOLDSPOHN, Chicago—It is of interest to have our attention called to several very important features in technic that some of us observe to some degree, but that, I am satisfied, are not observed so far as should be. I mean, particularly, the care to close the abdominal incision in layers, that is, reuniting the structures in the position in which they were originally, particularly reuniting the aponeurosis in front of the recti. From that there can be no dissent on correct anatomic grounds. I will challenge anyone to show consistent reasons for neglect to reunite the aponeurosis in front of the recti muscles, do he otherwise what he will in the technic of closing the abdominal wall. On this ventral hernia hinges. If that is attended to properly there will be no hernia, in the absence of long continued drainage, or suppuration. Dr. Marcy made a very good remark when he said that the comfort of the patient will depend very much on this and one other thing; that is, excluding all raw surfaces within the abdominal cavity. What does that mean? What do you see so many good abdominal surgeons do if they have an omentum adherent to a tumor, or in a ventral or other hernia? They dissect and tie it off very carefully, and drop it back; a broad, raw surface, which, in the order of things, must become adherent to something. The correct thing is to carry the peritoneum over this amputated stump of omentum, just as you cover over the stump in the removal of the uterus or its appendages, thus aiming to avoid leaving any surface in the abdominal cavity that is not covered with a serous membrane.

DR. H. W. LONGYEAR, Detroit, Mich.—The question of closing the abdominal wall has been a hobby of mine for years. I wrote a paper on that subject and read it before the American Association of Gynecologists some ten years ago, and preliminary to writing it I corresponded with a number of operators, both in this country and abroad, and asked their opinion as to the causes of post-operative hernia; it was remarkable how few gave the cause as non-union of the aponeurosis. Many said, "Because of non-union of the muscular structures." Others said, "Non-union of the peritoneum and skin," but not more than two or three said that it was due to non-union of the aponeurosis. It seems to me that that is the cardinal point in the entire business. No matter where the incision is, if you do not close it in such a way that the aponeurosis will unite you will be almost certain to get hernia. I use the

method Dr. Marcy described, although I have discarded one part of it. I close the layers up to the skin, as he does, then, instead of using the subcuticular buried suture, I sew with very fine catgut, making an external buttonhole stitch cover with gauze and adhesive plaster, leaving a little window in the plaster over the middle of the gauze. This change was made because in a few cases I had some hemorrhage under the collodion seal which clotted and prevented perfect union. I have found this to be exceedingly satisfactory and an ideal method.

DR. W. B. DORSETT, St. Louis, Mo.—I wish to make one point, and it is this: If ligatures are to be used, an animal ligature, and a small ligature, is best. Some of you may be familiar with the report of two cases of tetanus that I lost from the use of kangaroo tendon. Kangaroo tendon above No. 2 or 3 can not be made aseptic. In my cases sections were made of unused kangaroo tendon, and bacteriologic experiments were made on mice and guinea-pigs, and it was demonstrated, beyond a shadow of a doubt, that the kangaroo tendon was infected with tetanus germs. Since then I have been in the habit of using the angiotribe as often as possible. I appreciate the fact that it will often devitalize parts by crushing, but at the same time it is aseptic, and the ribbon of tissue can be turned in with a small catgut ligature. I discarded silk long ago, except for an appendectomy. The matter of position of the parts has been brought up, but the secret lies in the fact that in order to be successful in the closure of the abdominal wound we must unite connective tissue only. Therefore, close the peritoneum first with a small 00 catgut ligature, then the aponeurosis and then the muscle, and the skin will take of itself in a majority of cases. Never tie the sutures tightly, only enough to bring tissues in apposition.

DR. HENRY O. MARCY—We should have few or no broken intraperitoneal spaces. Two years ago I presented a paper on that subject to this Section. I based it on a hundred consecutive hysterectomies done in my private hospital by myself, and under my subsequent supervision. I had four deaths; three were from intestinal obstruction, brought on by the adhesion of the intestines to the intraperitoneal space. I made emphasis of the history of these cases to show that notwithstanding we exercise care, we find room for improvement. If, as Dr. Dorsett said, a very fine suture is used and with the parallel stitch, as I call it, running the needle parallel to the long axis of the wound and a certain distance from it, the unbroken peritoneal spaces are easily infolded and the stitches buried out of sight. The suture will absorb and disappear and union supervenes in a comparatively few hours. I have felt that the kangaroo tendon suture had every recommendation, because it is very seldom infected at the beginning; and yet, so carelessly is it preserved, that out of 100 pounds sent me from Australia, I burned, some time since, over 90 pounds of it at once. The supply houses have not recognized the difference between good and bad material, and, possibly, I have made the mistake myself. I am extremely careful in sterilizing it, and, in my opinion, the best thing to use is formaldehyde. If you use it too strong or too long, you ruin the material, but you can permeate the tendon thoroughly with it and not damage it in the least. Mr. Lister long ago found that by steeping catgut in carbolic solutions for a sufficiently long period it will be sterilized, and that the thicker the suture material the more difficult the sterilization, and, in consequence, advocated and practiced the using of fine suture material. But the tendon suture from any animal, as a rule, should be free from tetanus germs and can be infected only by careless handling. Kangaroo tendon should be kept dry after it has been sun-dried subsequent to its removal from freshly killed animals. If we could get just what we ask for, kangaroo tendon would be cheap and not expensive, safe and not dangerous. Careful handling in its preparation is the first essential. So far, much of it sent here has been very carelessly put up. In reference to dead spaces, do not permit them, if you can prevent it. If you have a dead or open space, and it fills with a clot, it must be kept at rest, and being aseptic, nature will take care of it. If septic, it is a culture chamber

of the greatest danger. Out of 600 consecutive major operations I had 2 per cent. of infected wounds. That is 2 per cent. too many, and theoretically should have been prevented. I welcomed the rubber glove, and last year I showed you my improvements in the fine pebbling of the surface. The hands of your assistants, to say nothing about your own hands, are safe. Everything pertaining to the technic of absolute sterilization must be emphasized. In reference to the suture for the closure of the skin: The subcuticular suture is important; a fine suture being taken through the deep layer of the skin, the suture is absorbed before the skin proliferates. If taken sufficiently deep, the suture being fine and sterile, the so-called stitch abscess will not occur. If you penetrate a sweat duct you may have infection. I have seen this time and again, and I am emphasizing more and more every day the extreme care that is necessary, of using a fine suture, and placing it so deeply that it will not penetrate a sweat duct, this preventing infection from the *Micrococcus pyogenes albus*. Will you trust a long wound to three or four layers of buried sutures sealed with iodoform collodion? I do it in the great majority of cases, but if the patient is likely to become uneasy, I bandage for two or three days and put on strips of adhesive plaster. It is far safer and you need not worry about the subsequent conduct of the case. I agree that silk is not the best material for sutures, and that the buried absorbable suture tendon preferred, holds a first place in modern aseptic surgery.

Special Articles.

THE UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

PART I. A HISTORICAL SKETCH.

(B) DR. WOODWORTH'S ADMINISTRATION, 1871-1879.

(Continued from page 328.)

Supervising Surgeon John M. Woodworth was a man of conspicuous ability and untiring energy. He had been appointed assistant surgeon, U. S. Army, in 1862, and had been promoted successively to surgeon and medical director of the Army of the Tennessee.

During the "march to the sea" he was in charge of the ambulance train, and made the remarkable record of bringing his sick and wounded to Savannah without the loss of a man.

He was eminently fitted for the work intrusted to him—the reorganization of the Marine-Hospital Service. He combined the ripe experience of the trained disciplinarian with the energy and enthusiasm of youth, and he used his rare combination of abilities unsparingly in the accomplishment of his work.

He effected the reorganization as provided for by this act with a promptness commensurate with the magnitude of the undertaking. He prepared regulations (1873) based on the act just mentioned, by which the candidates were henceforth to be appointed only after examination before a board of officers, and were liable for general service in any part of the United States. The regulations also provided for the maintenance of discipline on a military basis, and for regular systematic reports and methods of obtaining subsistence supplies. The independent local appointees who presided over the various stations previous to the reorganization were either assimilated into the general service or gradually replaced by regular officers.

In company with Dr. E. M. McClellan, U. S. Army, under a special act of Congress, Dr. Woodworth gathered information relative to the cholera epidemic of 1873. The result of this work, published by Congress, entitled "The Cholera Epidemic of 1873," is one of the most

valuable contributions to the literature of the disease.

In 1875 Congress recognized the ability of Dr. Woodworth and the growing importance of the service by changing his title to supervising surgeon general, and providing that the supervising surgeon general should be in future appointed by the President, by and with the advice and consent of the Senate. His salary was increased from \$2,000 to \$4,000, and was in future to be paid out of the marine-hospital fund.

Dr. Woodworth's interest in sanitary matters was responsible for the issuance of the first circular letter defining the duties of marine-hospital officers in regard to quarantine and the public health. A law passed in 1799, which had become a dead letter, was revived, and thereon, in 1875, Supervising Surgeon-General Woodworth based his circular. The medical officers of the Marine-Hospital Service were directed in this circular to make a special study of local health laws and regulations in force at their respective stations. They were directed also to obey these laws, and render prompt assistance in their enforcement, when requested by the proper authorities.

The head of the service directed his efforts from this time toward securing a more uniform system of inspection of arriving vessels and a shortened period of quarantine detention. He considered the detention of a vessel from an infected port, whether sickness existed aboard or not, barbarous and unjustifiable, when the length of the period of incubation of the disease quarantined against was known. In his annual report for 1875 Supervising Surgeon-General Woodworth said:

That a vessel arriving at a port between the first day of May and the first day of November from a place where contagious disease existed at the time of departure should be, by law, subjected to a quarantine of thirty days' detention, no matter whether contagious disease has appeared aboard the vessel or not, seems incredible. No stronger argument need be advanced to show that the general government in the exercise of its acknowledged powers—that, for example, to regulate commerce and to provide for the general welfare—should regulate quarantine to such an extent as that the law shall at least keep pace with science.

In a paper read before the International Medical Congress at Philadelphia in 1876, the supervising surgeon-general said:

From what has preceded, the following conclusions appear to be justified: (1) The supervision of ocean travel ought to be directed to securing good sanitary conditions for vessels at all times, out of, as well as in, port. (2) A system of port sanitation should be adopted and administered for each country or place separately, and should be modified in particular cases by taking into account the liability of the port of infection, the period of incubation of the disease, the length of time consumed in the voyage, and the measures enforced by the vessel en route. (3) In some countries the detention of passengers and crews of ships hailing from infected ports is warranted, but for such time only as is necessary to complete the period of incubation of cholera or of yellow fever, counting from the date of departure from an infected port or of landing from an infected vessel. In no instance should passengers or sailors be held for observation on board an infected vessel, and such vessel should not be detained beyond the period required for inspection and for thorough disinfection and cleansing. (4) Recognizing the fact that the morbid causes of infectious disease may sometimes elude the most vigilant sanitary supervision of shipping, the importance of wisely directed internal sanitary measures can scarcely be overestimated. (5) As far as America is concerned, it is desirable that prompt and authoritative information should be had of the shipment of passengers or goods from districts infected with cholera or yellow fever, thereby insuring the thor-