SOUTHERN

MEDICAL AND SURGICAL

JOURNAL.

EDITED BY

L. A. DUGAS, M. D.,
PROFESSOR OF SURGERY IN THE MEDICAL COLLEGE OF GEORGIA.

W. H. DOUGHTY, M. D.,
PROFESSOR OF MATERIA MEDICA IN THE MEDICAL COLLEGE OF GEORGIA.

DeSAUSSURE FORD, M. D.,
PROFESSOR OF ANATOMY IN THE MEDICAL COLLEGE OF GEORGIA.

"JE PRENDS LE BIEN OU JE LE TROUVE."

Whole Series, Vol. XXI.

AUGUSTA, GA.:
E. H. PUGHE, PRINTER AND PUBLISHER.
1867.
SOUTHERN
Medical & Surgical Journal
AUGUSTA, GA.

Vol. XXIII. - JULY AND AUGUST, 1866. [No. 1.

ORIGINAL COMMUNICATIONS.

ARTICLE I.


Chimborazo Hospital, Div. No. 2, November, 1863.

To Surgeon W. A. Carrington, Medical Director—

Sir: I have the honor to inform you that, in accordance with your order of the 29th June, 1863, I have received all the patients sent into this Division, with a "peculiar eruptive disease," supposed to be the consequence of vaccination, and herewith forward you the results of my investigation into this anomalous affection.

In compliance with an order issued from the Surgeon General's Office in the month of November, 1862, general vaccination was practiced upon all soldiers as soon as they were admitted into this Division, and in order to insure the full protective influence of vaccination (not anticipating any evil consequences therefrom), the order was strictly obeyed, and all the patients, even those having recent scars upon them, were re-vaccinated. A few days after the insertion of the virus, and, in many cases, within twenty-four hours, the seat of puncture became very much inflamed, with a deep inflammatory blush around it,
which gradually implicated, in the severe cases, nearly the whole of the affected limb. A pustule rapidly formed, instead of a vesicle, which very soon discharged an ichorous fluid. This fluid was, in the course of forty-eight hours, converted into a dark, mahogany-colored, irregularly shaped scab, prominent, and firmly attached at its base. A dark-red areola of several lines in diameter, measuring from the edge of the scab, was then developed, which, in turn, seemed to exude an ichorous serum. This was soon converted into a scab surrounding in juxtaposition the first, and presenting the appearance of a single scab. This process continued for several days, and there was often formed a scab, one inch or two and a half in diameter. "Pari passu" with the increase of this scab, the erysipelatous blush on the limb diminished, and when the blush had disappeared, this scab ceased to enlarge. As this inflammatory process subsided, the discharge lost its serous character, and seemed to be converted into pus, which exuded from under the scab, loosening its firm attachment at its base, and thus rendering it liable to be removed prematurely by the patient in his sleep, or even by the friction of his clothing. When this occurred, a foul bleeding, irregularly shaped phagedenic ulcer was revealed, with everted edges, and presenting the appearance of a Syphilitic phagedenic ulcer, involving the subcutaneous areola tissue, exposing, in many cases, the muscular tissue below. The process of destruction of parts did not end here, for the ulcer continued to increase, and from the loosened edges an ichorous discharge continued to pour out from under the skin, which seemed to destroy the edges of the ulcer, thus increasing its dimensions. Wherever the ichorous pus from this ulcer touched the sound skin, another pustule of a similar character was formed, in some cases reaching the size of the primary sore. This, however, was seldom the case, but a smaller
ulcer generally resulted, which often healed and cicatrizied before the first.

The Axillary Glands, when the arm was affected, and the Inguinal Glands, when the leg was the seat of the disease, sometimes became inflamed and discharged pus, presenting the microscopic character of healthy pus. This enlargement of glands, however, did not occur in a sufficient number of cases to make it a natural sequence of the disease. Attending the early stages of the formation of the ulcer, before pus was discharged, there was always more or less pyrexia, with furred tongue and loss of appetite; these symptoms disappearing as soon as ulceration was established. In these highly aggravated cases, successive crops of pustules made their appearance on the affected limb, often developing themselves also upon the lower limbs of the affected side, but seldom crossing the mesian line, and never developing themselves upon the trunk or head.

The less malignant form of the disease resembled the first in character, but not in degree. For a few days after the insertion of the virus, merely a small inflamed spot was discerned, which seemed to be more the result of the injury done to the skin by the prick of the lancet than any inflammatory action resulting from a specific cause. About the fifth or sixth day a minute pustule was discerned upon a scarcely larger inflamed base. This pustule and areola gradually increased, but the diameter of the areola was not as great, and there was no deep inflammatory blush upon the arm, merely a diffused redness of several inches in diameter. The same process, however, took place—an exudation of serum from the areola—which, in turn, became a crust, and which gradually increased in size; but it never reached the diameter of the more malignant type; and when it was detached by the process of ulceration, which occurred at an earlier period, the
revealed ulcer was neither as deep nor as malignant in its appearance. The edges were not everted, and there was no discharge of pus from under the edges of the ulcer; it only presented the appearance of an ordinary ulcer, showing no tendency to increase, and but little to heal. Pyrexia very seldom attended this form, nor was the appetite impaired.

The third and mildest form of the disease made its appearance as a small pimple, in from two to ten days after the introduction of the virus, which gradually formed a pustule; a dark brown scab succeeded in from three to four days, which remained attached sometimes as long as two weeks, and when it become detached, a livid or brown spot was revealed, the size of which was equal to the scab. This scar, however, was very sensitive to the touch, and liable to bleed from the least friction of clothing, and when this occurred, it would exude serum or blood, and another scab would surely form. If the system became suddenly depressed from any cause, it would almost always assume the ulcerative process, and become a sloughing ulcer, which only healed with the general improvement of the system.

As thus described, this disease has prevailed in the Army of Virginia, both in field and hospital. The Surgeons of the Army of the Southwest, report its prevalence there. It was developed, in the early part of the year, in a Cavalry Regiment in the mountains of Virginia, the Colonel commanding suffering severely from the disease. In every case, its origin has been traced to the introduction of vaccine virus into the system. How far an epidemic cause may have exerted its influence in its early development, it is impossible even to surmise; we know, however, that it originated in Virginia, at a time when our Army was upon very short rations, and that many of the soldiers sent from the field at that time presented a decidedly
scorbutic appearance. Many had been reduced and were broken down by exposure to the inclemency of a cold Winter, and the depressing influences of low diet, want of clothing, and many other prolific causes of disease, calculated to deprive the blood of its healthy constituents, particularly of its fatty matter. Hence, this may have produced a predisposition. In verification of this fact, I will state, that when it was found how frequently the disease in consideration supervened upon Vaccination in this hospital in broken-down and depraved constitutions, it was deemed prudent to postpone the introduction of the virus until the patient was restored to a healthy condition by improved diet and medical treatment. At the first appearance of the evil consequences of Vaccination, I was inclined, with other Surgeons, to believe that the virus was impure, and, because of this suspicion, I threw away the matter we then had, and obtained a vaccine scab from Dr. Knox, a practitioner on Church Hill, who assured me he had used it in several cases with a perfect result.

The introduction of this virus into the arms of some ten patients resulted in the development of the disease in question in three of them, while in the remainder it produced apparently a true pustule. From this fact, and the immunity which healthy looking men enjoyed, I was led to believe that the predisposing cause existed in a vitiated and impoverished condition of the blood, and so reported in my first report, and that the introduction of pure virus into the system was the exciting cause of a latent disease. This view, I see, is also held by Surgeon Frank A. Ramsey, of the Department of East Tennessee, in a communication on file in office of Surgeon General. This view I have never had reason to change, though I am aware that many men, apparently in health, have suffered from the effects of Vaccination.

In one case, which I here quote, the influence of a good
condition of the general system seems to have exerted a wonderfully modifying influence.

Case No. 29.—J. L. Turner, a private, Company G, Fifth Virginia Cavalry, aged 27, married, parents healthy—he himself enjoying good health—never had any venereal disease. Entered the service, April, 1861—has been in service ever since—was vaccinated about a month ago, when in Hospital at Farmville.

This patient, Turner, was vaccinated last Winter by Assistant Surgeon Vaiden, of this Division. It not having had any effect upon his system, and feeling assured from this and previous Vaccinations that he was proof against the effect of it, he insisted upon being vaccinated by Assistant Surgeon Moses, from the effects of which he has suffered since, and for which he was on the 8th September admitted to this Hospital, presenting the following appearance: A number of pustules, resembling Impetigo, on left arm and leg, which were developed in successive crops, appearing as soon as the original pustule began to heal. This was a remarkably mild form of the disease, and was improving on Cod Liver Oil, when he was furloughed on the 20th September, being a paroled prisoner. This patient was young, vigorous, and comparatively healthy, when he received this Vaccine into his system.

The search, for parasitic or cryptogamic vegetation, with a good microscope, revealed none. The pustule was seldom developed where Parasites make their habitation, namely, in the bulbs, or at the roots of the hair. The pus presented microscopic characteristics of pus globules floating in a homogenous fluid. These globules were not as abundant as in laudable pus, and not so distinctly nucleated, and were irregular in outline in some of the cases examined. This appearance of pus globules, however, often exists in healthy or laudable pus, when it has been exposed to the air any length of time. In the many cases I have
examined, I have yet to find a patient who will acknowledge that he has had any Syphilitic disease at any period of his life, though many of them have had Gonorrhoea. This exemption from Syphilis, however, is not strange, since it is a very uncommon disease in the rural parts of our country, the inhabitants of which comprise the very large majority of our Army. We also know the tendency of the secondary form of Syphilis is to develop itself in the forehead, chest, back, and trunk, generally, and yet no cases, developed upon these parts of the body, have presented themselves to my observation. Many of the patients, also, have suffered long enough to have had the tertiary form of Syphilis developed nodes, etc., and yet no such symptoms have been seen by me.

From what I can learn, the Army of the United States has so far escaped these evil results of Vaccination. A few cases, however, originated among the Federal officers, in the Hospital of Libby Prison, who were vaccinated in the Prison by one of their Surgeons from his own arm, some weeks after their confinement, which presented all the characteristics of the disease as it has appeared in our Army. I was assured by these officers that they had neither seen or heard of such a result of Vaccination in their Army. Does not this fact alone lead us to infer that its cause or origin may be traced to some abnormal condition of the blood, in these cases, induced by confinement in a vitiated atmosphere, without the means of eliminating the materies morbi from the system by exercise, and care to the function of the skin?

The classification of this disease is difficult and unsatisfactory, since it commences as a Pustule, and assumes often the outward form of Rupia, which, by all dermatologists is classified among the bullae. If we classify it among the pustulae, we find no disease there describing it accurately, some cases resembling Ecthyma, others Impetigo.
Inasmuch, however, as it oftener assumes the characteristics of Chronic Ecthyma, either in a mild or aggravated form, according to the healthy or unhealthy condition of the patient, I propose to name it Vaccine Ecthyma. Like all chronic cutaneous diseases, it shows a decided tendency to return whenever the system becomes reduced from any cause, or when the patient is exposed to causes which produce an undue action in the circulation of the capillary system. An undue amount of exercise in warm weather seems to excite its appearance. This was illustrated in those soldiers supposed to be thoroughly cured, and who were about to be ordered to their Regiments for duty, when a raid was threatened, in the month of July, upon the City of Richmond. These men were among the volunteers from the hospital to defend the city, and were marched through a hot sun some four miles to the lines at the extreme limits of the western end of the town. They returned with a new crop of pustules, which, however, healed by resolution in a short time.

Treatment.—There is every reason to believe that the disease results from a blood disease, only to be eliminated from the system by enriching the blood and supplying its deficiency of fatty matter with rich nutritious food and the judicious use of alteratives. It is vain to treat the ulcers locally, for without alterative treatment with nutritious diet, all the local applications which were tried seemed to aggravate rather than improve them; but as soon as the general condition began to improve, so did the ulcers. The milder cases began to improve a few weeks after admission, without any treatment, except dietetic, in conjunction with the Iodide of Potash, Syrup Iod. Ferri, and Sarsaparilla; in others, merely applying simple dressing to the ulcers, was found sufficient to subdue it. Under this treatment, all the cases gradually, but slowly improved. In the early part of August, we received a large supply of
Cod Liver Oil, and I was thus enabled to test fully the treatment which the supposed cause of the disease naturally suggested. Some few of the patients could not digest the Oil, but those who could began rapidly to improve, and many were well enough on the 18th of August to return to their Regiments, whilst others were thought well enough to be transferred to their respective State Hospitals, in compliance with an order issued at that time. Those who were unable to digest the Oil, continued the Syrup Iod. Ferri, which was thought the best alternative indicated in their cases. Their improvement was scarcely perceptible. In the early part of September, however, another effort was made by them to take the Cod Liver Oil, which they were enabled to do in a little Whiskey; their improvement soon became very evident to themselves, and though not yet entirely well, the ulcers are rapidly granulating. No new pustules are being developed, and the patients are in a fair way to recover. I have no doubt that the best remedy has been found in the Cod Liver Oil; and this, locally applied, and internally administered, with an entire change of air, and nutritious diet, will remove, and eventually eradicate, this obnoxious and filthy disease from the system.

From the above mentioned facts, I am led to draw the following conclusions: That the disease is pustular at its first appearance; that it resembles Ecthyma in its general character; that it is but a local manifestation of a general disorder, or vitiated condition of the blood; that this vitiated condition resulted from improper and spare diet, together with inattention to cleanliness, thus impairing the eliminating functions of the skin; that Syphilitic virus has had no influence in producing the disease; that the morbid effects have in most of the cases resulted from a deficiency in condition, independent of any imperfection in the Vaccine Virus; that the disease can only be removed by
those means calculated to improve the general condition, and restore the healthy play of all the functions.

---

**Summerville, April 28th, 1866.**

**Dr. Joseph Jones, Augusta—**

Dear Sir: The above report of an anomalous disease, or result of vaccination, was written shortly after its first appearance in the Army of Northern Virginia, and after a careful study of the cases especially assigned to the Hospital under my charge for "treatment and report." At the time there was much discussion among the Medical Staff, both in Field and Hospital, as to the aetiology and pathology of the manifestation which by some, and, indeed, most of the observers, was attributed to impure virus, and especially syphilitical inoculation. This latter opinion was very ingeniously advocated by Surgeon Breckinridge, and no doubt many cases may have resulted from such an accident. In none of the cases, however, assigned to my Division of Chimborazo Hospital could I discover a sufficient number of symptoms to lead me to suppose that such might have been the cause, either in its prodroma or development, hence I could not attribute the cause of the eruption to any other than that assigned in the report. This view as to its aetiology was subsequently very ably maintained by Surgeon Frank A. Ramsey, in a report referred to me by Surgeon-General Moore, and which was preserved among my papers, but lost at the time of the evacuation of Richmond, together with the history of all the cases, and diagrams intended to illustrate the above report. In consequence of the loss of these papers this report is not as perfect as it should be; but I hope the general description and history of the disease is sufficiently clear and comprehensive to embrace every thing of practical importance concerning
this horribly disgusting and filthy accident, or result of vaccination, as seen in our army.

Since the termination of the war, I have had several opportunities of conversing with a few intelligent Surgeons of the Federal Army, and ascertained from them that such a disease had appeared among their soldiers in regions of the country where the scurvy diathesis manifested itself among the troops, and to which the disease was generally attributed by them, though there were also Surgeons of that army who attributed it to syphilitic inoculation. I find the same view as advanced in the above report held by most of the Surgeons of the Federal Army, as stated in Circular No. 6, Surgeon-General's Office U. S. Army, November 1, 1865.

If you think the above report of sufficient importance to appear upon the pages of your journal, or if it can in any way advance the cause of medical knowledge, you are at perfect liberty to make use of it for that purpose.

With much respect, I remain,

Very truly, your obedient servant,

S. E. Habersham.

ARTICLE II.

Report on Wounds of Large Joints made to the "Confederate States Association of Navy and Army Surgeons," Richmond, Va., 1864. [By J. B. Read, M. D., Surgeon in the Provisional Army of the Confederate States.]

Your Committee approach the consideration of the subject proposed, "A Report on the Wounds of the Large Joints," fully impressed with its importance to Military Surgery, and with many misgivings as to their ability to add anything new, or of consequence to the knowledge that already exists on the subject. They are, however, encouraged by the hope that if the records of the Military Surgery of the war, at this date, do not
afford any very useful statistics as to these serious injuries; that the very knowledge of the want of accurate and complete reports of cases will direct the attention of Surgeons in the Confederate States Army to making investigations of Hospital case books and records of the past, and to the keeping of minute and accurate notes of all such cases for the future.

The records in the Surgeon-General's Office, collected and tabulated by Surgeon Sorrel, from the Surgical Registers, sent in monthly, and the special reports of cases of interest, have been thoroughly studied, and such information as could be derived from them will be found collated in this report. Beside the records, we have called on Surgeons in charge of Hospitals, in and around the city, for the records of their experience, which will also be found embodied here. In the coming campaign of the Spring and Summer of 1864, it is to be hoped that such records of cases will be obtained as to settle definitely by statistics many points of great importance, and which the material on hand necessarily leaves imperfect, and perhaps erroneous. It may thus happen that some of the ideas now promulgated as to the treatment of these wounds may be faulty; should such be the case, none will be more glad to be so instructed than your Committee, for our sole desire in this report is the advancement of Military Surgery, and the benefit and welfare of our fellow men.

It is a matter of surprise in looking over cases of such important and grave injuries as those of the large joints, to find how little attention has been given to details of moment, and how loosely the reports seem to be strung together. In many records, the peculiar nature of the wounds; what tissue was particularly injured; whether one or all the bones entering into the formation of the articulation, with their articular cartilages, were implicated;
whether the foreign body inflicting the injury remained lodged in the joint or passed through, or whether the Synovial Sack itself was alone injured, are all absolutely ignored in the description of the cases. In other cases we are at a loss to know if the wound was produced by a round or conical ball, or by some cutting instrument, the date of the setting in of constitutional disturbance, the time that suppuration began in the joint, the method of treatment pursued; whether incisions were made primarily, secondarily, or at all, into the joint; whether warm or cold applications were employed; whether blood-letting, general and local, was resorted to; and in those cases which resulted well for the patient, the length of time demanded for the cure, and the condition of the joint as to the future utility of the limb, are entirely neglected. In the larger number of cases recorded, no mention is made as to whether they resulted in ankylosis or in good or partial motion. They are generally recorded in this fashion: Private A, Company B, of such a Regiment, wounded —— date, part injured. Recovered, furloughed.

These cases thus reported are worse than useless, for they lead us to suspect that only the cures being thought wonderful, are reported; while the fatal cases have no report made of them, that result being the only one thought likely to occur. This will explain to the Association the rather extraordinary tables that have been compiled from the Surgical Register, which certainly presents some astonishing features. It may be true that figures don't lie, but in order to make this correct, there should be true record of every case of Joint Wound that has occurred during the war, and not of the cures alone.

The joints of whose injuries we shall treat are the diarthrodial, or those lined with synovial membrane. They consist of the orbicular or ball and socket joints,
and the hinge joints; under the orbicular, we meet with the shoulder and hip articulation; and of the hinge, the elbow, the wrist, the knee, and the ankle. The wounds inflicted on the joints of the upper extremities tend more generally to a favorable result than do those of the inferior. The simplicity of construction, and the smallness of the articulating surfaces of the orbicular joints give them decided advantage over the more complex hinge joints. These articulations consist of various tissues and membranes, which all act in modifying the inflammatory process, and the diseases that arise in them from traumatic or constitutional causes. The constituent parts are the synovial membrane, cartilage, bone, ligament and investing fibrous capsules.

The synovial sack is the part most generally involved, and which either primarily or secondarily plays the most important and often most destructive part in its diseases and injuries.

This is what a careful consideration of its physiological properties lead us to expect, for the more vascular, living organs are, and the greater the extent in which they are employed in secreting, the more liable they are to derangements of this function and inflammatory engorgements. These membranes are of extremely fine and thin structure, and are composed of epithelium and a fibrous envelope to which they owe their strength; between these is the connective tissue, in which ramify numerous blood vessels and nerves. The membranes are arranged in the joints as short, wide tubes, the open ends of which are reflected in upon themselves, and firmly united with the articular cartilage near its border, or rather to its enveloping perichondrium, having previously invested the bone and made connection with its periosteum. Where it adheres to the bone and soft parts it has great vascularity; but when it is reflected over the articular cartilage it is
thin and easily torn, and few if any vessels can be demonstrated in it. The synovial sack is really a serous membrane like the pleura and peritoneum, and resembles them in its function and uses. Certain flattened folds are often found just where the membrane unites the articular cartilages, and are denominated its vascular processes. The fluid secreted by this membrane is in health barely sufficient to lubricate the joints; it is clear and yellowish, thick and tenaceous, producing a sticky feeling when rubbed between the fingers. It consists of water 94.8, mucus and epithelium 0.5, fat 0.7, albumen and extractive matter 3.5, and salts 0.9. The result of the inflammation produced on this membrane by wounds is precisely the same that occurs in the serous membranes from the same cause. The membrane contiguous to the injury first becomes congested and reddened, there is evident increase of vascularity, and less of its peculiar shiny satin-like appearance. The fluid within the sack under this hyperaemic condition becomes altered in character and increased in quantity, it becomes thin and serous, and has floating about in it effused plastic material. In a few cases, especially of incised wounds, the inflammation may stop here; but in a majority of cases where the lesion is produced by a ball, or by a blunt weapon, or when there is a passage-way for the entrance of air, the inflammatory process goes on to an unfavorable issue. The congestion and vascularity of the synovial membranes increases, it becomes finally echymosed, and this condition results in the pouring out of a thin purulent fluid. The contents of the joint becomes enormously enlarged and turbid, the cells take on degenerative action, and pus is formed.

Under this inflammation of the membrane, other structures of the joint take on the process of disintegration; the articular cartilage becomes thin, soft, and ulcerated, and the articular facets of the bone become involved.
The acrid and offensive contents of the sack making their way through these ulcerated points, pass up through the cellular interspaces of the muscles. This destructive synovitis of joints in many cases ends by the death of the patient, or in the total loss of the use of the articulation.

The ends of the bones entering into the formation of the joints are covered by a whitish elastic tissue, the articular cartilage, one end of which is firmly united to the bone, and the other free in the cavity of the joint. This is covered over its edges by a membrane continuous with the periosteam, and called, from the tissue and its envelopes, the perichondrium. It is with this membrane that the synovial sack has such intimate connections that they cannot be separated. These cartilages are composed of a clear hyaline matrix filled with corpuscles, containing other cells and nuclei. These corpuscles are arranged in parallel lines. Near the bone the cartilage has a hard, calcified layer, called the articular lamella. No blood vessels or nerves permeate the substance of artificial cartilages, they are extra vascular, and are nourished by the vessels of the vascular folds of the synovial membrane, that project into the cavity of the joint, and by the tortuous convoluted and sinus forming vessels that exist in the cancellated structure of the epiphysis entering into the formation of the articulation; these lie directly under the articular lamella of the cartilage. This calcified lamella has the power of transmitting nutritive fluids from the blood to the cartilage corpuscles and cells, by endosmosis, and this force continues between the individual cells of the tissue itself. Cell life, is active and persistent in articular cartilage, their own peculiar changes for effete material and the reproduction of new are constantly going on, and the nutritive plasma for this is derived from the vessels of the bone, and from the "plicae vascular" of the synovial membrane. As articular cartilage possesses
no blood vessels of its own, but depends entirely for its nutrition upon those of its two adjoining tissues, any change in these must seriously interfere with its well-being. It is probable, however, that cell changes of increase and diminution continually at work within them, may produce changes of structure, and thus in many cases the cartilage may degenerate into bone, or be softened and disintegrated by ulceration. It is probable that, cartilage-like, the similarly nourished tissue, the cornea, may easily take on the ulcerative process.

Weber distinctly asserts that cartilage suppurates. Having no blood vessels of its own it cannot take on the true inflammatory action. The ulceration in articular cartilage, always in wounds of joints, begins from the free surface; under the influence of this process the cells break up, and the tissue crumbles away by granular disintegration, and leaves the articular ends of the bone free, and frequently covered by granulations which are prone to unite with others, and thus produce ankylosis. This is ordinarily the method of repair in joints destroyed by synovitis, by the pouring out of exudative plasma from both surfaces of the bones, and then being united by the coalescence of these together. The diseased conditions of the articular end of the bones in the joints are only of importance as they produce changes in, and affect the condition of the articular cartilages and the synovial membrane. In acute affections of the joints, such as those induced by Gun-shot Wounds, the fibrous capsules and the ligaments are not apt to be affected. They may soften and become elongated, or separated from their insertions, thus permitting the dislocation of some of the bones of the joint. They are only important pathologically in these cases, because of their dense unyielding structure, they retain and refuse exit to the accumulated fluids in the sack. Two tissues, therefore, the synovial
membrane and the articular cartilage, are principally implicated in wounds of joints, and it is to their peculiar action under the excitement of violence, and when brought into contact with air, that many, if not all, the destructive results of such wounds are directly attributable. Injuries to the bone, save insomuch as they are connected with the destruction of form and usefulness of the articulation, and the extension of inflammation from these two mentioned tissues, does not modify or exert any specific importance in the phenomena that arises.

The acute and destructive inflammation of the tissues forming a joint or membrane is called Traumatic Arthritis. It differs from ordinary acute arthritis, which may likewise be destructive to the parts affected, in this: in traumatic arthritis the disease begins from the centre of the articulation; and in simple acute arthritis it starts from the periphery. In the one it commences first by the inflammation of the synovial membrane; in the other, in the bone or surrounding tissue. The danger in these traumatic cases is much augmented by the presence of air in contact with the living membrane of the joint. This acts as an irritant to the sack, causes it to become engorged, and pour out a thin, reddish secretion, which rapidly becomes acrid and putrescent, and is mixed with flocculi of fibrin and blood. From the rapidity with which this secretion, when the over-distended sack has given way and its contents permitted to permeate through the boundaries of the joint into the meshes of the intermedullary ariola tissue, produces destructive consequences in the parts it comes in immediate contact with, it seems to have some peculiar irritant property. It is to this property of the inflamed membrane of rapid hypersecretion of a copious and easily putrescent fluid, that in most cases the great danger in joint wounds are due. This action of air on the sack and its secretions is established by the fact
that in many cases of injury to the joints by external force, in which no air is admitted, although the actual injury to the articulation may be great and extensive, still no such results ensue as are wont to happen after a slight wound in which air is admitted into the cavity.

Sir Benjamin Brodie, and other Surgeons, habitually made valvular incisions into the synovial sack, to extract loose cartilages from their interior; when this is done carefully, and air not admitted, no evil consequences result.

In many operations for this purpose, the distinguished Surgeon just mentioned, saw severe inflammation take place in but a single case, and in this the synovitis yielded to suitable antiphlogistic treatment, and no permanent injury to the joint remained.

Traumatic arthritis presents numerous points of great interest to the Surgeon. In many wounds of large joints, at first neither pain or great inconvenience is noticed. The articulation may be fairly opened, and the synovial fluid escapes; the articular end of the bones of the joint may be shattered, the epiphysis of the Femur may be split off in the largest joint of the body, the knee, and the patient experience little shock, and will often walk some distance with ease and comfort; so little inconvenience in many cases is experienced, that the wounded man refuses to believe himself seriously hurt, and, on this account, is unwilling to permit the Surgeon to undertake such operative procedure as his experience teaches him to be best and most suitable for the safety of his life or the preservation of his limb. We are aware, from a lamentable experience in these cases, that as certainly as a Gun-shot wound into the articulation exists, so surely will this traumatic arthritis supervene, and at a period from the reception of the wound that is very variable. It seldom occurs earlier than the first thirty-six
hours, and is often postponed until the tenth or thirteenth day. This condition is ushered in by a chill, or rather rigor, the pulse quickens, and becomes full and bounding, the eyes are bright, and the cheeks flushed; synchronously with these constitutional symptoms, changes take place in the injured articulation. The wound or wounds of the joints, those of entrance and of exit, if the missile has passed through, though previously looking healthy and discharging laudable pus, become tumid and swollen, the joint becomes enlarged, and a thin, reddish-brown serum, with small clots of blood with fibrin intermingled, leaks out from the external wound. The swelling increases rapidly, the skin and the periarticular tissues become tightly distended, red and engorged, the cutaneous veins seem filled with dark blood, and can be easily felt with the fingers, acute pain of a grinding character, comes on rapidly. The slightest motion of the bed, the slipping of a pillow, a heavy tread on the floor that gives a jar to the patient, causes him to cry out. The sensitiveness of the part is so great that he can illy bear to have it touched or examined. The discharges soon become mixed with globules of pus. This quickly augments in quantity, becomes acrid, offensive and putrescent, and has a peculiar decomposed odor. The limb becomes swollen and oedematous, and when pressed with the hand has a feeling of crepitation caused by the passing under pressure of the gasses retained in the part, that are generated by the putrescent condition of the contents of the synovial sack, through the meshes of the ariola tissue connecting the muscles and forming their sheaths. The constitutional symptoms stride apace with the local mischief. The pulse becomes quicker and feebleer, and rigors followed by profuse sweats take place. There are nightly exacerbations, marked by restlessness and profuse diarrhoea; abscesses form under the deep seated facia, and
between the muscles of the limb, dissecting, in many instances, the periosteum from the bone; at a later period more superficial deposits of pus collect under the integument, and between the outer layer of muscles, which thin the skin and "point" in divers places.

In a greater number of cases where the larger articulations are the seat of injury, hectic fever now supervenes, and colliquative diarrhoea destroys the little remaining strength, and hurries the sufferer to his end.

Sometimes, however, these abscesses break, and the sinuses empty themselves of purulent contents, or when opened by the knife of the Surgeon, discharge a large quantity of putrescent pus; and after months of patient endurance and great suffering, the case recovers with a limb, more often than otherwise, ankylosed in a faulty position.

Sinuses leading from diseased and necrosed bone, generally exist; and from the length of time consumed in the treatment of the cases, and the natural desire of both patient and Surgeon to place the limb in a position that affords most ease and rest, this faulty ankylosis can hardly be avoided, and the limb left is worse than none, for it is a useless encumbrance.

In these cases the rapidity of the fatal issue, or the tardiness of the protracted cure, depend mainly on the surroundings of the patient, as regards nursing, attendance and food; and more than all upon his age, strength of constitution, and freedom from previous bad habits and constitutional dyscrasia.

The collection of these purulent secretions in the tissues, and the direction the abscesses that form under the facia and in the ariola tissue of the intermediate interspaces follow, seem to be controlled by the position of the muscles, and their tendinous expansions as they are inserted into the heads of the bones constituting the
articulations, and by the position that the part injured must necessarily assume during treatment. In penetrating wounds of the shoulder-joint, the purulent depots are sometimes found beneath the periosteum, but more often external as far as the insertion of the deltoid in the humerus. They are also found at the anterior and posterior border of the axilla.

In some instances that have come under our observation they have been found to extend over the chest, under the pectoralis major muscle. The position of the arm in these cases causes the pus to gravitate downwards. In the elbow this dissection of the muscle by pus is downwards to the arm, for no matter how carefully the wounded arm may be placed on the pillow or splint, unless this be at a considerable elevation from the raised position, ordinarily assumed by the upper extremities whilst being on a bed, and especially if the patient be walking about, the fore arm and hand assume a general declination downwards. In wounds of the hip-joint, this being the most depressed point of the body in the bed, sinking as it were in a pit, the purulent depot is around the tuberosity of the ischium, and near the trochanter major, and the abscess will be found to point in the inner side of the thigh near the insertion of the adductor muscles, or in the groin, dissecting along the course of the iliacus internus and psoas magnus muscles. In this case the purulent matter often dissects up the periosteum from the Femur for some distance, and is held in this position by the deep fascia.

In the knee-joint unless the injury comes from the lower part of the articulation, the head of the tibia being alone penetrated by the ball, the pus invariably burrows upwards, first dissecting the periosteum from the Femur, and destroying the ariola tissue connecting the muscles under the deep fascia, afterward forming abscesses in the
more superficial muscles outside the fascia under the integument.

In the anatomical formation of this joint, we must bear in mind that two processes of the synovial sack or tube extend up a little higher than the upper edge of the patella; under the vast muscles, especially under the vastus internus; we must recollect, also, how dense the fascia is at the joint, and how closely the tendinous expansion of the flexor and extensor muscles of the leg are connected with the capsule of the joint as they pass over and near it, to be inserted into the upper end of the tibia.

By referring to the pathology of the diseases of the synovial sack inclosing the articular ends of the bones, and the rapidity with which the covering cartilages take on the ulcerative and degenerative process, and the close and intimate connexion of the synovial membrane with the perichondrium lining the outer edge of the cartilage, and that the perichondrium is really nothing but the extension of the periosteum, we can without much difficulty, comprehend how, by the inflammation of this highly vascular envelope of the bones, it would become loosened as is its habit under this state of things, from the bone, and thus permit the acrid and putrid contents of the inflamed and disorganized joint to pass along beneath and come in contact with the parts adjacent to it.

Moreover we have the testimony of so great a pathologist as Weber, that cartilage itself suppurates in this way; when disintegration has taken place in it, the pus may pass out of the cavity, and light up anew, destruction in the tissues.

Penetrating wounds of the joints we have to treat of, may be classed as those produced by cutting instruments, and those caused by missiles projected from modern implements of warfare by the explosive force of gunpowder. The missiles usually employed in this war, and with the
injuries inflicted by which on joints we have to do with, are conical balls and shells. The wounds produced by the fragments of these explosive iron cases may in some instances be classed with incised wounds.

It will be well, perhaps, before treating directly of these wounds into the joints, to spend some moments in discussing wounds in situations near, but not penetrating or entering the synovial capsule. These wounds are called "periarticular" by Liguest. They may be inflicted by cannon or other balls, and may produce great destruction of the soft parts near the articulation. If the case progress favorably, no injury to the joint itself will ensue, except that the cicatrices that form during the healing process may have troublesome contractions, that interfere greatly with the use of the limb. This danger should always be borne in mind, and guarded against. Balls often pass in the neighborhood of the articulations, and inflict no actual injury upon them; yet, at some time during the suppurrative period, traumatic arthritis will be lighted up, and run through its course as fatally and rapidly as if the joint had been first opened.

The inflammatory action excited in the parts after the reception of the wounds, and necessary in most instances for the healing of such injuries, extends to the articulation. The synovial membrane becomes inflamed in some cases, but generally, we think, the dis-integrating process is started in the articular cartilage, by the inflammation that exists in the bone which underlies it, and upon whose vessels and those of the plicae vasculosae of the synovial membrane, it depends for its nutrition. We can readily call to mind some instances of this extension of the inflammation from the neighborhood to the joint, and the subsequent traumatic arthritis caused by this, followed either by the death of the patient or the loss of the use of the articulation.
A private in the P. A. C. S., wounded at the disastrous fight at Bristow Station, was received into the General Hospital, No. 1, in this city, under the charge of Surgeon Charles Bell Gibson. The ball entered the leg, and produced a compound comminuted fracture of the fibula near its head; after some days it was thought necessary to excise the head of this bone; shortly after this, the patient had rigors, and grave constitutional disorder was developed. The knee-joint became swollen and tender, the thigh became oedematous and pitted under the pressure of the finger; there was a feeling of crepitus in the parts. Traumatic arthritis had been developed, and pus existed in the synovial membrane, and had burrowed up the thigh.

Surgeon Gibson made free and bold incisions in the line of articulation on each side of the joint leading from the patella down to the hamstring muscles, a large quantity of putrid purulent pus found exit through these incisions. The articular facets of the bone were felt to be rough and entirely denuded of their cartilages, the condition likewise obtained as to the articular facets of the patella. The leg was put upon a posterior splint, padded so as to fit into the hollow of the hams, and inclosed on the side by bracketed splints, devised extemporaneously by Acting Assistant Surgeon Howell Thomas, attached to the Medical Staff of the Hospital. The wound was kept constantly washed from all offensive discharges, and the whole of the articulation was freed from accumulations of putrid matter by being injected with warm water; none of these dressings required the displacement of the splint; from this time the patient improved, and when last seen (when he was transferred from this Hospital) was doing well. We have since learned that ankylosis had taken place. The wound had nearly cicatrized, and there was every prospect of a useful limb.
The following report of a case seen by Surgeon Michel and the Chairman of this Committee, is given as reported by Surgeon Gravatt, in charge of Seabrook Hospital, in this city. L. W. Wamsly. This man was wounded at the battle of Gettysburg, and had his leg amputated there, just above the ankle. He was held as prisoner of war some length of time during the Fall. He was transferred to this Hospital from No. 11, on the 15th of December, 1863, in a very feeble condition; numerous abscesses had formed along the leg, and at the time of his admission he had an extensive collection of pus around the knee-joint; this was immediately opened, and discharged a large amount of fetid pus, showing that it proceeded from a diseased condition of the bone. He was put upon a tonic, nutrative and stimulating plan of treatment, with a view to building him up sufficiently to bear amputation.

The Consulting Board, consisting of Surgeons Read and Michel, were convened on the 29th, and decided upon immediate amputation, which was performed by Assistant Surgeon C. M. P. Brock, by the circular method, Surgeon Michel compressing the femoral artery by digital pressure against the pubis; very little blood was lost, every thing was as favorable as possible under the circumstances.

Upon an examination of the limb after amputation, it was found that a portion of the shaft of the tibia, some four inches long, which had been split off by the ball in the first place, had been left in the first amputation, and gave rise to all the subsequent disease, viz.: caries and inflamed condition of the entire tibia, complete disorganization of the knee-joint, with carious condition of the articular surfaces of both the tibia and femur entering into the formation of the joint. Chloroform was used with the usual good effect, the patient rested tolerably well, and spoke of feeling better than he had done for
weeks, but died in twelve hours after the amputation. The disease of the joint in this case, evidently originated in the inflammation of the tibia. This condition of the bone seriously interferes with the nutrition of the articular cartilage, covering its head and thus producing degeneration and ulceration, and by this means opened the articular cavity. Had it been possible to recognize the condition of the knee-joint before hectic fever had been established, and free incisions made into the cavity of the articulation, so as to give vent to the retained secretions, might not a different result have been expected?

Many wounds noted in Monthly Surgical Registers, and entered as wounds of joints, are probably of this periarticular character, and are not penetrating wounds of the synovial membrane.

Lax and careless examinations of individual cases, that seem to be doing well in large Hospitals, or immediately after a battle, are too much the rule, and no special attention is called to the case unless some serious disturbance arises during its progress.

In wounds in the vicinity of large joints, especial diligence should be employed in their thorough examination, for often, on the early knowledge of their condition, the life of the wounded depend. In some cases there may be an orifice of entrance and one of exit, at opposite parts of the joint, and still the synovial membrane has not been penetrated.

This may be readily understood, when we think how often these injuries happen when the limb is strongly flexed, the patient at the time having been in rapid motion or movement, and when the limb is straightened, the position of the wound would naturally lead us to infer that the projectile has passed through the articulation, when such is not really the case. Moreover, we know that the conical ball in general use in modern warfare,
though it ordinarily goes with great directness of track through the part upon which it has impinged, at times is found to have deflected from contact with tissues, especially the fibrous, and have made a circular path for itself around a limb or joint; this is more apt to be the case, if in striking some substance before entering the tissue, the ball will have been turned sideways or butt foremost.

The treatment of these periarticular wounds, where they have been already decided to be so, and that they have not involved the tissues of the joint, must be conducted with the view of preventing the extension of the inflammation to the capsule. In the examination of these wounds the finger alone can be employed. The probe is inadmissable, from the danger of its being pushed through the delicate membrane. If the finger cannot be readily introduced into the orifice of the wound to make this exploration satisfactorily, the opening should be enlarged freely and the practice of "debridement" thus resorted to. The limb should be firmly and carefully fixed, in some immovable apparatus, so devised as to permit the dressing of the wound with suitable applications, and at the same time to keep the articulation perfectly at rest. This can, in the lower extremities, best be obtained by the bracketed splint of Mr. Abernathy; or in field practice by the fitting and adjusting Smith's anterior wire splint, bent into a bracket, and fastened securely by a straight splint, the piece between the bracket being sawed out. The wound should be treated on general antiphlogistic principles, constitutionally and locally; cold dressings are peculiarly suitable to these wounds, near joints, and may be employed, as ice in rubber bags or bladders, by constant irrigation, or by the drip. In general, water of the temperature of the nearest well or spring answers all purposes, as well as any other.

The swelling of the tissue external to the capsules,
which is apt to come on, if painful, must be combated with leeches or wet cups, the latter being probably of more utility on account of the incisions that are made in the skin, relieving tension. If only this condition of swelling around the joint obtains, the constitution does not seem to suffer, more than it ordinarily does, from the febrile reaction that exists in most cases of Gun-shot wounds of similar tissue, in other parts of the body.

During the treatment of these periarticular injuries, if rigors, excessive constitutional disturbance, with sudden swelling of the articulation, accompanied by acute pain, and distention of the superficial veins of the integument, should be developed, no time is to be lost, and free incisions must be made directly into the articulation, thus permitting all the putrescent contents of the sack to be evacuated.

If doubt exists in the mind of the Surgeon whether pus be in the cavity of the joint, an exploring trocar may be employed, by first drawing aside the skin, so as to make a valve to exclude the air, if the cavity be not diseased.

The joint being thus opened, and air freely admitted into contact with the already diseased synovial membrane, profuse suppuration must ensue, terminating in the total destruction of the membrane, and the disintegration of their articular cartilages. Our attention during the period must be turned to supporting the patient, by nutritious diet, and to modifying the character and diminishing the quantity of purulent discharges.

[To be concluded in next.]
ARTICLE III.

Report of two cases of Ligation of the Subclavian Artery. [By Wm. H. Doughty, M. D., Augusta, Ga.]

Private Jacob H. Kittrell, Co. D, Third Tennessee Regiment, C. S. A., was admitted July 15, 1863, into Walker's Division Hospital, at Lauderdale, Miss., having suffered an amputation of the right arm as near the shoulder-joint as it was possible to perform it, without involving it. This operation was performed on the 12th of July, near Jackson, Miss., for a Gun-shot Wound sustained in an action of that date. His general condition was good, and the stump healing kindly. At midnight of the 20th July a slight hemorrhage occurred, which was controlled by pressure.

At this time adhesion between the flaps was firm, and the ligatures upon the axillary artery and most important branches had not come away.

The hemorrhage recurring profusely at 10 A. M., 28th July, whereupon the patient was placed upon the table for the purpose of ligating the subclavian artery; but at the instance of consulting Surgeons it was determined to try the expedient of continued digital compression over the point at which the blood escaped. This was faithfully practiced, night and day, by a relay of assistants, until 6 A. M., 2d of August, when the bleeding again took place.

An attempt was then made to separate the flaps and secure bleeding vessels, but firm adhesion had long since taken place, and it was found impracticable to secure it without too great violence to the structures.

The only alternative was the ligation of the subclavian artery; which was adopted, the ligation being applied at its external third. The plan of operation was by an incision parallel to the upper margin of the clavicle, and subsequently by a slow dissection with the aid of a director.
down to the vessel as it crosses the first rib. During the operation, the patient lost perhaps a pint of blood from the stump, notwithstanding the pressure employed to restrain it, in consequence of which it became necessary to administer stimulants freely. After the application of the usual dressings he was put to bed, and his condition on the succeeding day, August 3d, reported as follows: Has high irritative fever; is slightly nauseated; coughed up a clot of dark blood this morning, but had several hours of sleep during the night; stump is swollen, hot and painful.

Treatment.—Irrigation to the stump; warm water enema to open the bowels. Diet, beef tea and eggs.

August 4th.—Patient has less fever; is quite comfortable, as well as cheerful. General treatment continued, and perfect rest enjoined.

August 6th.—Patient rests well; is inclined to eat; pulse 96; respiration 24; stump looks healthy, and the local inflammation is subsiding. Treatment continued.

August 15th.—Patient continues to do well; pulse and respiration quiet; appetite good.

August 25th.—Is still improving; is gaining flesh and strength; stump is quite healed; ligature to subclavian is still apparently firm, not yielding to gentle traction.

September 4th.—Ligature came away to-day; the general condition of the subject is as good as could be desired. He was furloughed on the 25th September, and started for his home in Tennessee.

Remarks.—The success of this case is attributable to the robust constitution of the individual. The early and firm adhesion between the flaps of the stump, even after they had been forcibly torn asunder to secure possibly the bleeding vessel, shows that his blood was rich in plastic material.

Note.—We were afterward informed by Surgeon Daniel
F. Wright, who performed the primary operation on the field, that an unusual number of ligations were applied at the time, and from the size of these vessels he was led to apprehend the occurrence of secondary hemorrhage.

Case 2.—Private Jonathan W. King, Co. C, Twenty-ninth N. C. Regiment, was admitted October 5th, 1863, into Second Georgia Hospital, Augusta, Ga., with a Gun-shot Wound of the right shoulder, received September 19th, 1863, at the battle of Chickamauga. Sixteen days had elapsed since the receipt of injury, and at the time that our relations with the case commenced (8th October, 1863), the wound was very much inflamed, and discharging profusely; the entire limb was greatly swollen, with a serous infiltration and a diffuse inflammation of the parts, neither strictly erysipelas, nor yet resembling ordinary phlebitis; there was no evidence of continuous infiltration of pus downward from the wound; no enlarged lymphatic glands; no enlargement and induration of the venous trunks. We ascribed the condition of the limb to an inflammation of the lymphatics (anguoleucitis).

Character and precise location of the Wound.—The ball entered anteriorly near the coracoid process of the scapula, passed directly through the joint, fracturing the head and surgical neck of the humerus, and emerged opposite the spine of the scapula.

All operative interference being at this time inadmissible, the arm was moderately bandaged; irrigation to the shoulder ordered, and quinine and opium administered to subdue irritative fever, relieve pain, etc.

At 11 P. M., October 10th, the patient doing tolerably well in other respects; hemorrhage occurred from the anterior orifice of the wound, which was soon arrested; but at 9 A. M., of the succeeding day, it gushed from both orifices so abundantly as to forbid reliance upon anything short of a ligature. With a comminuted fracture of the
humerus, and the state of the soft parts already cited, it was entirely impracticable to open at all the seat of injury; hence it was deemed best to ligate the subclavian artery and await the progress of events for further interference at the proper time, at the joint.

Accordingly, at 1 P. M., of October 11th, a ligature was cast around this vessel at its external third; the difficulties, to say nothing of the danger of the operation, were much increased by the anomalous position of the subclavian vein; instead of being in front of (but beneath) the artery, it was above it, and required to be held aside for the ultimate exposure of the vessel. At 3½ P. M., two hours after the patient was put to bed, there was no pulsation at the wrist, and the limb was quite cool; it was enveloped in cotton; and opiates, with strong beef tea, ordered as the general treatment.

October 12th.—The natural warmth of the limb has been restored; its capillary circulation is good, but no pulsation at the wrist can be detected; the inflammation and swelling of the arm are unabated; copious discharge of bloody pus from the wound; pulse is irritable and frequent. Treatment.—Brandy, quinine and iron. Nutritious diet.

October 13th.—The inflammation of the arm, particularly about the elbow, where suppuration seems imminent, has increased; no pulsation at the wrist; pulse is irritable and frequent. Treatment continued.

October 14th.—Pulse 90; patient is more cheerful, but has a slight diarrhoea; no pulsation at the wrist; inflammation of the limb unchanged. Treatment continued.

October 16th.—No material improvement; no pulsation at wrist; arm suppurating at the elbow; pulse 98; diarrhoea controlled. Treatment.—Free incisions for the discharge of the pus, and Tinc. Iodine (diluted), locally; general treatment continued.
October 17th.—Had a severe chill at 9 A.M.; pulse 92; diarrhoea returned; arm subsiding. Add 10 grs. quinine to usual treatment.

October 19th.—Another chill this morning; extreme restlessness through the night; pulse frequent and feeble. Hospital gangrene invades the posterior orifice of the wound. Treatment.—Increase the stimulants.

October 20th.—Gangrene appears in the wound, caused by the operation; at 9½ A.M., an oozing hemorrhage occurs from this wound; continued two hours; patient is evidently sinking. Treatment.—Brandy and ammonia.

October 21st.—Died at 2 P.M.; no further hemorrhage. An autopsy was made at 4 P.M.; Hospital gangrene had invaded both wounds; at the seat of operation, the subclavian artery was corroded at the superior part of its cylinder, where the knot of the ligature rested, but the other part was firm, and apparently undiseased. The axillary artery was intact, showing that the hemorrhage took place from some of its branches, but in the confused gangrenous mass, it was impossible to ascertain the precise vessel.

Remarks.—From the nature of the wound in this case, it is evident that a resection of the head of the humerus should have been performed upon the field; at the time of his admission into the Hospital, the condition of the wound and limb precluded the possibility of surgical interference. There was no alternative but to await a favorable moment for a secondary resection or amputation; to this end, means were adopted to abate the local inflammation, and sustain the strength of the patient. In the meantime, the hemorrhage occurred, adding greatly to the complication of the case.

By ligating the subclavian artery, it was hoped that three purposes would be subserved directly and incident-
ally, i. e.: 1st, The control of the hemorrhage temporarily, perhaps permanently. 2d, It would not interfere with the performance of the prospective operation, provided mortification of the limb did not ensue speedily from an arrest of its circulation, a contingency not very likely to follow on account of the already existing enlargement of the collateral vessels about the shoulder. And, 3d, By diminishing the supply of blood to the inflamed parts, a reduction of the inflammation would be produced in a short time, and the propitious moment for the operation at the joint hastened.

The hemorrhage was arrested, but no effect in the reduction of the inflammation ensued. It was not, however, increased. In all probability, if Hospital gangrene had not attacked the wound on the 19th, by the time the ligature came away it would have been practicable to perform the other operation. There were a number of cases of Hospital gangrene in the house at the time, but every precaution was taken to prevent its appearance in this case; everything except his removal from the Hospital was done, and this was at the time rendered impracticable, by circumstances over which we could exert no control. He died from this incidental disease before the ligature had time to come away.

At the time that this case was under observation, we had read with much interest the chapter on hemorrhage contained in a Manual of Military Surgery for the C. S. Army, published in 1863, and issued from the Surgeon-General's Office. It is understood that Surgeon H. F. Campbell, formerly of this city, but then having official relations with the Georgia Hospitals at Richmond, was the author of that essay. We confess to a great interest in that portion of it which refers to the "incidental benefit" hoped for from "experimental effort to cure the inflammation in a limb by cutting off its arterial supply, by ligation of the
main trunk which supported that inflammation." (Page 103, Manual of Military Surgery C. S. Army.)

The several cases there alluded to in which this expedient was adopted, presented almost parallel complications—secondary hemorrhage and inordinate local inflammation—with the one then on hand; and the success of the experiment in those cases fully justified its adoption.

The effect upon the inflammation was not, however, as hoped, in those reported by him. He says: "In all of the six cases the Hunterian operation was chosen, with the distinct end in view of combating and checking, if possible, the destructive progress, and, in some, the septic tendency of the inflammation. In all of these, the pain, the swelling and turgescence were almost immediately relieved, and the most remarkable change was soon presented, as seen in the character of the discharges. (See Note, page 104.)

In the case reported above, it failed to produce any such results.

---

ARTICLE IV.

A Lecture on Suppuration. By L. A. Dugas, M. D., Professor of Surgery in the Medical College of Georgia, at Augusta.

The term Suppuration is employed to denote the process by which pus is formed, whether upon or beneath the surfaces of the body. More modern writers have used the word pyogenia or pyogenesis, to convey the same idea, and we may find it convenient to do likewise, by way of variety.

But, before we proceed to an explanation of this process, let us see what are the characters, physical, chemical, and microscopic, of the fluid called pus. In order to do so understandingly, however, we should remember that the term is often loosely applied to fluids
presenting very different peculiarities, and we should therefore confine our description to that alone which is denominated *laudable pus*, by which we simply mean *pure pus*—pus unmixed with extraneous elements.

Bad pus, sanies, or ichor is thinner than good pus, its color greenish, grayish, or brownish, its odor is more or less fetid, and it sometimes resembles an oily, mucous, or serous fluid, somewhat modified by the materials it contains. Pure pus may be obtained from acute abscesses, or well-conditioned ulcers in process of healing, and such as occur in habits not unduly depraved. It will then be found to be a homogeneous fluid of the color and consistency of fresh cream, presenting a yellowish-white tint, opaque, somewhat sweetish or insipid, usually more or less inodorous, and slightly unctuous or tenacious. It is a little heavier than water, and will therefore settle at the bottom of the vessel in which these two fluids have been mixed, and then allowed to be at rest. It may be coagulated by heat, alcohol, or hydrochlorate of ammonia, and will resist putrefaction for some time. When pus is allowed to stand at rest, it separates into two parts; the one, opaque and dense, occupying the bottom of the vessel, and the other, more liquid and transparent, floating above.

The chemical composition of true pus is variously stated by different observers. Gueterbock found in pus taken from a mammary abscess the following constituents:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount (in parts per hundred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>86.1</td>
</tr>
<tr>
<td>Fat, soluble only in boiling alcohol</td>
<td>1.6</td>
</tr>
<tr>
<td>Fat and osmazome, soluble in cold alcohol</td>
<td>4.3</td>
</tr>
<tr>
<td>Albumen, pyine, pus globules and granules, soluble neither in hot nor cold alcohol</td>
<td>7.4</td>
</tr>
<tr>
<td>Loss</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

But the discrepancies observable among authorities on this subject evince still so much uncertainty in organic chemistry that I will at once proceed to the consideration of the microscopic appearances.
Much attention has been bestowed upon the microscopic examination of pus, whether pure or modified by perturbing influences, or by the presence of extraneous materials. Upon placing pure pus under the microscope it is found to consist of a thin, colorless and transparent fluid, called liquor puris, in which may be seen floating small spherical bodies, termed pus globules, or pus corpuscles. These are cells, whose diameter is estimated to be from two to three thousandth part of an inch, and which contain distinct nuclei. Their outline is irregular, and more or less rugged, but when the pus is mixed with a little water some of these cells appear to become distended by imbibition, and assume a more regular shape. Their nuclei, which appear to be numerous and not in contact with each other, are found, upon the addition of acetic acid, to become more distinct, to coalesce, and to vary in number from one to three or four, and sometimes more. The specimen should therefore be successively examined by itself, then with water, and lastly with acetic acid.

Besides these nucleated globules, pus often presents still smaller particles, called granules, estimated to be not more than the ten thousandth part of an inch in diameter, and which are considered by some as rudimentary cells, while others regard them as fragments of broken cells, or as particles of fibrin, having no relation to the cells. Such are the microscopic appearances of laudable pus, the pus globule constituting its essential peculiarity. As the suppurative process deviates, however, from the normal standard, we find the product correspondingly affected, and the microscope may then reveal the presence of fragments of disintegrated tissues, withered or shrivelled cells, fatty matter, blood corpuscles, fibrinous shreds, etc. The character of the liquor puris may also vary, as well as the relative proportions of this and of the solids it contains. Pus coming from secerning organs may be
mixed with the secretions; hence, it may contain bile, urine, semen, etc., the presence of which may be readily detected by the microscope. That derived from specific diseases will contain the contagious element peculiar to each; but as this does not change its microscopic appearance, it may escape detection.

The purulent discharge from ill-conditioned ulcers, especially those connected with diseased bone, or those of a cancerous nature, is, not unfrequently, denominated sanies or ichor. It is thin, sometimes fetid, and often more or less excoriating to the surface over which it may flow. It often contains fibrinous flakes, grumous blood, and other detritus.

Carbuncles, diseased joints, etc., give rise to a thick lead colored pus, combined with lymph, which is sometimes called fibrinous pus; and serofulous pus will not unfrequently be found to contain tubercular matter, besides shreds of cellular tissue and curdy flakes. Inflammation of the mucous surfaces yields an admixture of mucus and pus, which is therefore called mucopurulent pus, and which has served to perplex very much those who have sought to establish a distinction between mucus and pus. We now know that it is not necessary that the pulmonary mucous surface should be in a state of ulceration to furnish pus globules, and hence their presence does not possess the important diagnostic value formerly attached to them in the investigation of pulmonary affections.

With the graphic diagrams before you, representing the microscopic appearance of laudable pus, and of pus modified by the various circumstances to which I have referred, you are now prepared by an examination of other diagrams to see the difference between them and blood, milk, tubercular matter, cancerous matter, etc. You will observe that the blood corpuscles are much smaller than
the pus corpuscles, and present a very different appearance. When pus and blood are commingled, however, the pus globules are apt to be so masked that it requires very nice discrimination to detect their presence if in small numbers. The globules of milk and of tubercular matter are also smaller than those of pus, and radically different in appearance. The cancer cell, especially, deserves your careful attention, and will be fully studied when we come to treat of the class of affections to which it belongs.

Pyogenesis.—Having thus hastily, and perhaps, too briefly, studied with you the nature and characteristics of pus, I must beg leave to dwell a little longer upon the important question of pyogenesis, or the mode and mechanism of suppuration. How is pus formed? Is it formed at the expense of the surface upon which it is found? Does it exude already formed from the blood vessels? Is it the result of an act of secretion, similar to that which takes place in secerning organs? or is it not a substance formed on the surface upon which it occurs, out of materials poured upon it by the capillaries?

Pus is not formed at the expense of the surface upon which it is found, because this would lead necessarily to a loss of substance, which does not always attend suppuration, however abundant it may be. Suppuration of the skin may occur and be abundant for an indefinite length of time without loss of substance. It is true that the cuticle will be elevated, dissolved, or otherwise destroyed by the suppurative process; but this coating, you know, possesses no vitality, and should, therefore, not be taken into consideration in studying the morbid vital act of suppuration. Whenever a suppurating surface or locality evinces a loss of substance, this is in consequence of the disintegration of the tissues, which nutrition fails to reproduce. Inasmuch as the particles which constitute
our tissues are continually disintegrating and being replaced by new nutritive deposits, it follows that any impairment or suspension of the great function of nutrition in any given locality, must of necessity be attended with a loss of substance. No loss of substance can take place so long as the processes of disintegration and of nutritious deposit keep pace with each other. If disintegration be in excess, there will be loss of substance, and if nutrition be in excess, there will be hypertrophy. The act of suppuration has, in itself, therefore nothing to do with the loss of substance which sometimes accompanies it.

Does pus *exude from the blood vessels ready formed?* It has been long known that pus contains all the elements of blood, with the exception of its coloring matter, and also that pus is often found ready formed within blood vessels. The mere fact that pus contains most of the elements of blood, only shows that many of its constituents are derived from the circulation; but we should bear in mind that pus contains peculiar characteristic globules which do not belong to blood, and which are generally admitted to be too large for transudation through the pores of the blood vessels. Admitting then, that the elements of pus are derived from the blood, we must also concede that they have to undergo some change before they can constitute pus. This change being brought about after the exudation of the blood elements, must necessarily take place outside of the blood vessels, and the pus cannot therefore be said to exude ready formed from the blood vessels.

It is true that pus is frequently found within blood vessels; but in these cases the pus is introduced into the vessels of a suppurating locality in consequence of accidental or ulcerative opening of their walls, thus allowing the pus to enter them without difficulty; or it may be formed upon the lining surface of the blood vessels under the same influences and in the same manner as it is
produced upon the serous membranes elsewhere. There is no reason why suppurating inflammation may not occur just as well in the internal coat of arteries, veins, and lymphatics as upon any other surface of the body. In such cases pus would be found in the blood, but would not escape from its vessels unless these were opened by ulcerative or other process, for as I have already observed, pus corpuscles are too large to exude through the vascular coats.

With regard to the theory which assimilates suppuration to the act of secretion as this occurs in the liver, kidneys and other secerning organs, and to which Hunter lent the sanction of his great name, I would remark that secretions are the products of organs specially constructed for the purpose, that they are the result of physiological action under the influence of special nervous supplies, and that it is not safe either in physiology or in pathology to admit that a secretion can be formed in any other way, or by accidental causes. Secretion is a complex act, by which certain elements are taken from the blood and recombined so as to give rise to a new product. The liver does not separate bile, as such, from the blood, although it unquestionably derives from this source the materials which go to to form the bile—and we have no good reason to believe that bile can be formed by any other organization than that peculiar to the liver. And yet we are asked to admit that pus, a peculiar and well defined product, may be secreted by organs and tissues the most dissimilar, and never in the physiological condition of the parts, but on the contrary always under the influence of morbid action. Pyogenesis is essentially a morbid act, and should therefore not be confounded with those which are strictly physiological.

We now come to the consideration of the last question, and I repeat it: Is not pus a substance formed on the surface
or in the locality in which it occurs, out of materials poured upon it by the capillaries? This view has been advocated by many able pathologists; but they differ with regard to the manner in which the change is effected, and predicate their belief upon theories more or less groundless. To James Paget, of London, was reserved the honor of solving the question by direct observation, and by the exercise of that rare inductive discrimination which characterizes all his investigations. In his Lectures on Surgical Pathology, delivered at the Royal College of Surgeons of England, we find his views most beautifully unfolded, as he passes from the consideration of the repair and reproduction of injured and lost parts, to the study of the materials for the repair of injuries, the processes by which wounds are repaired, and finally to suppuration and the perfection of scars.

We are reminded of the correctness of Mr. Hunter's declaration that "injuries done to sound parts are of two sorts, according to the effects of the accident. The first kind consists of those in which the injured parts do not communicate externally, as concussions of the whole body, or of particular parts, strains, bruises, and simple fractures, which form a large division. The second consists of those which have an external communication, comprehending wounds of all kinds, and compound fractures. The injuries of the first division, in which the parts do not communicate externally, seldom inflame; while those of the second, commonly both inflame and suppurate." Paget then states that "the healing of open wounds may be accomplished by five different modes, namely: 1. By immediate union; 2. By primary adhesion; 3. By granulation; 4. By secondary adhesion, or the union of granulations; 5. By healing under a scab. The repair of subcutaneous wounds may be effected by immediate union, but is generally accomplished by con-
connexion, or the formation of bonds of union between the divided and retracted parts. Very rarely it is effected by means of granulations without suppuration." "Of these modes, it is the peculiarity of the first, or process of immediate union, that it is accomplished by the mere union or re-joining of the divided parts, without the production or interposition of any new material. In all the others, new material is produced and organized." Now this new material is called lymph, or coagulable lymph, the essential vital property of which is "its tendency to develope itself; a tendency which it has of its own properties. It thus displays itself as a plasma or blastema; a fluid to be classed with those others that manifest the capacity to assume organic structure; such as the lymph and chyle that develope themselves to blood, and the semen, which, at first fluid, gradually develops itself into more and more complex structures.

"The natural tendency of coagulable lymph is to develope itself into the fibrous, or the common fibro-cellular or connective tissue—the lowest form of vascular tissue, and the structure which, in nearly all cases in man, constitutes the bond by which disunited parts are again joined."

"The development of the fibro-cellular or connective substance through nucleated cells may be observed in the material of granulations, or in that of inflammatory adhesions (whether in a serous sac or in a wound healing by primary adhesion), in inflammatory indurations, and in the naturally developed fibro-cellular tissue of many parts. The process is, with slight and apparently not essential modifications, the same in all.

"The cells first formed in granulations are spherical, palely or darkly nebulous, from about 1/1800th to 1/2500th of an inch in diameter. They contain a few shining, dark-bordered granules, and lie imbedded in a variable
quantity of clear pellucid substance, by which they are held together, and which it is hard to see, unless acetic acid be added. When water is added, it penetrates the cells, and as they swell up their walls appear more distinct, and their contents are diffused. Some cells thus become much larger and clearer, and show in their interior numerous vibrating molecules; others display fewer molecules, but a distinct, round, dark-bordered nucleus, which appears attached to the inside of the cell-wall. Such a nucleus is rarely seen in granulation-cells, unless they are distended with water; acetic acid, acting more quickly than water, brings the nucleus more evidently and constantly into view, and often makes it appear divided into two or three portions."

Having with much minuteness detailed the process of healing by granulations, Paget concludes as follows: "But let me add, that although one may so clearly trace in the development of granulation-cells, and in the end which they achieve by the formation of fibro-cellular tissue and cuticle, an imitation of the natural processes and purpose of the corresponding developments in the embryo, yet is there a remarkable contrast between them, in regard to the degrees in which they are severally liable to defect or error. We can scarcely find examples of the arrests or errors of development of mere structure in the embryo; but such events are quite common in the formation of granulations, as well as of all other new products. All the varieties in the aspect of granulating wounds and sores, which the practiced eye can recognize as signs of deflection from the right way of healing, are so many instances of different diseases of the granulating substance; diseases not yet enough investigated, though of much interest in the study of both the healing process and the organization of new products in inflammation.

"A comparatively few observations enable one to trace
morbid conditions of these new structures, closely answering to those long known in the older and more perfect tissues. Thus, one may find simply arrested development of granulations; as in the indolent healing of wounds and ulcers, whether from locally or generally defective conditions. Herein even years may pass, and the cells will not develope themselves beyond one or other of their lower forms. There is probably a continual mutation of particles among such cells, as in common nutrition; or they may increase, as in growth; but no development ensues, and the wound or the ulcer remains unhealed.

"In other cases, the cells not only do not develope themselves, but they degenerate, becoming more granular, losing the well-marked characters of their nucleus, and acquiring all the structures of the pus-cell; thus are they formed in the walls of fistulae and sinuses. Or, worse than this, the granulation-cells may lose all structure, and degenerate into a mere layer of debris and molecular substance. Thus they may be found on the surface of a wound for a day or so before death or exhaustion, or in erysipelas, or fever; and in this state they are commonly ejected when a granulating wound ulcerates or sloughs.

"With more active disease, granulations become more turgid with blood, or ædematous: such are the spongy masses that protrude beyond the openings leading to diseased bone, or, they inflame; and abundant large inflammatory granule-cells are found among their proper structures, or, they suppurate internally, and purulent infiltration pervades the whole mass.

"All these are among the many hindrances to healing; these are the dangers to which the healing by granulations is obnoxious; it is the proneness to these things that makes it even slower and more insecure than, in its proper course, it might be. And these are all instances of a class of changes which it is most important to study
for exactness in morbid anatomy. I mean the diseases of the products of disease."

"The formation of granulations is not necessarily attended with the production of pus. I have already referred to this fact when speaking of the formation of sub-cutaneous granulations, such as are sometimes seen on the end of bones that do not unite, in the ordinary way, after simple fractures. Mr. Hunter also expressly describes these cases; and the same kind of granulations without suppuration may be sometimes seen springing from the ulcerated articular surfaces of bones, in cases of diseased joint without any external opening. However, when granulations are formed on an open wound, there is always suppuration."

"Pus not distinguishable from that of granulating wounds is formed in many other conditions; as in inflamed serous and mucous cavities, and in abscesses. But the histories of all cases of the formation of pus concur, with that of suppurating wounds, to the conclusion that pus may be regarded as a rudimental substance ill-developed or degenerated; as a substance essentially similar to the materials of granulations, or of the lymph of inflammatory exudation, but which fails of being developed like them, or, after having been developed like them to a certain stage, degenerates.

"To illustrate this relation between the pus and the granulations of healing wounds, I may state that the last figure (in the illustrations) was copied from sketches that I made, at the same time, of some granulation-cells from the walls of a sinus, and some pus-cells from a healthily granulating wound. I chose those sources purposely, that I might be able to compare ill-developed granulation-cells with well-constructed pus-cells; and a comparison of them showed that, whether as seen without addition, or as changed by the action of water and acetic acid, they
were not to be distinguished from one another. Had I not seen the vessels in the tissue that the granulation-cells formed, I might, in the first examination, have almost thought I was deceived in thinking they were not pus-cells. The six varieties of the appearances of the cells which are represented might have been taken from either source; so might some other varieties; but these may suffice to show the apparent identity of structure between well-formed pus-cells and ill-developed or degenerate granulation-cells, such as are found in the walls of sinuses and the like half-morbid structures. I do not mean to say, generally, that granulation-cells and pus-cells cannot be distinguished; for between well-formed granulation-cells, such as are found in healing wounds, and any particles that are usually found in pus, certain distinctions are almost always manifest. The pus-cells are darker, more and more darkly, granular, more various in size, and more various, not in shape, but in apparent structure, more often containing numerous particles, like fatty molecules, more rarely showing a nucleus when neither water nor acetic acid is added, and much more commonly showing a tripartite or ill-formed nucleus under the action of the acid. None, however, of these characters is indicative of essential difference; and between even the widest extremes there are all possible gradations, till distinction is impossible; so that when you place, as I have often done, ill-developed or degenerate granulation-cells, on one side of the microscope-field, and pus-cells on the other, there is not a form of corpuscle on the one side which is not repeated on the other.

"From this, one cannot but conclude that the cells of pus from wounds are ill-developed or degenerate granulation-cells. Some of them may be degenerate, i.e., they may have been, as granulation-cells, attached for a time to the surface of the granulation-layer, and having lived
time, may, in ordinary course, have been detached and shed, as epithelial cells are from healthy surfaces. They may be thus detached after more or less degeneration, and hence may result some of the modifications that they present. But some pus-cells, I imagine (at least in the healing of wounds), may be ill-developed; that is, imperfectly formed of material which exudes from the surface of the granulations, and which, being exposed to the air, or being too remote from the supply of blood, cannot attain its due development, and, in an imperfectly developed state, is soon cast off. It cannot but be that organizable matter is constantly oozing from such a surface as that of granulations; but the conditions into which it enters on that surface are such as are very likely to hinder any but the lowest or some imperfect organization.

"The many characters of imperfection or of degeneracy that pus-cells show, accord with this view; such as the general imperfection of their nuclei; the frequent abundance of fatty-looking granules in them; the large quantity of fatty matter that analysis detects in pus; and the limitation of the cells to certain forms, beyond which they are never found developed, though none of these forms is more highly organized than that of the youngest or most rudimentary granulation-cell.

"A further confirmation of the opinion that pus-cells are ill-developed or degenerate granulation-cells, is furnished in the cases, to which I shall hereafter refer, in which pus-cells are produced after, or together with, inflammatory lymph-cells; as in abscesses, inflamed membranes, and the like. Now such lymph-cells are not distinguishable in apparent structure from granulation-cells, and, like these, they may show every gradation of form to that of the pus-cell.

"But it is not only in the cells that we may trace this appearance of the degeneracy or incomplete development
of pus. It is equally shown in the fluid part, or *liquor puris*, which, unlike the intercellular substance of granulation and inflammatory lymph, is incapable of organization, even when, by evaporation or partial absorption, it assumes the solid form. The liquor puris answers to the solid ororganizable blastema of granulations; and as undue liquidity is among the most decided marks of ill-formed pus, so the abundance of the blastema, in proportion to the cells, is one of the best signs that granulations are capable of quick development."

I have thus freely quoted from the work of Paget, in order that I might give you his views in his own language. I could have substituted none more concise and graphic, and I think that you will agree with me that he has satisfactorily demonstrated that pus is not formed at the expense of the surface upon which it is found; that it does not exude already formed from the blood vessels; that it is not the result of an act of secretion; but that it is really formed on the surface upon which it occurs, out of materials poured upon it by the capillaries.

It would now be interesting to determine whether any good end is attained by the formation of pus, or, in other words, what are the uses or purposes of suppuration. We may understand that the tender granulations may be somewhat protected by the pus, especially if this be of good character and be permitted to form a scab by drying. But beyond this I can conceive of no good it can accomplish. In abscesses and phlegmonous inflammations it would rather seem to constitute the disease, and, as such, can hardly be regarded as salutary, unless by the visionary advocates of an obsolete pathology, who considered all discharges beneficial, by eliminating supposed impurities of the blood. It is true that when splinters or other foreign bodies are introduced into the tissues, a process of elimination is set up, characterized by suppurative
Inflammation and ulcerative destruction, by which an exit is made for the extraneous material. But, even in these cases, the formation of pus is only incidental to the other acts of inflammation, and the expulsion of the offending object might be secured by the liquified detritus of broken down tissues, without necessarily involving the formation of any genuine pus.

With regard to the effects of suppuration upon the healing of wounds, ulcers, etc., it must be obvious, that, inasmuch as pus results from an abortive attempt at the organization of granulations, these must be retarded in their evolution in a direct ratio with the quantity of pus formed. Without this interrupted organization there would be no pus formed. Hence it is that any course by which we may impede the formation of pus, must favor the development of granulations, and vice versa, by provoking suppuration we must retard granulation.

The materials constituting pus, being confessedly derived from the blood, and we may add, from the most important elements of the circulating mass, it follows that the quantity of pus daily discharged must be the measure of the tax upon the blood to which the patient is subjected. And, if it be true that the daily loss of even a small quantity of blood must ultimately impair the general energies of the system, we have the ready solution of the problem of the injurious effects of long continued suppuration. The hectic fever, night sweats, emaciation, diarrhoea, loss of appetite, etc., which so often accompany extensive or protracted suppuration, all clearly indicate the radical injury done to the great pabulum of life. The patient has to contend with the combined influence of the irritation attending inflammation and of the drain upon the circulation, which is thus being continually impoverished. Hence the difference between the effects of this drain, and those of daily or often repeated hem-
orrhage, by which the patient may be rendered anemic without hectic fever and its concomitants. Instances in illustration of this difference very often present themselves in individuals affected with bleeding hemorrhoids, who lose more or less blood almost every day. Their whole system testifies to the injurious effects of such repeated loss of blood; they become anemic and all their energies are impaired in proportion to the degree of anemia; but they have very few of the symptoms which characterize the injurious effects of protracted suppuration.

Another element of constitutional injury arising from suppuration, is to be found in the fact that pus, or some of its combinations, occasionally find their way into the circulation, so as to contaminate it to a greater or less degree. It has often been argued that pus cannot be absorbed, because its cells are too large to pass into the veins or lymphatics, unless these be opened by accident or diseased action. This may be true, and yet these pus-cells may themselves become dissolved or otherwise destroyed, so as to enter the circulation in this altered condition; or portions of the liquor puris, which is not amenable to this objection, may become so vitiated as to give rise to injurious consequences when absorbed. Now the degree of poisoning to which the blood is thus exposed may, and probably does, vary from the slightest to the most overpowering effect. Hence it is that, while suppuration, even considerably protracted, may exist without seriously implicating the general condition of the system, there are instances in which hectic fever is induced, and others in which the purulent infection, so called, proves speedily fatal; the victim dying with all the symptoms of blood poisoning by animal matter.

While the beneficial effects of suppuration are therefore very problematical, it is quite evident that the formation
of pus is fraught with mischief in very many instances, and that it should be regarded as a disease demanding our most serious attention. Instead of yielding to the popular error, that suppuration is necessary to the process of healing, we should, on the contrary, look upon it as one of its injurious complications, and endeavor to lessen it as much as possible, if we cannot altogether prevent it; we should also use such means as may prevent it from assuming the condition of a poisonous material which may contaminate the whole economy. Let us recollect that pus is the result of an abortive attempt at organization, and that, when once formed, it may, more or less readily, undergo the putrefactive process; and we shall at once perceive the propriety of a resort to antisepsics, for the double purpose of lessening the tendency to suppuration, and of preventing the decomposition of the pus after it has been formed.

Among the antisepsics of the Materia Medica, there are some which exert a much greater influence in lessening suppuration than others. It would perhaps be well to designate these as anti-pyogenics, for the purpose of drawing attention more forcibly to them than has heretofore been done. As an anti-pyogenic, chloride of soda (Labaraque’s solution), stands pre-eminent. For some unaccountable reason, that prepared by the French is incomparably superior to any made in the United States, and should therefore always have the preference. The printed directions which accompany the French bottles may, however, lead into error with regard to the strength to be used for lessening suppuration, as they refer principally to the dilution proper in cases of mortification. I find that half an ounce of French chloride of soda in a quart bottle of water, will usually make a solution of the proper strength for our purpose. A safe rule is never to make it so strong as to be painful when applied; for if too strong it will act as a powerful irritant, and increase, instead
of lessening, the suppuration; made of the proper strength, the solution should be used as a wash, once or twice a day, and the lint of old linen used in dressing should be kept wet with it.

A solution of alum (two to four grains to one ounce of water), or of tannin (one or two grains to one ounce of water), and the vegetable infusions containing tannin as the active principle, especially the red oak bark infusion, will all be found beneficial—but they must not be used too strong. I have derived much advantage from the use of tar water, which can be procured upon any of our plantations. This is prepared by simply pouring a gallon of hot water upon a gill of pine tar, and stirring it a little. The water will soon become saturated, and may then be used without further dilution, in the same way as directed for the diluted solution of chloride of soda. I may here add that it is the best disinfectant I know of in hospital gangrene, and altogether, I think, the best application.

In conclusion, I must urge upon you to watch the condition of the system whenever you have to treat wounds or diseases attended with suppuration, so as to detect the first inroads upon the general stamina. The patient should be sustained by good and nutritious diet, and any constitutional deterioration should be promptly met by tonics; the best of which, under such circumstances, is the muriated tincture of iron. This should be administered three times a day in doses of from twelve to fifteen drops in a tumblerful of sweetened water. You should give it thus largely diluted, in order that it may not offend the stomach, as it would be very apt to do if given in a more concentrated form. It may be taken either before or after eating, as the patient may prefer. The tartrate of iron and potash, so highly recommended by some, is apt to act upon the bowels, and thus defeat our object. A moderate allowance of malt or alcoholic liquor is usually
beneficial, and always necessary in the treatment of those addicted to intemperance.

P. S.—Since the delivery of this lecture, I find that Professor Polli, of Milan, has called the attention of the profession to the treatment of zymotic diseases by the alkaline sulphites; and the experiments made by him with this new class of remedies, seem to indicate that they would be of great value in purulent infection or pyemia. Sulphite of soda is given in doses of thirty grains, three or four times a day, in water. It is well worthy of trial, especially as it is said to be perfectly harmless.

---

**ARTICLE V.**

*Notes upon the History of Hospital Gangrene.* By Joseph Jones, M. D., Professor of Medical Chemistry, in the Medical College of Georgia, at Augusta.

It is impossible to determine the time of the first appearance of Hospital Gangrene. The records of the ancients furnish only negative testimony: that is, we are not justified in asserting that this disease had never appeared amongst the wounded of the immense armies of the ancients, simply because a description is not preserved in the fragments of their writings which have come down to us. Not only have many of the works of the ancients been lost, but it would also appear, that amongst some of the greatest nations of antiquity, it was impossible that any accurate history of diseases could have been written, because of the absence of both medical science, and of physicians devoted to the treatment of diseases. Thus Herodotus affirms, that the Assyrians, even at the time of the greatest splendor and power of the Babylonian Empire, had no physicians; but were in the habit of exposing the sick in the market place, that
they might confer about their diseases with the passing multitude. If the passers by had themselves been afflicted with the same disease, as the sick person, or had seen others so afflicted, they advised him to have recourse to the same treatment, as that by which they escaped a similar disease, or as they had known to cure others.

Herodotus also relates, that amongst that nation of the Indians called Padæans, who were cannibals, it was the custom when any one of the community was taken sick, whether man or woman, for the nearest connections to put the sick person to death; and they justified this barbarous treatment, on the ground, that if the sick person wasted with disease his flesh would be spoiled. Those attaining old age, were in like manner sacrificed and devoured. Herodotus adds, that few amongst them attained to the state of old age, for before the limit of life was reached, every one had been destroyed in consequence of some distemper.

Whilst it may be true, that in the early ages of the world, there could not be much occasion for medical science, on account of the simplicity of manners, and plainness of diet, and temperance in meat and drink, and the active pastoral life of the first inhabitants; and that as the world became more populous and the people were gathered together in crowded cities, various epidemic and contagious diseases appeared, which were before unknown: at the same time, it is in like manner true, that, the texture and materials of construction and scarcity of the clothing of the ancients, tended to the generation and propagation of various contagious diseases, and especially of skin diseases. Reasoning from our present knowledge of the mode of origin and propagation of Hospital Gangrene, we are led to infer, that in equal numbers of wounded in ancient and modern times, the more vigorous constitutions and more simple habits of
the former, as well as the custom of sleeping in the open air, without tents or houses, would greatly tend to prevent the occurrence of such diseases as Erysipelas and Hospital Gangrene; while on the other hand, the scanty supply of suitable materials for dressing and cleansing the wounds, would tend to promote the origin of these diseases, even when the wounded were kept in the open air.

As far as our knowledge of the immense armies of the ancients extends, we are led to believe that they were subject to very much the same forms of fever, bowel affections, and pestilence, generated by the collection of large masses of human beings, which afflict modern armies. Thus we find numerous allusions to the pestilence amongst armies, and in beleaguered cities in the sacred writings of the Hebrews; and Homer opens the Iliad with an account of a fatal pestilence in the camp of the Achæans, which sent many gallant souls of heroes to hades, and made their carcasses a prey to dogs and birds of prey. Herodotus relates that during the hasty retreat of Xerxes from Thessaly to the Hellespont, a large portion of his army perished from hunger, dysentery, and pestilence. Pliny, in his "Natural History," refers to a disease, called by medical men, stomucæae and sceloturbe, characterized by loss of the teeth, and total relaxation of the joints of the knees, which afflicted the army of Cæsar in his German campaign, and which from its cause, symptoms, and method of cure, appears to have been the scurvy. This disease appeared in a Roman camp, beyond the river Rhenus, near the sea. The water was brackish, and the only fresh water to be obtained, was from a spring in the vicinity of the sea. The habitual use of this water for two years, caused the loss of the teeth and general debility. A remedy was discovered in the plant known as the Britannica, which Sprengel and Desfontaines identify with the Rumex aquaticus, and Fée
with the Inula Britannica, of Linnaeus. It is probable that the Romans were not unacquainted with scurvy, and with the best means of preventing this disease; for they are said to have constantly carried vinegar and wine with their fleets and armies, and even the common soldier and sailor daily partook of both. These facts are of interest, for in modern fleets and armies, scurvy has often been associated with the most dangerous forms of Hospital Gangrene. We might multiply these examples by reference to the pestilential fevers which afflicted the Grecian and Roman armies at various times, but our limited space will not permit of farther illustration of the similarity of diseases in ancient and modern armies.

The strongest argument against the ancient existence of Hospital Gangrene, lies in the fact, which is well established by the writings of the Hebrews, of Homer, Herodotus, and many others, that notwithstanding the immense armies of the ancients, and the immense slaughter which took place in their battles, the dead being numbered by tens and even hundreds of thousands, at the same time, there were few or no wounded who survived the immediate conflict. The contending armies of the ancients came to close quarters and engaged in desperate hand to hand fights. In such contests, it was difficult, if not impossible, to remove the wounded from the field of battle; and as soon as an adversary had wounded or disabled his antagonist, he followed up his advantage, and did not desist until his victim was slain and robbed of his armor.

The qualifications of the ancient warrior were very different from those considered essential in modern times. The rigid discipline and mechanical movements of modern armies, appear to have been less practiced, if not unknown in ancient times; and the success of the ancient warrior depended chiefly upon his strength and presence of mind, personal bravery, experience in the use of weapons, bodily
strength and agility. The eye of the ancient warrior acquired an animation, his countenance an expression of fierceness and eagerness, and his voice a power and variety of cadence, and his whole frame a degree of athletic force and energy unknown amongst the comparatively sluggish and mechanical masses of modern armies.

Thus Homer describes the Trojans, as advancing to battle with a clamor and a shout, like the scream of cranes, when flying from winter and excessive rains, they wing their way over the floods of Oceanus, carrying death and destruction to the Pigmies; while the Grecians moved on in silence, breathing forth valor; and as the south wind spreads a mist upon the brow of a mountain, by no means agreeable to the shepherd, but to the robber better than night, in which a man sees as far only as he can cast a stone, so rose the troubled dust under the feet of the hostile hosts, as they rushed across the plain. When Alexander advanced in front of the Trojans, with the skin of a panther on his shoulders, and shaking two brazen spears challenged the chief of the Grecians to mortal combat, Menelaus perceiving his adversary advancing with long strides, rejoiced like a hungry lion, who lights upon a huge carcass, and burning with revenge, leaped from his car to the ground.

Again, in the second meeting of the hostile armies, Homer compares the advance of the columns of the Grecians to the rushing of waves upon a resounding shore, which rising in the deep water, and urged on by the winds, are dashed against the shore, roaring and swelling and curling around the rocks. When advancing on both sides, the armies meet, the spears and bossed shields and brazen corselets are dashed together; the earth flows with blood, and the shriek and the shout of the slaughtering and slaughtered warriors mingle together.
as when the torrents of winter rolling down the steep mountain from their vast sources, pour together their foaming waters in some lake, within the hollow glen.

The description by Homer, of the personal conflicts of the individual warriors, still more forcibly illustrates the deadly and ferocious nature of ancient battles, and explains the reason of the disparity between the wounded and the slain. The Grecian Antilochus, was the first who slew a Trojan warrior—his brazen spear struck the cone of the helmet crested with horse hair, and pierced the helmet and bone within. Elephēnor, the leader of the Abantes, seized Echepolus by the feet as he fell, and dragged him from amongst the weapons, that he might plunder him of his armor; but his eager efforts were short, for Ageōnor seeing him dragging the body, thrust his brazen spear into his side, which was uncovered by his shield as he stooped. Over the dead body of Elephēnor, the Trojans and Grecians rushed upon each other like wolves, and engaged in deadly strife. Here the Telamonian Ajax, with his spear, struck upon the breast near the right pap, Simocisius, a noble and vigorous youth, and the brazen spear went to the opposite side through the shoulder. Antipus, a son of Priam, then hurled his sharp javelin at Ajax, and missing him wounded Leucus, the comrade of Ulysses, as he was dragging the body of the youthful warrior to the other side, and the body dropped from his hands, and he fell upon it. Then Ulysses, enraged on account of the slain, armed in glittering brass, advanced amongst the foremost combatants, and threw his shining spear, which struck Democoon, a bastard son of Priam, upon the temple, and the brazen point passed through the other temple, and his armor rang upon him as he fell with a crash. Hector and the foremost warriors then giving way, the Argives loudly shouted, dragged away the dead bodies for plunder and rushed forward. After the Trojans
had been rallied by Apollo, who had been looking on from the Citadel of Troy, the battle was renewed with increased fury. Perios the leader of the Thracians, hurled a large rugged stone which struck the right leg of Diores, near the ankle, and crushed the tendons and bones. As Diores fell in the dust, with both hands stretched out to his comrades, Perios rushed upon him, and plunged his spear into his bowels, so that all his entrails gushed out upon the ground. Thoas, the Ætolian, rushed upon Perios, and drove his spear through his breast into his lungs, and jerking the spear from his breast, and drawing his sharp sword, plunged it into his belly, and in turn deprived him of life. But Thoas did not strip his fallen foe of his armor, for the Thracians closing over the dead body, drove him back.

And in a similar manner Homer describes the fierce and bloody contests of many other of the Grecian and Trojan heroes, and has thus given a graphic, and as far as the testimony of other writers extends, a truthful picture of ancient battles.

It appears, therefore, that in the battles of former times, few or no wounded survived, and the prisoners which were captured, were either immediately destroyed or sold as captives. In the wars carried on between the Israelites and the surrounding nations, persons of rank, were frequently reduced to the most degrading slavery, some prisoners were put under saws and harrows of iron, and made to pass through the brick kiln, others were beheaded or mutilated in various ways, mothers were murdered with their children, pregnant women were ripped up, and infants were dashed against the stones. And amongst the Romans, prisoners were frequently sold to the infamous schools for gladiators.

The time at which regular army Surgeons were first employed, as well as the date of the establishment of
Hospitals, for the treatment of wounded and sick generally, are points of interest in the discussion of the origin of Hospital Gangrene.

With the Hebrews as well as among the Egyptians, the art of healing was committed chiefly to the Priests. Moses, who was reared in the Court of the Prince of Egypt, and instructed in all the knowledge of the wise men, and of the learned Egyptian Priesthood, has left a most valuable monument to the history of medicine. The writings of this great law-giver and statesman, contain hygienic rules of the highest sagacity designed to regulate not only the intercourse of the sexes, but also to prevent the origin and spread of contagious diseases amongst the hosts of Israel. As the Hebrew Priests accompanied the armies to battle, it is probable that their ministrations to the wounded were of a physical as well as of a spiritual nature. The careful precepts of the Hebrews regarding cleanliness, in all, whether healthy or diseased, as well as the free use of oil and wine on wounded surfaces, would appear to have been eminently calculated to favor the speedy recovery of the wounded, without the supervision of the diseases which so often infest modern Military Hospitals. The instructions of Moses, regarding the signs of the leprosy, and other contagious diseases, and the measures to be adopted to prevent their origin and spread amongst the people, are certainly most accurate and minute. Many of the expressions of the sacred writers, as those of Job, indicate that they were acquainted with unhealthy and even gangrenous sores and wounds; and some of these descriptions would apply with force and accuracy to the severest forms of Hospital Gangrene.

That physicians frequently accompanied and ministered to the leaders of armies, at an early period, may be established by many facts. Thus Homer, in his account of the
wounding of Menelaus by the barbed arrow of Pandarus, represents the King Agamemnon as calling for a Surgeon to probe the wound, and apply medicaments to allay pain. Machaon, son of the famous Æsculapius, who in response to the call of Agamemnon, extracted the arrow, squeezed out the blood, and sprinkled upon the wound soothing medicaments, which Chiron of old had kindly given to his father, is presented by Homer in the light of a warrior and hero, as well as of a Surgeon. According to Plutarch, Alexander the Great was assisted in the study of Physic by Aristotle, and not only loved the theory, but also the practice, and prescribed for his friends medicines and a proper regimen. And it is evident from the account given by the historian, of the illness of the great Conqueror, in Cilicia, supposed to have been caused by bathing in the cold waters of the river Cydnus, that Alexander was accompanied by regularly appointed physicians. The physicians are represented as consulting together, fearing to administer medicine to the King in his dangerous illness, lest in case of a fatal termination, they should be accused of poisoning; and the life of Alexander was said to have been saved by the bold and timely ministrations of Philip the Acarnanian physician. The fears of the physicians appear to have been well-founded, for Alexander himself crucified the physician Glaucus, after the death of Hephæstion, a favorite soldier and officer, who when sick of a fever, took the opportunity whilst Glaucus was gone to the Theatre, to eat a roast fowl and drink a flagon of very cold wine, in consequence of which he grew worse, and died a few days after. It is clear, also, from Herodotus, that Darius kept around him the most learned physicians of foreign countries. Shortly after the overthrow of Orcetes the Persian, Darius in leaping from his horse, while hunting, twisted his foot with such violence that the ankle-joint was dislo-
cated. Thinking that he had about him those of the Egyptians who had the first reputation for skill in the healing art, Darius made use of their assistance; but by twisting the foot and using force, the Egyptian physicians made the evil worse; and the pain was so great that he lay seven days and nights without sleep. On the eighth day, as the King still continued in a distressed state, some one who had before heard of the skill of Democedes the Crotonian, made it known to Darius, who ordered him to be brought as quickly as possible. This physician by using Grecian medicines, and applying lenitives after violent remedies, caused the King to sleep, and in a little time restored him to health, though he had before despaired of ever recovering the use of his foot. The surgical skill of Democedes was still farther attested by the cure of Atossa, daughter of Cyrus and wife of Darius, who had a tumor on her breast, which after some time burst and spread considerably. As long as it was small, she concealed it, and from delicacy informed no one of it; when it became dangerous she sent for Democedes.

It would appear that at a comparatively remote period, the Roman armies were furnished with regularly appointed physicians, with determinate duties. Medicus cohortes and Medicus legionis are said to appear in ancient inscriptions; and Salmasius, in noticing a passage about an army physician, exercitus medicus, in the work of Achilles Tatius, who lived about the third century of the Christian era, says that each cohort had in general a physician. In the sixth century the emperor Mauricius had attached to his army deputati, who were distributed amongst the cavalry, and were obliged to carry off their wounded in battle. They had on the left side of the saddle two stirrups, in order that they might more easily take up the wounded behind them; and for every person thus saved they obtained a certain reward. They were also obliged
to carry a bottle of water, for the purpose of reviving those who might have fainted through loss of blood. The emperor Leo VI, in the ninth century, mentions besides the officers necessary for each band or company of a regiment, the deputati, physicians, and attendants on the sick.

We know but little beyond the bare fact that the Roman armies were provided with a medical staff, and little or nothing of the diseases of the sick and wounded soldiers who fell to their care.

The employment of appointed physicians in armies, appears to have fallen into disuse, with the decline of the Roman power; and the first Christian armies of the middle ages appear to have been without any medical organization; the various celebrated physicians who were present at the battles and sieges of those times appear to have served not in an official capacity, as army surgeons, but as soldiers. It was not until the fifteenth century that the attempt was made to furnish some of the European armies with medical organizations. In fact, notwithstanding the efforts of the Germans, and of Henry V, of England, and of Ferdinand and Isabella, of Spain, no very efficient organization was established, until the time of Gustavus Adolphus, who appointed four surgeons to each regiment, which he reduced from the number of two or three thousand, first to twelve hundred, and afterwards to one thousand and eight. We cannot look to the barber surgeons, to whom these armies were entrusted, for any very accurate accounts of the various diseases.

As far as our knowledge extends, there were no organizations for the treatment of sick and wounded soldiers and of the sick generally amongst the ancient Greeks and Romans, corresponding to the military and civil hospitals of the present day. When the sick were carried to certain temples, as that of Æsculapius, they received no
special medical attention, and looked to supernatural means entirely for restoration. The view that the *taberna meritoria* was a house or hospital, in which Roman soldiers disabled by wounds, or worn out by the fatigues of war, were received and cared for, does not appear to be well founded. That the Grecians and Romans paid some attention to the welfare of their soldiers, rendered unfit for service, either by wounds or old age, is evident from the fact that Solon deducted something from the pay of soldiers, and employed it for the education of children whose fathers had fallen in battle, in order that others might be encouraged to bravery; Pisistratus made an order that those who had lost any of their limbs in war, should be maintained at the public expense; and many instances may be found, some of which occur in the Justinian and Theodosian codes, of the attention paid by the Romans to their *milites causarii*, who were not only exempted from taxes, but frequently obtained lands, and cattle, and money, and were sometimes assigned over, to be taken care of by rich families and communities.

Hospitals, as well as many other honorable and benevolent institutions, were first introduced by Christianity. In the fifth century, Fabiola, a Roman lady, the friend of St. Jerome, is said to have built one of the first houses for the reception of the indigent sick. As soon as pilgrimages to holy places, and especially to Palestine became customary as a part of religion, it was found necessary to build numerous resting places, in which both the well and the sick might find entertainment. Brotherhoods were formed in the Holy Land, towards the end of the eleventh century, which undertook to provide for the wants of sick and indigent persons, and became richer and more numerous as the Crusades increased. Opulent persons when dying, bequeathed their property to these brotherhoods; and in this manner the hospitals in Palestine were con-
structured on a large scale, and were provided with better accommodations than those in Europe. They were even considered as models, and princes and rich persons returning safe from their pilgrimages caused similar ones to be established in their own countries.

The oldest hospitals, therefore, with the exception perhaps of the institution founded in Persia, by some Nestorian priests as early as the seventh century, were established chiefly under the direction of the clergy, for the convenience and accommodation of the well rather than of the sick; and hospitals exclusively devoted to the treatment of the sick, with appropriate medical officers, were not established until the eleventh century. In fact, in many of the large hospitals, long after the beginning of the eleventh century, there was no regular medical organization, and in the large hospitals of Jerusalem, the knights and brothers attended the sick themselves, and bound up each other's wounds, and exerted themselves to obtain the best balsamic mixtures; and in the houses for the sick, belonging to the order of Templars, the duties of physicians and surgeons were not defined until near the middle of the fifteenth century. Many of the older European hospitals now existing, are said not to date back beyond the seventeenth century, and the Hôtel des Invalides, of Paris, was not commenced until the year 1670, by Louis XIV, and the English hospital at Chelsea was founded by Charles II, in 1682.

From the facts which we have now presented, concerning the mode of warfare of the ancients, the imperfection of their medical knowledge, and of their arrangements for the treatment of the sick of their armies, and the comparatively modern origin of military and civil hospitals, we are justified in the assertion, that the mere absence of special descriptions of this disease in the writings of the ancients, is no proof that Hospital Gangrene is not a
disease of great antiquity. The essential conditions for the origin and spread of this disease were frequently present in ancient times.

Pliny, in that portion of his Natural History which treats of the remedies derived from plants and animals, has mentioned various ulcers; as phagedæna, which he describes as an ulcer of the corrosive kind; malignant ulcer cacœthes; serpiginous ulcers, the cure of which, Pliny considers more than doubtful; corrosive sores; putrid sores; callousities or putrid sores; corrosive sores known as nome; defluxions; aposthemes; sordid ulcers; suppurations; abscesses; fistulous ulcers and gangrenes; also, contused and incised wounds, and simple and compound fractures. Pliny also recommends various remedies, as the juice of the Tilhymalos Characias, bull’s gall, leek juice, woman’s milk, bull’s blood dried and pounded with the plant Cotyledon, and ashes of cow’s hide mixed with honey, for the cure of gangrenous, phagedænic sores, and putrid ulcers.

Mr. Blackadder has shown in his “Observations on Phagedæna Gangrænosa,” that several of the ancients in their descriptions of foul gangrenous bleeding ulcers, must have alluded to the same kind of disease, which is now usually denominated Hospital Gangrene. Besides the use of the actual cautery, several of the old writers, as Ætius, Paulus, Rolandus, Avicenna, Guido, and others, appear to have employed for the cure of such ulcers, arsenical applications.

Parée, more than two hundred and fifty years ago, says that, in siege of Rouen, the air was so noxious that no wound healed; and the besieged, finding that all their wounds became gangrenous, reported that the besiegers had poisoned their balls; the besiegers, also, seeing none but putrid sores in the camp, believed that their wounds were poisoned; and both within and without the city,
such was the state of the air, and so putrid were all the wounds, that the surgeons could scarcely look upon the sores, or endure the smell; and if they neglected them for a single day, they found them full of worms. Parée complained that in the Hotel Dieu, sores would not heal, and no operations could be rightly performed. And, after him, Diorus, more than one hundred and fifty years ago, protested against performing operations in the Hotel Dieu; and advised that an hospital should be built in the environs of the city, for those who were wounded or required operations. And other army surgeons of former times have remarked, that in some seasons, those wounded in battle, and those operated upon became afflicted with gangrene; and however trifling the wounds at first sight might be, the patients usually fell victims to the gangrenous affections which ensued. Lamotte, in 1722, mentions Hospital Gangrene as being known in the Hotel Dieu, of Paris, by the name of La Pourriture, and as a disease which attacked the wounds inflicted by operations, and the ulcers and abscesses of those who breathed the corrupted air of this hospital.

The first description of Hospital Gangrene, as a distinct disease, appeared in 1783, in the third volume of the posthumous works of M. Pouteau, chief surgeon to the Hotel Dieu, of Lyons. The attention of this author was directed to the disease, by having been himself affected with it while employed as dresser in the hospital. M. Dussassois, the successor of Pouteau, in the same hospital, published in 1788, an account of this disease in a pamphlet of about ninety pages. This was followed shortly after, in 1796, by a small pamphlet upon this disease, by Moreau and Burdin. According to Dr. John Thomson, who published near fifty years ago, a valuable chapter on "Hospital Gangrene or malignant ulcer," in his "Lectures on Inflammation," the first accurate account
of this disease published in the English language, appeared in the sixth volume of the London Medical Journal, in 1785, and was entitled "Observations on the Putrid ulcer, by Leonard Gillespie, surgeon of the Royal Navy." Dr. Thomson regards the sore described by Dr. Rollo, in his work on Diabetes published in 1797, in the section, "A short Account of a Morbid Poison, acting on sores, and of the Method of Destroying it," as one and the same disease with Hospital Gangrene.

Various writers have recorded observations upon Hospital Gangrene, as:


Observations on Hospital Gangrene occur, also, in the various systematic treatises on Surgery, and in the numerous medical journals of Europe and America, under the head of Phagedéna, Putrid or Malignant Ulcer, Hospital Gangrene, Hospital Sore, Gangræna Contagiosa.
An Anatomical Controversy. The Distribution of Nerves to Voluntary Muscle, including the Discussion of the following Questions: Do Nerves Terminate in Free ends? Or do they invariably form circuits and never end? By Lionel S. Beale, M. D., F. R. S., Fellow of the Royal College of Physicians; Physician to Kings College Hospital; Professor of Physiology and of General and Morbid Anatomy in Kings College, London. (Reprinted from the Archives of Medicine. London: John Churchill and Sons, 1865; p. 38. Plates 6.)

The author of this "Anatomical Controversy," is well known to the profession by his works "On Some Points in the Anatomy of the Liver of Man and Vertebrate Animals, with Directions for Injecting the Hepatic Ducts, and making preparations;" "The Microscope and its application to Clinical Medicine," and by his various papers upon the minute anatomy of certain organs, published in the "Archives of Medicine."

In a paper upon the distribution of nerves to the voluntary muscle of vertebrate animals, published in the Philosophical Transactions of 1860, p. 611, Dr. Beale arrived at conclusions which were opposed to the views entertained by most authorities, especially Kölliker, Gerlach, and Kühne. This paper was followed by a communication from Kühne, in which he supported, by investigations upon the breast muscle of the frog, conclusions advanced by him previous to the publication of Dr. Beale's paper, in favor of the view, that the nerves in insect muscle terminate in ends beneath the sarcolemma, and are in fact, continuous with rows of nuclei which lie among the contractile tissue.

Kölliker, a month after Kühne's paper appeared, put forward a memoir in which he agreed with Kühne as to the termination of the nerves by ends, but with Beale as to the fine nerve fibres being upon or external to the sarcolemma, instead of penetrating through this membrane and coming in contact with the contractile tissue.

Here then are three utterly incompatible inferences with reference to the termination of the nerves: 1. That the nerves terminate in ends external to the sarcolemma; 2. That the nerves
terminate in ends beneath the sarcolemma; 3. That the nerves do not terminate at all. It might be said that all are wrong; but it is an absolute necessity that two are wrong, since no two of the preceding arrangements can coexist.

Notwithstanding the appearance of many new memoirs upon this subject in 1862, 1863, and 1864, the views of which as a general rule differ from those of Dr. Beale; this microscopist does not yield; "for the simple reason that I have seen what I have figured, and have indeed found no difficulty in following fine fibres structurally continuous with dark-bordered fibres for a long distance beyond the point where Kühne, Kölliker, and others, make them end. Moreover, my specimens show the arteries and capillaries as well as the nerves, and I have now worked at this anatomical point so long and so hard that I have a right to ask that my opponents should prepare the specimens by the same process that I have followed, and give drawings of what they observe. I would then reply by giving drawings of the very same structure, showing what I have seen. Independent observers would then be in a position to judge between my opponents and myself." We consider this proposition of Dr. Beale as just, and as calculated to settle definitely some of the most difficult and important questions in anatomy and physiology.

Our knowledge of the minute anatomy of many organs, is at present, by no means as perfect as we have every reason to believe that it will be in the future, by the aid of the improved instruments and methods of microscopical research. Up to a comparatively recent period, the methods of preparation, as well as the character of the optical instruments employed, were unsuited to the accurate determination of the mode of distribution of the nervous fibres, in such structures as the papillae and tactile bodies of the skin, in the Pacinian bodies, in the retina and cochlea, and in the mucus membrane of the nose and mouth. Thus Geber in his efforts to determine the ultimate distribution of the cutaneous nerves, overcame the opacity of the cutaneous tissue of man and quadrupeds, by boiling portions of skin, and then steeping them in oil of turpentine, until they were rendered transparent; and Krause in similar investigations, treated the skin with nitric acid;
and many of these violent modes of boiling and coagulating and 
metamorphosing and coloring with strong chemical re-agents, are 
still used in microscopical investigations, into pathological as well 
as anatomical or normal structures.

In all future anatomical discussions, of difficult questions, the 
method of preparation as well as the power and character of the 
instruments employed, should be so fully and emphatically stated 
that the observations may be repeated and the drawings subjected 
to that critical scrutiny which the importance of the subject 
demands.

We look with great expectations to the application of the art of 
photography to the correct representation of the minute anatomy 
of structures. Whilst it is true, that no mere photograph can 
ever convey the knowledge acquired by patient and intelligent 
microscopical investigation of delicate structures viewed in thous-
ands of varying attitudes and lights; at the same time the 
photograph when perfect, will tend to correct those regular dia-
grams so beautifully executed by some anatomical artists, and will 
also tend to expose the errors of those who are able to make the 
anatomical structures which they delineate, correspond exactly to 
the pre-existing theories of their minds.

In the paper now under consideration, Dr. Beale claims that he 
has demonstrated:

That the nerve fibres passing to a muscle, divide at length into 
a vast number of exceedingly fine, pale granular fibres, which 
ramify upon the external surface of the sarcolemma, connected 
with which fibres at certain intervals, are oval nuclei, and that 
these fine fibres, after an extensive and in many cases very circuit-
ous course are continuous with other fibres to form dark bordered 
fibres, which at length pass toward the nervous centre, either in 
the same bundle as the dark-bordered fibres passing toward the 
muscle, or in other bundles.

It therefore follows, that of the dark-bordered nerve fibres 
distributed to a muscle, some pass from the nervous centre toward 
the muscle, some from the muscle toward the nervous centre, and 
that the nerve fibres do not end in the muscle at all. The results 
of these researches considered in connection with those arrived at
from the investigation of various kinds of nerve centres, justify
the inference that the fundamental arrangement of a nervous
apparatus, is a complete and continuous circuit. These observa-
tions of Dr. Beale, the importance of which cannot be over-
estimated, as they involve the typical arrangement of every
nervous instrument, show therefore, that so far from their being
distinct ends to nerves, that in all cases complete circuits exist;
and that in these circuits are included central nerve cells, and
peripheral nerve cells generally termed nuclei, which are connected
by intervening fibres. The course of any given fibre may be
extremely complicated, and there may be many minor circuits
connected with the greater one, but in all cases there is a circuit
—a nerve never ends.

The importance of these results are seen in a clear light, when we
attempt to apply them to the explanation of certain nervous
diseases.

Thus if we attempt to apply these anatomical facts to the expla-
nation of Traumatic Tetanus, we observe—

1st. The nerves in their ultimate branches and ramifications,
form a network of great complexity and of immense extent.

2d. Within this extended network, and connected by both
efferent and afferent nerves, with the central ganglia, are potential
elements, true nerve-force generating cells.

3d. A local injury or irritation is capable of producing a state
of super-functional activity in the nerve cells of the periphery of
the sensative and motor nerves. As these nerve cells exist in
immense numbers even in comparatively small portions of struc-
ture, and as they are within the same closed circuit with the nerve
cells of the gray matter of the cerebro-spinal axis, a state of
super-functional activity or of irritation, might be readily trans-
mittted from the periphery to the central ganglia. Thus a local
nervous exaltation of nervous function in the peripheral ganglionic
nuclei, is capable of propagating itself, first to the nervous cells
included in its own peculiar circuit, and from these latter, through
the channels of intercommunication, to the various segments of
the spinal axis.
It is but right that we should add, that in the preceding observations, and in our application of the results of the labors of Dr. Beale to the explanation of the phenomena of Tetanus, we do not at all claim for Dr. Beale the discovery of the formation of extensive networks in the peripheral fibres of the nerves, and the reunion of the ultimate fibres composing the networks, into nerves which return to the central ganglionic masses.

Thus Valentin, Burdach, and other observers, represent the nervous fibres distributed to the skin of the frog, as dividing into numerous small fibres, and forming a close anastimosing network, which does not end in the tissue, but after coursing for a longer or shorter way, returns sooner or later, to the larger branches of the nerves. Schwann observed that the nerves in the web or fin of the tadpole's tail, and in the mesentery of amphibia, divide into numerous fine fibres destitute of the white substance, without any dark outline, and presenting little enlargements from whence delicate fibres spread out in various directions, and connect themselves in the form of a delicate and extensive network. The subsequent observations of Quain confirmed those of Schwann, and also showed that the smallest nerve fibres presented here and there along their course, elongated corpuscles, like cell nuclei. The researches of Rudolph Wagner, upon the distribution of the nerves of the electrical organs of fishes, in like manner establish the doctrine that the peripheral nerve fibres divide and subdivide, and reunite, and are distributed in a plexiform manner, like the ramifications of the capillaries. Here Bilharz has shown that the small nerve which supplies the electrical organ of the electrical Silurus (Malapterurus), keeps continually dividing, until it finally resolves itself into an enormously great number of ramifications, which spread themselves out upon the electrical organ, thus allowing of the sudden diffusion of the nervous influence over the whole extent of the electrical plates. The investigations of Meissner and Billroth have shown that the submucous layer of the intestines, is as Willis had long before declared it to be, a nervous tumic. The afferent nerves of the intestine, after having divided, finally break up into extensive networks, presenting at certain points, nodules having the appearance of ganglions, from which
the nerve fibres spread out into interlacements like the network of capillaries.

This arrangement not only enables us to understand the nature of peristaltic action; but it also offers a groundwork for the explanation of Tetanic spasms, and convulsive affections arising from irritating substances in the alimentary canal, similar to that afforded by the distribution of nerve fibres to involuntary muscles.

We are enabled by such facts to understand how a local irritation may excite super-functional activity in the adjacent nervous centres, and these in virtue of their communications with other nerve centres may extend the influence over larger tracts of the intestines, and the excitation may also extend to the central sympathetic ganglia, and from thence be reflected upon the spinal axis.

Such physiological applications as we have made of these investigations, do not appear to have suggested themselves to the mind of Dr. Beale, or to the other observers to whose labors we have referred.

The tendency of the more careful investigations, appear to be, the establishment of the peripheral division and expansion of the nerves into extensive networks, or of their direct connection with special apparatuses, as in the retina of the eye.

The plates illustrating this "Anatomical Controversy," executed by Dr. Beale from nature, combine clearness, finish and beauty, and certainly most forcibly illustrate the views of the author, and present a striking contrast to the more confused and rude diagrams of Kühne and Kölliker, which are presented by Dr. Beale for purposes of reference.

ARTICLE II.

Hygienic Experience in New Orleans during the War: Illustrating the Importance of Efficient Sanitary Regulations. By ELISHA HARRIS, M. D. (From Bulletin of the New York Academy of Medicine, No. 30: September; 1865.

All facts relating to the origin, causes, and means of prevention of yellow fever, are of vital importance to the inhabitants of the Southern cities. A correct knowledge of the laws which govern yellow fever, and all other diseases, can be
obtained only by the accumulation of a large number of well observed and undoubted facts. Those who are instrumental in the discovery and establishment of the laws which govern the origin and spread of so great a scourge as yellow fever, should surely be considered as honored and useful instruments in the hands of Providence. The author of the observations now under consideration, is well known for his devoted and untiring labors in the cause of sanitary science, and his testimony, therefore, upon this or any other subject of hygienic experience, is entitled to the confidence and respectful consideration of the medical profession.

The personal inquiries of Dr. Harris in the city of New Orleans, were made during the month of July, 1865, while pursuing certain investigations relating to the hygienic experience of the military forces.

As these notes upon the civic hygiene of that important military district were submitted to the Academy of Medicine, without any attempt to present an exhaustive statement, we shall limit the present review to a bare presentation, in the language of the author, of those facts which are of the greatest interest in their bearing upon the sanitary regulations of cities subject to yellow fever.

Shortly after the occupation of New Orleans by the United States' forces, the most stringent sanitary regulations were promulgated (May 1st, 1862), and an efficient sanitary police established.

"Throughout the entire period, upwards of two years, the Provost Marshal, the Military Governor, the Mayor (an appointee of the provisional government), together with the Medical Director of the post, and certain subordinate health officers, have vigilantly administered the regulations relating to municipal hygiene and cleanliness in New Orleans and its vicinity. During all that period the accustomed scourgings of yellow fever have been suspended in that city, while the dire forebodings and prophecies of the inevitable pestilence that would quickly destroy the Northern soldiery on reaching the Gulf coast, remain unrealized. The conditions under which the "Crescent City" has obtained
this remarkable immunity from a doom which her own bitter experience seemed to fasten upon her, are now as well understood as were the apparently inexorable causes of her former insalubrity.

Such immunity from her accustomed scourging of yellow fever had not been enjoyed by New Orleans the last half century. Even her wisest hygienists had been generally discredited and often derided when they publicly taught, as Fenner, Barton, Simonds, and Bennett Dowler had most faithfully, that the active and localizing causes of yellow fever and the high death-rate in that city were preventable. There was a truthfulness worthy of the medical profession in the words of Dr. Barton, who, as President of the New Orleans Sanitary Commission, sitting in grave and scientific consultation upon the terrible visitations of yellow fever, unhesitatingly declared the causes of that pestilence and the city's excessive insalubrity 'entirely susceptible of cure.' But how few persons appreciated the truth of Dr. Barton's words of prophecy; when he said that 'upon the broad foundation of sanitary measures we can erect a monument of public health, and that if a beacon light be erected on its top, and kept alive by proper attention, this city will be second to none in this first of earthly blessings.'

It is the design of the following notes to show what have constituted the chief causes of insalubrity in New Orleans, and by what means the redemption from its fearful doom has been achieved. In doing this it will be shown that for two successive years the threatening pestilence was localized in a fleet of gunboats moored so close to the city levees that they menaced the streets with death. It will likewise appear that, by the exercise of absolute and relentless military authority, an impregnable system of quarantine was maintained, restraining all the exotic causes of yellow fever, and controlling such causes at a distance of nearly seventy miles from the city; and yet that this dreaded scourge originated spontaneously in more than twenty of the gunboats that were moored in the river opposite the city; also that those naval vessels were uniformly filthy, ill-ventilated, and overcrowded; that of the more active, cleanly, and less crowded
steamboats (120 in number) employed in quartermaster's service, no yellow fever occurred; that in all the city not more than three or four cases of yellow fever occurred each year, and that the cause of such immunity from the pestilence of former years was as certainly the direct result of civic cleanliness and the hygienic care of the poor, as its accustomed visitations were the result of neglect of these public duties.

Three classes of facts, concerning which neither doubt nor uncertainty can be alleged, have conspired to give precise relations and definite value to the series of events we are about to consider: First.—The relentless rigor and precision of a military government precluded the ordinary violations of quarantine regulations, while it gave peculiar certainty to the execution of sanitary regulations in the city. Second.—The official usages and the armed discipline of the naval fleet in the harbor of New Orleans and upon the river, enabled the medical officers to trace to its source every case of yellow fever that occurred in the gunboats. Third.—That the climate of the city and of the river districts, during the past three years, was not perceptibly different from the climate of previous years and the periods of yellow fever epidemics; the same evils from imperfect culture and drainage, imperfect levees, and extensive crevasses, flooding and subsequent evaporation from vast areas of overflowed land, continued to recur in the latter as in former years. In short, all the physical conditions that are supposed to promote the prevalence of yellow fever—excepting only such as are immediately controllable by a sanitary police—prevailed continually and abundantly in the delta of the Mississippi during this period of immunity from that disease.

The Sanitary History of New Orleans before the War.—Constantly recurring epidemics of pestilential diseases had for two generations seemed to pronounce the doom of the Crescent City; and, notwithstanding the vast interests of commerce, there have been dismal forebodings of inevitable decadence of wealth and commerce. Between the years 1829 and 1852 inclusive, there were not less than twelve great epidemics of yellow fever, or one every second year. Those twelve epidemics killed 22,884 inhabitants, or an average of 1907 in each epidemic, which gives an
average of 888 persons killed by that fever, year by year. As
the fever prevailed to some extent almost every year, the actual
average each year reached about 1,000 persons.

During the epidemic years the average death-rate, from all
causes, was nearly 75 deaths to the 1,000 inhabitants. The
average annual death-rate during all that period, and up to the
year 1861, was about six and a half per cent. There were years
when the death-rate exceeded ten per cent.

Fresh immigration of Northern or foreign born persons was
always accredited as the chief source of any excessive mortality;
and to become creolized (naturalized to the climate) was esteemed
almost equivalent to a limited life assurance policy. But we
have now seen that during the period of military occupation by
the national troops, a hundred thousand Northern men, uncreolized
and unacclimated, have annually arrived in or passed through that
city without a single individual being smitten with yellow fever,
except in a few instances in which soldiers detailed to assist at the
boats on the levee in receiving and conveying yellow-fever patients
to the Naval Hospital on New Levee and Erato streets.

The Summers of 1862, 1863, 1864, and 1865 have now passed
without any sign of epidemic disease, except from paludal malaria
being manifested at New Orleans, save only the outbreak of small
pox last Winter. That epidemic was at once controlled by a house-
to-house visitation by a corps of medical inspectors, armed with
vaccine virus.

Malarial fever and the ordinary diseases of the climate, not
dependent upon a medical police, continued to prevail, but the diarrhoeal and infantile maladies were less fatal than in former
years. The following statistics of mortality for the six weeks
that are usually the most unhealthful of the year, show how the
"hygienic barometer" stood during the Summers of 1863 and
1865—the periods when the largest numbers of Northern men and
unacclimatized persons were in that city. For the Summer of
1863 the records stand thus:—

<table>
<thead>
<tr>
<th>No. of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the week ending August 2</td>
</tr>
<tr>
<td>During the week ending August 9</td>
</tr>
<tr>
<td>During the week ending August 16</td>
</tr>
<tr>
<td>During the week ending August 23</td>
</tr>
<tr>
<td>During the week ending August 30</td>
</tr>
<tr>
<td>During the week ending September 6</td>
</tr>
<tr>
<td>During the week ending September 13</td>
</tr>
</tbody>
</table>
During the seven weeks of the past Summer (1865), of which we have received official returns, the records read as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>No. of Deaths*</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the week ending July 2</td>
<td>155</td>
</tr>
<tr>
<td>During the week ending July 9</td>
<td>154</td>
</tr>
<tr>
<td>During the week ending July 16</td>
<td>155</td>
</tr>
<tr>
<td>During the week ending July 23</td>
<td>165</td>
</tr>
<tr>
<td>During the week ending July 30</td>
<td>174</td>
</tr>
<tr>
<td>During the week ending August 6</td>
<td>144</td>
</tr>
<tr>
<td>During the week ending August 13</td>
<td>168</td>
</tr>
<tr>
<td>During the week ending August 20</td>
<td>170</td>
</tr>
<tr>
<td>During the week ending August 27</td>
<td>110</td>
</tr>
<tr>
<td>During the week ending September 5</td>
<td>149</td>
</tr>
<tr>
<td>During the week ending September 10</td>
<td>116</td>
</tr>
</tbody>
</table>

New York cannot boast a lower death-rate for the same period. The total number of deaths in July was 793, and in August just past, the number was but 623. Compare this with the mortality in that city in August, 1853, when 6,201 of the inhabitants died! Or compare with the average mortality of the three years, 1853, 1854, and 1855, which gave more than 1,000 deaths per month, though the population was far less than during the past summer.

It cannot be claimed that there have been any favoring circumstances in the seasons, the dryness, or the humidity, that can account for such hygienic changes. During the past three years the levees have been cut and *crevassed*, and the country overflowed, as at no former period; and then, in August last, for example, the swampy surfaces surrounding the city were desiccated, *less than a single inch* of rain having fallen that month; while in the early part of the present month (September), as in the months of Spring and Summer, floods have descended. Now, from the sanitary officers of the city we learn that diseases and mortality have been chiefly diminished in connection with the abatement of those local conditions that are recognised as the *localizing causes*. These causes, in the language of Dr. E. H. Barton, consisted mainly in—

1. Bad air.

2. Offensive privies, cemeteries, various manufactories, stables, slaughter-houses, filthy streets, etc.

3. Bad water, stagnant water, bad drainage.

These were the causes of disease first noticed and officially controlled by the military government under the national forces.

*The total population, including the permanent or the transient military forces, was little less than 200,000.*
The Appliances and Means of Sanitary Reform.—1. The streets, the courts, the market-places, and all the private and public premises of the city have been cleansed and kept in a state of unusual cleanliness by an absolute authority.

2. The drainage of the city was a matter of constant official concern, and the steam-drainage works kept in great activity night and day. [As all the drainage is superficial, by gutters, ditches, and canals, the mechanical appliances for drainage, located at the junctions of canals and bayous leading toward Pontchartrain, maintain an important relation to civic purity and the public health. Some of the water-lifting machines exhaust from the canals and basins at the rate of more than 100,000 cubic feet per minute, raising the sewage from the lowest levels of the town, and sending it forward toward Lake Pontchartrain by way of the bayous] During the frequent rain-falls, when the water floods the gutters and covers whole streets, cleaners are seen at work with hoes and stiff brooms adding the effectiveness of their arms to the process of cleansing by water-flushing.

3. The water-supply, which is wholly from the river, was, from the beginning of the military government, a matter of first-rate importance. Though the river surface is higher than the plane of the city, the supply depends mainly upon steam pumps and reservoirs. The pumps were ordered to be kept in the highest activity, and the water company was held accountable for any failure in its works.

4. Street-cleaning was literally a cleansing; the faithful broom was immediately and all night long, as constantly as night returned, succeeded by a flushing stream of water from the hydrants, filling and flushing gutters and the pavement-joints, and, aided by the sleepless sweepers, thus rendering the Augean work complete. So clean a city had never before been seen upon the continent.

5. Scavenging and domiciliary hygiene were enforced by order of the Provost-Marshal. Privies and garbage, stables and butcheries, damp and unventilated quarters, and the haunts of vice and debauchery, were all brought under police control. The privies in populous streets, and those connected with places of public resort, were sometimes cleansed as frequently as twice each week.
All animals for the markets were impounded at the outskirts of the city, and the cattle-boats were there scrubbed and cleansed before proceeding down to the commercial levees. And as an illustration of the salutary exercise of authority over improper habitations, the writer would mention that he saw all the tenements upon the first floor of an entire block vacated by peremptory orders in a single day.

6. The destitute were supplied with wholesome food at the expense of the city.

Such were the leading features of the sanitary government of the Crescent City under military rule. The errors of that government, and the criticisms it may have provoked, were neither the cause nor consequence of the protection it gave to life and health. All the acts that related directly to the public health can be repeated in any city, and by any enlightened civil government.

Quarantine.—Perhaps there has never been a more enlightened and faithful exercise of regulations in the nature of quarantine than has been witnessed at New Orleans the past four years. Yellow fever and small pox were the only infections feared or guarded against. All the exotic and transportable causes or fomites of these maladies were detained at the quarantine anchorage, sixty five miles down the river, near Fort Philip.

Shall we be told that it was by this very application of a judicious and inviolable quarantine that the city escaped the epidemic visitations of disease? We have seen that small pox appeared as a wide-spread epidemic, and that it was checked by a house-to-house visitation of a medical police armed with vaccine virus!

Yellow Fever.—This disease did not become epidemic in the city. Nearly three and a half years have passed without so many as a score of sporadic cases occurring in the streets where that enemy and pest of the city had been wont to destroy its thousand victims every year, and sometimes to kill no less than five thousand in a single month!

As the writer's views concerning the transportability and the infectious nature of yellow fever are already well known to the Academy, the following statement regarding yellow fever and
quarantine at New Orleans will not require explanation as respects the stand-point from which he has examined the facts. With the peculiar and abundant experience of yellow fever in the ports of the North fresh in mind, the history of this malady at New Orleans and in our naval fleet on the Mississippi was investigated with all the predilections which such experience could justly impart in favor of the theory of the exotic and imported origin of the disease.

Well-marked and fatal cases of yellow fever occurred in New Orleans in the Autumn of 1863, and in the Autumn of 1864. In the former year the Charity Hospital received two cases, both of which proved fatal. Both were boat hands from the steamer J. H. Hancock, a river tug. In 1864 there were five undoubted and fatal cases of yellow fever, terminating in black vomit. The writer conversed with the physicians who attended these patients, viz.: Professor Crawcour, Dr. Bennett Dowler, and Dr. Smythe; and Dr. Huard has furnished notes of a case that occurred in the parish prison. These five cases occurred in persons who resided or daily visited in the vicinity of Erato, Tchapitoulas, and New Levee streets. They were exposed to known causes of the fever. Other cases may have occurred; if so, they have eluded all search.

We have referred to the two cases from a tug in the river, in the Autumn of 1863. Nearly 100 other cases of the fever occurred in the river fleet and in the Naval Hospital that season. The history of all these cases, in detail, shows that they were not of imported origin. They nearly all occurred in crowded, filthy, and unventilated gunboats that were at anchor in the river at New Orleans. Owing to the inaccessibility of medical officers who had charge of some of the patients, the tabulated history of these cases gives way, in this place, to the more complete records of yellow fever in the Autumn of 1864.

We have mentioned the five cases of black vomit that occurred near New Levee street, in 1864. The Naval Hospital occupies a large pile of old buildings on that street, with yards and accessory buildings toward Erato and Tchaptoulas streets. One block of buildings—storehouses—intervenes between the Hospital and the river levee and landings. The accompanying record of yellow
fear in that Hospital and in the idle gunboats in the stream, sufficiently accounts for the concentration of infection in the particular locality in which the five cases occurred outside of the Hospital premises. Other cases occurred, but they were directly dependent on intercourse with the infected vessels, and the bedding brought from those vessels.

The fact, then, is indisputable, that yellow fever visited twenty-five vessels in the fleet that was anchored in the river in front of New Orleans during the Summer of 1864, and that the disease appeared first, viz.: as early as September 12th, in vessels that had been for a long time at anchor there. The brief notes here appended supply the best commentary we could wish. Filthiness, crowding, excessive heat and moisture, lack of ventilation, and the stagnation incident to anchorage in a tideless stream, constitute the leading facts relating to the infected vessels.

To test the merit of this view of the spontaneous origin of the fever, the writer has obtained the written history of every case of which any note was made at the Naval Hospital and elsewhere. He also obtained from the quartermaster in charge of water transportation, a record of the 120 steamers and sailing-vessels that were under his control. Of these active vessels, only one had yellow fever on board. That these ordinary mercantile and transport vessels under control of the quartermaster were open, ventilated, and moving briskly about from place to place, yet infinitely more exposed to all sources of exotic infection, is the only comment this point in our record requires.

Our records show that not less than 191 cases of yellow fever occurred on board the twenty-five vessels we have mentioned in the fleet at New Orleans, in the year 1864; and that of these, fifty-seven proved fatal. Also, that in addition to these, there were twelve cases and three deaths among employees and guard at the Naval Hospital and landing on Erato street. Five other cases of black vomit occurred in citizens exposed to the same cause in the vicinity of the landing. The total number of cases was 208, and the total deaths 65. At the Quarantine station no other cases or vessels than those mentioned in our record were seen in 1864; and from July 4th, 1863, to September 10th, 1865,
only twenty-three deaths from yellow fever occurred, and only one vessel, besides those we have here designated, brought cases of the fever to the Quarantine station—that, a Spanish war ship, in 1863.

The hygienic lessons taught by the events to which these notes refer, abundantly vindicate the principles and the methods of sanitary improvement which are advocated by the medical profession. These lessons may be entitled as follows:

1. The insalubrious circumstances that produce a constantly high death-rate, and the localizing causes of disease generally, are the most important and the most preventable causes of the epidemics that afflict cities.

2. That the climate and the topographical disadvantages which have hitherto been popularly supposed to be the essential causes of the insalubrity of New Orleans, are but unimportant factors of insalubrity, which sink into insignificance when the preventable causes of disease in the city are controlled, and that "vanquished Nature yields its empire to man, who creates a climate for himself."

3. That yellow fever, the most dreaded scourge of New Orleans, was unequivocally generated in a large number of filthy and unventilated gunboats and other naval vessels lying idly at anchor within a mile from the densest portions of the city.

4. That by fomites, or some other material agency, the infection of yellow fever was communicated to the guard, and to certain other persons who were exposed in a narrow district, at the Naval Hospital landing in Erato street, and near New Levee and Tchapi-toulas streets.

5. That the infected vessels were remarkably close in their exterior construction; that they discharged no cargoes; were under an armed surveillance and discipline; and were seemingly incapable, from these circumstances, of diffusing their own infection, except by the clothing and "dunnage" of the sick when taken ashore.

6. That vessels and river boats of ordinary construction and in active service, escaped yellow fever almost without exception.

7. That no vessel infected with yellow fever, arriving by way of the Gulf of Mexico, was allowed to pass above the Quarantine station—65 miles from the city.
8. That the utility of a rational quarantine system against the fomites of yellow fever was not disproved, but the contrary rather, by the records studied by the writer at New Orleans.

9. That an epidemic of small-pox was promptly arrested by house-to-house vaccination.

10. That with the prevention of epidemics, and unquestionably by the same agencies of prevention generally, the death rate from zymotic diseases as a class has been very greatly diminished.”

ARTICLE III.


Professor Hamilton, already favorably known to the profession as the author of a most valuable treatise on Fractures and Dislocations, published at the beginning of our late war a “Practical Treatise on Military Surgery” to supply the immediate wants of young Surgeons entering the army service. He tells us that “the edition was soon exhausted; but unremitting engagements in the public service prevented a revision of its pages, and the republication was consequently delayed. Having at length undertaken the revisal, it was found that four years of war had opened so many questions of interest, that the limits and scope of the original volume were inadequate to their consideration; and instead of a new edition, an entirely new work was demanded.” The work before us, therefore, embodies his perfected labor, and fully sustains the high reputation he had before acquired as a writer and teacher in Bellevue Medical College and Hospital.

In order to present a general view of the scope of this work, it is only necessary to state that it treats of the Examination of recruits; General Hygiene of troops; Bivouac, accommodation of troops in tents, barracks, billets, huts, etc.; Hospitals; Preparations for the field; Hygienic management of troops upon the march; Conveyance of sick
and wounded soldiers; Gun-shot Wounds; Punctured and Incised Wounds; Gun-shot Fractures; Amputations; Exsections, Arrow Wounds; Traumatic Gangrene; Dry Gangrene; Tetanus; Scorbute; and the employment of Anaesthetics. Our limits will not permit us to examine each of these topics, but we shall cite a few paragraphs in illustration of some of the author's views.

In describing some of the probes used in the examination of Gun-shot wounds, the following brief account of Nelaton's neat little invention is given: "The probe of Nelaton is often invaluable in determining whether the foreign body, the presence of which the ordinary silver probe may have discovered, is lead or bone. This instrument is a small ball of unpolished porcelain fastened securely upon the end of a probe. Its size may be conveniently varied from two to four lines in diameter, but the size which we have found most generally useful is about two lines. To keep it from being defaced it should be laid in a small, neatly fitting gutta-percha case. In using it care must be taken that all previous stains are removed from its surface by careful wiping, it then should be pressed down to the foreign substance, and made to rotate upon it a few times. On withdrawing the probe, the porcelain will of course be soiled with blood, but this can be removed by rinsing it in water, without any danger of effacing the marks made by the lead." P. 184.

In the primary treatment of Gun-shot wounds by water dressings, now in such general use, the author makes the following very judicious remarks, in which we fully concur: "No complaints have ever been made against tepid water. No one has ever charged that it produced gangrene, or excessive suppuration even, unless it was continued a long time, and after suppuration had actually commenced; but the same cannot be said of cold water and of ice water. Many Surgeons have declared to us that they have seen much mischief done in this way, and we have ourselves seen several conclusive examples.
"It is our confident belief that, where the bleeding has wholly ceased, tepid water ought to have the preference as a first application, but that from this point of time, or soon after, the temperature may be gradually and steadily lowered for several days; keeping constantly in mind that our object ought to be, not to extinguish the inflammation, but only to control it, and for this purpose we may, commencing at some time during the first or second day, lower the temperature to $80^\circ$, $70^\circ$, or even $60^\circ$ or $50^\circ$ Fahrenheit, just in proportion as the inflammation increases, and then gradually elevate its temperature as the inflammation declines, or as suppuration intervenes. Usually, however, it will be best not to make a change of more than $10^\circ$ or $15^\circ$.

"Returning to the matter of temperature, we wish to say that the final decision as to whether we shall in any case employ tepid, cool, cold, or ice-cold applications, must depend upon the sensations of the patient. We shall seldom or never err if we make use of that temperature only which the patient declares most agreeable. Irritation is the first link in the chain of circumstances which results in inflammation, and pain is its subjective sign; we may therefore conclude that those applications which most effectually allay pain, or obviate sensations of burning, smarting, throbbing, etc., will most certainly prevent or subdue irritation and inflammation; and that the opposite of this proposition, namely, that whatever increases pain, etc., will increase inflammation, is equally true.

"Upon this one point nearly all the Surgeons who have used water in the treatment of wounds have arrived at the same conclusion. The majority have preferred tepid water; some have preferred cold, and a few have declared their general preference for ice water. But however much they have differed in relation to absolute temperature, they have never, so far as we are aware, deviated from the opinion that if the application increases the pain it is actually hurtful. Their views will be found further illustrated and sustained in that excellent treatise entitled 'On the Employment
of Water in Surgery," written by M. Alphonse Amussat of Paris and published in 1851, and which we translated into English the same year." p. 211.

In the after treatment of Gun-shot wounds, the author again refers to the use of water in the following language:

"In regard to the water dressings, the rule which has been laid down as applicable in the first instance still holds good, namely, that the temperature be made agreeable to the patient. It will often be found, however, as the inflammation progresses, that the temperature may be gradually lowered; and in a few examples of active inflammation, invading a large amount of soft structure, even the refrigerating mixtures may be employed. It is certain that actively inflamed surfaces tolerate a greater degree of cold than surfaces only slightly inflamed, probably for the reason that caloric is elaborated under these circumstances much more rapidly. Yet it is possible to freeze inflamed tissues, and some care is required to avoid this accident. The ice, snow, or ice water should not be applied directly to the skin, but always with some non-conductor interposed, such as cloth, lint, or a beef's bladder; the latter, half filled with the cold mixture, constitutes the most convenient mode of application. If after the cold has been applied some time the patient experiences a sense of numbness in the part, a total loss of sensation, or a cold clammy sensation, even though it may not be actually painful, the water ought at once to be discontinued or its temperature raised. It is our opinion also, that in all cases the temperature should be gradually elevated as suppuration takes place. Indeed very cold applications must be limited ordinarily to a brief period of time, or to that period during which the inflammation is actually culminating.

"In confirmation of what we have said as to the hazards of cold applications, we shall take the liberty of quoting the following passages from Amussat, on the use of water in surgery:—
‘Goursaud reports a case of Guyenot’s, in which ice having been applied an hour or two upon a strangulated crural hernia, the hernia was not reduced, and the Surgeon, obliged to resort to an operation, found the epiploon frozen; the intestinal knuckle was, however, not injured, and the patient recovered.

‘I have notes of the case of a patient affected with a phlegmonous erysipelas of the arm and forearm, with whom the continued application of ice produced a solidification of the pus, so that for its removal it became necessary to resort to shampooing, and very firm graduated compression.

‘My father has been often consulted on account of a gangrene which he has thought ought to be attributed to the employment of very cold water; among the cases of gangrene which I have myself seen, there are several which must be ascribed to the same cause.

‘I have collected also several cases of patients who having been submitted to irrigations with cold water, have suddenly died with some nervous malady. What part does the cold play in the development of these phenomena? Without being assured that it is the principal cause, I believe I can at least say that it has some agency.

‘Who will affirm,’ says M. Richet, ‘that the application of a powerful refrigerant upon a large surface will not, by repelling inward upon the viscera the blood which originally abounded in the diseased part, occasion congestions, and give birth to those complications to which I have alluded! The facts are everywhere to be seen, and the practitioner ought to profit by them.’

‘It is well known, says Sanson, ‘that cold applications may cease to be useful, and may even become hurtful, by rendering the flesh oedematous and pale, and causing it to become irritable when suppuration is established in the wounds. Sometimes also they entirely prevent the development of inflammation to such a degree as that at the end of twelve or fifteen days the wound is still in nearly the same condition as at the moment of the accident.’
M. Apvrille reports a fact upon this point, which occurred in the service of M. Jobert. A woman had received a blow from the horn of a cow, which had torn extensively the skin and superficial muscles of the abdomen; cold water compresses were applied and renewed every ten minutes; when this mode of treatment had been pursued for some time, the wound was found to have made no progress toward a cure, and the cold was suspended. The next day a violent inflammation ensued; again the cold water compresses were applied, and the wound returned to its original condition. A renewed suppression of the compresses was followed by a yet more intense inflammation. Gradually a flabbiness supervened, and the patient died.

M. Cloquet has remarked to me that he has observed the phenomena noticed by Sanson, in debilitated subjects, when cold has been used perseveringly.

'Cold,' says Tanchou, 'is only suitable for the young and robust; with feeble persons, the very old, and with infants, it is always injurious.' This proposition is the more true as the time of the application is the more prolonged.

'One will ask, perhaps, why the accidents of which we speak are not observed more frequently? I answer, that in general Surgeons have not taken care to note them, and farther, the temperature and the quantity of water employed in a given time being seldom indicated in the report, it is difficult to understand exactly the degree of refrigeration produced, and whether, therefore, the accident ought or ought not to be ascribed to the cold.

'We see from what precedes, that if cold water possesses some great advantages, it has also many inconveniences, and under certain circumstances it becomes even dangerous. We ought then to prefer tepid water, which calms the pain, and produces the desired effect of subtracting the caloric without exceeding the proper limits, and without exposure to any of the inconveniences of cold water, such as chills, too sudden suppression of the inflammation, and especially gangrene.'" pp. 214-217.
In speaking of Gun-shot wounds of the thorax, Prof. H. thus disposes of the question regarding the propriety of closing the orifice:

"Military Surgeons have of late been generally agreed that in most cases Gun-shot wounds of the chest ought not to be immediately closed. This is in accordance with the general statement of our own views which we have already made. Recently, however, Assistant-Surgeon Howard, of the U.S.A., has recommended an opposite practice. He proposes, having first removed as far as possible all foreign substances, to hermetically seal the external wounds at once. In order to accomplish this more certainly, he pares away with a sharp knife the contused margins down to the bone or to the pleura, giving to the wounds an elliptical form; and then approximates the edges with silver sutures, which are introduced at very short intervals, and made to penetrate deeply; over the whole surface he now spreads colloidion, in which the fibres of loosened charpie are imbedded to prevent more effectually the separation of the edges. A compress and bandage may be added if necessary.

Dr. Howard claims for this method that it will assist in controlling the hemorrhage; that it will relieve the dyspnea, and prevent or diminish suppuration.

It is perhaps scarcely proper to attempt a criticism of these views at this moment, since the results have not yet been given fully to the profession. It will be proper, however, to state that this practice, in a form more or less modified according to circumstances, has been recommended and adopted in penetrating or perforating wounds of the chest made by sharp instruments; in all penetrating or perforating wounds of the abdomen, whether Gun-shot or incised; and in all Gun-shot wounds of the chest accompanied with severe and alarming hemorrhage from the pulmonic vessels. The novelty consists in the application of this method to all wounds of the chest; and it is precisely this exclusive view of the practice to which Surgeons will hesitate to give their approval.
We will attempt to indicate what thoracic wounds seem to us to demand or permit immediate closure of their external orifices.

First.—All simple incised and punctured wounds; in which class of accidents ample experience has shown that we have not much to fear from suppuration, and that we may reasonably expect union by adhesion throughout the whole course of the channel caused by the weapon.

Second.—All wounds made by smooth round balls or shot, which have not come in contact with and broken any portion of the bony parietes, and into which no foreign substance has been conveyed.

Third.—When both pleural cavities have been opened by the weapon or the projectile; since the free admission of air into both sides of the chest would, in most cases, cause death immediately, and it is proper to anticipate and provide against such an occurrence by every possible means.

Fourth.—When the pulmonic hemorrhage—the blood escaping freely from the external orifices—is very profuse and alarming. In closing the wound, under these circumstances, the purpose would be to allow the blood to accumulate within, with the hope that eventually, and before fatal syncope was induced, the pressure of the coagulated mass upon the wounded lungs would close the vessels. In this case, however, the wound should not be closed by sutures, but with compresses and adhesive straps, in order that, if the pressure of the blood became so great as in itself to threaten death by suffocation, by removing the dressings it might be allowed again to escape.

Fifth.—When it is ascertained that the sense of suffocation is due to the presence of air in the pleural cavity and not to blood; if at this moment the external wound is open it will be proper to close it, temporarily at least, and to keep it closed so long as the breathing is thereby relieved.

"The cases which remain after this enumeration, and in which we cannot from our present experience advise a closure of the wound, are:
First.—Gun-shot wounds made by conical rifle-balls, and by all projectiles of a larger size (with the exceptions as to pneumo-thorax, pulmonary hemorrhage, and perforation of both cavities already stated).

Second.—Gun-shot wounds made by any form or size of projectile, in which fragments of bone or other foreign substances have been sent into the cavity of the chest and cannot be removed.

Third.—'Penetrating' Gun-shot wounds, or those in which the missile itself remains within the chest.

In not one of these latter cases would it seem proper to hermetically seal, or even close temporarily, the external orifices. The very rare examples of recovery from such injuries, without excessive suppuration, do not warrant a reasonable expectation of a result so desirable." pp. 278-280

Gun-shot fractures of the femur have, during the late war, been very often left to nature, in consequence of the great mortality which attended amputations, and the statistics the author has been able to collect are not of such a character as to settle the practice in these cases. The following are his conclusions:

We are prepared to say, however, that the Surgeon ought not to attempt to save the thigh after a Gun-shot fracture, when any of the following conditions obtain.

When the patient has to be carried far over rough roads and without adequate support to the limb.

When the bones are greatly comminuted.

When the patient suffers great pain, or violent spasms continue in spite of opiates and rest.

When the soft parts have suffered great contusion, as in case of a fracture from a solid shot or shell.

When there is very extensive laceration of the soft parts.

When the principal arteries or nerves are involved in the injury.

When the fracture implicates the knee-joint, or even when it is near the knee-joint; experience having shown that amputations near the knee-joint give a better percentage of
recoveries than any other thigh amputations; while, on the other hand, attempts to save the limb in these cases give a worse percentage of success than in any other fracture of the thigh.

Under the following circumstances we would not, as a rule, resort to amputation:

When the ball has entered the head, neck, or trochanteric portion of the femur. Owing to the more spongy nature of the femur in these parts, and the presence of a less amount of solid lamellated structure, there is usually here less comminution than in Gun-shot injuries of the shaft. The great vascularity of the trochanteric portion, and the firmness with which the bone is attached to the adjacent tissues, diminish the danger of necrosis and exfoliation. The cases to which we have already referred seem to justify this conclusion. If any surgical operation is demanded in these cases, it is usually exsection.

When the fracture is just below the trochanters; experience having shown that very few recover after these amputations. We think we have seen during the last three years more femurs united after Gun-shot fractures in the upper third of the shaft, than we have seen successful amputations after the same injuries.

When the fracture of the femur is caused by a pistol ball, by a round musket ball; or by any missile, whose force is nearly spent.

It will be understood that the last observation has reference solely to the less degree of comminution which these missiles usually occasion." pp. 399-401.

We subjoin the author's views with regard to amputations:

"What conditions of the Limb in Army practice demand Amputation?

Simple fracture of a limb, it is unnecessary to say, does not demand amputation.
A fracture complicated with considerable laceration of the skin, or of the skin and muscular tissue, does not of necessity demand amputation.

A fracture, with laceration of the main arterial trunk supplying the limb, does not necessarily demand amputation. If the artery can be tied the limb may be saved, and the fracture treated successfully.

A fracture, accompanied with the laceration of one or more of the principal nervous trunks, does not always demand amputation, yet it is a graver accident than the one last supposed.

A fracture, complicated with a destruction of both the principal arterial and nervous trunks, occurring in the course of a large limb, like the thigh, the leg, the arm, or the forearm, renders amputation necessary.

Similar lesions, without a fracture, render amputation almost equally imperative.

Comminuted fractures, accompanied with extensive lesions of the soft parts, or with a rupture of either the principal artery or the principal nerves, in the case of large limbs, generally demand amputation in army practice.

Compound fractures, with either of the above complications, in large limbs, generally demand amputation.

Fractures accompanied with extensive and violent contusion, demand amputation oftener than the same fractures accompanied with open laceration.

In army practice, Gun-shot wounds which penetrate fairly the shoulder-joint, the elbow-joint, or the wrist-joint, demand in most cases either amputation or exsection.

Gun-shot wounds penetrating the hip-joint are generally fatal, yet amputation may be practiced under some very favorable circumstances. Exsection also presents a feeble ground for hope.

Amputations after Gun-shot fractures of the upper third of the shaft of the femur are seldom successful.
Primary amputations for Gun-shot fractures in the middle or lower thirds of the femur, present a much better average of successful results.

Gun-shot wounds involving the knee-joint demand amputation in almost all cases. Guthrie has seen no recovery from a Gun-shot wound of the knee-joint, unless the limb was amputated. We have seen a few recoveries, especially when the joint was penetrated by round balls, or when the joint was slightly opened.

Gun-shot wounds, in which the ball does not actually enter the joint, but in which the bone is struck above or below, and the line of fracture extends into the joint, are subject to nearly the same rules as that class of cases in which the ball enters the joint; but the rule is less imperative.

Gun-shot wounds fairly penetrating the ankle-joint or the tarsal bones, demand either amputation or exsection.

Gun-shot wounds of the metacarpal or of the metatarsal bones are often cured without amputation. Similar wounds of the fingers or toes do not in general result so favorably; but the rule in this latter case cannot be stated very positively.

Second.—The point at which the amputation is to be made.

This must depend mostly upon the part of the limb which has suffered injury; but in general we may say, at as low a point as will be safe; or in other words, we would state the rule to be, to save as much of the limb as possible. Yet in no case should the life be put at hazard for the sake of a limb, much less for a small portion of a limb.

There are two reasons why we adopt the rule above stated. First, because the longer the stump, the more useful it will be to the possessor; and second, because experience has shown that the nearer an amputation is made to the trunk and the larger the circumference of the limb, the greater is the danger to life. Thus, according to Malgaigne, only 1 death occurred from 26 amputations of one of the
smaller toes; 7 deaths from 46 amputations of the great toe; 9 from 38 partial amputations of the foot; 106 from 192 amputations of the leg; and 126 from 201 amputations of the thigh. Again, in the Crimea the mortality after amputations of the thigh, in a certain number of cases, was as follows: Lower third, 56 per cent.; middle third, 60 per cent.; upper third, 86 per cent.; hip, 100 per cent. (23 cases).

Stephen Smith, in a paper on hip-joint amputations, has brought together 98 cases, obtained partly from military and partly from civil practice, of which 56 proved fatal; a ratio of mortality of only 57 1/2 per cent. In the Mexican campaign all amputations at the hip-joint terminated fatally. In a total of 44 cases of amputations for Gun-shot injuries, collected by Legouest, 40 died. The four which recovered were secondary amputations.

During the present war two successful amputations have been made at the hip-joint. One by Edward Shippen, Surgeon, U.S.V., and one by Dr. E. S. Fenner, of the Confederate Army." Pp. 420-423.

In conclusion we commend Prof. Hamilton’s work as a valuable contribution to Military Surgery, which will do credit to the United States.

---

**ARTICLE IV.**


This circular which has been published by Brevet-Major General Joseph K. Barnes, Surgeon General, U. S. A., for the information of the Medical officers of the United States Army, is composed of two distinct reports, drawn up from materials in the Surgeon General’s Office.
The first report, by George A. Otis, Brevet-Lieutenant Colonel and Surgeon U. S. Vols., in charge of the Division of Surgical Records, S. G. O. and Curator of the Army Medical Museum, relates more exclusively to the Surgical records of the recent civil war; and the second report, by J. J. Woodward, Assistant Surgeon and Brevet-Major, U. S. A., in charge of the Record and Pension Division, Surgeon General’s Office, and of the Medical Section, Army Medical Museum, relates chiefly to the Medical Statistics of the several armies and general hospitals, and to the memoirs and reports by medical officers, on the causes, symptoms, and treatment, and pathological anatomy of the more important camp diseases.

We shall confine the present review to the Surgical report by Surgeon George A. Otis, and shall endeavor to give such an analysis as will embody every fact of value in the very language of the author; believing that this information will prove of great interest and value to the medical officers of the late Confederate States’ Army. The report of Dr. Woodward will be reviewed in the next number of this Journal.

The materials in the Surgeon General’s office relating to the surgery of the late war, consist of the reports of medical officers engaged in it, and of illustrations of these reports in the shape of pathological specimens, drawings, and models. The documentary data are of three kinds: first, the numerical returns, in which the number alone of the different forms of wounds, accidents, injuries, and surgical diseases is given; secondly, what may be called the nominal returns, in which are furnished the name and military description of each patient, and the particulars of the case, with more or less of detail; and, thirdly, the miscellaneous reports. To the first class belong the “classified return of wounds and injuries,” which every medical officer has been required to furnish immediately after every engagement; the “tabular statement of gun shot wounds,” and the portion of the “monthly report of sick and wounded,” referring to surgical diseases and accidents. The second class comprises the “quarterly reports of wounded,” required of all general and post hospitals; the “quarterly sanitary reports of regimental surgeons;” “the nominal lists of wounded,”
Circular No. 6, War Department U.S.A. [July,]

procured by medical directors after every general engagement; and extracts from "case books." In the second class are included the reports of medical directors of armies in regard to the operations of the medical department, and the succor given to the wounded; reports and dissertations on new methods and modes of treatment, and modifications of surgical apparatus and appliances; pathological researches on morbid processes, pertaining to surgery, as hospital gangrene, osteomyelitis, pyæmia, and the like; plans for ambulance organization, and the transportation of the wounded by land and water.

Surgeon Otis affirms that the extent of these materials is simply enormous, and that the returns are of as huge proportions as the armies that have been engaged in active operations for the last four years. The author of this portion of the work, still farther expresses his belief that the result of the labors of the medical officers of the United States' Army has been the accumulation of a mass of facts and observations in military surgery of unprecedented magnitude.

Whilst it has been found as yet impracticable to determine with accuracy the number of wounds received in action during the late war, some conception may be formed of the vast numbers dealt with, by a comparison of a portion of the returns with the complete statistics of other armies.

Thus, in the British army in the Crimea, during the entire war, there were 12,094 wounded, and 2,755 killed, or a total of 14,849; in the French army, in the Crimea, of a total effective force of 309,268, according to M. Chenu, there were 39,868 wounded, and 8,250 killed, or a total of 48,118; whilst in the late war, the monthly reports from a little more than half the United States' regiments in the field, give for the year ending June 30, 1862, an aggregate of 17,496 gunshot wounds; the reports from rather more than three-fourths of the regiments, for the year ending June 30, 1863, give a total of 55,974 gunshot wounds; and the battle-field lists of the wounded of the United States' armies for the years 1864–65, include over 114,000 names. Great as these figures appear to be, they are still below the mark, for many wounded
1866.

Circular No. 6, War Department U.S.A.

103

were received directly into the general hospitals whose names were never entered upon the field reports.

Whilst, therefore, the total killed and wounded in the English and French armies during the Crimean War, numbered 62,967; the incomplete returns of the United States' armies show three times this number of gunshot wounds, or more exactly 187,470.

And in pondering over these figures, the reviewer cannot refrain from expressing his wonder, that the imperfectly armed, half-clad, half-fed, and unpaid battalions of a sparsely settled country, with imperfect supplies of arms and ammunition, without manufactories, cut off from the rest of the world, with less than eight millions of white inhabitants, with innumerable internal enemies and spies, and with a dangerous class of laborers which formed an invaluable recruiting ground to their enemies in addition to all Europe: should have bravely withstood, during four long years of unexampled privation and suffering, three millions of men in arms; and have inflicted four-fold as much damage, as the well appointed and immense armies of one of the greatest powers of Europe inflicted upon the combined armies of England and France.

The gigantic nature of the late civil war between the different sections of the United States, has been still farther shown by Surgeon Otis, in comparing the relative numbers of cases of some important injury; as, for example, gunshot fractures of the femur, it is found that in the French Crimean army, there were 459 such injuries, and in the English army 194, while over 5,000 such cases were reported to the Surgeon General's office of the United States' army: or if one of the major operations is selected for comparison, as excision of the head of the humerus, the Crimean returns give sixteen of these excisions in the British, and thirty-eight in the French army, whilst the registers of the United States' army contain the detailed histories of 575 such operations.

The surgical specimens of the Army Medical Museum are said to number 5,480, and Surgeon Otis affirms that not only in specimens of recent injuries, but in illustrations of reparative processes after injury, of morbid processes, of the results of operations, and
of surgical apparatus and appliances, this institution is richer, numerically at least, than the Medico-Military Museums of France or Great Britain.

After several efforts to arrange the original records in a form more convenient for reference and study, the following classification of wounds and their results, and of operations was finally adopted. It is less elaborate than that employed in the British statistics of the surgery in the Crimea, and more detailed than that followed by M. Chenu, in the French Surgical Report of the Crimean War. The appended figures give the number of cases of each class that were revised and corrected upon the new registers in September 30, 1865.

Classification of Wounds and Injuries, and Their Results, followed in the Division of Surgical Records. Surgeon General's Office, United States Army.

<table>
<thead>
<tr>
<th>Wound Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunshot fractures and injuries of the cranium</td>
<td>1,108</td>
</tr>
<tr>
<td>Gunshot fractures of the bones of the face</td>
<td>1,579</td>
</tr>
<tr>
<td>Gunshot fractures of the spine, not involving the chest or abdomen</td>
<td>187</td>
</tr>
<tr>
<td>Gunshot fractures of the ribs without injury of the thoracic or abdominal viscera</td>
<td>180</td>
</tr>
<tr>
<td>Gunshot fractures of the pelvis, not involving the peritoneal cavity</td>
<td>397</td>
</tr>
<tr>
<td>Gunshot fractures of the scapula and clavicle, not implicating the thoracic cavity</td>
<td>389</td>
</tr>
<tr>
<td>Gunshot fractures of the humerus</td>
<td>2,408</td>
</tr>
<tr>
<td>Gunshot fractures of the radius and ulna</td>
<td>755</td>
</tr>
<tr>
<td>Gunshot fractures of the carpus and metacarpus</td>
<td>790</td>
</tr>
<tr>
<td>Gunshot fractures of the femur</td>
<td>1,957</td>
</tr>
<tr>
<td>Gunshot fractures of the patella and knee joint</td>
<td>1,220</td>
</tr>
<tr>
<td>Gunshot fractures of the tibia and fibula</td>
<td>1,056</td>
</tr>
<tr>
<td>Gunshot fractures of the tarsus and metatarsus</td>
<td>629</td>
</tr>
<tr>
<td>Gunshot penetrating wounds of the chest and injuries implicating thoracic viscera</td>
<td>2,303</td>
</tr>
<tr>
<td>Gunshot penetrating wounds of the abdomen and injuries involving the abdominal viscera</td>
<td>565</td>
</tr>
<tr>
<td>Gunshot scalp wounds</td>
<td>3,942</td>
</tr>
<tr>
<td>Gunshot flesh wounds of the face</td>
<td>2,688</td>
</tr>
<tr>
<td>Gunshot wounds of the neck</td>
<td>1,285</td>
</tr>
<tr>
<td>Gunshot wounds of the thoracic parietes</td>
<td>4,753</td>
</tr>
<tr>
<td>Gunshot wounds of the back</td>
<td>5,195</td>
</tr>
<tr>
<td>Gunshot wounds of the abdominal parietes</td>
<td>2,181</td>
</tr>
<tr>
<td>Gunshot wounds of the genito-urinary organs</td>
<td>468</td>
</tr>
<tr>
<td>Gunshot wounds of the upper extremities</td>
<td>21,248</td>
</tr>
<tr>
<td>Gunshot wounds of the lower extremities</td>
<td>25,152</td>
</tr>
<tr>
<td>Gunshot wounds of arteries</td>
<td>44</td>
</tr>
<tr>
<td>Gunshot wounds of veins</td>
<td>6</td>
</tr>
<tr>
<td>Gunshot wounds of nerves</td>
<td>76</td>
</tr>
<tr>
<td>Sabre wounds</td>
<td>106</td>
</tr>
<tr>
<td>Bayonet wounds</td>
<td>143</td>
</tr>
<tr>
<td>Simple fractures and miscellaneous wounds and injuries</td>
<td>2,888</td>
</tr>
<tr>
<td>Cases of tetanus</td>
<td>363</td>
</tr>
<tr>
<td>Cases of secondary hemorrhage</td>
<td>1,233</td>
</tr>
<tr>
<td>Cases of pyaemia</td>
<td>753</td>
</tr>
</tbody>
</table>

Total: 57,862
Classification of Surgical Operations followed in the Division of Surgical Records. Surgeon General's Office, United States Army.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amputations of the fingers</td>
<td>1,849</td>
</tr>
<tr>
<td>Amputations at the wrist joint</td>
<td>46</td>
</tr>
<tr>
<td>Amputations at the fore arm</td>
<td>262</td>
</tr>
<tr>
<td>Amputations at the elbow joint</td>
<td>19</td>
</tr>
<tr>
<td>Amputations of the arm</td>
<td>2,706</td>
</tr>
<tr>
<td>Amputations at the shoulder joint</td>
<td>437</td>
</tr>
<tr>
<td>Amputations of the toes</td>
<td>82</td>
</tr>
<tr>
<td>Amputations of the foot (partial)</td>
<td>169</td>
</tr>
<tr>
<td>Amputations at the ankle joint</td>
<td>73</td>
</tr>
<tr>
<td>Amputations of the leg</td>
<td>3,014</td>
</tr>
<tr>
<td>Amputations of the knee joint</td>
<td>122</td>
</tr>
<tr>
<td>Amputations of the thigh</td>
<td>2,984</td>
</tr>
<tr>
<td>Amputations at the hip joint</td>
<td>21</td>
</tr>
<tr>
<td>Amputations of the elbow</td>
<td>573</td>
</tr>
<tr>
<td>Excisions of the elbow</td>
<td>315</td>
</tr>
<tr>
<td>Excisions of the wrist</td>
<td>34</td>
</tr>
<tr>
<td>Excisions of the ankle</td>
<td>22</td>
</tr>
<tr>
<td>Amputations of the arm</td>
<td>2,706</td>
</tr>
<tr>
<td>Amputations at the shoulder joint</td>
<td>437</td>
</tr>
<tr>
<td>Amputations of the toe</td>
<td>82</td>
</tr>
<tr>
<td>Amputations at the ankle joint</td>
<td>73</td>
</tr>
<tr>
<td>Amputations of the leg</td>
<td>3,014</td>
</tr>
<tr>
<td>Amputations of the knee joint</td>
<td>122</td>
</tr>
<tr>
<td>Amputations of the thigh</td>
<td>2,984</td>
</tr>
<tr>
<td>Amputations at the hip joint</td>
<td>21</td>
</tr>
<tr>
<td>Amputations of the elbow</td>
<td>573</td>
</tr>
<tr>
<td>Excisions of the elbow</td>
<td>315</td>
</tr>
<tr>
<td>Excisions of the wrist</td>
<td>34</td>
</tr>
<tr>
<td>Excisions of the ankle</td>
<td>22</td>
</tr>
<tr>
<td>Amputations of the arm</td>
<td>2,706</td>
</tr>
<tr>
<td>Amputations at the shoulder joint</td>
<td>437</td>
</tr>
<tr>
<td>Amputations of the toe</td>
<td>82</td>
</tr>
<tr>
<td>Amputations at the ankle joint</td>
<td>73</td>
</tr>
<tr>
<td>Amputations of the leg</td>
<td>3,014</td>
</tr>
<tr>
<td>Amputations of the knee joint</td>
<td>122</td>
</tr>
<tr>
<td>Amputations of the thigh</td>
<td>2,984</td>
</tr>
<tr>
<td>Amputations at the hip joint</td>
<td>21</td>
</tr>
<tr>
<td>Amputations of the elbow</td>
<td>573</td>
</tr>
<tr>
<td>Excisions of the elbow</td>
<td>315</td>
</tr>
<tr>
<td>Excisions of the wrist</td>
<td>34</td>
</tr>
<tr>
<td>Excisions of the ankle</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excisions in the continuity of the upper extremities</td>
<td>695</td>
</tr>
<tr>
<td>Excisions of the shafts of the tibia and fibula</td>
<td>220</td>
</tr>
<tr>
<td>Excisions of the knee</td>
<td>11</td>
</tr>
<tr>
<td>Excisions of the shaft of the femur</td>
<td>68</td>
</tr>
<tr>
<td>Excisions of the head of the femur</td>
<td>82</td>
</tr>
<tr>
<td>Excisions of the bones of the face and neck</td>
<td>161</td>
</tr>
<tr>
<td>Trephining</td>
<td>234</td>
</tr>
<tr>
<td>Ligations of arteries</td>
<td>434</td>
</tr>
<tr>
<td>Extraction of foreign bodies</td>
<td>726</td>
</tr>
<tr>
<td>Operations for surgical diseases</td>
<td>443</td>
</tr>
<tr>
<td>Operations not included in other categories</td>
<td>23</td>
</tr>
</tbody>
</table>

Total: 17,135

ON SPECIAL WOUNDS AND INJURIES.

Gunshot Injuries of the Head.—They number 5,056, and have been recorded in two classes: First, The gunshot fractures and injuries of the cranium, including the perforating and penetrating and depressed fractures, the fractures without known depressions, and the contusions of the skull resulting in lesions of the encephalon; and, Secondly, the simple contusions and flesh wounds of the scalp.

In the first class, 1,104 cases are recorded; of 704 of them, of which the results have been ascertained, 505 died, and 199 recovered. In 107 of these terminated cases, the operation of trephining was performed, of which sixty died and forty-seven recovered. In 114 cases, fragments of bone or foreign substances were removed by the elevator or forceps, without the use of the trephine; and of these sixty-one died, and fifty three recovered. When operative procedures were instituted, the recoveries were
45, 3 per cent. But it must be apprehended that this favorable exhibit will be materially modified when a larger number of results are ascertained, and that a greater proportion of the field operations of trephining, in which the results are stated to be undetermined, were lost sight of and terminated fatally. In the 483 cases treated by expectancy, the ratio of recovery is only 20, 5 per cent. But the latter group of cases includes nearly all of the penetrating and perforating fractures, and it would be unwise to base on these figures an argument of operative interference.

The gunshot contusions and wounds of the scalp that have been entered on the records, number 3,942, of which 103 terminated fatally. It is altogether probable that in all of these fatal cases, some undiscovered injury was done to the cranium or its contents; or that the peri-cranium was removed, and death of bone ensued, with consecutive lesions of the encephalon. The histories of many of these cases are now under investigation, and so far as ascertained, the fatal results have depended upon concussion or compression of the brain, or upon the formation of abscesses in the liver or lungs, in consequence of inflammation in the veins of the diploe. Compression has resulted either from extravasation of blood, or inflammation of the brain or its membranes, or from suppuration. This portion of the report is illustrated with a number of cases and drawings of fractures of the cranium. The following remarks upon these cases appear to be worthy of consideration:

"The foregoing case illustrates the fallacy of Potts' views in relation to trephining for pus under the skull-cap; and yet, under such circumstances, the best modern authorities advise the use of the trephine as affording the patient the only chance of recovery. The records attest how slight this chance is, and corroborate the observation of Mr. Hewett,† that 'the successful issue of a case of trephining for matter between the bone and the dura mater is almost unknown to surgeons of our own time.'"

"According to Mr. Teevan's‡ experimental inquiries, the aperture of exit in gunshot perforations of the cranium is always

†British and Foreign Medico-Chirurgical Review, vol. xxxiv, p 205.
larger than the aperture of entry, because it is made by the ball plus the fragments of bone driven out from the proximal table and the diploe."

We would also add, in virtue of the change in the symmetrical form of the ball and the diminished velocity:

"While the number of fatal results after trephining are very great, the examples of success are yet numerous. The data are not sufficiently complete to admit of fair comparative analysis; still it is difficult to avoid the impression that a larger measure of success has attended this operation in the late war, than the previous experience of military surgeons would have led us to anticipate. Surgeon D. W. Bliss, U. S. Vols., alone has reported eleven successes after the use of the elevator or trephine. Even in those almost hopeless cases in which compression of the brain follows a gunshot injury of the skull at a late date, instances of recovery are reported."

"The occurrence of hernia or fungus cerebri is mentioned in connection with eighteen cases of gunshot fracture of the skull, complicated by lacerations of the dura mater and brain. In four of these cases recovery took place without operative interference with the protruding fungous mass, which, in these instances, gradually contracted, was then covered by granulations, and finally cicatrized. In those cases in which bandaging and compression was resorted to, cerebral oppression was soon manifested, and stupor and coma eventually supervened. In those in which the tumor was sliced off, as usually recommended, at the proper level of the brain, it was commonly speedily reproduced, and death from irritation ensued." p. 17.

"In looking over the registers of gunshot injuries of the head, two general facts are noticed: First, that in the after treatment of scalp wounds, a multitude of surgeons did not consider spare diet, perfect rest, and antiphlogistic measures as of essential importance; and, Secondly, that in the treatment of cranial fractures, the general tendency was to the practice recommended by Guthrie, in regard to operative procedures, rather than the more expectant plan insisted upon by the majority of modern European writers on military surgery." p. 17.
"Gunshot Wounds of the Face.—Of 4,167 gunshot wounds of the face transcribed from the reports from the beginning of the war to October, 1864, there were 1,579 fractures of the facial bones, and 2,588 flesh wounds. Of the former, 891 recovered, 107 died, and the terminations are still to be ascertained in 581 cases.

Secondary hæorrhage has been the principal source of fatality in these injuries. It is a frequent complication in gunshot fractures of the facial bones; and the difficulties in securing bleeding vessels in this region are very great. Recourse has often been had to ligations of the carotid artery, with the result of postponing for a time the fatal event.

Owing to the great vascularity and vitality of the tissues in this region, gunshot wounds of the face have commonly healed rapidly, and many creditable plastic operations for the relief of deformities following such injuries have been accomplished." p. 20.

Gunshot Wounds of the Neck.—Of the 1,329 cases of this category that have been entered on the records, the ultimate results have been ascertained in 546 cases only, and in these the mortality is fourteen per cent. Several instances are recorded in which large grape shot, on striking the hyoid bone, were deflected, and buried themselves in the supra-spinous fossa of the scapula, or among the muscles of the back. These patients died from laryngitis or œdema of the glottis, and might have been saved perhaps by tracheotomy; but they died suddenly, when surgical assistance could not be immediately procured. p. 20.

Gunshot Wounds of the Back and Spine.—In this class have been included the fractures of the vertebral column which were not complicated by penetrating wounds of the chest or abdominal cavity, and flesh wounds of the region covered by the trapezius, latissimus dorsi, and gluteal muscles. Of 187 recorded cases of gunshot fractures of vertebrae, all but seven proved fatal. Six of these were fractures of the transverse or spinous apophyses. The seventh case is that of a soldier wounded at Chicamanga, September 20, 1863, by a musket ball, which fractured the spinous process of the fourth lumbar vertebra, and penetrated to the vertebral canal. The ball and fragments of bone were extracted
at a Nashville hospital. The last report states that the patient is likely to recover.

Five thousand one hundred and ninety-four gunshot wounds of the back have been recorded, of which a large proportion are injuries from shell. Troops being often ordered to lie down under a shell fire, this region becomes particularly exposed. p 21.

Gunshot Wounds of the Chest.—Of 7,052 gunshot wounds of the chest that have been examined and transcribed from the reports, belonging to the period prior to July, 1864, there were 2,303 that either penetrated the thoracic cavity or were accompanied by lesions of the thoracic viscera: The results have been ascertained in 1,272 of these, and were fatal in 930, or seventy-three per cent. The 4,759 flesh wounds presented a very small ratio of mortality. It was observed, however, that they were commonly long in healing, in consequence, no doubt, of the mobility of the thoracic parietes.

In the treatment of penetrating wounds of the chest, venesection appears to have been abandoned altogether. Hæmorrhage was treated by the application of cold, perfect rest, and the administration of opium. These measures seem to have proved adequate generally, and no instances are reported of the performance of paracentesis or of the enlargement of wounds for the evacuation of effused blood. Hæmorrhage from the vessels of the costal parietes has been exceedingly rare, and in the few instances recorded, was a secondary accident. Hence, the management of bleeding from wounded inter-costal arteries has presented theoretical rather than practical difficulties. It has been the common practice to remove splintered portions of fractured ribs, and to round off sharp edges that were likely to wound the pleura or lung. After this, with the exception of extracting foreign bodies, whenever practicable, and performing paracentesis when empyema was developed, it has been usual to leave these cases to the natural process of cure.

The records of the results of the so-called method of 'hermetically sealing' gunshot penetrating wounds of the chest are sufficiently ample to warrant an unqualified condemnation of the practice. The histories of the cases in which this plan was
adopted have been traced, in most instances, to their rapid fatal conclusion.

Few examples of recovery are recorded where the track of the ball passed near the root of the lung. The cases in which there was a fracture of the ribs at the wound of entry were very dangerous. The established opinion, that penetrating wounds with lodgment of the ball are more fatal than penetrating wounds, was amply illustrated. But very few recoveries with balls lodged in the lung are recorded, and the histories of such cases are less explicit and complete than could be desired.

Only four cases are recorded of gunshot wounds of the heart that came under treatment. The patient that lived longest after a gunshot wound of the heart, survived twelve hours. In this case a small pistol-shot entered the left ventricle and passed out through the right auricle. pp. 21-23.

*Gunshot Wounds of the Abdomen.*—Of 2,707 gunshot wounds of the abdomen reported from the beginning of the war to July 1st, 1864, there were 2,164 flesh wounds, and 543 cases in which the peritoneal cavity was penetrated or the abdominal viscera injured. Among the flesh wounds, 114 fatal cases are recorded, which were, in most instances, cases of sloughing from injuries of the abdominal parieties by shells. Of the 543 penetrating wounds, the results have been ascertained in 414, and were fatal in 308, or 74 per cent.

In many cases faecal fistulae were produced; they commonly closed after a time, without operative interference, reopening at intervals, and then healing permanently.

Recoveries after wounds of the large intestines have been much more numerous than after wounds of the ileum or jejunum.

No case has been reported in which it was thought expedient to apply a suture to the intestines after gunshot wounds.

Gunshot wounds of the liver were usually followed by extravasation into the abdominal cavity and rapidly fatal peritonitis. Of 32 cases in which the diagnosis was unquestionable, all but four terminated fatally. All cases of gunshot wounds of the spleen that have been reported, were fatal.

Gunshot wounds of the bladder, when the projectile entered
above the pubes, or through the pelvic bones, have proved fatal, so far as the records have been examined. There are many examples of recovery, however, from injuries of the parts of the bladder uncovered by the peritoneum.

Several examples of recovery, after protrusions of the abdominal viscera through gunshot wounds have been reported. In two cases in which loops of small intestine issued, they were immediately returned and retained by means of adhesive strips and bandages, and the patients recovered with ventral hernia. The escape of omentum, through wounds, would not appear to be a very serious complication, for in many cases portions of protruding omentum have been excised, and the patients have, nevertheless, recovered promptly. pp. 24-27.

Gunshot Fractures of the Pelvis.—The records under this head include only the cases in which the abdominal cavity was not penetrated. From the beginning of the war to October 1st, 1864, 359 such cases have been reported. Recovery took place in 97, death in 77, and the result is still to be ascertained in 185. In 256 cases the ileum alone was injured, the ischium alone in 19, the pubes in 12, the sacrum in 32, and in 40 cases the lesions extended to two or more portions of the innominata. The gravity of these cases depended upon the location and extent of the fracture. The majority of recoveries were from fracture of the ileum by musket balls, in which the crest was grooved, or comparatively slight injury was inflicted. Yet there were many examples of perforation of the body of the ileum with ultimate recovery.

In most cases of injury of the pelvic bones, very tedious suppuration ensued, and Surgery could do but little, except to facilitate the escape of pus, and to remove dead bone as it became separated. The returns corroborate the observation of Stromeyer, that there is a great liability to pyæmia in gunshot fractures of the pelvis.

Gunshot Wounds of the Genito-Urinary Organs.—In this category are included gunshot wounds of the genitals or urinary organs, that are not complicated with fractures of the pelvis, or
with penetrature of the abdominal cavity. To October 1st, 1864, the reports furnish 457 such wounds, of which 37 had a fatal result. p 29.

Gunshot Wounds of the Upper Extremities.—When unaccompanied by lesions of the vessels and nerves, the gunshot flesh wounds of the upper extremity are not very serious injuries. All foreign bodies having been extracted, they commonly heal, under the use of water dressings, and the lightest bandaging, in a few weeks. The 21,248 cases entered on the registers are all copied from the reports for the last quarter of 1863, and the first two quarters of 1864.

The gunshot fractures of the upper extremity are recorded in four classes: those of the scapula and clavicle, which are not, at the same time, penetrating wounds of the chest; those of the shaft of the humerus and either of its articular extremities; those of the ulna and radius; and those of the carpus and metacarpus. It is only with the second class that much progress has been made. This comprises 2,408 cases of gunshot fractures of the humerus that have been examined and recorded. Recovery followed in 1,253 cases, death in 436, and the result is as yet undetermined in 719 cases. In the 1,689 completed cases, amputation or excision were practiced in 996, and conservative treatment was adopted in 693, with a ratio of mortality of 21 per cent. in the former and 30 per cent. in the latter. But it is premature to make deductions from statistics which are daily augmenting and tending toward completion. p. 29.

Gunshot Wounds of the Lower Extremities.—Of these 30,014 cases have been recorded, of which 4,562 were fractures, and 25,152 were flesh wounds. The latter were transcribed from the reports from October 1st, 1863, to October 1st, 1864. Of the 1,823 cases of gunshot fracture of the femur that have been entered on the permanent records, the results have been ascertained in 1,233. Of the 1,183 cases of gunshot wounds of the knee-joint, the results are known in 740.

The following table exhibits at a glance the results of 2,003 cases of gunshot fracture of the femur, or of gunshot wounds of the knee-joint, out of a total of 3,106 cases hitherto recorded:
TABLE, Exhibiting the Results of 2,003 Terminated Cases of Gunshot Fracture of the Femur, or of Gunshot Wounds of the Knee-Joint, out of 3,106 cases that have been entered on the records.

<table>
<thead>
<tr>
<th>NATURE OF WOUND</th>
<th>AMPUTATION</th>
<th>EXCISION</th>
<th>CONSERVATIVE MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>TERMINATED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recovered</td>
<td>Died</td>
<td>Undetermined</td>
</tr>
<tr>
<td>Gunshot Fractures of Femur implicating Hip Joint</td>
<td>82</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Gunshot Fractures of Upper Third of Femur</td>
<td>387</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Gunshot Fractures of Middle Third of Femur</td>
<td>346</td>
<td>43</td>
<td>51</td>
</tr>
<tr>
<td>Gunshot Fractures of Lower Third of Femur</td>
<td>418</td>
<td>131</td>
<td>112</td>
</tr>
<tr>
<td>Gunshot Wounds of Knee Joint with or without Fracture</td>
<td>770</td>
<td>12</td>
<td>331</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2003</td>
<td>302</td>
<td>520</td>
</tr>
</tbody>
</table>

NOTE.—In this table the rate of mortality is calculated for the finished cases alone.

In examining the above table in detail, it is seen that the results are ascertained in 822 of the 1,263 cases treated by amputation, or 65 per cent.; in 64 of the 82 cases treated by excision, or 78 per cent.; and in 1,117 of the 1,761 cases treated by conservative measures, or 63 per cent.

The only recorded recoveries after gunshot fracture of the femur involving the hip-joint are those in which excision was practiced. In fractures of the upper third, the mortality rate is greatest for the cases treated by amputation. There were 43 of these cases, and in 19 of them the amputation was done at the hip-joint. Excision gives 7 recoveries after fractures of the upper third; 2 of these were excisions of the head and a portion of the shaft of the femur, 4 were formal excisions of the continuity, and 1 was a removal of fragments and rounding off of sharp edges of bone, which was admitted amongst the excisions with some hesitation. Under conservative measures 93 cases of fracture of the upper third had survived the injury a year or more, and are reported as recovered.
Comparing in gross the 822 finished cases treated by amputation, with the 1,117 treated by conservation, the mortality rate of the former has the advantage by 3 per cent.; an advantage that is maintained in the different regions, except in the upper third. It must be remembered that the amputations include most of the bad cases, and those in which preservation of the limb was attempted and abandoned. p. 30-32.

**Gunshot Wounds of the Arteries.**—The number of cases reported under this head is extremely small. In the campaign of the Army of the Potomac from the Rapidan to the James, in May, June, and July, 1864, of a total of 36,508 gunshot wounds, only 27 belong to this category. The cases of compound fracture complicated with injuries of the large vessels, the cases in which limbs are carried away by solid shot or shell, and the cases in which all the tissues of a limb are disorganized by contusion from a large projectile, and the vitality of the arteries is destroyed, are all returned under other heads. Those only are included in which the canal of a large vessel is primarily opened, and in which this is the principal accident. Such cases are to be sought for among the dead on the battle-field rather than in the Field Hospitals. Surgeon J. A. Lidell, U. S. Vols, reports that on the morning of March 25th, 1865, he examined 43 bodies of soldiers killed in the combat near Fort Steadman, in the lines before Petersburg; 23 were shot in the head, 15 in the chest, and 5 in the abdomen. The bodies of all those wounded in the abdomen were very much blanched, as if they had died of hemorrhage, and the same remark held true in regard to all but two or three of those wounded in the chest. In the few cases of primary gunshot lesions of the arteries that came under treatment, it was usually found that only a portion of the calibre of the vessel had been carried away, and that retraction had been thus prevented. But 44 cases are entered on the records. In most of them, ligatures were placed above and below the seat of injury; but in a few instances, the main trunk was tied at a distance, and amputation was practiced when the bleeding recurred; 20 of the 44 cases terminated fatally. p. 38-39.

**Sabre and Bayonet Wounds.**—The number of sabre and bayonet
wounds that have come under treatment has been comparatively small; 105 cases of the former, and 143 of the latter comprise nearly all that have been reported for the first three years of the war. Of these wounds, two-thirds were received in action, and the remainder were inflicted by sentinels or patrols. There are 11 deaths from sword wounds recorded, and 6 from bayonet wounds. From General Sheridan's campaign in the Shenandoah Valley, 25 sabre wounds are reported; and from the battle of Jonesborough, in Georgia, 30 bayonet wounds. p. 39.

_Tetanus._—The 363 cases of traumatic tetanus recorded in the register for that subject, are all that have been reported during the war. The proportion to the total number of wounds is not large. Of the total number of cases of traumatic tetanus, 336 terminated fatally; of the twenty-seven recoveries reported, the disease was of a chronic form in twenty-three; in the remaining four cases the symptoms were very grave. In two, recovery took place under the use of opiates and stimulants; in two, after amputation of the wounded part.

The great majority of the cases were treated by the free use of opium, conjoined with stimulants and concentrated nourishment. Chloroform inhalations were very generally employed during the paroxysms of spasmodic contraction. Subcutaneous injections of the salts of morphia and atropia were frequently used. Cathartics, quinine, camphor, cannabis indica, bromide of potassium, strychnine, belladonna, and aconite are mentioned among the remedies employed. Cups, blisters, turpentine stupes, and ice were among the applications made to the spine; and fomentations with opium or tobacco were, in some cases, applied to the wound. Amputation, the division of nerves, and the extirpation of neuromata in stumps, were the surgical measures sometimes employed. The results have not modified the conclusion of Romberg, that 'whenever tetanus puts on the acute form, no curative proceeding will avail, while in the milder and more tardy form, the most various remedies have been followed by cure.' The value of nicotine, of the calabar
bean, and of curare,* as curative agents in tetanus was not tested.

Autopsies were made in many cases; but with almost negative results. There were no microscopic examinations to corroborate or disprove the assertions of Rokitansky and Demme,† that tetanus has a constant anatomical lesion, consisting in a proliferation of the connective tissue of the whole medullary substance of the medulla oblongata, of the inferior peduncles of the cerebellum, of the crura cerebri, and of the spinal cord, producing a viscous mass, abounding in nuclei, and never progressing to the formation of fibres. It is frequently mentioned, however, that great congestion of the brain and spinal cord was observed, a condition on which the lesions of the connective tissue above described are believed to depend.

The records abound with illustrations of the influence of sudden vicissitudes of temperature in producing this fatal affection, and of the effect which unextracted balls and other foreign bodies and matter confined under fasciae appear to exercise upon its development. pp. 41-42.

Secondary Hemorrhage.—On this important subject the records are still very incomplete.

Of 387 cases of secondary bleeding from stumps, 233, or sixty per cent. ended fatally; of 650 cases of secondary hemorrhage from gunshot wounds, 330 cases, or fifty-one per cent. terminated fatally. In the 1,037 recorded cases, the femoral artery was ligated ninety-three times for bleeding from stumps, and forty-five times for bleeding from wounds; the subclavian was tied five times for bleeding after amputation at the shoulder joint, and six times for hemorrhage from gunshot wounds of the axilla. The common carotid was ligated fifteen times for hemorrhage from the deep branches of the internal maxillary. Amputation was practised seventy-eight times for secondary

*According to H. Demme, of twenty-two cases of traumatic tetanus, treated by the latter agent, eight recovered. See Schweiz. Zeitschrift für Heilkunde; ii, 356.
†Schmidt's Jahrbucher, vol. xiii.
bleeding from gunshot wounds, and re-amputation was performed fourteen times when other means of arresting hemorrhage from stumps had failed.

The 387 cases of secondary hemorrhage from stumps, were chiefly examples of arterial bleeding. In ninety-five cases, the hemorrhage was, perhaps, mainly venous, and was checked by elevating the stump, or applying cold water, ice, pressure, or the solution of the persulphate of iron. When the hemorrhage was arterial, the most common practice was to tie the main vessel, at the second bleeding, as near as was prudent to the end of the stump. The results of tying the vessel above, according to Anel's method, were very unfortunate.

In reviewing the 650 recorded cases of secondary hemorrhage from gunshot wounds, it appears that, during the earlier part of the war, there were many surgeons who were not sufficiently impressed by the precepts of Bell and Guthrie, and who frequently treated secondary hemorrhage from gunshot wounds by tying the main trunk at a distance from the wound, even when the bleeding occurred at a comparatively early period. Later in the war, however, it was the universal practice to endeavor to secure both ends of the bleeding vessel at the seat of injury, and some brilliant examples are recorded in which this was accomplished in wounds of the posterior tibial or popliteal, when limbs had become infiltrated and swollen, and the difficulties of the operations were immense. pp. 42-43.

Pyæmia.—On this subject 281 reports have been examined, and the individual cases detailed in them have been transcribed upon the registers; 251 special reports on the subject remain to be examined. The histories of 754 cases are recorded in the register, the post-mortem observations accompanying a large proportion of the fatal cases. These number 719, or 95.35 per cent. Pyæmia supervened in 377 cases of gunshot injury in which no operation had been performed, and after 295 cases of amputation, of which 155 were cases of amputation in the continuity of the femur.
The purulent infection was subsequent to excision of the shafts of long bones in twenty-seven cases and to excisions of joints in twenty-eight cases.

These figures by no means represent the frequency with which pyaemia poisoning has occurred. It has been one of the great sources of mortality after amputation, and its victims are to be counted by thousands. The small number of cases on the register are taken from special reports. The reports on the treatment of pyaemia are adverse to the therapeutical utility of the sulphites and hyposulphites in this disease. pp. 43-44.

Erysipelas.—In the ill-ventilated barracks and private edifices which were sometimes of necessity occupied as hospitals during the earlier period of the war, erysipelas was a frequent visitor. p. 87.

Gangrene.—The various forms of sloughing phagedena, and traumatic gangrene, described by systematic authors, were among the complications of wounds that throughout the war often rendered the skill of surgeons abortive, but the ravages of true contagious gangrene were comparatively limited. p. 87.

SURGICAL OPERATIONS.

Amputations.—The histories of 13,397 amputations for gunshot injury have been examined and recorded, and the final results have been ascertained in 9,705 cases. The following table exhibits the number belonging to each region, and includes both primary and secondary cases. It shows the regular increase in the rate of mortality as the trunk is approached.

<table>
<thead>
<tr>
<th>AMPUTATIONS OF THE SUPERIOR EXTREMITIES</th>
<th>Recovered</th>
<th>Died.</th>
<th>Total</th>
<th>Percent. of Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingers and parts of the hand</td>
<td>1778</td>
<td>29</td>
<td>1807</td>
<td>1.60</td>
</tr>
<tr>
<td>Wrist</td>
<td>34</td>
<td>2</td>
<td>36</td>
<td>5.55</td>
</tr>
<tr>
<td>Elbow</td>
<td>19</td>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Forearm</td>
<td>500</td>
<td>99</td>
<td>599</td>
<td>16.52</td>
</tr>
<tr>
<td>Arm</td>
<td>1535</td>
<td>414</td>
<td>1949</td>
<td>21.24</td>
</tr>
<tr>
<td>Shoulder Joint</td>
<td>144</td>
<td>93</td>
<td>237</td>
<td>39.24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4910</strong></td>
<td><strong>637</strong></td>
<td><strong>5547</strong></td>
<td><strong>13.70</strong></td>
</tr>
</tbody>
</table>
We pass over the observations of Surgeon Otis upon the minor amputations, and will content ourselves with presenting his remarks upon the graver operations.

**Amputations at the Elbow.**—The returns corroborate the conclusions of Dupuytren, Malgaine, and Legouest, who combat the disfavor into which this operation has fallen. It was done infrequently in the late war, but nineteen cases having been reported. But in all of these the ultimate results have been ascertained, and were favorable in every instance. The success of Salleron, and other French surgeons, with this operation in the Crimea is well known. Whenever, then, it is practicable to amputate the forearm, disarticulation at the elbow should be preferred to amputation of the arm. The oval method answers the purpose best in this locality. p. 46.

**Amputations at the Shoulder Joint.**—It is creditable to the surgery of the war that the number of cases of amputation at the shoulder joint reported is less than the number of cases of excisions of the head of the humerus, and that the latter operation appears to have been adopted in nearly all the cases in which it was admissible. The reported cases of amputation at the shoulder joint, for the entire period number 458; of excisions of the head of the humerus, there were 575. Of the 237 terminated cases of amputation, ninety-three died, a ratio of mortality of 30.2, which is 6.7 per cent. greater than the mortality in excisions. p. 46.

**Amputations at the Ankle Joint.**—The record is incomplete. In the terminated cases, Symes’ method was employed in twenty-five cases, Roux’s method in two cases. The operation
of Pirogoff appears to be regarded with little favor, and it appears that the author himself has abandoned it, finding the segment of the os calcis likely to become necrosed. p. 46.

Amputations at the Knee Joint.—This operation has found numerous advocates during the war, and has been frequently performed. The returns to October, 1864, give 132 cases, of which fifty-two recovered and sixty-four died. In six cases, amputation of the thigh was subsequently performed, with three recoveries and three deaths. In ten cases the result is undetermined. These figures are encouraging, and if we look at the primary operations alone, the result is still more gratifying. Of forty-nine cases of primary amputation at the knee joint, thirty-one recovered, and sixteen died; while two underwent re-amputation, of whom one recovered, and one, a tuberculous subject, died. This gives a percentage of mortality in primary amputations at the knee joint of 34.9. The mortality in primary amputation at the lower third of the thigh is much larger than this; indeed, it has been already indisputably proved by the Crimean statistics, and by M. Malgaine, that the mortality in amputation augments in exact proportion as the incisions approach the trunk. p. 47.

Amputations of the Thigh.—In 1,597 terminated cases, 568 recovered, and 1,029 died, or 64.43 per cent., which is within a fraction of the mortality, after amputation of the thigh: in the English army in the Crimea, the whole number of amputations of the thigh for gunshot injuries was 1,666, of which 1,531, or 91.89 per cent. terminated fatally. Of these 1,597 amputations, the date of operation is ascertained with precision in 1,061. Of these, 423 were primary and 636 were intermediate or secondary. The ratio of mortality was 54.13 in the former, and 74.76 in the latter. p. 48.

Amputations at the Hip Joint.—At the commencement of the war, the uniform fatality of amputations at the hip joint in the Crimean war was impressed upon the minds of surgeons, and many believed that the operation should be discarded altogether. Still it has been occasionally performed, and several lives have unquestionably been saved by it.
Surgeon Otis sustains the truth of this assertion by the record of three successful amputations at the hip joint, illustrated by a handsome plate and wood cut. pp. 48-51.

**TABLE, showing the Mortality of Amputations at the Hip Joint, for Gunshot Injury, Including Primary, Intermediate, and Secondary Cases.**

<table>
<thead>
<tr>
<th></th>
<th>Recov'd.</th>
<th>Died.</th>
<th>Total.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larrey's primary cases.</td>
<td>1</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Larrey's intermediate cases.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Guthrie's Ciudad Rodrigo cases (intermediate).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Guthrie's Waterloo cases (primary).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>S. Cooper's case.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Blandin's cases (in 1794).</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Huten (Mem. de Med. Mil., t, xlii).</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Brownrigg (Elvas, 1811).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wedemeyer (Ball. de Feruze, t, iii, p. 161).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Letulle (Siege d'Anvers).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Clot Bey (Legouest's table).</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Jubiot (Mem).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Guyon (Algiers, 1840).</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Sedillot (Annales de la Chir., t, ii, p. 279).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Richel (Journées de Juin, 1848).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Robert (Idem).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Guersant (Idem).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Vidal (Idem).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bandeins (Traite des Plaies d'Armes a Feu).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Schleswick Holstein cases.</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Langenbeck's case (schleswick Holstein).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Two operations in the English army, in the Crimea, by the Director General.</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>A soldier of the 53d English regiment.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Two other cases prior to April, 1855, in the English army in the Crimea.</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Seven enlisted men and two officers (Med. and Surg. Hist. of British army in the Crimea).</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Twelve primary cases in the French army in the Crimea.</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Mounier's case at Dolma Batchi.</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Legouest's case (fully recovered and died of cholera).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Four other secondary cases in the French Crimean hospital.</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Bertherand's case after the engagement at Novara (Campagne d'Italie de 1859, p. 37).</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Jules Roux cases at Toulon (all secondary).</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Primary cases in the late war (U. S.).</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Secondary cases in the late war (U. S.).</td>
<td>1</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>92</td>
<td>163</td>
</tr>
</tbody>
</table>

From an examination of the results of the preceeding table, and from a careful analysis of all the cases of hip joint amputations during the late war, Surgeon Otis concludes that there are but three conditions under which early amputation at the hip joint is admissible in military surgery, viz: when nearly the entire thigh is carried away by a large projectile, when the totality of the femur is destroyed by osteomyelites, and, possibly, when, with comminution of the upper extremity of the femur, the femeral vessels are wounded.
The experience of M. Jules Roux, in the Italian war, seems to prove conclusively that secondary amputations at the hip joint are less dangerous than primary ones.

As to the method of operating, it may be observed that the anterior single flap procedure has of late been generally performed. pp. 48-53.

Excisions. — The number of excisions after gunshot injuries that have been transcribed from the reports, has been given on page 104 of this review, and indicates that this branch of conservative surgery was largely practiced by the medical officers of the United States army during the late war.

We shall extract from the report the statistics and observations upon the more important excisions.

Excisions of the Wrist. — The thirty-five cases included in this category were all examples of partial excision. In twenty-seven, the ends of the radius or ulna, or of both, were removed, and, in some instances, shattered fragments of the upper row of carpal bones. In eight cases, the greater part of the carpus was encised. Death took place from pyaemia, and twice from exhaustion from protracted suppuration and irritative fever; twenty-six cases are reported as recovered. In two cases, amputation of the forearm became necessary. The reports are unsatisfactory in relation to the amount of mobility left in the hand, and the cases are now under investigation with reference to this point. p. 54.

Excisions of the Elbow. — The returns from three-fourths of the entire period give 315 cases of excision of the elbow, and the results are ascertained in 286 cases. In sixteen cases, amputation of the arm became necessary; sixty-two cases terminated fatally, or 21.67 per cent., which is a mortality a fraction greater than that resulting from amputation of the arm. p. 55.

Excisions of the Shoulder Joint. — Nearly all of the cases that have been reported during the war have been recorded. The following are the results: In 252 primary operations, fifty died, 160 recovered, and in forty-two cases the results
are undetermined; in 323 secondary operations, 115 died, 183 recovered, and in twenty-five the results are still undetermined.

The percentage of mortality is 23.3 in primary cases, 38.59 in secondary cases, or a mean ratio of 32.48 per cent. in the aggregate of 575 operations.

The ratio in amputations at the shoulder joint is 39.24, a per centage of 6.76 in favor of excision.

Of thirty-six cases of gunshot fractures of the head of the humerus, selected as favorable cases for the expectant plan, and treated without excision or amputation, sixteen died, or 44.4 per cent., a ratio in favor of excision of 11.96 per cent. p. 55.

Generally the operation has been done in cases in which the head of the bone was alone implicated, and consisted simply in a decapitation of the humerus. Partial excisions have been seldom practiced. The method commonly preferred was that by a single vertical incision, though some operators raised a V shaped flap, and all endeavored to include the wound made by the ball in the incisions. It is frequently mentioned that the long tendon of the biceps was preserved. In twenty-nine cases, portions of the clavicle, or of the coracoid and acromion processes and neck of the scapula, were excised, as well as the head of the humerus. Only four of these cases terminated fatally, and the average result in the recovered cases was as satisfactory as the ordinary result in decapitation of the humerus. When the shaft of the humerus has been extensively shattered, the United States' surgeons have not been deterred by the prohibition of Guthrie, but have frequently removed the head with even five or six inches of the diaphysis. p. 56.

Excisions of the Ankle Joint.—Of twenty-two recorded cases, eight were excisions of the tibio-tarsal articulation, and the remainder were nearly all ablations of the tarsal bones; of eighteen terminated cases, twelve recovered, and six died. p. 57.

Excisions of the Knee-Joint.—Prior to the present war,
there were but seven recorded examples of excision of the knee for gunshot injury. During the late war, complete excision of the knee-joint has been performed eleven times. Dr. Otis furnishes interesting abstracts of each case; two cases of recovery and nine deaths are reported, the mortality being precisely the same as in the same number of cases reported before the war.

**Excisions of the Head of the Femur.**—There were on record, previous to the late war, twelve cases of this operation, with one success. Experience having demonstrated the uniform fatality of gunshot fractures of the head or neck of the femur when abandoned to the resources of nature, and the excessive mortality of amputations at the hip-joint for gunshot injury, the highest authorities in military surgery were then unanimous in advising, under suitable conditions, excision of the head of the femur, until, as Baron Hippolyte Larrey expressed it, the experiments of the future proved more discouraging than the experience of the past.

Surgeon Otis gives a tabulated statement of 32 cases of excision of the head of the femur, and from this we gather that 26 deaths occurred, to the three recoveries; one case is reported as doing well, and the result is not stated in the remaining two cases. pp. 61-75.

**Excisions in the Continuity of the Long Bones of the Extremities.**—The great Surgeons who have done most toward substituting excision for amputation in gunshot injuries of the joints have almost unanimously condemned excisions of the continuity of the long bones in the treatment of gunshot fractures. The surgical histories of the Crimean war, of the Schleswick-Holstein campaigns, and of the Italian mutiny, record a few successes in resections of the shafts of the humerus, the tibia, and the bones of the forearm; but this class of operations could scarcely be considered as admitted among the established and approved procedures of Surgery. The late war has furnished ample materials for arriving at definite conclusions on this subject,
and for determining how far these measures can claim to be included in that true conservatism which has for its first object the saving of life, and refuses to jeopardize lives in order to save limbs.

These materials are yet to be thoroughly analyzed. So far as examined, their evidence is, on the whole, unfavorable to incisions in the continuity.

A synopsis of the results at present attained is presented in the following table:

TABLE, giving the number of Cases of Excisions for Gunshot Injuries in the Continuity of the Bones of the Extremities, from the Commencement of the War to July, 1864, and the Results as far as ascertained.

<table>
<thead>
<tr>
<th>Type of Excision</th>
<th>Died</th>
<th>Recovered</th>
<th>Amputated</th>
<th>Excised and not recovered</th>
<th>Total</th>
<th>Percent of mortality in finished cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excisions in the Continuity of the Humerus</td>
<td>42</td>
<td>132</td>
<td>7</td>
<td>79</td>
<td>96</td>
<td>24.00</td>
</tr>
<tr>
<td>Excisions in the Continuity of the Radius</td>
<td>11</td>
<td>93</td>
<td>3</td>
<td>67</td>
<td>174</td>
<td>10.67</td>
</tr>
<tr>
<td>Excisions in the Continuity of the Ulna</td>
<td>16</td>
<td>100</td>
<td>3</td>
<td>51</td>
<td>170</td>
<td>13.79</td>
</tr>
<tr>
<td>Excisions in the Continuity of both Radius and Ulna</td>
<td>5</td>
<td>24</td>
<td>1</td>
<td>10</td>
<td>40</td>
<td>17.24</td>
</tr>
<tr>
<td>Excisions of the Metacarpal Bones</td>
<td>2</td>
<td>30</td>
<td>15</td>
<td>18</td>
<td>50</td>
<td>6.25</td>
</tr>
<tr>
<td>Excisions in the Continuity of the Femur</td>
<td>32</td>
<td>6</td>
<td>24</td>
<td>62</td>
<td>86</td>
<td>84.21</td>
</tr>
<tr>
<td>Excisions in the Continuity of the Tibia</td>
<td>11</td>
<td>48</td>
<td>5</td>
<td>20</td>
<td>64</td>
<td>18.64</td>
</tr>
<tr>
<td>Excisions in the Continuity of the Fibula</td>
<td>15</td>
<td>60</td>
<td>3</td>
<td>15</td>
<td>93</td>
<td>20.00</td>
</tr>
<tr>
<td>Excisions in the Continuity of both Tibia and Fibula</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>25.00</td>
</tr>
<tr>
<td>Excisions of Metatarsal Bones</td>
<td>5</td>
<td>25</td>
<td></td>
<td>23</td>
<td>33</td>
<td>19.23</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>140</td>
<td>234</td>
<td>23</td>
<td>259</td>
<td>973</td>
<td>26.71</td>
</tr>
</tbody>
</table>

After excisions of portions of the shaft of the humerus for gunshot fractures, a number of patients have certainly obtained very useful limbs. But the mortality after the operation is 3 per cent. greater than after amputation of the arm.

Excision in the continuity of both bones of the forearm has a larger mortality ratio than amputation of the forearm.

The specimens at the Museum and the records afford emphatic arguments against formal excisions of the shaft of the femur. With one exception, the few cases that recovered were those in which, after the removal of detached fragments, the least amount of operative interference had been practiced.
The mortality rate after excisions of the tibia and fibula is less than after amputation, as the statistics stand; but the number of cases in which the result is still pending is unusually large. p. 76-77.

LIGATIONS.

The following table exhibits the number of cases of ligation of the larger arteries, from the beginning of the war to March, 1864:

<table>
<thead>
<tr>
<th>Artery</th>
<th>No. of Cases Recovered</th>
<th>No. of Cases Died</th>
<th>Total</th>
<th>Ratio of Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Carotid</td>
<td>12</td>
<td>37</td>
<td>49</td>
<td>75.71</td>
</tr>
<tr>
<td>External Carotid</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Subclavian</td>
<td>7</td>
<td>23</td>
<td>35</td>
<td>80.</td>
</tr>
<tr>
<td>Axillary</td>
<td>3</td>
<td>21</td>
<td>24</td>
<td>87.50</td>
</tr>
<tr>
<td>Brachial</td>
<td>55</td>
<td>11</td>
<td>66</td>
<td>17.18</td>
</tr>
<tr>
<td>Radial</td>
<td>13</td>
<td>2</td>
<td>15</td>
<td>25.00</td>
</tr>
<tr>
<td>Ulnar</td>
<td>9</td>
<td>1</td>
<td>10</td>
<td>20.00</td>
</tr>
<tr>
<td>Common Iliac</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Iliac</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Iliac</td>
<td>2</td>
<td>14</td>
<td>16</td>
<td>80.</td>
</tr>
<tr>
<td>Femoral</td>
<td>25</td>
<td>55</td>
<td>80</td>
<td>65.50</td>
</tr>
<tr>
<td>Profunda</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>85.71</td>
</tr>
<tr>
<td>Popliteal</td>
<td>4</td>
<td>14</td>
<td>16</td>
<td>80.</td>
</tr>
<tr>
<td>Anterior Tibial</td>
<td>11</td>
<td>5</td>
<td>16</td>
<td>33.85</td>
</tr>
<tr>
<td>Posterior Tibial</td>
<td>13</td>
<td>6</td>
<td>19</td>
<td>31.57</td>
</tr>
<tr>
<td>Peroneal</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>All others</td>
<td>11</td>
<td>4</td>
<td>15</td>
<td>25.66</td>
</tr>
</tbody>
</table>

AGGREGATE: 163 240 403

pp. 78-79.

We pass by the division of this report "on the Medical Staff and the Meteria Chirurgica," and conclude with the observations of Surgeon Otis on Anaesthetics. There have been consulted, in regard to the employment of anaesthetics, the reports of 23,260 surgical operations performed on the field, or in general Hospitals. Chloroform was used in 60 per cent. of these operations, Ether in 30 per cent., and in 10 per cent. of the cases a mixture of the two was administered.

At the general Hospitals, the greater safety of ether as an anaesthetic was commonly conceded. It was often employed, and no fatal accident from its use has been reported. In the field operations, chloroform was almost exclusively used. The returns indicate that it was administered in not
less than 80,000 cases. In seven instances fatal results have been ascribed with apparent fairness to its use.” p. 87.

We hope to review the remaining portion of this Circular, prepared by Assistant Surgeon J. J. Woodward, in the next number of this journal.

The extracts which we have given from the report of Surgeon George A. Otis, present all the important facts which will prove of value to the Surgeons of the late Confederate Army for reference and comparison, in the study and record of their Surgical experience during the recent revolution.

---

SELECTIONS.

ARTICLE I.

Grand Summary of the Sick and Wounded of the Confederate States Army under Treatment during the Years 1861 and 1862.

The immense mass of reports from the Army Medical Corps for the first two years of the war has been carefully winnowed and digested under the supervision of the Surgeon-General, and a general summary laid before Congress at its last session. Necessarily imperfect as these statistics are, they show, at a glance, the herculean labors performed by the Medical Staff. Gathered up as the Army was from homes of peace to meet the throng of the invading enemy, the amount of sickness surpasses anything on record, while the ratio of mortality is far below the usual average. The Medical Department—without resources of any sort—without organization, without hospitals or the furniture to equip them, without transportation, self-depending and almost self-sustaining—assumed the enormous burden which is reached in the accompanying figures, containing a few of the leading diseases of the years 1861 and 1862, and faithfully conducted their task to a satisfactory conclusion. We should be prepared to make every allowance for the many imperfect statements and confused or irregular reports consequent on the confusion attendant on these faithful public officers, whilst fighting manfully, and but half equipped, with such a torrent of disease. In our next issue, when the more complete records of the year 1863 will be presented to the reader, a comparison, not without interest to all, can then be instituted.
GENERAL RESUME.

From all the reports now on file in the Surgeon-General's Office for the years 1861 and 1862, exclusive of the few scattering ones which have reached us from the Trans-Mississippi Department, we are enabled to sum up the sickness and mortality occurring in our Armies, as follows:

Continued Fevers.—Field Reports, 36,746 cases and 5,205 deaths. Hospital Reports, 40,565 cases and 7,020 deaths.

Paroxysmal Fevers.—Field reports, 115,415 cases and 848 deaths. Hospital reports, 49,311 cases and 485 deaths.

Eruptive Fevers.—Field, 44,438 cases and 1,036 deaths. Hospitals, 32,755 cases and 1,238 deaths.

Diarrhea and Dysentery.—Field, 226,828 cases and 1,696 deaths. Hospitals, 86,606 cases and 1,658 deaths.

Pulmonary Affections.—Field, 42,204 cases, 3,534 deaths, and 4,538 discharges from service. Hospitals, 36,988 cases, 4,538 deaths, and 1,135 discharges.

Rheumatism.—Field, 29,334 cases and 1,142 discharges. Hospitals, 30,438 cases and 700 discharges.

Gun-shot Wounds.—Field, 29,569 cases, 1,623 deaths, and 493 discharges. Hospitals, 47,724 cases, 2,618 deaths, and 742 discharges. Killed in battle, 8,087.

All other Diseases.—Field, 324,321 cases and 2,278 deaths. Hospital, 123,402 cases and 1,802 deaths.

Whole number of cases exhibited in the Field Reports during 1861 and 1862 was 848,555; of which 16,220 died and 10,455 were discharged from service. There were admitted in Hospitals, for the same period, 447,689 cases; of which 19,359 died and 6,485 were discharged.

We learn, also, from these Reports that of all the cases represented as originating in the field, 108,068 were sent to General Hospitals. If this be so, the large number received into Hospitals, as shown by their own returns, can only be accounted for in the repeated transfer of patients during convalescence from one Hospital to another.

It is greatly to be regretted that the interest naturally felt in medico-vital statistics, when based on accurate and reliable data, can scarcely be claimed for what is offered in this paper. Still, if it have but the effect of directing the attention of Medical officers more closely and carefully to the reports required of them, it will not be altogether without good results. This is but a beginning, and the next Annual Report, that for 1863, will doubtless embody many facts of a much more useful and interesting character.—Confederate States Medical and Surgical Journal, September, 1864.
ARTICLE II.


**GUN-SHOT WOUNDS.**

The proportion of these was less than that of last year by two per cent.; that is to say, while gun-shot injuries, during the period covered by the Report of last year, amounted to 9.8 of the whole number of cases reported, for 1863 they only reach 7.7. It will be remembered that the campaign of 1862 was conducted with the utmost vigor, and that the army fought, in quick succession, many sanguinary battles, commencing with that of Williamsburg, and ending with that of Fredericksburg; including between these two the battles around Richmond, Cedar Mountain, Manassas and Sharpsburg, each of which resulted in a heavy list of casualties to the troops engaged.

The mortality from these causes, as might be expected, was not nearly so great during this year as it had been during the one previous. The men had become hardened and better able to resist the influence of climate and exposure, and the battles which occurred during the year, transpired at a season far more favorable to recoveries. Thus, instead of being crowded together in hastily extemporised Hospitals during the intense heats of mid-summer, as they were in 1862, the battle of Chancellorsville, fought early in May, gave to its wounded the benefit of a most delightful and salubrious season for treatment and recovery, while that of Gettysburg, still later, sent to our Hospitals the more slightly wounded, leaving the grave cases in the hands of the enemy to die, or to be otherwise accounted for in a manner not known to our reports.

The Surgical Operations performed on the field at Chancellorsville did remarkably well. Generally, the wounded reached the Hospitals in this city in a condition favorable to recovery, and, as before stated, the excellent condition of our Hospitals seemed to repress all tendency to the prevalence of Erysipelas or Gangrene. Indeed, never before or since have they been so entirely free from the presence of these diseases, as they were during the Summer and Fall of this year.

In the Hospitals, the mortality from wounds during the year 1862, amounted to 11.2; in 1863, to 2.3; and this difference is really increased still further in favor of the latter year, by the fact that the wounded from the battle of Fredericksburg gave most of its mortality to the year 1863, without adding at all to the number of cases for that year—these having been already embraced in reports for 1862.

The figures, as we have them in our Reports for this year, exhibit 42,885 cases of Wounds treated in Hospitals, and 999 deaths—this yields a mor-
tality of 2.3. But, in order to arrive at a more accurate estimate of the proportion really dying from Wounds in the Hospital, it will be well to assume that the number reported from the field were all that were treated in Hospitals, and this being 27,206, and the mortality 999, we have a per centage of 3.7, which, it is believed, approaches nearer the truth.

Adding the number dying in Hospitals to those reported from the field, we have an aggregate of deaths for the year in field and in hospital, from Gun-shot Wounds, of 1,723, or 2.4 of the whole number of cases reported.

This, however, is much too small, because it is impossible, as before stated, with our present form of Reports, to avoid the frequent multiplication of cases by transfer, etc.

During this year, one case of successful Amputation at the hip-joint was reported. It occurred on the person of James Kelly, Private Company “B,” 56th Pennsylvania, aged 23, and by occupation a Farmer. He was wounded April 29th, 1863, near Fredericksburg, sustaining Compound Comminuted Fracture of the Femur. Disarticulation, by antero-posterior flaps, was performed the same day on the field. He fully recovered, was paroled and sent North, July 14th, 1863. (Operation performed by Surgeon E. Shippen, U. S. A.)

It is proper to remark, also, in this connection, the many successful cases of Amputation, especially of the upper-third of the thigh, occurring in our Reports. Among them may be mentioned Lieutenant-Generals Ewell and Hood (the latter now General Commanding Army of Tennessee), both of whom have been restored to duty, in the full vigor of health, with thighs amputated just a little short of the hip-joint. Added to these are many others, of less distinction, it is true, but not the less attesting the skill and ability of Confederate Surgeons in the performance of an operation regarded heretofore as almost uniformly fatal. Indeed, so much had this come to be regarded the case, that recently an order emanating from the Federal Surgeon-General, forbids such operations on the field, not only at the upper-third, but any where along the continuity of the thigh.

This question of Conservative Surgery in Compound Fractures of the Femur, is one which is receiving the most earnest attention of Military Surgeons, and though it has been to some extent, decided in the United States, we are obliged, in balancing the merits of the two methods of treatment, to adopt a different opinion. With us, the results, as elicited from our Reports, exhibit a slight per centage in favor of the operation itself on the field. Thus, of 77 cases of Primary Amputation of the Thigh, at the upper-third, 40 recovered, and 37 died. The same favorable results are also found to have attended the Conservative Method of treatment in similar cases; for, of 221 cases, where Amputation was not resorted to, 116 recovered.

These results are, indeed, remarkably favorable; far surpassing, in this way, any heretofore reported or known to the Profession.
As between the two modes of treatment, the difference in the results is but slight, as shown by the figures given above, and as will be more perfectly understood when the tables annexed shall be examined. Guided, then, by our Reports, it may be safely accepted as a rule, that the better plan, in general, is to operate on the field. The greater readiness with which the patient can be transported from the field; the greater ease and comfort realized, under these circumstances, when the limb has been removed; the lesser time required in Hospital for recovery, would all seem to point to its adoption as the wiser policy. Still, in these and in all other questions of Surgical interference, the Medical Officer should be governed by the peculiar circumstances attending each case.

Many Resections were performed during this year, and while, in very many instances, with results altogether favorable, so far as recovery alone is considered, yet, we are inclined to think, in nearly all cases, leaving limbs of very doubtful utility. Indeed, when it is considered that these operations are much more fatal than simple Amputations, exposing the patient for a much greater time to the evil influence of Hospital atmosphere; involving, more frequently, too, attacks of Erysipelas, Gangrene, and Pyemia, it may be well questioned if our Surgeons do not too often resort to them.

The shoulder joint, we sometimes think, is the only one in which Resection promises all the good results claimed for it. In the elbow, if the entire joint be removed, no possible effort of nature can supply the lost motion; and the slight prehensile power of the fingers, which may continue, can scarcely atone for the awkward, useless and ungainly limb remaining.

Excision of the knee joint we cannot help regarding as positively reprehensible on the field, and scarcely less so in Hospital. But one successful case is reported during the year (Surgeon J. B. Read), at last accounts (September, 1864) the patient was fully recovered, but with a limb shortened by several inches, and union only ligamontous. Amputation has been asked for by him, and will be performed as soon as the condition of his health may justify it.

One successful case of Resection of hip joint has likewise been reported by Surgeon J. B. Read, and though the leg will never be of any use, yet it is fair to say, that to this operation may be due the preservation of the patient's life, which might have been more seriously imperilled by disarticulation.

Frequent cases of Gun-shot Wounds, healing by first intention, have also been reported. It is difficult to understand how this can be so, when all our theories of repair and restoration of lost tissues have been based on inflammatory action, leading, of course, to suppuration and granulation. Still, the evident care and truthfulness which accompany the report of the cases attest the fact beyond all doubt; and it is hoped that future investigations on the part of the Medical Staff will, in time, yield much that is interesting and instructive in this connection. Already, it has been
proposed (by Surgeon J. J. Chisolm) to convert all Gun-shot Wounds into simple incised wounds, by paring the ragged edges and nicely adjusting the lips by means of sutures or straps, excluding the atmosphere, and thus effecting a cure by absorption and re-modelling, without the aid of suppuration.

Tetanus.

In reviewing carefully all the circumstances connected with Gun-shot Wounds, as exhibited in the Reports before us, it would be singular did we not remark the occasional occurrence of Tetanus.

This complication of Gun-shot Wounds, so obscure, so fearfully fatal, and so much to be deplored, is fortunately seldom met with. Indeed, it has always been a source of wonder to all writers on Military Surgery that it so rarely occurs. In our Reports for 1861 we find that in 1,750 cases of wounds of different characters, there were thirteen cases of Tetanus—0.75, or one case of Tetanus in 134 cases of Wounds. Of these, only three are reported as having ended fatally, giving a ratio of mortality of 2.3, or one death in four cases—a result which clearly proves the inaccuracy of our earlier Reports.

In 1862, the consolidated Reports from Hospitals, present 45,974 cases of Wounds, and only 53 cases of Tetanus—0.11, or one case of Tetanus in 867 cases of Wounds. Of these 53 cases, 28 terminated in death—52.8, about one death in two cases, a much larger per centage of mortality than in 1861—but still we have reason to suspect, very much below the truth. Many of the cases reported Tetanus are, doubtless, mere cases of Traumatic Spasms; hence, such apparently favorable results.

Tetanus was, doubtless, of more frequent occurrence in our Hospitals than would appear from the Reports, as it is well known that cases are generally reported under the disease they first enter with, which ordinarily is "Vulnus Sclopeticum." It is only recently that Surgeons have been reporting "supervening diseases." In referring to our special reports of gun-shot injuries involving Tetanus, covering the whole period of the war up to the present time, and which are evidently drawn up with great care, we find 66 cases recorded. Of these, six only recovered, giving a mortality of nearly 91 per cent.

Assuming, then, that these constitute the entire number of cases of decided Tetanus which have occurred on the whole number of Gun-shot Wounds treated (56,775), we have the proportion of one case of Tetanus to every 860 cases of Gun-shot Wound.

McLeod, in his Surgery of the Crimean War, does not give the proportion of Tetanus to wounds, but he says he could only hear of thirteen cases of Tetanus in the English army throughout the Crimean War. These were all fatal—with only one exception. In the last East India War, nineteen cases are reported, and only one recovery. Alcock gives the proportion of cases of Tetanus to wounds as one in seventy-nine. Stromyer states, that during the Schleswig-Holstein War, the proportion was three in 1,000. In 1830, of three hundred and ninety cases of Gun-
shot Wounds, there was only one case of Tetanus in the Hotel Dieu at Paris.

The following tables will exhibit the general results of amputations and resections thus far collected, and carefully prepared from reports throughout the Confederacy:

<table>
<thead>
<tr>
<th>RESECTIONS</th>
<th>Shoul't</th>
<th>Elbow</th>
<th>Wrist</th>
<th>Hlp</th>
<th>Knee</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful</td>
<td>28</td>
<td>22</td>
<td>2</td>
<td></td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>13</td>
<td>3</td>
<td></td>
<td></td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful</td>
<td>20</td>
<td>23</td>
<td>1</td>
<td></td>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>7</td>
<td>6</td>
<td></td>
<td>1</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Useful Joints</td>
<td>2</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>70</td>
<td>61</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>149</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISARTICULATIONS</th>
<th>Shoul't</th>
<th>Elbow</th>
<th>Wrist</th>
<th>Hlp</th>
<th>Knee</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>54</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>65</td>
</tr>
<tr>
<td>Deaths</td>
<td>25</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Deaths</td>
<td>20</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>74</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>11</td>
<td>136</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AMPUTATION OF THIGH</th>
<th>UPPER THIRD</th>
<th>MIDDLE THIRD</th>
<th>LOWER THIRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cures</td>
<td>Deaths</td>
<td>Cures</td>
<td>Deaths</td>
</tr>
<tr>
<td>Circular—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>19</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>Secondary</td>
<td>3</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Flag—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Secondary</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Method not stated—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>15</td>
<td>29</td>
<td>24</td>
</tr>
<tr>
<td>Secondary</td>
<td>4</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50</td>
<td>61</td>
<td>87</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPOUND FRACTURE OF THE THIGH TREATED WITHOUT AMPUTATION</th>
<th>Recoveries</th>
<th>Deaths</th>
<th>Days</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Period of Recovery</td>
<td>116</td>
<td>105</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>Greatest Period of Recovery</td>
<td></td>
<td></td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>Least Period of Recovery</td>
<td></td>
<td></td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Average Period of Death</td>
<td></td>
<td></td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Greatest Period of Death</td>
<td></td>
<td></td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>Least Period of Death</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Average Amount of Shortening</td>
<td></td>
<td></td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Greatest Amount of Shortening</td>
<td></td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Least Amount of Shortening</td>
<td></td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>
### Consolidated Table of Amputations

<table>
<thead>
<tr>
<th>Joint</th>
<th>Cases</th>
<th>Cures</th>
<th>Deaths</th>
<th>Percent</th>
<th>Cases</th>
<th>Cures</th>
<th>Deaths</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thigh</td>
<td>345</td>
<td>213</td>
<td>132</td>
<td>38</td>
<td>162</td>
<td>43</td>
<td>119</td>
<td>73</td>
</tr>
<tr>
<td>Leg</td>
<td>314</td>
<td>219</td>
<td>95</td>
<td>30</td>
<td>150</td>
<td>76</td>
<td>74</td>
<td>49</td>
</tr>
<tr>
<td>Arm</td>
<td>294</td>
<td>252</td>
<td>42</td>
<td>14</td>
<td>140</td>
<td>87</td>
<td>53</td>
<td>37</td>
</tr>
<tr>
<td>Fore-Arm</td>
<td>69</td>
<td>61</td>
<td>8</td>
<td>12</td>
<td>45</td>
<td>35</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Shoulder-Joint</td>
<td>79</td>
<td>54</td>
<td>25</td>
<td>31</td>
<td>28</td>
<td>8</td>
<td>20</td>
<td>71</td>
</tr>
<tr>
<td>Elbow-Joint</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>25</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wrist-Joint</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td></td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip-Joint</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>66</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Knee-Joint</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>60</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ankle-Joint</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>33</td>
<td>8</td>
<td>7</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Tarsal-Joint</td>
<td>16</td>
<td>13</td>
<td>3</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1142</td>
<td>827</td>
<td>315</td>
<td>27</td>
<td>546</td>
<td>262</td>
<td>284</td>
<td>51</td>
</tr>
</tbody>
</table>

### Article III

**Amputation, Disarticulation and Resection Statistics of the Confederate States Army.**

Amputations of the Thigh, whole number, 507: Primary, 345; Recovered, 213; Died, 132; 38 per cent. Secondary, 162; Recovered, 43; Died, 119; 73 per cent.

Amputations of the Leg, whole number, 464: Primary, 314; Recovered 219; Died, 95; 30 per cent. Secondary, 150; Recovered, 76; Died, 74; 49 per cent.

Amputations of the Arm, whole number, 431: Primary, 294; Recovered, 252; Died, 42; 14 per cent. Secondary, 140; Recovered, 87; Died, 53; 37 per cent.

Amputations of the Fore-Arm, whole number, 114: Primary, 69; Recovered, 61; Died, 8; 12 per cent. Secondary, 45; Recovered, 35; Died, 10; 22 per cent.

Disarticulations, whole number, 135: Primary, shoulder-joint, 79; Recovered, 54; Died, 25; 31 per cent. Primary, Elbow-joint, 4; Recovered, 3; Died, 1. Primary, wrist-joint, 7; Recovered, 5; Died, 2. Primary, hip-joint, 3; Recovered, 1; Died, 2. Primary, knee-joint, 5; Recovered, 2; Died, 3. Secondary, shoulder-joint, 28; Recovered, 8; Died, 20; 71 per cent. Secondary, elbow-joint, 3; Recovered, 2; Died, 1. Secondary, knee-joint, 6; Died, 6.

Resections, whole number, 130: Primary, shoulder-joint, 41; Recovered, 28; Died, 13; 27 per cent. Primary, elbow joint, 25; Recovered, 22; Died, 3. Primary, wrist-joint, 2; Recovered, 2. Primary, knee-joint, 2; Died, 2. Secondary, shoulder-joint, 26; Recovered, 19; Died, 7; 21 per cent. Secondary, elbow-joint, 29; Recovered, 23; Died, 6.
Secondary, wrist-joint, 1; Recovered, 1. Secondary, hip-joint, 2; Recovered, 1; Died, 1. Secondary, knee-joint, 2; Recovered, 1, Died, 1.

Amputations of the Foot: Primary—Chopart's, 16; Recovered, 13; Died, 3—Symes', 2; Recovered, 2—Pirogoff's, 4; Recovered, 2; Died, 2. Secondary—Chopart's, 8; Recovered, 7; Died, 1—Symes', 4; Recovered, 4 (1 unsuccessful, requiring subsequent amputation above the ankle-joint.)

A vast number of additional operations are received, but without positive results, and, therefore, they have not been included in the above list.

We may be well satisfied with the results of these statistics, which, carefully excluding all doubtful cases, are compiled from those operations only that have reached a positive conclusion. A general summary of the above tables shows that the mortality after 1,814 operations, including amputations, resections and disarticulations, amounted to 632, giving a death ratio of 34 per cent.

By referring to the mortality tables after amputations, subsequent to many of the great battles of modern days, taken from the pages of Lagouest, which will be found in our chronicle for this number, the reader will be able to draw his own comparisons.

The only statistics on this subject from the Federal army we find in the United States Army and Navy Journal for November, 1863, which gives the amputation statistics for September, October, November and December of 1862, as follows: Whole number, 1,342; deducting 516 under treatment January 1, 1863—826. Of this number, 336 died; a mortality of 40 per cent.

The journal to which we owe the above observation gives the following table: Whole number, 1,342: Returned to Duty, 100; Furloughed, 25; Deserted, 11; Discharged, 350; Died, 336; Secondary Operation, 34; Under Treatment, January 1, 1863, 516.—C. S. Med. & Surg. Journal, May, 1864.

ARTICLE IV.

Conservative Surgery in Compound Fracture of Femur.

The Military Surgeon has no question submitted to his discretion of more importance than to determine upon the propriety of amputation in compound fractures of the Femur, the result of Gun-shot Wounds.

The authorities, both French and English, teach us not to trust these cases to nature, and broadly state that, in the operation alone, there is hope; but the statistics, particularly of the Crimean campaign and in our own service, prove that the mortality after amputation is enormous, and force us to consider the propriety of conservative practice in this numerous class of surgical accidents.
In various numbers of the Journal, the reader will find many interesting observations bearing upon this question, and we submit at this time a consolidated statement of compound fractures of Femur treated without operation, compiled from the records in the Surgeon-General's Office, from June, 1862, to February 1, 1864, inclusive. We have, in summary, excluded all cases not positively determined, and hence, while the number of observations is greatly reduced, the value of the conclusion is increased in like proportions.

Total number of cases, 221: Recovered, 116; 52 per cent.

Average period of recovery, 104 days—greatest period, 255 days, and least, 41 days. Average period where death occurred, 52 days—greatest period, 185 days—least, one day. Average amount of shortening, 1 9-10ths inches—greatest, 5 inches, and least, half an inch.

When we compare directly the results of amputations with the table of cases not operated on, we feel still more disposed to rebel against the authority of Guthrie, McLeod, Larrey, Percy and Dupuytren, and at least hesitate before condemning the shattered limb to instant ablation.

Our own statistics are as follows:

507 cases amputated; 250 recovered; 50 per cent.
221 cases not amputated; 116 recovered; 52 per cent.

The chance for life being more than equal, the value of the leg saved should be considered, and the table throws important light on this point—the average shortening is less than two inches.

Submit these facts to an intelligent soldier—"your thigh is broken by the ball—your chances of life are even, whether amputation is performed or not—without the operation, if you live, you will suffer an average of 104 days—if you die, it will take 52 days—and when you recover, you will have a leg two inches shorter than the other." It is easy to imagine his reply to this simple statement of the facts—"Give me a chance for life and limb."

The very important remarks on this subject from the most recent French authority on Military Surgery, published in the chronicle for this number, corroborate forcibly the position which is assumed in this article. The reader's careful attention is called to this interesting translation, but for the sake of condensation, we group his statistics with those collected from various sources during the war.

Legouest.

1,664 cases amputated; Recovered, 123; 7 per cent.
337 cases not amputated; Recovered, 117; 31 per cent.

Chimborazo Hospital Statistics—first and second numbers of this Journal.

31 cases not amputated; Recovered, 19; 61 per cent.

These observations bring us to conclude, that whenever, in compound fracture of Femur, the result of Gun-shot Wound, there is no doubt as
1866.]

__Thomas on Ligation of Arteries.__

137
to the propriety of amputation, that we give the leg the benefit of the
doubt—the chances of life being at least equal, and the value of the
limb, after recovery, being worth the effort to save it.—C. S. Med. &

---

**ARTICLE V.**

**Cases of Gun-shot Injury Requiring Ligation of the Artery.**

[From Reports in Surgeon-General’s Office.] Collated by H. L. Thomas, M. D.

**Carotid.**

Case 1.—B. Creecy, company “E,” Forty-Second Virginia Regiment, wounded May 3, 1863, by a Minie ball, passing through the larynx above the vocal chords and carrying away the epiglottis. The common carotid of the left side was ligated on the 12th for excessive arterial hemorrhage. No chloroform could be administered. Patient fainted during the operation. On the morning of the 18th the right common carotid had to be ligated. Patient died thirty-eight hours after second operation. No brain symptoms supervened, and the heat of the head was retained. Autopsy: the hyoid artery of the left side was wounded; both carotids had been effectually secured.

Case 2.—J. W. Jones, Company “E,” Twenty-First Mississippi Regiment; wounded May 3, 1863; ball entering left ear, fracturing the superior maxillary bones, and escaping at the right angle of the mouth. The wound began to slough on the 3d of June, and on the 5th, 6th and 7th hemorrhage occurred. Carotid artery was tied on the 7th, and patient died same day.


Case 4.—Moses Huts, aged 35. The lower jaw was badly shattered, and the tongue injured. The right common carotid was ligated June 7th; hemorrhage did not recur; patient died on the 8th.


Case 6.—Daniel Shockley, Company “I,” One Hundred and First Indiana Regiment; was wounded September 20, 1863, by a round musket ball entering the face about an inch from the corner of the mouth, passing downwards and backwards, across the upper part of the neck, badly fracturing the lower jaw in its passage. The ball was extracted near transverse process of third cervical vertebra. The patient had hemor-

---

*Note: The text above is a historical excerpt and does not require any specific action.*
September; hemorrhage recurred again on the 30th. Three other hemorrhages, of October 6th, 9th and 10th, respectively, so reduced the strength of the patient that the common carotid artery was ligated. The ligature separated on the 29th of October. Recovery perfect.

Case 7.—M. W. Smith; wounded May 5, 1864; ball entered the left temple just above zygoma, ranging downwards and backwards beneath the ear and immediately under the mastoid process, and passing out through the soft parts of the neck. On the 12th of May secondary hemorrhage supervened, which was controlled by pressure. It occurred from day to day until the 21st, when the common carotid was ligated. The hemorrhage was controlled, but the condition of the patient was anæmic, and he died in twenty-four hours, evidently from the want of supply of blood to the brain.

Case 8.—E. F. Lilley, Company "G," Eighth Texas Cavalry, aged 24; was wounded May 9, 1864, by a Minie ball in the face. Secondary hemorrhage, to the extent of one pint, occurred on the 16th, apparently from wound in right side of the mouth. At six o'clock, P. M., there was a repetition of the hemorrhage, amounting to about three pints, from same point. The right primitive carotid was ligated in the inferior triangle, in the usual way, and with very little additional loss of blood. Chloroform was not used, and the patient bore the operation well. The operation was successful to the extent of arresting the hemorrhage, of which there was no recurrence. The patient died May 16, 1864, with well marked cerebral symptoms.

Case 9.—G. W. Nelson, Company "K," Twelfth Georgia Regiment; was wounded June 6, 1864, the ball entering posteriorly to left ear, passing upwards and forwards, and emerging at the infra-orbital ridge, fracturing the zygoma. The wound was extensive, and the hemorrhage considerable. The cavity was plugged after the removal of loose bone, but the hemorrhage returned the next day, and the external carotid was ligated. Hemorrhage recurred two days successively, in the last instance produced by patient's tearing off the dressings in his sleep. The patient died on the 19th.

Subclavian.

Case 1.—Corporal G. M. Caughman, Company "K," Thirteenth South Carolina Regiment, aged 25; wounded July 3, 1863, the ball passing through upper part of the chest, wounding the lung and the subclavian artery where it passes between the clavicle and first rib. The subclavian was ligated on the inner side of the clavicle. The operation was successful; the patient was furloughed, with the wounds entirely healed, but with the left arm paralyzed.

Case 2.—J. H. Kitrell, Company "D," Third Tennessee Regiment; wounded July 12, 1863, the ball fracturing humerus, and primary amputation being performed through surgical neck. The stump was progressing well until July 20, when slight hemorrhage occurred, which was controlled
by pressure. Hemorrhage recurred again on the 28th, and digital pressure was diligently applied up to August 2d, when the hemorrhage again took place more copiously than ever. Effort was then made to expose the bleeding vessel by tearing open the flaps, but the adhesions were too firm, and, the hemorrhage proceeding from two points, it was determined to ligate the subclavian at its third division. The patient, under chloroform, bore the operation well, but required stimulation, having lost largely of blood from the stump, but none from the operation itself. The separated flaps re-adhered, and the ligature came away on the 4th of September. The patient was furloughed the latter part of the month.

Case 3.—John T. Endy, Company "F," Fifth North Carolina Regiment, aged 23; wounded July 2, 1863, the ball entering one-and-a-half inches below the scapula, ranging forwards, but having no exit. There was great tumefaction and effusion about the shoulder, while the wound under the deltoïd region was filled with clots of blood. Hemorrhage supervened on the morning of the 16th, but was controlled by pressure and styptics; it occurred again the evening of the same day, and was controlled in like manner. On the morning of the 17th, very profuse hemorrhage took place, which could only be controlled by pressure over the subclavian artery. Exploring the wound failing to detect the bleeding vessel, it was determined to ligate the subclavian in its third division. The operation was performed without any untoward accident, but, while the hemorrhage was lessened, the flow of blood could not be entirely arrested in the wound, even with the assistance of styptics; it was therefore decided to ligate also the suprascapular artery, which had been exposed in the operation; this being done, the hemorrhage immediately ceased. The patient was put to bed with the arm warmly wadded, and at night there was sufficient temperature in the parts below the seat of ligature. The ligature from the suprascapular came away on the tenth day, and that from the subclavian on the thirteenth day. The patient got well without any bad symptom, and was furloughed on the 31st of August. The ball was not discovered.

Case 4.—W. S. Averitt, Company "H," Fourteenth Tennessee Regiment; wounded August 9, 1862. Arm amputated just below surgical neck. Excessive hemorrhage having supervened, the subclavian was ligated at usual point. Died January 26, 1863.

Case 5.—A. C. Howard, aged 19; wounded May 31, 1862. Ball passed through left shoulder, injuring the spine and producing paralysis. June 7—ligation of subclavian artery in consequence of hemorrhage. Died June 18.

Case 6.—J. W. King, Company "C," Twenty-Ninth North Carolina Regiment; wounded September 19, 1863, the ball passing through shoulder joint, fracturing and detaching head of humerus. The ball entered near the coracoid process and passed out over the spine of the
scapula. The accident was followed by a high degree of swelling and inflammation, extending from the seat of injury down the forearm; suppuration copious and offensive, with high irritative fever. On the 10th of October there was hemorrhage from the anterior wound, which was arrested by pressure; on the 11th, the hemorrhage recurred copiously from both wounds, and the subclavian was ligated in its external third. There was no further hemorrhage, but gangrene attacked the wound of operation on the 20th, and the patient died the next day.

Case 7.—Result fatal. [This case is reported in full in the February number of the Journal, by Surgeon Browne.]

We give below a tabular statement of the rest of the cases of ligation, including those detailed above:

<table>
<thead>
<tr>
<th>VESSEL</th>
<th>Cases</th>
<th>Recovery</th>
<th>Death</th>
<th>Undetermined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carotid</td>
<td>9</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Subclavian</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Axillary</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Brachial</td>
<td>43</td>
<td>30</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Arteries of Forearm</td>
<td>16</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Femoral</td>
<td>53</td>
<td>24</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>Profunda</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Popliteal</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Arteries of the Leg</td>
<td>11</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>All others, including Facial, Temporal and Occipital</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

TOTAL..........................157 84 53 18

In giving the above report, it is not pretended to include all the ligations performed, but simply all that have been reported. Medical officers can look over it and see to what an extent the deficiency lies at their own doors. That the bloody work through which the army has passed in four campaigns has demanded only 157 ligations, and many of these of only a trivial vessel, is an estimate which cannot be adopted. Certainly more operations of this character have been performed, for the number reported does not bear a respectable ratio in the chapter of gun-shot accidents. The presumption is, they have not been reported, and are sleeping in the case-books of the Hospitals. Gentlemen may see to what a desirable use full reports of each special branch of surgery may be put—namely, the laying of them before the profession at large, and especially before those officers whose experience has not yet brought them in contact with such cases.

Even in many of the reports the data are so meagre as not to furnish any satisfactory conclusion with regard to the gravity of the case. Brevity is a very commendable feature in clinical reports, but should not be pushed to the extent of robbing the case of its interest. "Alexander died—Alexander was buried;" but there are some people who would be curious to know how he died and when he was buried; and it is a lean obituary that does not give these small items. Some of the reports, indeed, seem to have been based upon the editorial warning that "funeral notices of more than ——— lines will be charged for as advertisements."
But we are satisfied there is room enough in the Surgeon-General's Office for reasonable and instructive post-obits, and if they are transferred to the pages of this journal, disquisitive platitude may be modestly re-trenched, but deficient data cannot be supplied.—C. S. Med. & Surg. Jour., 1864.

ARTICLE VI.

Conservative Treatment of Compound Comminuted Fracture of the Femur. By G. M. B. MAUGHS, Surgeon P. A. C. S.

Case 1.—C. S. Sheffield, private 15th Mississippi Cavalry, aged 17, of feeble constitution, power of reaction very low, was wounded at Tishimingo Creek, June 10th, 1864, transported some thirty or forty miles in an ambulance to Rail Road, and thence in cars some 130 miles, to Lauderdale Hospital, where he was admitted June 15th, 1864; compound comminuted fracture of Femur at juncture of middle and upper third—commination very severe. Treated by Smith's anterior splint; but little effort at reparation; suppuration excessive. Died August 1st, 1864, of hectic and exhaustion.

Case 2.—M. B. James, private Company "H," First Kentucky Cavalry, aged 19, wounded at Tishimingo Creek, June 10th, transportation as case 1st, admitted in Hospital June 19th, 1864; compound comminuted fracture of Femur at upper third, the ball in its oblique course passed through the bone as high up as the trochanter major. Treated by position; attempted union by free provisional callus; doing well until the middle of August, when he was attacked with continued fever, of which he died September 9th, 1864.

Case 3.—W. H. Ray, private Newsom's cavalry, Company "H," aged 24, wounded at Tishimingo Creek, June 10th, 1864, admitted into the Hospital June 19th, 1864; compound comminuted fracture of Femur at middle third. Treated by Smith's anterior splint; cure perfect; no shortening or deformity.

Case 4.—E. H. Powell, private Newsom's Cavalry, Company "H," aged 49, wounded at Tishimingo Creek, June 10th, 1864, admitted June 19th, 1864; compound comminuted fracture of Femur at middle third. Treated by Smith's anterior splint; recovered with three inches shortening.

Case 5.—W. B. Davis, private Sixth Mississippi Cavalry, Company "F," wounded at Harrisburg July 14th, admitted at Lauderdale Hospital July 18th; compound comminuted fracture of Femur at middle third. Treated by Smith's anterior splint; union perfect; shortened one inch; no deformity otherwise.
Case 6.—D. C. Crouch, private Twentieth Tennessee, Company "F," aged 19, wounded at Harrisburg, July 14th, 1864, admitted July 18th, 1864; compound comminuted fracture of Femur at middle third; extensive comminution. Treated by Smith's anterior splint; furloughed October 12th, 1864; perfect union; shortened three inches.

Case 7.—J. Posten, private First Kentucky Cavalry, Company "C," aged 18, wounded at Harrisburg, July 14th, 1864, admitted July 18th, 1864; ball passed through both thighs; compound comminuted fracture of left Femur at upper third at trochanter. Treated by Smith's anterior splint; furloughed September 26th; cure perfect; shortening scarcely perceptible.

Case 8.—J. H. Shelley, private Third Kentucky Cavalry, Company "L," aged 20, wounded near Tishimingo Creek, June 9th, 1864, admitted June 14th; compound comminuted fracture of Femur at the juncture of middle and upper third. Treated by position. The cure in this case has been greatly retarded, and the limb rendered useless by the meddlesome surgery to which he was subjected, in incising the soft parts and removing the broken fragments of the Femur. Union complete; will recover with great shortening.

Case 9.—J. W. Martin, private Seventh Kentucky Cavalry, Company "K," aged 19, wounded at Tishimingo Creek, June 10th, 1864, admitted June 14th; compound comminuted fracture of Femur at the junction of middle and upper third; extensive injury to soft parts; died June 16th, 1864.

Case 10.—J. L. Lawrence, private Eighth Kentucky, Company "C," aged 25, wounded at Tishimingo Creek, June 10th, 1864, admitted June 14th; compound comminuted fracture of Femur at upper third; died June 16th, 1864.

Case 11.—N. L. McNight, private Fourteenth Confederate Cavalry, wounded at Harrisburg, July 15th, 1864; compound comminuted fracture of Femur at upper third. Treated by long, straight splints; died September 9th, 1864.

Case 12.—N. L. McGoodwin, sergeant-major Third Kentucky Cavalry; compound comminuted fracture of Femur at junction of middle and upper third; extensive comminution. Treated by position; union complete; shortened two and a half inches; wounded at Harrisburg, July 14th, 1864; furloughed September 16th, 1864.

Case 13.—J. T. Tindell, Eighteenth Mississippi Cavalry, Company "K," aged 19, wounded July 15, 1864; compound comminuted fracture of Femur at upper third, the ball passing up to the joint; extensive comminution, with great injury to soft parts; died September 18, 1864.

Case 14.—A. Latten, Morgan's Command, wounded at Harrisburg, July 15th, 1864; compound comminuted fracture of Femur at upper third, near hip-joint; injury to bone and soft parts very severe; wound sloughed extensively. Treated by long splint; died of pyæmia September 1st, 1864.
Case 15.—J. Malone, Morgan's Command, aged 21, wounded at Harrisburg, July 15, 1864; compound comminuted fracture of Femur at middle third. Treated by long splint; partial union of bone; wound doing well, when he was taken with pyæmia, and died September 17th, 1864.

Case 16.—V. T. Bynum, Third Kentucky Cavalry, aged 23, wounded at Harrisburg, July 15th, 1864; compound comminuted fracture of Femur at lower third. Treated by position; union complete; shortening two inches; gone home.

Case 17.—J. H. Stevens, Third Kentucky Cavalry, Company "D," aged 20, wounded at Harrisburg, July 14th, 1864; compound comminuted fracture of Femur, upper third; treated by position; had phthisis pulmonaryis; died August 3d, 1864.

Case 18.—H. Jenkins, private Company "H," Mississippi Partizan Rangers, wounded at Harrisburg, July 14th, 1864, aged 23; compound comminuted fracture of Femur, middle third; treated by position; cure perfect; shortening scarcely perceptible.

Case 19.—W. T. Ivy, private Nineteenth Mississippi Cavalry, aged 40, wounded at Harrisburg, July 14th, 1864; compound comminuted fracture of Femur, upper third; ligation of arteria profunda; treated by position; union complete; shortened one inch.

Case 20.—W. W. Shophire, Thirty-Eighth Mississippi, Company "D," aged 28, wounded at Harrisburg, July 14th, 1864; compound comminuted fracture of Femur, junction of middle and upper third; very great comminution; attacked with erysipelas; recovered; union complete; shortening one inch; furloughed August 12th, 1863.

Case 21.—Yankee Lieutenant, wounded at Harrisburg, July 14th, 1864; compound comminuted fracture of Femur, upper third; during treatment femoral artery sloughed and was ligated; complete recovery; has been exchanged.

Case 22.—A. Boy, attached to the army, was admitted for wound of Femur, middle third, compound comminuted; treated by position; union complete; but little deformity; gone home.

Here we have twenty-two cases of compound comminuted fracture of the Femur, treated without amputation; not selected to make an argument, but consecutive cases, and include, with a single exception, all the cases so wounded and so treated at these Hospitals, during the time included within this report. And we have not extended the report through a greater time, or hunted up isolated cases because others might have been wounded at the same time, of whom no record was preserved, thereby rendering the statistics incomplete and worthless.

To the statistician, these twenty-two cases are worth more than a thousand would be, gathered up from different sections, where in each section a few cases had been omitted, and the result in others was not known. Such statistics are like native offerings in heathen temples, they tell but a partial story.
The excepted case is that of a private, wounded at Harrisburg by a grapeshot through both thighs near the hip-joint, with great destruction of the soft parts, tearing out the testicles, and bruising the perineum. It was not expected that this unfortunate man could survive even a few days. His testicles were removed, the wounds dressed, and his mangled limbs placed in the most comfortable position; stimulants and nourishing diet were administered. He lived for six weeks, during which time one of the wounds healed up, the bone united, and considerable progress had been made in the other limb, when he sank, worn out with the extensive suppuration.

This case is mentioned and fairly stated to show that it could not have been included with those given in this report, as the object of this paper is not to prove that wounds of the Thigh may not be of such a nature as to require amputation. Would, however, the most reckless advocate of the knife have used it in this case?

Our object is to prove that in all compound comminuted fractures of the Femur, with the artery intact and no very great destruction of soft parts, conservative surgery not only gives the patient the advantages of a natural over an artificial limb, but also gives him a better chance for his life than amputation would. And all of this we think this paper establishes.

Of these twenty-two cases nearly all were subjected to circumstances most unfavorable to recovery. The patients from the Tishimingo battle, treated by Assistant-Surgeon S. Kennedy, were hauled over rough roads for thirty or forty miles, and then transported some hundred and thirty miles by Rail Road, being constantly disturbed and their wounds fretted for eight or nine days before their arrival at Lauderdale Hospital. Several of the patients from the battle of Harrisburg were subjected to nearly the same transportation and frequent change of place; the delay, however, in their arrival at the Hospital was not so great; some of the others were necessarily removed three or four times during their treatment. The Surgeon in charge, Dr. Hoyle, thinks the death of more than one of these clearly attributable to this untoward circumstance. Cases 9 and 10 died soon after their admission, never having re-acted from the shock. Case 17 had phthisis pulmonalis, of which he most probably died; admitting, however, that he did not really die of this, it can not be denied that it rendered his recovery from any serious injury most improbable. Case 2 was progressing favorably when attacked with continued fever, at the time prevailing in the Hospital, of which he died. While, therefore, there would be much justification for excluding cases 2, 9, 10 and 17 from the report, as their deaths were only indirectly the result of their wounds, yet we will give the advocates of amputation the benefit of them.

We have then recovered, cases 3, 4, 5, 6, 7, 8, 12, 16, 18, 19, 20, 21, 22 —total, 13, or 59.1-11 per cent. Died, cases 6, 2, 9, 10, 11, 13, 14, 15, 17—total, 9, or 40.10-11 per centum.
Now, let us see what would have been the result had amputation been performed in all those cases. In cases 2, 7, 13, amputation must have been at hip-joint; disarticulation, all of whom would have died. That a case does now and then survive this formidable operation does not affect the rule that of ten or twenty so operated upon all will die. Dr. Macleod never saw a successful case in Military Surgery. We have heard of but one—that of a private wounded by a shell at Port Pemberton, and operated upon by Surgeon W. M. Compton, and afterward attended by Surgeon Green in Hospital at Yazoo City.

In cases 1, 8, 9, 10, 11, 12, 13, 14, 17, 19, 20, 21—total, 12—amputation must have been high up in upper third, through or near the trochanters; of these, nine, most probably ten, would have died. In the other seven cases, amputation could not have been lower than the middle third; of these, four would have died, giving for operative surgery, deaths 16, or 72.8-11 per cent.; recoveries 6, or 27.3 11 per cent., or more than 100 per cent. in favor of conservative, under the most untoward circumstances, over operative surgery, under circumstances the most favorable.

And this proportion, we doubt not, but for the meddlesome interference of the Surgeons, would hold good throughout the Confederacy, or even be greatly increased, as it would scarcely happen that a concatenation of circumstances so unpromising would again be met with. It will be observed that in all of these cases, with a single exception, and that greatly to the detriment of the patient, the treatment was eminently conservative. **No Excisions of the Femur, no Incisions of soft parts for the removal of loose pieces of bone, no formidable display of machinery to keep the limb in place and the patient from sleep.**

The wounds were carefully examined, and all foreign bodies, including spicule of bone immediately in the track of the ball, removed. The limb was placed in Smith's anterior splint, or what was preferred, placed in position and retained there by soft cushions or pillows, and all unnecessary probing or handling carefully avoided.

By even late authorities, the experience of the Crimean campaign and Dr. Macleod's observations have been quoted to prove that ordinary fractures from rifle balls, above the knee (of the Femur), demand amputation. These give only eight per cent. recoveries for conservative surgery under the most favorable circumstances, with selected cases, and only thirty-two per cent. for amputation. This is indeed an alarming fatality, and as frightfully dangerous, as it shows amputations of the thigh to be two to one against recovery, as it is four times more successful than conservative treatment, would of course establish the rule to amputate. But against such a rule our paper is an unanswerable demurrer; and as it reverses the *result*, and proves that by saving the limb we save twice as many lives as could be saved by amputation, by the same parity of reasoning it must also reverse the *rule*, and establish this. **As a general rule, ordinary fractures above the knee, from rifle balls, should never cause primary amputation.—*C. S. Med. & Surg. Jour.*, January, 1865.**
ARTICLE VII.

A Summary of Observations on Cholera. By GEORGE SUTTON, M. D., of Aurora, Indiana.

As the pages of the Reporter have been open for the opinions and observations of physicians on the subject of cholera, I will present a summary of conclusions which I think can be sustained by conclusive arguments, and which appears to me to explain much of the obscurity which has attended this disease. Some of these conclusions were presented to the Indiana State Medical Society in the year 1853, and are published in the proceedings of the Society for that year. They are based upon an extensive experience with cholera under various aspects—having observed the progress of the disease as it spread through a sparse population in our rural districts, which gives the physician a favorable opportunity of tracing the connection, if any exists, between the different cases that occur—also having seen cholera assume, as it were, a local character, and present its most malignant form in certain small localities within our city, and sweep off more than half their inhabitants; again presenting an opportunity of examining why these localities (which are the most healthy and elevated in our city) should be so severely attacked by the disease—and also having had the experience of being prostrated from a severe attack of cholera myself, and while confined to the bed, see my family stricken down, my son die after only a few hours' illness, and other members of my family reduced to the lowest stage of collapse from which the system could recover—an experience with me in cholera which has led to a careful observation of facts, and an anxious endeavor to unravel and account for the diversity of phenomena which the disease presented, as it prevailed in this section of country.

Physicians have recently presented the theory that cholera-poison may emanate from evacuations, as something new. This theory was advanced by myself in 1853, in the report alluded to (and I am not aware that the theory was ever advanced before), to account for the cause of the disease being so malignant in certain
localities in the city of Aurora. It was shown in that report that the alimentary discharges, from their watery character, were generally emptied upon the ground, and that in one locality the bedding known to have been saturated with the discharges during the last stages of a fatal case which I attended, was thrown upon a vacant lot and became, as I supposed, the first point from which emanated the infection that produced a local malignancy to the disease. (See the same Report, pages 162, 163 and 166.) The idea is also advanced in that report, that cholera, like many other diseases, is capable of assuming different grades of violence, and that under the form of a mild diarrhoea, it may be spread over the country by persons who are scarcely aware that they are unwell. (See pages 160 to 175.)

The conclusions which we present may be summed up as follows—and if found not to be altogether correct, we think is an advance in the proper direction:

1st. That cholera is unlike any other disease, and is governed by laws peculiar to itself.

2d. That its cause is an organic poison, which is reproduced within the human system, and is diffused by human intercourse.

3d. That for the development of cholera on this continent, there must first be cholera-poison, next, a community susceptible to its influence.

4th. That the susceptibility to cholera resides in the organic nervous system, upon which the poison first makes its impression, producing innervation and altered action of the capillaries, giving rise, in many instances, to profuse exhalations, also morbid secretions from the mucous membranes, from which probably the infection arises—as we see in hydrophobia, a nervous disease, associated with poisonous secretions from the salivary glands or glosso-pharyngeal mucous membrane.

5th. That this susceptibility to cholera is not alike in all persons, but exists to the greatest extent in a community that has never been under its influence.

6th. That temperature, or season of the year, humidity, modes of living, and other local and physical causes, increase or diminish the susceptibility of the community to the disease.
7th. That cholera, like other diseases, may assume different grades of violence, and may also prevail under different forms.

8th. That it may prevail under the form of a diarrhoea. That where predisposition, season of the year, or other causes favor the development of dysentery, that cholera assumes this form of disease. That it may prevail as a mild cholera-morbus, and the malignant form is the name that we would give to those cases where there is failure of the circulation, blueness of the skin, cramps, etc., etc.

9th. That when cholera-poison was introduced upon our continent, in 1832, in the North, and in 1848, in the South, it was the cause of these four forms of disease spreading over the country—in many places intimately associated, and in others appearing only as an epidemic diarrhoea—which we consider not merely a "symptom" of cholera, or the "premonitory stage," but the cholera itself in a milder form. Why call this diarrhoea that accompanies cholera the premonitory stage, when a large majority of cases proceed no further? And at what period of the attack are we to consider true cholera as commencing?

10th. That the disease may be spread by each one of these forms, and by the diarrhoeal form, even if only one person out of ten is susceptible to its influence. Consequently, no other disease known can be so easily diffused over the country as cholera, and no other disease so difficult to trace the manner of its diffusion.

11th. That the malignant form of cholera is favored by a variety of causes, among which are predisposition, tendency to diarrhoea, modes of living, mental depression, probably fear, but more particularly than from any other cause, upon the accumulation of infection, which overpowers vital resistance before the system has acquired the power to tolerate the disease, as we see from the same cause, in certain malarial districts, a simple disease assuming the fatal and malignant form of congestive fever.

12th. That the principal cause of the accumulation of infection is from the evacuations, which from their watery character are generally emptied upon the ground, and from which the infection is capable of spreading through the atmosphere, and gives a local malignancy to the disease. (See Report to Ind. S. M. S.)
1866.]

SUTTON'S Observations on Cholera. 149

13th. That this accumulation of infection takes place when cholera is introduced under favorable circumstances into large crowds of human beings, or poorly ventilated places, or in cities, or on low damp situations during stillness of the atmosphere—and particularly where the sub-soil is of clay or limestone formation, while upon a dry and sandy soil, which rapidly absorbs moisture, the infection seldom accumulates. (Pettenkoffer's theory might have some foundation if the disease did not appear so fatal on board our steamboats and ships, thousands of miles from the soil or land, which he considers necessary in connection with the evacuations, to develop the cholera germ.)

14th. That season of the year or temperature has a marked influence upon the progress of cholera, and that during the Winter it may prevail in our cities as a mild form of diarrhoea, to reassume its malignant form as Summer and other causes favor its development.

15th. That the system soon tolerates the poison, and that attacks of either of the forms of cholera and frequent exposure to the infection, removes in a great measure the susceptibility to the disease, which is probably acquired again in from 15 to 20 years. This power in the system to tolerate the poison is the reason the disease leaves the country, and seldom attacks a city or town severely the second time.

16th. That when cholera-poison is once introduced upon our continent, the most certain prophylactic in our northern climate (in connection with proper sanitary regulations) against the malignant form of cholera in the Summer, is frequent exposure under favorable circumstances to the infection during Winter, by which the susceptibility to the disease may in a great measure be removed. We are well aware that cholera prevailed in Russia, Scotland, and parts of England during the Winter, but we think that these facts, when properly examined, have but little weight against the correctness of our conclusion.

Now we think that we have a very extensive array of arguments to sustain each one of these conclusions, a summary of which, in as few words as possible, we will present at another time; merely stating at present that the first conclusion that cholera as an infec-
tious disease is governed by laws peculiar to itself, we consider as self-evident, and requires no argument, if the other conclusions we present are correct. Physicians tell us that cholera cannot be contagious, because it differs from all other contagious diseases. This assertion, we think, is without foundation, because we do know that contagious diseases are governed by different laws—hydrophobia, for instance, is a contagious disease—communicated by inoculation, like small-pox, and capable of reproducing its poison in different species of animals, even in the human system, according to the experiments of MM. Magendie and Breschet; but hydrophobia differs from all other diseases, and is governed by laws peculiar to itself, and differs as much in its nervous symptoms and indefinite period of incubation of its poison from small-pox, as cholera does from other infectious diseases.

Could the virus of hydrophobia rise into the atmosphere like the infection of rinderpest or of small-pox, and many other diseases (and why should it not assume an aerial character?), and produce its specific effects upon the human system through the respiratory organs as it does now by inoculation, it would then in its mode of communication resemble cholera, and be by far a more terrible disease, perhaps the most terrible disease upon our globe, incurable in its nature—communicable to different species of animals, which would reproduce the infection from innumerable sources; and, like cholera, this infection having no definite period of incubation, it would be still more difficult to guard against it by quarantine than cholera, and in time, like cholera, it might desolate extensive portions of the globe. By merely changing then the physical properties of the virus of a well known contagious disease, we should have a malady probably more terrible than cholera, which unlike all other diseases, would be then, as it is now, governed by laws peculiar to itself. It is highly probable that future discoveries may show that several theories of the formation of contagion are correct, and that organic poison germs may originate, 1st, from zymotic agents, or poisons which are capable within the blood of re-development. 2d, from morbid secretions, which by a natural selection for the organs from which they were secreted, cause the reproduction of a similar secretion.
and also, possibly from morbid secretions becoming poisonous from their union with the elements of matter, either in the earth or atmosphere. Is there anything unreasonable in supposing that certain vitiated secretions, which are probably in the form of cells, when introduced into the blood of another system through the respiratory organs, have a natural selection or tendency to produce morbid or specific effects on those organs, membranes or cells, from which they were secreted, so as to reproduce a similar secretion or re-development of poison germs. This action being influenced by an excited or irritated condition of the nervous system of the part, produced by the poison itself—as we know that many of the secretions are excited and changed by nervous influence. That poison germs are reproduced by secretions without the blood being contaminated, is a well known fact—as we see that an application of gonorrhœal poison to a mucous membrane, or the poison of purulent ophthalmia applied to the conjunctiva reproduces a similar poison without poisoning the blood, while in small-pox, measles, scarlatina, and some other diseases, we have the evidence of blood poisoning; and in gonorrhœa, purulent ophthalmia, hydrophobia, cholera, and probably hooping-cough, we have reason to believe that the poison germs depend upon morbid secretions. Then again we see the different effects which these specific poisons produce upon the nervous system, as in hooping-cough, hydrophobia, and malignant cholera.—Medical & Surgical Reporter.

ORIGINAL CORRESPONDENCE.

ARTICLE I.

History of the Dry Culture System on the Rice Lands near Savannah, with Observations on the Effects of Rice Culture upon the Health of this City. By W. C. Daniell, M. D.

ATHENS, GA., October 2d, 1865.

JOSEPH JONES, M. D., Professor of Medical Chemistry, in Medical College of Georgia: Augusta.

Dear Sir: Some necessary writing and the unusual heat of the Summer have delayed my fulfilment of a promise to supply you with whatever my memory may furnish of the history of the
Dry Culture system on the rice lands near Savannah, first purchased by the city at forty dollars per acre, and afterwards extended by legislative authority and confirmed by the Supreme Court of this State.

It is now my purpose to make such memoranda, from day to day, as my recollections will call up, that I may suppose will interest you.

The idea of getting rid of the rice culture, around Savannah, had been previously agitated, but was fully considered in the early part of 1817 and established in 1818. The late Mr. John Bolton, then an eminent merchant of Savannah, was at the head of the movement, and we owe the establishment of the dry culture system to his perseverance and address.

Some of the proprietors of the land to be subjected to the system accepted the measure in the best spirit, among them was Dr. N. B. Bayard, I believe. One of the proprietors, I think the largest, positively refused to subject his lands to the system—in other words to relinquish the cultivation of rice. He was a Scotchman who had acquired his property by marriage with a wealthy widow, and who did not purpose living much longer in this country; indeed, he removed, some years after, to Scotland. Several of the proprietors, unwilling to sell and equally indisposed to incur the public odium by refusing to concur in a measure so eminently conducive to the health of the city, yielded a conditional assent. They would sell the right to cultivate rice on their own land, provided all (amounting to some eight or ten) would sell. There must be unanimity or a failure of the measure. Mr. Bolton came to the conclusion that this conditional consent was given in the conviction that the Scotchman would adhere to his solemn declaration, so repeatedly made, that under no circumstances would he sell. The measure which the city had so much at heart was to be defeated, and the conditional consent of so many of the proprietors would be unavailing, because of the obstinacy of the Scotchman. He was consequently responsible; on his single head would fall the execrations of an indignant and incensed community, foiled in its efforts, at great cost, to give health to their homes. How, or by what means, I know not, Mr.
Bolton inspired the Scotchman with the conviction that the proprietors who had placed their consent to the proposed measure, on the condition that he would also consent, had done so in the full belief that he would stand by his declaration; and that whilst these proprietors were as opposed to the measure as he was, they had so managed that all the odium of the refusal should fall on him, and they would be held up as willing to do all that the occasion demanded. Once satisfied on that point, in an agony of rage he avowed his determination to defeat and punish the d—d rascals, and yielded to passion and resentment, what neither reason nor the wants of the city could win. Thus are, occasionally, the evil passions of men made the means to accomplish a great good.

In the course of the year the contracts were made and the money paid, and the dry culture system went fully into operation the following year (1818) which was certainly and decidedly the most healthful year I have ever known in Savannah. The late Dr. George Jones, whose father accompanied General Oglethorpe to Georgia, in reply to my inquiry how to account for the number of Charleston names to be found recorded as possessors of city property in Savannah, told me that at an early period, and before the clearing of the tide swamp immediately around the city, Savannah was resorted to as a Summer residence by many Charlestonians on account of its greater healthfulness.

The dry culture system was a measure to restore Savannah to its early salubrity; it was a measure of self defence adopted by the citizens for protection against injury, originating from the pursuits of a few of the citizens, exercised to the injury of the whole community. Instead of rising up in their power and abating the nuisance, the people of Savannah acting under a commendable respect for individual rights, preferred to compensate the proprietors of the offensive culture, and paid to them two-thirds the value of the lands so employed for their right to cultivate rice, conditioned that they should keep their lands well drained and not irrigate them during the warm months.

Some of the proprietors of the dry culture lands, after a few years, became dissatisfied with their bargains, and an effort was
made by application to the city authorities to have them annulled, upon the ground that the change of culture had not proved beneficial to the health of the city, and that it had caused great loss to the proprietors. The latter proposition was doubtless true, but whether owing to the intrinsic qualities of the soil or to want of enterprise and energy of the proprietors, need not be here discussed.

The first proposition was of a different character. It had two sides, an affirmative and a negative, and was of a character to require research, investigation, and analysis. Apparently conflicting facts were to be reconciled by investigating remote and secondary causes; indeed, it was one of those questions which, in this country, every man undertakes to judge of, and of which, not every tenth man is capable of forming a reasonable opinion. Three years had elapsed under the dry culture system. The first had been very healthful; I mean 1818, the only year during my practice there in which I did not see a case of yellow fever. The year 1819 was fatal to strangers who came out in great numbers in the Summer, in consequence of financial embarrassments North. They were chiefly of the laboring class, and were Europeans. 1820 was visited by yellow fever, as an epidemic, and carried off over one-fifth of the white population. The city had been visited by an extensive fire in its heart, and the foreign population which had been constantly pouring in, were necessarily crowded into small houses, and they supplied the main element to fill the bills of mortality.

Whilst, therefore, the proprietors could cite the experience of the three years as proving the inutility of the dry culture system so far as 1819 and 1820 were concerned, the friends of the measure saw nothing in the past to discourage them. The city authorities referred the question of the abandonment of the dry culture system to the citizens. If the proprietors had proffered to return the money received by them in consideration for giving up the culture of rice, I believe they would have prevailed, but they refused this, alleging that their losses had been so great as fully to cover what they had received in payment; as it was, the citizens, by a small majority sustained the system. In speaking
of the proprietors of the dry culture lands, I refer to a portion of them and not to all; some of them, from first to last, yielded their cordial support to the dry culture system. The small majority of citizens by which it had been sustained imposed great caution on the friends of the measure. The dry culture committee of the City Council made occasional reports, censuring the delinquent proprietors, but dared not ask the approval or adoption of them by the board. Appeals were made through the city press to the community against these reports, which only embodied the substance of the Inspector of dry culture reports, and reasoned from them. Of these appeals no notice was taken by the party assailed. It was deemed most wise to let the dry culture system silently work out its own vindication.

Whilst this was going on, some zealous friends of the measure had a prosecution instituted against a citizen of another State, who owned rice land near the city, which he cultivated. I believe no proposal was ever made to him to purchase his right to its culture. The prosecution failed, as had been predicted, and that land is still cultivated in rice. I believe it is farther removed from the city than any tract of land contracted to dry culture.

About eight years after the dry culture system had been in operation, and when the community had become fully assured of its importance to the health of the city, a law was passed by the General Assembly, prohibiting the culture of rice within a specified distance of the city, and its jurisdiction so enlarged as to embrace the dry culture lands, and heavy penalties were imposed on violators of the law. The main purpose of this law was to supply a prompt and efficient remedy against violations of the dry culture contracts, and to repress the culture of rice upon abandoned and recently opened rice lands. Prosecutions were soon after instituted against some violators of the law. They failed, the presiding judge having been taught by learned counsel that the omission of the numeral "one," before "hundred dollars," vitiated the penalty—in other words, that the absence of the adjective nullified the presence of the substantive. This decision led to some curious results; proprietors became partial to the cultivation of rice as a dry culture crop, and most strangely wherever
(or in many cases) rice was so cultivated, such was the affinity of the cherishing mother, water, that it would thrust a chunk or billet of wood between the outer mouth of the trunk and the door, and creep in and cover the thirsty rice, and closing the door on the inner mouth of the trunk, would remain with its nurselings, to the proclaimed astonishment of the proprietor. This foster mother of rice was as promptly extending its work of beneficence as proprietors became enamored of the dry cultivation of rice, and it soon became apparent that the dry culture system was about to be most mysteriously overthrown by new agencies never dreamed of by the original contracting parties.

In this dilemma the city instituted prosecutions against some of the proprietors under the law already referred to, and which had been overruled by the grammatical decision of a most exemplary judge. I understand that it was proven to the satisfaction of both court and jury that the cultivation of rice was per se injurious to health, which it may be supposed was founded upon the remarkable affinity of water for growing rice, as already referred to. The party was convicted, and an appeal was taken to the Supreme Court, which sustained the finding of the court below. Thus, after a long protracted struggle for existence, the dry culture system has vindicated its salutary influence upon the health of the city of Savannah, and its inhabitants are unanimous in its support, and I believe all the proprietors of the dry culture lands now acquiesce in good faith in the measure.

I might earlier have stated that before and after the vote was taken, some of the contractors, sometimes from inability and sometimes, perhaps, from perverseness, did not comply with the conditions of their contracts. The friends of the system doubting the results of any attempt at their legal enforcement, were content to rely on hopes of future amendment, and promptly accepted the abandonment of any dry culture lands, in the belief that their natural growths and the flux and reflux of the tides on them, which followed such abandonment, approximated in influence upon the health of the city to the most ample fulfilment of the contract, and I believe that experience has fully justified this judgment. Such abandonment, by the prompt growth of
a dense cover of bushes, briars, and weeds would measurably, and to that extent, restore the soil to the condition in which it was when Charlestonians sought in Savannah a more healthful climate than their own cherished city then supplied, and when Hugh Bryan sold Hutchinson's Island for a bowl of punch, which was, of course, before the introduction of slave labor into Georgia.

On my settling in Savannah, in the Fall of 1815, I found in full practice there Dr. Samuel Kollock, a gentleman not less remarkable for his social virtues than for his colloquial powers. He told me that he always was advised of the rice harvest by the graver character of the fevers that immediately followed the letting off the harvest water.

I also found in Savannah, W. B. Bullock, then late Senator in Congress, from which he had retired, that he might no longer be deprived of the enjoyments of domestic life. He told me that forty-five was a good old age in Savannah, and that Robert Bolton, who had died at the age of 38, as stated on his tombstone, had been called old Mr. Bolton for some years before his death. Mr. Bullock died at an advanced age, I think above eighty.

When I went to Savannah to live, many respectable families lived on Bay street, which lies next to and parallel to the river. It was the custom of such families to remove into the centre of the city in the Summer, and Broughton street was then preferred. After the introduction of the dry culture system, Bay street, I considered, at least, as healthful as Broughton street.

It was said (and I believe truly) that during the destructive pestilence of 1820, not one case of yellow fever originated south of South Broad street. The great fire of that year had not extended south of Broughton street.

During my practice in Savannah (that is up to 1834), usually in August, sometimes earlier, intermittent fever prevailed in the last and next to the last range of houses south. As the city advanced south, these fevers advanced pari passu in the same direction, having abandoned their previous localities.

I believe, my dear sir, I have written all that occurs to me that
I may have repeated somewhat that I have published, which you will excuse, as I have no means of reference. I am conscious that I may have done little in fulfilment of your wishes; if so, please take the will for the deed.

Very truly, yours,

W. C. Daniell.

ARTICLE II.

Introduction of Shad into the Southern Rivers emptying into the Gulf of Mexico. By W. C. Daniell, M. D.

Savannah, May 22d, 1866.

Professor Joseph Jones, M. D., Augusta, Ga.—

Dear Sir: I am gratified to say that I have fully established the White Shad in the Alabama River, where they are as large and as fine as our own Shad.

Now that it has become a fixed fact that the Shad prosper at the mouth of the Alabama River, we may readily infer that they will equally prosper at the mouth of the Mississippi River, and probably of all the rivers discharging into the Gulf of Mexico. I hope to test this another year. I would have done so this Spring, but that my fisherman disappointed me. As soon as I was satisfied that there were distinctive, though minute, differences between the Shad of the Savannah and the Ogeechee Rivers, I felt confident of establishing the White Shad in the Alabama River. These differences were pointed out by our fishermen in 1846, and in 1848 I planted the fecundated eggs in a small tributary of the Etowah, and in 1851 or '52 the fish were taken in the traps at the foot of the falls at Wetumpka and Tuscaloosa.

Very truly yours,

W. C. Daniell.
ARTICLE III.


GADSDEN, ALA, April 25th, 1866.

Dr. Joseph Jones, Augusta—

My Dear Sir: Your favor, containing a report on the Coal and Iron Ore that I sent you, came to hand in due time. I ought to have acknowledged it long since, but I have been off here in the back woods, very busily engaged in starting our operations for Petroleum. I think our prospects of success are very good. The indications we have already are very encouraging. Our practical well-borers from Oil Creek seem very confident we will succeed. We have passed through about ten feet shale immediately under the surface soil of four feet, then nineteen feet hard limestone, strongly bituminous, then slate and soapstone, sixty-seven feet, limestone again, three feet, then the first sandstone which we have entered, eight or ten feet. It is strongly bituminous, and the borings smell quite like the oil. At about sixty-five feet we struck what the Pennsylvania men call the "Black Soot" Oil, and which they say is considered in Pennsylvania one of the surest indications of a good well. I have very little doubt that this region will afford oil.

Very truly yours,

J. L. Rogers.

TRANSACTIONS OF SOCIETIES.

ARTICLE I.

Discussion on Cholera. New York Academy of Medicine, Stated Meeting, March 21, 1866; Dr. Alfred C. Post, Vice-President, in the Chair.

Mr. T. McElroy, by courtesy of the Academy, exhibited the model of a very unique surgical table, and also an invalid bed, after which

Dr. Herzog continued the discussion by referring to an epidemiological map prepared by the War Department of Bavaria, and which he had brought with him for the inspection of the Fellows of the Academy. This had been very carefully prepared
from the most authentic sources, since a commission representing nearly every branch of science had been appointed, with ample powers, to investigate the laws which governed the epidemic there of 1854. Bavaria, he would remark in passing, represents a population of five millions, confined to comparatively a small area, and at the time presented peculiar opportunities for the study of the various causes at work in the progress of this scourge. The artist in the map represents what, for convenience sake, we shall style local epidemics, by red lines, sporadic by green, and mere cholera by those of a bluish tint. By this device the eye is very readily addressed, and our facts very easily marshalled into line. The commission to which I have alluded embraced, among others equally celebrated, such names as Liebig and Pettenkofer. They performed their duty ably, zealously, and thoroughly. They observed that the epidemic attacked some localities and avoided others, in obedience to other laws than those which govern portable diseases; that certain persons or certain vessels were not responsible for the introduction of this destroying power; or, in brief, that human travel had very little, if anything, to do with the question. They found that the direction of the winds or of the water-courses was a matter of no importance. Why, then, they inquired, as they narrowed down the results of their observations, are these choleraic visitations confined to certain streets, sides of streets, and even certain houses? This led to the search after specific causes, and we have the summary of their conclusions that a dry, solid, rocky, compact soil is uniformly exempt from the infection; while a wet, oozy, soft soil especially invites the invasion. The water underneath the surface of the ground is continually seeking different levels, and in its recession leaves the débris of various offending substances, which ferment and decompose in obedience to well known laws. The only requisite for the spread of the disease in a locality permeated by those underground streams, is the contact of choleraic stools.

The power of the excrements in the causation of the malady was well exemplified in the case of the laundresses employed about cholera hospitals; they were peculiarly susceptible to attack, and the attack almost invariably terminated in death.
Dr. Hutchison, for the sake of giving the discussion a practical
turn, wished to hear the experience of his brethren in the matter of
treatment. He had acted his part in two epidemics. The one
of 1849 he was in the Mississippi Valley, and that of 1854 in this
vicinity; and he had come to the conclusion that the preferable
plan was to disturb the patient with as few medicines as possible.
He had adopted the practice of free vomiting by stimulating
emetics, such as common salt and mustard. These agents, he
found, controlled the vomiting attendant upon the disease, after
the production of their immediate therapeutical effect, much
more certainly than creasote, hydrocyanic acid, or any of the
salts of opium. They seemed to thoroughly clear the stomach of
all offending substances; he remembered a case where the ejection
of a piece of lemon-peel, dislodged from this organ by a mustard
emetic, gave almost immediate relief. The vomiting of the dis-
case he would set down as rather of a regurgitative character, and
as indicative of what nature was striving to accomplish. He also
aimed to procure bilious stools by the exhibition of calomel in
one-grain doses every hour; in fact, he looked upon nature as an
excellent indicator of the plan to be pursued, and had early
learned to regard free vomiting and purging as very hopeful signs.
For the cramps, he knew of no better plan than the forcible and
continuous extension of the muscles—say, for instance, that if the
arm were implicated, he would subdue them by putting the
extensors upon the stretch. He thought also that some benefit in
these cases had been derived by the use of anaesthetics and hot-air
baths. He rather favored the method of introducing saline
solutions into the circulation, notwithstanding the want of satisfac-
tory results; he had adopted the method in five cases, all of
which terminated fatally; none of these, however, were fair tests.
Indeed there were many niceties involved in the question of
failure; the mode of operating, the quantity, quality, and relation
to each other of the materials, the specific gravity and temperature
of the solution, etc. The formula he had employed in his earlier
cases was as follows: Alcohol 3 i., chlor. sodium 3 iii., and water 1
pint. One or two pints were injected into the median basilar vein.
He afterward employed the solution recommended by Dr. Gull,
which was composed as follows: Chlor. sodium 40 parts, chlor. potassium 6 parts, phos. sod. 3 parts, and carb. sod. 40 parts; 140 grains were dissolved in 40 ounces of water, and injected at the temperature of 100°, 115°.

The solutions employed are intended to represent the fluids discharged from the blood, minus the organic materials. He desired to see this method of treatment more thoroughly ventilated.

Dr. Herzog's experience coincided with Dr. Hutchison's; he had known of no recovery where this plan had been adopted. In reply to the question regarding the conclusions of the Bavarian Commission in the matter of disinfecting the evacuations, he would state that chloride of lime was an unreliable agent, and that the most satisfactory results had been derived from the use of the sulphate of copper; an instance or two being quoted where the epidemic was arrested in the residence of the patients immediately after the occurrence of the first case. The sulphates of iron or zinc had also been tried, and were highly extolled.

One part of sulphurous acid and ten parts of water was likewise a good combination. In this the soiled clothing was purified, and by it also the evacuations deprived of their noxious properties.

Dr. Harris had verified in his hospital experience the observation of Pettenkofer, that almost all the first cases were rapid in progress and uniformly fatal; that these conditions prevailed until, to use the language of Dr. Blair, "the complement of mortality had been attained, when the type became milder and more amenable to treatment of any kind." He entertained the opinion that the disease was in some way portable, since, notwithstanding the maintenance of a cordon almost military in character, to prevent the communication of patients in buildings isolated some one hundred or two hundred yards apart, and the exercise of the utmost care in the disposal of the choleraic stools, the epidemic had spread from building to building. Here there was certainly no such thing as personal contact.

Dr. Herzog was reminded also that, according to the statements of the Commission, a local epidemic spent its force in twenty-five days. By the term local he meant certain districts, streets, or neighborhoods; and not, of course, a large aggregation of dwellings like New York City, or even towns of smaller dimensions.
Dr. Hamilton favored, upon the whole, the expectant plan of treatment, and his experience, like that of many present, embraced the observations of two epidemics; these he saw in the City of Buffalo. He had no faith whatever in the beneficial results of morphine or opium in the stage of collapse. He had also exhibited large doses of quinine without any favorable effect; he could recall two cases of recovery after thorough emesis, and would adduce as examples of the success attendant upon the administration of calomel in full doses, the salvation of many patients by a German practitioner not over scientific, but possessed of a good stock of strong common sense.

He would lay much stress upon a change of location as an element of success; he attributed quite a number of recoveries in his experience to the early adoption of this method.

Dr. Stiles recited his experience while assistant physician to the Kings County Hospital. He had there observed that many patients had died almost upon the instant that the limb was tied, as a necessary preliminary to the operation for introducing the saline solution. The medical staff then adopted friction in the direction of the venous circulation, with, as they conceived, happier results. He would warn against the danger of heat, which increased with the rise of the temperature; he had been led to this conclusion by certain experiments upon the lower animals. He would show the futility of the ice-bag plan of treatment, by merely reminding his hearers that there was a continual stream of warm blood coursing in the neighborhood of the spine which required some time to be cooled; and cooling the spine was claimed to be effected by the advocates of the method.

Dr. Foster gave his experience in the epidemic of 1832, at which time he was a practitioner in Schoharie County. He and his colleague had employed with manifest advantage large doses of calomel, larger perhaps than necessary, in conjunction with injections of warm starch, retained through the medium of towels applied to the anal orifice.

He was led to adopt this latter procedure by observing that the rice-water stools were very low in temperature.

The meeting then adjourned.—Medical Record, N. Y.
EDITORIAL.

SOUTHERN MEDICAL AND SURGICAL JOURNAL.

Our journal was established thirty years ago, by Dr. Milton Antony, the founder of the Medical College of Georgia. The volumes already issued, embrace over sixteen thousand closely printed pages, containing more than six hundred original communications from professional men throughout the Southern States, besides an immense number of valuable articles republished from its ample list of American and foreign exchanges.

It has been claimed for the SOUTHERN MEDICAL AND SURGICAL JOURNAL, that under the conduct of its able editors it has accomplished a good work in diffusing valuable medical and scientific information, and that it has contributed materially to the advancement and elevation of the medical profession by furnishing a medium for the communication of the valuable experience of Southern physicians.

At the close of a bloody and disastrous civil war, we have re-established this journal, with the earnest desire that it may still live as an honored medium for the communication of the discoveries and advancing doctrines of science, and of all the departments of medicine. We cannot close our eyes to the facts that our armies were vanquished in the field by superior numbers and by starvation, and our records of honor as a people, captured and burned; and that our houses and lands are desolate, our cities burned, and our people distressed and afflicted.

Even in Pagan Rome, the Triumph was accorded only for victories which enlarged the territory, and never for those which only recovered lost ground—no Triumph in civil wars, for in such case, whatever might be the success, the Roman considered it always a subject for public mourning. It would be well for Americans in the distracted state of their country to consider the advice of a noble Roman to the Senate: "All who deliberate upon doubtful matters, ought to be uninfluenced by hatred, affection, anger or pity. When we are animated by these sentiments, it is hard to unravel the truth; and no one has ever been able to serve at once
his passions and his interests. Free your reason of that which beclouds it, and you will be strong; if passion invades your mind and rules it, you will be without strength. It would be here the occasion to recall to mind how many kings and peoples, carried away by rage, have taken fatal resolutions; but I prefer reminding you, how our ancestors, unswayed by prejudice, performed good and just deeds."

Whilst acknowledging no geographical bounds to the operations of science, and especially of medical science, we shall feel it to be our duty as well as our highest pleasure to use the Southern Medical and Surgical Journal as a medium for the communication of the facts and discoveries tending to develop the material prosperity of the South, and especially for the recording and preserving of the valuable medical statistics and observations of the Confederate Surgeons during the recent revolution. It is earnestly to be hoped, that the medical experience gathered from the gigantic mass of suffering endured during four years by the sick and wounded Confederate soldiers in Camp and Hospital and in Prison, will not pass unrecorded. The medical officers of the Confederate Army, who performed their arduous duties so manfully in the face of unnumbered difficulties, should not consider these labors in behalf of suffering humanity fully accomplished until they have been carefully recorded and placed in a living form.

SPURIOUS VACCINATION.

Our journal opens with an interesting article upon this subject from Dr. Habersham. During the recent civil war, untoward results followed vaccination, and a number of deaths both amongst the troops and citizens were directly referable to the effects of vaccination. So great was the evil in the army, that it was made a special subject of investigation, and a number of most interesting reports were prepared by several of the medical officers, upon what was most generally called in the army "spurious vaccination." Our friend, Surgeon Jackson Chambliss, in charge of Div. No. 1 Camp Winder Hospital, Richmond, had examined and
recorded a large number of cases of "spurious vaccination," illustrated with valuable drawings of the various local diseases and skin affections. As far as our information extends, this valuable mass of matter, relating to one of the most important subjects in its bearings upon the welfare of the human race, was destroyed during the evacuation of Richmond. If any of these reports are still in existence, we shall be happy to be the medium of communicating them to the profession.

So common had accidents become after vaccination, and so strong was the prejudice growing, both in the army and amongst citizens against its employment, that we instituted a series of experiments upon the inoculation of cows with small-pox matter, in order to produce, if possible, cow-pox, from whence a supply of fresh and reliable vaccine matter might be obtained. It was our design to carry out an extensive series of investigations upon the various secondary affections following vaccination, and to determine, if possible, what contagious principles could be associated with the lymph of the vaccine vesicle. These labors were brought to a sudden and unexpected close, by the disastrous termination of the civil war. As far, however, as our labors amongst the Confederate troops extended, we were led to attribute the injurious effects of vaccination to the following causes:

1. Scrobutic condition of the blood of the patients vaccinated and yielding vaccine matter.

Large numbers of the Confederate soldiers manifested slight scrobutic symptoms, which were not sufficient to attract attention, or to induce treatment, and as far as we could learn, no attention was paid to this condition either in vaccination or in the selection of vaccine lymph.

In scrobutic patients, all injuries tended to form ulcers of an unhealthy character, and the vaccine vesicles even when they appeared at the proper time, and manifested many of the usual symptoms of vaccine disease, were nevertheless larger and more slow in healing, and the scabs presented an enlarged scaly, dark, unhealthy appearance. In many cases, a large ulcer covered with a thick laminated crust, from one-quarter to one inch in diameter, followed the introduction of the vaccine matter into scrobutic
patients. Matter from these scabs and sores was frequently used in vaccination, and this decomposing pus and blood acted as an animal poison in some cases, and especially in constitutions debilitated by exposure, fatigue, and salt diet.

During the prosecution of the investigations which we instituted upon the diseases of the Federal prisoners confined at Andersonville, the opportunity was embraced of investigating the remarkable effects which followed the attempts of the Confederate medical officers to arrest the spread of small-pox by vaccination. In a number of cases, large gangrenous ulcers appeared at the points where the vaccine lymph had been inserted, causing extensive destruction of the tissues, exposing arteries, nerves, and bones, and necessitating amputation in more than one instance. These accidents led to the belief amongst some of the prisoners that the Surgeons had intentionally introduced poisonous matter into their arms during vaccination.

After careful inquiry we were led to the conclusion that these accidents were in the case of these Federal prisoners referable wholly to the scorbutic condition of their blood, and to the crowded condition of the stockade and hospital. The smallest accidental injuries and abrasions of the surface, as from splinters, or bites of insects, were in a number of instances followed by such extensive gangrene as to necessitate amputation. The gangrene following vaccination appeared to be due essentially to the same causes; and in the condition of the blood of the patients, would most probably have attacked any puncture made by a lancet, without any vaccine matter or any other extraneous material. It appeared also that the dried scab, resulting from the vaccination of these scorbutic patients, was also capable of producing effects wholly different from the vaccine lymph of healthy individuals; and in some cases, these effects were of a most potent and injurious character.

2. The employment of matter from patients who had been previously vaccinated and who were partially protected.

Whilst it might admit of debate, whether pure vaccine virus, obtained from persons never before vaccinated, and who manifested all the phenomena of the disease, and especially the characteristic
febrile phenomena, ever becomes deteriorated or possessed of deleterious properties in its passage through numerous human bodies, not suffering with such a contagious disease as syphilis; on the other hand, it cannot be denied that the protective power of vaccination has been impaired to a lamentable and almost incalculable extent, by a succession of imperfect vaccinations.

Vaccination may be rendered imperfect by the development of febrile and other diseased states after the introduction of the virus into the system, arising from the action of cold or some cause producing constitutional disturbances, differing essentially from the febrile phenomena which mark the progress and perfection of the vaccine disease, as well as by its imperfect and altered course in those who are partially protected by previous vaccination.

In the isolated condition of the Southern Confederacy, cut off from the surrounding world, and denied even vaccine matter, as "contraband of war;" with the necessity of turning out the entire fighting population to repel invasion, and with the necessity of employing all the available medical aid, good, bad, and indifferent; and with the progressive increase of small-pox, it is not strange that the process of vaccination was not as carefully watched and tested as it should have been: and that consequently much imperfect material circulated as vaccine matter, which not only afforded little or no protection against small pox, but also proved positively deleterious.

3. Dried vaccine lymph, or scabs, in which decomposition had been excited by carrying the matter about the person for a length of time, and thus subjecting it to a warm moist atmosphere.

The effects of such decomposing matter, resemble those of the putrid animal matter received in dissecting wounds. The practice of some physicians to mix a considerable portion of powdered vaccine with water upon a glass slide, and to use this in a number of vaccinations from house to house, is not unattended with danger, especially during warm weather. In the warm climate of the Southern States it is impossible to preserve vaccine matter for any length of time, without more or less putrefaction. The length of time which the vaccine virus will retain its active
properties will depend upon the temperature and the moisture of the climate.

4. Dried vaccine lymph, or scabs, from patients who had suffered with erysipelas during the progress of the vaccine disease.

In several instances death resulted from phlegmonous erysipelas, following vaccination in apparently healthy patients, in both civil and military practice. It was supposed that in some cases the poison of erysipelas was conveyed along with the vaccine virus.

5. Fresh and dried vaccine lymph, or scabs, from patients suffering with secondary or constitutional syphilis, at the time and during the progress of vaccination and the vaccine disease.

We examined at different times, during the progress of the recent war, and also had under treatment, various skin affections, which presented the characters of the cutaneous diseases characteristic of secondary syphilis, which were directly traceable to impure vaccine virus. In several cases enlarged buboes in the axilla and groin accompanied the peculiar skin affections induced by spurious vaccination.

A number of the Confederate Surgeons took the ground that secondary syphilis could be communicated along with the vaccine virus, and especially when the dried scabs were employed. In the records upon this subject, which we examined in the Surgeon General's Office in the Confederate Capital, this view was clearly announced and supported by well recorded facts. Surgeon O. Kratz, in an interesting article upon vaccination, published in the July number of the Confederate States Medical & Surgical Journal (vol. i., 1864; p. 104), boldly announced and supported the view that secondary syphilis could be communicated through the medium of the vaccine virus. On the other hand, many of the Surgeons entertained views similar to those announced by Dr. Habersham in the present number of this journal.

Up to the commencement of the recent civil war, the belief was almost universal, that secondary syphilis could not thus be communicated by vaccination.

This question is of vast importance in its bearing upon the human race, and should not be settled dogmatically—in fact it is not in any manner a question of belief, but of fact. Intimately
associated with this question is that of the possibility of inoculating secondary syphilis.

Some of the older writers appear to have entertained no doubts with reference to the possibility of communicating constitutional syphilis. The following testimony is from William Clowes, who wrote more than two centuries and a half ago:

I have also knowne divers persons infected, who have had in all other parts of the bodie manifest signes thereof, as dolors, tumors, ulcers, and venomous pustules, &c. And yet in the parts aforesaid, no paine, or any signe thereof: so that their opinion is not to be observed, which affirme, that this disease is ingendred onely, by the company of uncleane persons: for I have knowne not many yeaeres past, three good and honest Midwives infected with this disease, called Lues Venerea, by bringing abed three infected women, of three infected children, which infection was chiefly fixed upon the Midwives fingers and hands, &c. What should I speake of young sucking children, whereof divers have beene grievously vexed with this disease, and some of them a moneth, two, three or foure moneths old, and some of them a yeare old, some foure or five yeaeres old, and some of them sixe or seaven yeaeres old, amongst which sort, I thought it good here to note a certaine wenche, the daughter of one Sare, of twelve yeaeres of age, the which I cured, in the yeaere of our Lord 1567, who was greatly infected with this sicknesse in many parts of her body, having thereon painfull nodes or hard swellings and ulcers, with corruption of the bones, and yet no signe in the most suspected parts, neither by reason of debilitie was able to have committed any such act, but it is not to be doubted, but that she received the infection, either from the parents, the which cure of some is supposed uncertaine, whether children begotten by infected parents, may bee cured or not: or else she was infected, as divers are, by sucking the corrupt milke of some infected nurse, of whom I have cured many, for such milke is ingendred of infected blood, and I may not here in conscience overpasse, to forewarnye the good Reader, of such lewd and filthy nurses: for that in the yeaere 1583, it chanced that three young children, all borne in this citie of London, all of one parish, or very neere together, and being of honest parentage, were put to nurse, the one in the countrie, and the other two were nursed in this citie of London: but within lesse than halfe a yeaere, they were all three brought home to their parents and friends, grievously infected with this great and odious disease, by their wicked and filthy nurses: Then their parents seeing them thus miserably spoiled and consumed with extreme paines, and great breaking out upon their bodies, and being so young, sick and weake, unpossible to be weaned, were forced, as nature doth binde, to seeke by all meanes possible to preserve these poore silly infants, which else had died most pitifull. To be briefe, ere ever those children could be cured, they had infected five sundry good and honest nurses: I cured one of the children, and the nurse which gave it snaeke, the other two children and their nurses were also cured by others, but one of the children lived not long after, as I was given to understand. Also friendly Reader, I read of late in a certain history, written by Ambrose Parce, in his 2. book, intreating of the causes of Lues Venerea, which history indeed is worthy the rehearsall: "An honest Citizen saith he, granted his most chaste wife, that she should nurse the childe which she was lately delivered of, if she would keepe a nurse to be partaker of the travell and paines: the nurse that
she tooke by chance, was infected with *Lues Venerea*, therefore she did presently infect the foster childe, and he the mother, and she the husband, and he two children which he had daily at his table and bed, not knowing of that poison which he did nourish in his own body and intrals. But when the mother considered and perceived, that her childe did not prosper or profit by the nourishment, but continually cried and waxed wayward, desired me to tell her the cause of that disease, neither was it any hard matter to doe, for his body was full of the small-pocks, whelkes, and venereous pustules: and the breast of the nurse and mother being looked on, were eroded with virulent ulcers: and the body of the father and his two sons, the one about three yeares, and the other four yeares of age, were infected with the like pustules and swellings that the childe had: therefore I shewed them that they were all infected with *Lues Venerea*, whose beginnings, and as it were provocations, were spread abroad by the nurse that was hired, by her maligne infection. I cured them all, and by the helpe of God, brought them to health, except the sucking childe, which died in the cure: and the nurse being called before the magistrates, was punished in prison, and whipped closely, and had been publicily whipped through all the streets of the citie, if it had not been for the honors of that unfortunate family." Thus we see children infected by filthy nurses, and sometimes nurses be infected by giving sucke to such infected children. And now to returne to my former purpose, the disease, as saith Nicholas Masa, whose counsel and direction in the cure of this disease I have greatly observed. The disease because it hath a flowing matter, being once entred into any part of the body, proceeded on from part to part, never resting until it hath corrupted the liver, with the ill disposition of this infection especially. When it toucheth any such part, as hath in it an apt disposition to admit such infection, as when the action or force of the agent is wrought and imprinted in the patient, fitly affected to receive the same forme, and so it disperseth it through the whole body: likewise this sicknesse is many times bred in the mouth, by eating and drinking with infected persons, and sometimes and sometimes onely by breathings: and Almanor a learned Physition setteth downe for a truth, that this disease may be taken by kissing, and sometimes by lying in the bed with them, or by lying in the sheets after them: also it is said to come by sitting on the same stoole of easement, where some infected person frequented, and sometimes such as have been cured of this disease, fall into it againe by wearing their old infected apparel: all which causes of this disease I rather set downe, for that I would thereby admonish as many, as shall read this treatise, to be carefull of themselves in this behalfe, and to shun as much as may be, all such occasions.—*A Profitable and Necessarie Booke of Observations for all those that are burned with the flame of Gun-powder, &c.*: *By William Clowes, London; M. Davison, 1637.* pp. 151-2-3.

Gideon Harvey, in his "Venus Unmasked," published two hundred years ago, expresses similar views:

4. Prob. How many various ways doth the Pox exert its Contagion? No external part is impowered to transmit its infection immediately, except where its suspected: so we observe the Venereal parts to be infectory immediately upon the suspicion of virulence, but not through kissing, sucking of the breast, by sweat, or through any other parts but themselves. So the mouth that's infected by kissing, or sucking a thorow pockified whores tet, is capable immediately of infecting anothers lips by kissing, or any other part by sucking it, because the pocky Miasms are
neer; but not by copulation, or sweat, &c. because the contagion cannot be crept so far. Experience verifies this dictate. Is it not an ordinary trick of Wenchers (as Musa relates) to suck whores tongues, and tets of their breast, and yet those, whom they know have been pockified many years about their lower parts, and for that reason though their appetites are furious, yet dare not be dabling, but the other they reiterate a thousand times over without the least hazard? An instance for the other part of the dictate, which I had from my first master in Physick, that wonder of Physicians Prof. Job. Antonid. van der Linden. p. m. the profoundest Commentator on Hippocrates and Celsus, that ever any age presented, whom I heard that most famous Professor Regius Guido Patin intitulate the Dutch Hippocrates. He during his luculent practice at Amsterdam, had a Merchants Prentice in cure of an Gonorrhe, and a blistered, or cankered like mouth; both symptoms he confess to have started upon him at the same time. The excellent Professor being curious, and admiring at the rarity of such distant symptoms emerging at once, extorted an ingenuous confession from his Patient, upon presence that it would facilitate and abbreviate the cure: the other without any longer suspense impudenty told him, his tongue was as unfortunate as his tayl; a sort of Diabolick fatyrism, outvying Aretius flagello de Principi, and very like a Dutch invention. What assured? this bastard at a Besoeck (an invitation that usually made to young folks, preliminary to all Weddings) accosted himself to two pretty Damsels, and being planted between them, oft flanckt to the right, and in a kiss pledged his right hand man, and so to the left, and performed the like duty there. But the tragick evident may imprint a dread upon all young women. A short time after their lips felt hot, inflamed, grew sore, and ulcered, one named it the thrush, another a sore mouth; vulgar applications rather promoted than checkt the evil, wherein they persisted so long, that accessory accidents, as sordid ulcers of the palat and tonsils, nocturnal pains, &c. moved a jelousie of the fowl disease. Here you may remark, how innocently these poor lasses pessudated their fortunes. The reflexion of this relation upon the latter part of the dictate I commit to your own thoughts.

2. A Wench or Monsieur by that time they are thorow pockified, are infectious in any part where ever the Pox bursts out, because the virulent seminaries are propagated quite through the body, which exhaling at the places affected, transport the contagion. What the thorow-pox is expect below; so that when the malady is tumefied to so high a flood, its time for Nurses, Physicians, and all visiters to stand off: upon such occasions a person may be infected by drinking out of the same vessel (provided the spittle adhering be warm still), as we have heard of many; (Leonardus Botallus addeceth an observation of a patient of his, of a chast and religious converse, who was stigmatized by a peculiar pledging of his familiar, then under a sore affliction of a thorow-pox. His lips inflamed, afterwards ulcered, his jaw bone grew curios, and was miserably rackt with nocturnal arbritack pains.) By trying of a warm Pocky Glove; by succeeding a virulent Patient on a close-stool; by shifting of him, or making his bed whilst the sheets continue warm; as Nicol. Musa’s friend and Patient, who incurred this evil, by touching the sheets, one lay in, that was lame of a Neapolitan ulcer in his legg; and that old woman in Horst’s observe, aged fifty six, tending a Pocky fellow in his lying in, was seized of the same disease in as furious a degree as her Master; and by kissing, witness Fowentinus, who knew a young man, that contracted this evil by oft kissing a fowl slut. The initial symptoms appeared about his mouth; his privities, which otherwise might have
bin suspected, appearing free from all contagion. To this I'll parallel
another; one Mrs. &c. then a pocky inhabitant of the Hague, having run
the gamut of several cures, Hydrotick and Mercurial, at last proved with
child; her reckoning being expired, she was brought to bed of a
Monster, in all particulars resembling a living child; saving the skin,
which was abominably ciphered with spots and botches. This object of
mercy upon us was committed to the care of a Nurse, the Infant aspiring
to higher things, bad the world adieu. But the unhappy Nurse had
cause to curse her late Foster-child, her breasts and head ulcered, a
Caries got into the cranium, the Pox took possession of the poor wom-
man carcase, for want of a purse to release her. The pocky original
Mistris &c. was proclaimed barbarous by a whole Jury of Matrons, for
refusing relief to the disastered woman. In all these transactions the
Pater Familias stood it out vigorously with a fresh countenance, no sign
contradicting his pancratrick health. Just such another mishance Musa
Brasavolus, tells us, befell a nurse that sucked one Sr. Orobo's child,
horribly conspuricated with the Pox. The observation hereupon infers
his a thorough-pox, and consequently must prove infectious in all parts
of the body. Physicians in this case run a great risk in feeling pulses, and
approaching such Patients in their sweats,—Venus Unmasked, or a More
Exact Discovery of the Venereal Evil, or French Disease: By Gideon
Harvey, London; T. Grismond, 1665. pp. 94-5 6-7-8-9.

In like manner Daniel Turner in his work on Syphilis, published
in 1717, maintains the contagious nature of constitutional Sy-
philis:

And this I intend shall suffice for its Chronology or Time, the Topology
or Place, and the Histoigraphy or Account of the Disease in general;
which, with some other Writers thereon, we shall now define, A venemous
or contagious Distemper, for the most part contracted by impure Cointion,
at least some Contact of the Genitals of both Sexes, or some other lewd
and filthy Dalliance between each other that way tending.

I said for the most part, because it is beyond Controversy, the Infection
is also communicated by other ways, as from Pocky Parents by
inheritance; by sucking an infected Nurse, to the Child; sucking a
diseased Child, to the Nurse; lying also in Bed with the Diseased, with-
out any Carnal Familiarity; by which, though it may be possible for
strong and vigorous Bodies to escape, yet are the tender ones, especially
of little Infants, very likely to be contaminated, as I have more Reason
to believe than by bare Imagination.

There are several other more uncommon Ways of giving as well as
receiving the Venereal Venom; some of which I have already imparted
to the World in short Remarks upon a Quack Libel, Printed several
Years past: But the Thought of such vile Monsters, and their execrable
Practices, is too shocking (unless to the Dregs of humane Nature) to
bear even a Repetition of Circumstances, and fit only for a detestable
Gonologium or Collection of Smutt and Obscenity, in which I am told,
they have been inserted, as some of the Author's own Observations.

As for those fancied Ways of catching it by common Conversation,
drinking after one, sitting on the same Close-stool, drawing on a Glove,
wrapping on the Napkin or Towel, after the infected Person, with a hundred
the like Stories; I believe in our time (whatever may have happened
formerly) there is no great Danger: Yet we find in one of our late
Chronicles, that these and such like Imaginations, were so strongly
rivetted in Mens Minds at that time, even those of the better and more
learned sort, that it was one of the Articles against a noted Cardinal, That he had breathed on the King, when he, the said Cardinal, had this Disease upon him: Which you will find in Baker’s Chronicle, and of which Passage Dr. Harry has also taken Notice. Hildanus likewise tells us of a young Gentlewoman, who contracted the same, by only putting on the Apparel of a Gentleman (that it seems was pox’d) at a Masquerade, of which, through Modesty concealing her Illness (which first of all had seized the Pudenda) till she was past Recovery, she deceased. The good Man’s Credulity, at least his Charity, might however be abus’d in this Relation, as the young Lady perhaps was also after the Masque, otherwise than by simply putting on the Habit. But were it so as the Case is stated, there is nothing therein much more admirable than what the same great Man recites of a whole Family he knew infected, viz. the Wife with three Children and a fourth in the Womb, as also a Maid Servant, by the Husband, who had got the Distemper in their Absence only by sleeping in the same bed with his Man Servant, whom he after understood was broke out with this Distemper.

The Relation of Horst. and Hornung. are yet more strange, of several People infected in the Baguio, by having the same Scarificator apply’d after Cupping, as had been used to a Venereal Patient: Which seems a like credible with that of the Priest pox’d at his Ear, in the time of confessing a wanton Nun; the venous Breath from her Mouth defiling the holy Father: But enough of this.—Syphilis; A Practical Dissertation on the Venereal Disease: By Daniel Turner, London; R. Bonwicke & Co., 1717. pp. 10-11-12.

John Hunter, in his Treatise on the Venereal Disease, gives a number of instances of the communication of secondary syphilis, from which we select the following:

A lady was delivered of a child on the 30th of September, 1776. The infant being weakly, and the quantity of milk in the mother’s breasts abundant, it was judged proper to procure the child of a person in the neighborhood to assist in keeping the breasts in a proper state. It is worthy of remark that the lady kept her own child to the right breast, the stranger to the left. In about six weeks the nipple of the left breast began to inflame, and the glands of the axilla to swell. A few days after, several small ulcers were formed about the nipple, which, spreading rapidly, soon communicated and became one ulcer, and at last the whole nipple was destroyed. The tumour in the axilla subsided, and the ulcer in the breast healed in about three months from its first appearance. On inquiry, about this time, the child of the stranger was found to be short-breathed, had the thrush, and died tabid, with many sores on different parts of the body. The patient now complained of shooting pains in different parts of the body, which were succeeded by an eruption on the arms, legs, and thigh, many of which became ulcers.

She was now put under a mercurial course, with a decoction of sarsaparilla. Mercury was tried in a variety of forms: in solution, in pills internally, and externally in the form of ointment. It could not be continued above a few days at a time, as it always brought on fever or purging, with extreme pain in the bowels. In this state she remained till March 16th, 1779, when she was delivered of another child in a diseased state. The child was committed to the care of a wet nurse, and lived about nine weeks; the cuticle peeling off in various parts, and a scabby eruption covering the whole body. The child died.

Soon after the death of the child, the nurse complained of headache.
and sore throat, together with ulceration of the breasts. Various reme-
dies were given to her, but she determined to go into a public hospital,
where she was salivated, and after some months she was discharged, but
not cured of the disease. The bones of the nose and palate exfoliated,
and in a few months she also died tabid.

Of the various remedies tried by the lady herself, none succeeded so
well as sea-bathing. About the end of May she began a course of the
Lisbon diet-drink, and continued it with regularity about a month, dress-
ing the sores with laudanum, by which treatment the sores healed up;
and in September she was delivered of another child, free from external
marks of disease, but very sickly; and it died in the course of the month.

About a twelve month after, the sores broke out again, and, although
mercurial dressings and internal medicines were given, remained for a
twelve month, when they began again to heal up. * * *

The third case was of a gentleman, where the transplanted tooth
remained, without giving the least disturbance, for about a month, when
the edge of the gum began to ulcerate, and the ulceration went on until
the tooth dropped out. Some time after, spots appeared almost every-
where on the skin; they had not the truly venereal appearance, but
were redder or more transparent, and more circumscribed. He had also
a tendency to a hectic fever, such as restlessness, want of sleep, loss of
appetite, and headache. After trying several things, and not finding
relief, he was put under a course of mercury, and all disease disappeared
according to the common course of the cure of the venereal disease, and
we thought him well; but some time after the same appearances returned,
with the addition of swelling in the bones of the metacarpus. He was
now put under another course of mercury, more severe than the former,
and in the usual time, all the symptoms again disappeared. Several
months after the same eruptions came out again, but not in so great a
degree as before, and without any other attendant symptoms. He a
third time took mercury, but it was only ten grains of corrosive sublimate
in the whole, and he got quite well. The time between his first taking
mercury and his being cured was a space of three years.—The Works of
John Hunter, with Notes, edited by James F. Palmer. Vol. ii., p. 475-
476; p. 484.

We might greatly multiply such facts from various authors, but
this appears to be unnecessary, as the experience of the authors
just quoted covers nearly three centuries; and we are justified in
affirming that it is now clearly established that constitutional
syphilis can be transmitted by direct inoculation with the secre-
tions of secondary sores.

And more recent experiments have shown that the blood of
persons affected with constitutional syphilis is capable when
inoculated on healthy subjects of giving rise to syphilitic disease.

Waller succeeded in inoculating a healthy boy fifteen years old,
with this disease, by applying the blood of an individual affected
with secondary syphilis to incisions made by a scarificator on the
body of the boy. Well marked and unmistakable symptoms of
secondary syphilis followed this experiment. Other experimenters
have arrived at similar results, but the best conducted experiments appear to be those performed by Professor Pelizzari,* of Italy.

As this subject is of great interest, and as we have been cut off from the main sources of information upon this and other medical questions, we present the account of these experiments, as well as of the most recent and circumstantial facts illustrating the transmission of secondary syphilis through the vaccine virus, as it is contained in one of the most recent works on Venereal Diseases:

This physician inoculated two medical students with the blood of a syphilitic patient with a negative result. On the 6th of February, 1862, he resumed his experiments, three physicians, Drs. Bargioni, Rosi, and Passagli submitting themselves to his investigations. The blood of a female patient, aged twenty-five, affected with constitutional syphilis, and who had undergone no treatment, was used for the purpose. The blood was drawn, with a new lancet, from the cephalic vein. The patient was at the time affected with mucous papules on the left labium, at the place where the chancre had existed; mucous tuberules surrounded the anus, and the inguinal glands were indurated and enlarged. A confluent syphilitic eruption existed upon the body, the posterior cervical glands were enlarged, and there were pustules on the head. At the point on the arm from which the blood was drawn there was no sign of any eruption, the skin of the part was well washed, and the surgeon washed his own hands. The bandage was new, as was also the vessel in which the blood was received. As the blood escaped from the cephalic vein, some of it was received on a piece of lint, which was placed on the upper part of Dr. Bargioni's arm, where the epidermis had previously been removed, and three transverse incisions made. A similar operation was performed on the other two gentlemen, but in the case of one the blood was cold, and in that of the other it had coagulated.

After twenty-four hours the dressings were removed, and nothing was observed but the crusts formed by the effused blood. Four days afterward all traces of the inoculations had disappeared.

On the morning of the third of March, Dr. Bargioni informed Prof. Pelizzari that in the center of the inoculated surface he had noticed a slight elevation, which produced a little itching. The arm was examined, and at the point indicated Prof. Pelizzari found a small papule of a roundish form, and of a dull-red color. On the eighth day the papule had augmented to the size of a twenty-centime piece. On the eleventh day it was covered with a very thin adherent scale, which became denser, and on the second day commenced to crack in its central part. On the fourteenth day two axillary glands became enlarged to the size of nuts. The papule remained indolent, and there was no induration at its base. On the twenty-first the scale was transferred into a true crust, and the part beneath was ulcerating. Slight induration was more evident. On the twenty-second the crust was detached, leaving a funnel-shaped ulcer, with elastic and resistant borders, forming an annular induration. There was but a small amount of secretion from the sore, and the pain was trifling. On the twenty-sixth the ulcer had become as large as a fifty-centime piece, and the surrounding induration was considerably increased. Up to the 4th of April the ulcer remained stationary, but at that date

---

* Lectures on Syphilis, etc., by Henry Lee, 1863; p. 198.
its base appeared to be granulating. The axillary glands remained swollen, hard, and indolent. Slight nocturnal pains occurred in the head about this time, and the posterior cervical glands became somewhat enlarged. On the 12th of April spots of an irregular form and of rose color appeared on the surface of the body. The eruption extended itself, and during the succeeding days became more confluent. No constitutional disturbance, heat of skin, or pruritus accompanied it. On the twentieth the cervical glands had increased in size and were harder. The chancre maintained its specific character and exhibited no tendency to cicatrization. On the twenty-second the color of the eruption was decidedly coppery. Small lenticular papules were now perceived to be mixed with the erythema. The edges of the chancre had begun to granulate. Mercury was now administered.

This case is of itself sufficient to prove the inoculability of syphilis through the blood of an infected person. But the evidence does not stop here.

In a very interesting memoir, M. Viennois* has collected many cases of the transmission of syphilis by vaccination, and has summed up his conclusions from the data on hand. From his observations and researches it would appear that syphilis cannot be communicated by vaccine virus taken from a subject affected with the disease unless a portion of the blood of the individual is also inoculated. Thus he says:—

'When the vaccine virus of a syphilitic subject, pure and unmixed with blood, is inoculated on a healthy individual, a simple vaccine pustule is obtained, without any near or remote syphilitic complications being produced.'

'On the contrary, if, with the vaccine virus of a syphilitic individual who either has or has not at the time constitutional accidents, a healthy person is vaccinated, and the point of the lancet be charged with a little blood at the same time as with the vaccine virus, both diseases may be transmitted by the one operation—the vaccine disease with the vaccine virus, and syphilis with the syphilitic disease.'

M. Viennois also concludes that in such cases the vaccine vesicle is developed first, and that after undergoing its incubatory period the syphilitic ulcer, with all the characteristics of a true chancre, appears.

These views of M. Viennois have recently received the most ample confirmation from the tragedy which occurred at Rivalta, in Italy, by which forty-six children and twenty nurses had syphilis communicated to them through vaccination, and of which several of the children died. The full details of this remarkable event are given in a memoir by Dr. Pacchiotto;† of Turin, and I condense the following summary from his report.

On the 21st of May, 1861, Sig. Cagiola vaccinated Giovanni Chiabrera with lymph contained in a tube sent from Acqui. The operation was performed in the usual manner and with a perfectly clean lancet. The child was eleven months old, and in good health at the time. Forty-six other children were, ten days subsequently, vaccinated with lymph taken from the vesicle of this child; and ten days after this, seventeen children were vaccinated with lymph taken from the arm of Luigia Manzone, one of the forty-six first vaccinated.

Of these sixty-three children, forty-six—thirty-nine of the first lot and seven of the last—were within two months attacked with syphilis. On

---

the 7th of October seven of them, including the little Manzone, were dead, three were yet in danger of dying, fourteen were recovering under the use of mercury and iodine, and one was well.

A medical commission was now appointed to inquire into all the circumstances connected with this fatal event, and they proceeded to the execution of the duty assigned them.

Twenty-three children were examined in full; the others were not so accurately noticed, as their parents had neglected to avail themselves of medical aid in time. In the forty-six children who were affected, syphilis appeared at periods varying from ten days to two months after vaccination, the average time being twenty days. The initiatory symptoms were variable. Sometimes just as the vaccine vesicle had healed, it became surrounded with a red, livid, and copper-colored areola, and ulcerated again. In other instances an ulcer would form on the cicatrix, and become covered with a scab, which in a few days would fall off to make room for another, and so on. In others the vaccine vesicles had an unhealthy appearance from the first, and were accompanied by a general eruption.

The principal symptoms observed by the commission were mucous tubercles in the vicinity of the anus and on the genitals, ulcerations of the mucous membrane of the lips and fauces, engorgement of the lymphatic glands in the groin and neck, syphilitic skin diseases, alopecia, deep tubercles, gummy tumors, etc.

In two subsequent papers, Dr. Pacchiotti* continues the detail of his investigations. On the 8th of February, twenty of the mothers or nurses of the forty-six children had become affected with symptoms of syphilis. He ascertained, too, from a revaccination of five of the children, that the occurrence of syphilis had not destroyed the efficacy of the first vaccination. But he also discovered the source of the infection. It appeared that a year and a half previously a young unmarried woman had had syphilis, and that she was syphilitic at the time Chiabrera was vaccinated. This woman was the mother of a child which had died syphilitic three months after its birth. After the death of the child she was in the habit of having her breasts drawn by the little Chiabrera, and gave him the clothes which her own child had worn. Another child nursed by this woman, but who was not vaccinated, also became syphilitic, and this child infected its mother just as little Chiabrera did his mother. It is therefore shown that the vaccine virus used on Chiabrera was not at fault, but that all the other forty-five children were infected through the lymph taken from his arm. It is also shown that blood was on the lancet when several of the children were vaccinated.

Dr. Pacchiotti, as the results of his investigations and those of the commission, gives the following rules to be observed in vaccinating:—

1st. Examine the child from whom the lymph is taken.

2d. Inquire into the state of the parents' health.

3d. Take the lymph in preference from those children who have passed the fourth or fifth month, as hereditary syphilis appears in general before that time.

4th. Do not use lymph taken from a vesicle which has passed its eighth day, because on the ninth and tenth days the lymph becomes mixed with pus, which latter may be of an infectious character.

5th. In taking the lymph, avoid hemorrhage, as there is less danger with lymph free from blood.

6th. Do not vaccinate too many children with the same lymph.

*L'Union Medicale, Fevr. 8ème et Avril 3ème, 1862.
In consequence of the publication of the details of the lamentable affair at Rivalta, Dr. Marone concluded to relate the particulars of a similar event which occurred to him, and in regard to which he had thought it advisable to maintain a discreet silence. The particulars are given with sufficient fullness by Mr. Lee, whose excellent work I have already referred to several times.

It seems that in November, 1856, Dr. Marone obtained some vaccine lymph, with which he vaccinated a number of children at Lupara. The lymph was contained in glass tubes, and Dr. Marone noticed that it was mixed with a little blood, which affected its transparency. Of the number of children vaccinated with this lymph, notes were preserved in twenty three cases. All these were affected with syphilis, and the disease likewise manifested itself among the mothers, nurses, and even the servants who were brought in contact with them. The symptoms with which the children were affected consisted chiefly of eruptions of a syphilitic character, and subsequently of mucous tubercles at the angles of lips, around the anus, and on the vulva. The post-cervical and inguinal glands were enlarged, and there was emaciation, in degree varying with the severity of the syphilitic symptoms.

Besides these cases, eleven nurses of the number who suckled these children gave the disease to eleven other children who were not vaccinated.

In some of the cases the syphilitic phenomena continued till April, 1859.

Dr. Marone draws the following conclusions from his experience:

"That the syphilitic virus was really transmitted in the above recorded cases by means of vaccination.

"That the children vaccinated suffered first, and became the means of transmitting the disease to others.

"That the lymph used for the purpose of vaccination was impure, being mixed with blood, and that the result shows how necessary it is to abstain from using lymph of that description."—Lectures on Venereal Diseases: By Wm. A. Hammond, M. D. Philadelphia: J. B. Lippincott & Co., 1864. p. 208-217.

The experience of the Confederate Surgeons, establishing the possibility of communicating constitutional syphilis by vaccination; the experiments of Waller, Pelizzari and others, establishing the possibility of communicating secondary syphilis by inoculation of the blood from patients suffering with the constitutional symptoms of this disease into healthy individuals: the cases collected by M. Viennois illustrating the transmission of syphilis by vaccination: and the unfortunate tragedy of Rivalta in the district of Piedmont Italy, where syphilis was previously unknown (forty-six children of various ages being simultaneously attacked with well-marked syphilis, proceeding in all cases which could be properly examined from the action of vaccine virus which produced chancre on the arms, followed by buboes in the axilla, and all these children had been vaccinated directly or indirectly
Vaccine Matter from the Cow. [July]

from a single child, who was subsequently proved to have contracted syphilis from a wet nurse, and these children transmitted the disease to a number of women, their wet nurses and mothers, and even to children who played and nursed with them, and the women so infected, in turn infected their husbands, and finally the disease yielded in all cases to the usual remedies for syphilis: these, and other similar facts, as the infection of the infant at the breast with secondary syphilis, and the communication of syphilis from the infant inheriting the disease from its mother or father, to a healthy nurse,—all demonstrate the possibility of transmitting constitutional syphilis by inoculation of syphilitic blood, or vaccine virus, from patients poisoned with syphilis: and each such fact of itself is sufficient to overthrow the dogma, that "Primary syphilis alone is capable of being inoculated, and that secondary affections and the constitutional disease cannot be communicated from one individual to another, by any means as vaccination, or the direct inoculation of syphilitic blood."

Vaccine Matter from the Cow.

M. Lanoix has read a paper on this subject before the Academy of Medicine at Paris. This physician, after studying the subject at Naples, is founding in the capital of France an establishment for such vaccination. In the paper it is stated that out of 820 revaccinations practiced in different schools upon children from seven to thirteen years old, 21 per cent. succeeded. The figures respecting a more advanced age are as follows: From fourteen to twenty years, 71 revaccinations, 31 effectual; from thirty to forty years, 200 revaccinations, 97 effectual; from forty to fifty-five years, 30 revaccinations, 7 effectual; from fifty to sixty years, 5 revaccinations, 2 effectual. The author considers that the transmission of vaccine matter from heifer to heifer is always possible, the quantity obtained being quite adequate to very numerous operations; that the matter does not lose in activity in passing through animals as it does in passing through human organisms; that vaccinations are always or almost always successful; the revaccination with animal matter succeed more frequently than with matter obtained from human beings; that vaccination with heifer matter is extremely easy; and that such vaccinations are highly useful in epidemics of small-pox, as larger supplies of vaccine matter may rapidly be sent to extensive tracts of country.—London Lancet.
MEDICAL COLLEGE OF GEORGIA, AUGUSTA.

The exercises of this good old institution having been suspended during the late war, were resumed on the first Monday in November last. The class in attendance, in consequence of the disastrous effects of our conflict, was very small when compared with the full benches of former years. It numbered, however, forty-seven young men of fine promise, of which thirty-seven were from Georgia, four from South Carolina, one from Alabama, one from Louisiana, one from Kentucky, and three from the United States army.

The following named gentlemen having complied with all the rules of the College, were graduated Doctors of Medicine:

Fontenoy A. Beall, of Augusta, Ga.
William W. Bussey, of Columbia County, Ga.
Louis A. Cormick, of Augusta, Ga.
John W. Johneton, of Screven County, Ga.
David S. McLver, of Newnan, Ga.
Benjamin B. Palmer, of Richmond County, Ga.
Beverly H. Washington, of Louisville, Ky.
Amos G. Whitehead, of Burke County, Ga.

Dr. Frank J. Moses, a graduate of the Medical College of South Carolina, and Dr. Virginius G. Hitt, a graduate of the Medical College of Richmond, Va., were admitted ad eundem gradum.

This is one of the oldest Medical Colleges in the South, and its Faculty, Library, Museum, and Laboratory, will compare favorably with any in our country. We may therefore reasonably expect for it a career in the future as prosperous as it has been in the past, when its classes numbered from one hundred and fifty to one hundred and seventy-five. The deplorable condition of Southern finances may render recuperation slow, but the merits of this institution must secure to it a return of its former prosperity if our people are true to themselves.

The next session will be commenced on the first Monday in November next, when we have every reason to believe that the class will be materially increased.
Process of Disinfection.

A memorandum on disinfection has been issued by the Privy Council (Great Britain). In view of the approaching epidemics, we give its main points, after the Chemical News and Druggists' Circular:

1. For artificial disinfection, the agents most useful are—chloride of lime, quicklime, and Condy's manganic compounds. Metallic salts—perchloride of iron, sulphate of iron, and chloride of zinc are applicable. In certain cases chlorine gas or sulphurous acid gas may be used; and in other cases powdered charcoal or fresh earth.

2. If perchloride of iron or chloride of zinc be used, the common concentrated solution may be diluted with eight or ten times its bulk of water. Sulphate of iron or chloride of iron may be used in the proportion of a pound to a gallon of water, taking care that the water completely dissolves the sulphate of iron, or has the chloride of lime thoroughly mixed with it. Condy's stronger fluid (red) may be diluted with fifty times its bulk of water; his weaker fluid (green) with thirty times its bulk of water. When the matters requiring to be disinfected have an offensive smell, the disinfectant should be used till this smell has entirely ceased.

3. In the ordinary emptying of privies or cesspools, use may be made of perchloride of iron or chloride of zinc, or of sulphate of iron. But where disease is present, it is best to use chloride of lime or Condy's fluid. Where it is desirable to disinfect, before throwing away the evacuations from the bowels of persons suffering from certain diseases, the disinfectant should be put into the night-stool or bed-pan when about to be used by the patient.

4. Heaps of manure or of other filth, if it be impossible or inexpedient to remove them, should be covered to the depth of two or three inches with a layer of freshly burnt vegetable charcoal in powder. Freshly burnt lime may be used in the same way, but is less effective than charcoal. If neither charcoal nor lime be at hand, the filth should be covered with a layer of some inches thick of clean dry earth.
5. Earth near dwellings, if it has become offensive or foul by the soakage of decaying animal or vegetable matter, should be treated on the same plan.

6. Drains and ditches are best treated with chloride of lime, or Condy's fluid, or with perchloride of iron. A pound of good chloride of lime will generally well suffice to disinfect 1000 gallons of running sewerage; but of course, the quantity of disinfectant required will depend upon the amount of filth in the fluid to be disinfected.

7. Linen and washing apparel requiring to be disinfected should without delay be set to soak in water containing per gallon about an ounce either of chloride of lime or Condy's red fluid. The latter, as not being corrosive, is preferable. Or the articles in question may be plunged at once into boiling water, and afterward, when at wash, be actually boiled in the washing water.

8. Woollens, bedding, or clothing which cannot be washed, may be disinfected by exposure for two or more hours in chambers constructed for the purpose to a temperature of 210 to 250 degrees Fahrenheit.

9. For the disinfection of interiors of houses, the ceilings and walls should be washed off with quicklime water. The wood work should be well cleansed with soap and water, and subsequently washed with a solution of chloride of lime, about two ounces to the gallon.

10. A room, no longer occupied, may be disinfected by sulphurous acid gas or chlorine gas—the first by burning in the room an ounce or two of flowers of sulphur in a pipkin; the second by setting in the room a dish containing a quarter of a pound of finely-powdered black oxide of manganese, over which is poured half a pint of muriatic acid, previously mixed with a quarter of a pint of water. In either case, the doors, chimney, and windows of the room must be kept carefully closed during the process, which lasts for several hours.'—Journal of Materia Medica; Boston Medical and Surgical Journal.
BOOKS, JOURNALS, ETC., RECEIVED.

Outlines of Surgical Diagnosis. By George H. B. Macleod, M. D., etc. Bailliere Brothers, 520 Broadway, New York: 1864.


Essay on Osmosis. (Extracted from the American Journal of the Medical Sciences, for July, 1865.)


Successful Removal of the Uterus and both Ovaries, by Abdominal Section, etc. By Horatio R. Storer, M.D. Boston; David Clapp & Son: 1866.

Instructions in the Preparation, Administration, and Properties of Nitrous Oxide. By George T. Barker, D. D. S., etc. Philadelphia; Rubencame & Stockton: 1866.


The Medical and Surgical Reporter: A weekly journal, S. W. Butler, M. D., Editor; 115 South Seventh street, Philadelphia: vol. xiv.


The Chicago Medical Examiner: Edited by N. S. Davis, M.D., Chicago: March, April, May, June.


Buffalo Medical and Surgical Journal: Edited by Julius F. Miner, M. D. Buffalo: May, June.

Atlanta Medical and Surgical Journal: Edited by Drs. J. G. & W. F. Westmoreland. Atlanta, Ga.: May.


The Richmond Medical Journal: Edited by Drs. E. S. Gaillard and W. S. McChesney, M. D. Richmond, Va.: June.


Southern Cultivator. Athens, Ga.: May, June.

Catalogue of the University of Virginia: 1866.