

resume my bed as the temperature rose with a severe rigor to 103° F., and I felt great pain in the right hypochondrium. Examination now revealed another infarct, this time in the posterior portion of the lower lobe of the right lung; this ran a course similar to that of those in the left lung, accompanied, as were they, by a remittent type of fever. But there developed in this case a fresh complication, namely, a considerable pleuritic exudate in the lower part of the right pleural cavity. The temperature excursions were very great, and was accompanied each time by rigors and profuse sweating. The pleuritic pains were at first very severe.

"In the early part of December I began to feel most torturing pains in the right hypochondrium, which I may describe as diaphragmatic, to check which I was compelled to breathe as superficially as possible, and resorted to the use of hypodermic injections of morphine. From December 1st to 15th the temperature was constantly in the neighborhood of 102° F., and the character of the fever was more or less steady (febris continua); this, of course, greatly reduced my strength. On account of steady pain beneath the right ribs, as well as supervening painful spasms of the abdominal muscles of the right side, especially of the musculus rectus abdominis dexter, I could lie only on my right side, holding the right leg flexed at the hip. From time to time there were rigors and profuse sweating."

All these severe symptoms were scarcely explained by the comparatively unimportant anatomical changes to be found in the lungs and pleura, the only objective symptoms at that time discoverable. Repeated urinalyses failed to show any pathological change in that secretion. The condition had become very grave; all therapeutic effort seemed unavailing.

By December 20th the clinical picture became somewhat simplified, in that a swelling, apparently a perinephritic abscess, appeared in the right lumbar region. On December 21st a long lumbar incision was made, under chloroform; this revealed a purulent infiltration not only of the subcutaneous and intermuscular connective tissue, but also of that surrounding the right kidney. Fluctuation was also determined in the kidney itself. The kidney capsule was split and from it was evacuated a large amount of pus. There was present a suppurating embolic infarct of the kidney itself. The wound was irrigated and packed and treated on antiseptic principles. By evening the temperature fell to 97.4° F.; and rose the next day to 101° F.; and from the 22d to the 28th of December there was a wide variation of the temperature, evoked by the formation of a new infarct in the left lung. From December 26th to 28th the temperature fell in forty-eight hours from 104.4° F. to 97.2° F. on the appearance of expectoration, at first bloody, but later purulent. On December 30th the temperature again rose to 101° F., but after that remained normal.

In the beginning of January, 1889, there appeared a recrudescence of the periostitic process which had been observed in October, 1888, on the upper third of the anterior aspect of the left tibia. Severe rheumatic pains asserted themselves throughout the whole of the left lower leg, and presently another swelling, similar to the one above, appeared at the old spot on the lower end of the fibula. The upper spot very quickly suppurated (in spite of vigorous mercurial inunctions) and was opened by an incision under cocaine at the end of three weeks. From the wound was removed a sequestrum of the cortical portion of the bone. On March 5th the lower swelling was opened, under chloroform, and from it also a sequestrum was removed from beneath the periosteum, which membrane was separated by a layer of pus from the underlying bone. "Both wounds healed comparatively soon, and by the end of March I was again out of bed."

"In spite of good diet and hygienic living my strength returned very slowly after a seven months' illness. As a sequela there developed a pronounced anemia, which was in turn the occasion of a (psychic) neurasthenia, manifested in absolute apathy, indecision, and confusion of ideas; this culminated in a "délire de persécution."

May, June, and July, 1889, were passed at the seashore, where loafing, sea-bathing, and walking were helpful, along with the change of air, in restoring a certain degree of strength. Not until June did the wound in the back heal entirely.

"During my sojourn at the seashore, a new periosteal swelling formed on the lower epiphysis of the left tibia. In May, 1890, this suppurated and opened spontaneously, and after healing left a pigmented scar. During all this time the left lower leg was frequently oedematous throughout. A periosteal swelling also formed on the olecranon process of the left ulna.

"Up till the present time (October 2d, 1890), I suffer now and then from cramps in the abdominal muscles of the right side, and from parasthesia in the course of the ileo-hypogastric and ileo-inguinal nerves."

Case II. That of Dr. Roswell Park, of Buffalo, N. Y.²⁷ Writing under date of February 13th, 1898, Dr. Park says: "For eight months, and until the first of the year, I was completely out of work as the result of an infection. Now, I am happy to report myself as well again, and hard at work. My case has puzzled every one to whom it has been submitted, and no one term or even sentence would define it all. It was certainly a mixed infection, but just when it occurred I do not know. It came on slowly with manifestations mostly confined to the lymphatics of the left arm and axilla; for two months these were troublesome. Then a sudden attack of diaphragmatic pleurisy, with probable mediastinal infection, prostrated me. Then, a few weeks later, I had the lymphatics of the arm all dissected out. I was just getting out after this when acute septic symptoms appeared, and the axillary nodes swelled enormously. I then had the axilla all cleaned out; within two hours my temperature fell 8° F. But there was no pus present either time, and cultures and all sorts of bacteriological studies gave no result. After this I went to the seashore, came back with partial (toxic) laryngeal paralysis, went abroad, was quite sick over there, but finally came home well in every respect, only wearing my scars."

Case III. That of Dr. W. W. Keen, of Philadelphia, Pa., who says, writing on February 11th, 1898: "I made a post-mortem on a case of suppurative peritonitis, following cancer of the stomach, at 11 A.M., on January 9th, 1898. In doing so, I inadvertently and very slightly pricked my right thumb with a needle. The hand was disinfected by washing, but the wound was so slight that it was not deemed necessary to lay it open at once. At six o'clock that evening I began to feel chilly, by nine o'clock I went to bed, as I felt so unwell. It was impossible for me to sleep, because by that time the thumb had become the seat of severe throbbing pain, and in the neighborhood of the prick the tissues were already becoming hard. By 2 A.M., feeling quite sure there was an infection, I called a brother surgeon who laid open the thumb and disinfected it with bichloride of mercury solution, 1 to 500, and applied the same as a dressing. A quarter of a grain of morphine gave some sleep, but by eight o'clock the next morning, about twenty-one hours after the infection, I was vomiting repeatedly, and had a temperature of 105°. Twenty-two grains of quinine and six ounces of whiskey were administered in each twenty-four hours for three days, with sufficient morphine to procure sleep. The pain was very severe. The swelling of the thumb was so great that all the tissues were under great tension, so that it was feared that either necrosis of the last phalanx would take place, or, as a dark spot appeared on the edge of the wound, that possibly gangrene of the tissues might follow. Accordingly, on the third day, the incision already made was enlarged and the parts were disinfected anew. Fortunately the lymphatics were never involved. Within ten days the constitutional symptoms had disappeared, but the thumb did not heal for about six weeks. Two cultures were taken from the incision in my thumb (of course after the primary disinfection), but showed no growth whatsoever, though taken separately on different occasions. Unfortunately no culture was taken from the abdomen of the patient at

the time of the post-mortem, so that I do not know what the nature of the infection was. It seems to me that the very prompt incision made by Dr. Taylor, and the thorough disinfection account for the absence of lymphatic involvement, for I never had the slightest tenderness in the axilla; and they also account for the sterile cultures.

Case IV. That of Dr. Charles P. Strong, of Boston, Mass., reported by Dr. Harrington.²⁹ "Dr. Strong died of acute septicemia six days after operating upon a patient with septic peritonitis, probably of appendicular origin. The nature of the disease was not determined until after the death of the patient. The point of entrance of the septic poison is not known, as no wound was discovered anywhere upon the body. The circumstantial evidence is so strong that there can be no doubt that the disease resulted from the operation, notwithstanding the fact that all the usual precautions were taken.

"On the day following the operation Dr. Strong performed a hard day's work. He mentioned in the afternoon that the left arm felt somewhat sore, but he did not speak of it again in the evening. He had a somewhat restless night, and decided on the following day not to go out to his work. I saw him then for the first time. He complained of some pain in the left pectoral muscle, left shoulder, and elbow. The temperature was normal and the pulse 80. There were a loss of appetite and some nausea. In the evening the temperature was 100° and the pulse 90. The patient was drowsy through the day, and slept a good deal. There was a trace of albumin in the urine.

"On the following morning the temperature was 102° and the pulse was 90. There was some sweating. In the evening the temperature rose to 103° and the pulse to 98. The urine contained a large amount of albumin. The patient still complained of pains in the left arm and back. There was a disinclination to take food. A moderate amount, however, both of food and stimulants was given. On the following morning the temperature remained at 103° and the pulse at 98. There was still much inclination to sleep. In the afternoon there was complaint of pain in the right knee and right thigh just above the knee. The temperature remained at 103° and the pulse rose to 108. During the night there was considerable pain in the right knee and thigh.

"In the morning there were found to be some fluid in the right knee-joint, and swelling of the lower part of the right thigh. A ham splint was put on and the leg suspended. An examination of the urine showed a large trace of albumin, hyaline, granular, and fatty casts, but no blood. The temperature had fallen to 101°, while the pulse remained at 108. The patient had been perfectly clear in his mind and fairly comfortable. In the evening the temperature had dropped to 100°, but the pulse had risen to 120 and was of bad character. The sweating became profuse. The following night was a comfortable one.

"In the morning the pulse had risen to 128 and the temperature to 101.8°. During the night the thigh had swollen considerably. The heart's action was feeble, and there was a duskiess about the skin. The respiration, which had remained normal during the entire sickness, rose rapidly during the morning to 50 per minute. On examination, bronchial breathing was detected over the upper lobe of the right lung. The patient sank rapidly and died in the evening, this being the fifth day of his sickness. The thigh in a few hours became dark and greatly swollen, and was covered with bullae.

"The symptoms up to the last twenty-four hours had suggested an attack of la grippe, with the usual acute irritation of the kidneys. The condition of the right knee had suggested an acute inflammatory rheumatism. The marked changes in the thigh did not appear until the last few hours. The treatment had been supporting and stimulating. No depressants had been used. The amount of pain was not great, so that opiates were not needed. The patient did not associate his illness with the operation, which was its probable cause. It was subsequently found on investigation that, at the close of

the operation, Dr. Strong had pricked one of the fingers of the left hand with a needle which was being used in closing the incision.

"Several months earlier Dr. Strong had suffered from a synovitis of the left knee, but there had been complete recovery; and no connection could be traced between this and the subsequent illness. There was no evidence of a chronic nephritis.

"Autopsy.—The preliminary bacteriological examination and autopsy were made by Drs. Councilman and Whitney, about twelve hours after death, and the bacteriological cultivations were made by Dr. Stone.

"There was lividity of the dependent parts of the body, and the course of the cutaneous veins was marked by dark, dirty bluish-black lines with illly defined edges. The right thigh above the knee was swollen, dark, and discolored, with numerous bullae containing a dirty-red serum. The lungs contained a large amount of frothy, reddish fluid, but there was no evident consolidation. The muscular substance of the heart and the parenchyma of the liver and kidney were very pale and opaque. The spleen was swollen, pale, and very soft. The other organs presented nothing remarkable. The muscles of the external aspect of the right thigh were dry, infiltrated with blood-coloring matter, but there was no evident pus.

"Cover-glass preparations gave the character of the bacteria as micrococci, chiefly in long chains (streptococci). Cultures were made from the heart's blood, the liver, kidney, spleen, and subcutaneous tissue of the thigh. From all of these there was obtained a pure culture of streptococci. These grew in long chains in bouillon and on agar. In the former they made the fluid cloudy for twenty-four hours, and then settled as a white precipitate. In gelatin they grew along the needle track in small isolated colonies. They grew also in milk but did not coagulate it. On blood serum the bacteria formed small white colonies, at first almost like drops of water on the surface. They developed rapidly in the thermostat at 37° C., more slowly at the ordinary temperature of the room.

"The sections of the muscles of the thigh showed that all the intermuscular spaces were distended by a mass of bacteria, there was no infiltration of leucocytes into the tissues, though the blood-vessels seemed to contain an unusually large number of white blood corpuscles. In sections of the kidney the bacteria were demonstrated with considerable difficulty, in spite of the fact that the amount of kidney substance one could pick up with a small wire loop gave over one hundred colonies when planted. When found, the cocci were in the intercellular spaces. Neither in the kidney nor in the muscular tissue was there any suggestion of arrangement of the cocci in chains. This was to be seen only when they were cultivated outside of the body.

"The case is one of true septicæmia following a local streptococcus infection, the original point of infection not being evident."

D. DIAGNOSIS.—The diagnosis of dissection and operation wounds is essentially that of the sepsis which accompanies them. When this has a distinct local expression, at the site of inoculation, as in Cases I. and III. the diagnosis is not specially difficult; but when the portal of infection is concealed, as in Cases II. and IV., the diagnosis presents difficulties which may even become extreme. A pure infection with pyogenic germs may, as we have seen, find expression in a great variety of morbid processes, and consequently sepsis, as a disease, may counterfeit a whole host of other more familiar morbid conditions; among others grippe, typhoid fever, malaria, rheumatism, and scarlet fever, and the specific pneumonias are those perhaps most likely to confuse the diagnosis for a time, or even till the end of a fatal case. On this account the history of recent exposure to septic infection, in a physician or a pathologist, should always be allowed weight in the diagnosis of any of these affections occurring in professional men. Two means of differentiation are available to us in doubtful cases: first, an examination of the blood for the determination of leuco-

cytosis, and, secondly, a bacteriological examination of the blood itself. The first of these is quite easy of application, and is capable of giving most important information in any case in which the system offers any considerable resistance to the invasion of the pyogenic germs.³⁰ The two conditions in which it may fail to afford a clew to the proper diagnosis are, first, when the infection is so slight as not to evoke any considerable reaction on the part of the tissues, and secondly, when the invasion of the system is such an overwhelming one that all its efforts to react are borne down, practically without a struggle, and the patient perishes forthwith of "septicémie foudroyante." The careful bacteriological examination of the blood is a more considerable matter, the technique of which does not properly concern us here, beyond the remark that it requires for its accurate performance quite a considerable quantity of blood (an ounce or more), and that negative results from the examination of smaller quantities should not be allowed much weight. The actual discovery of pyogenic cocci in the blood is of most grave prognostic import, and is the gravest of all in the presence of streptococci. As it will be remembered that true septicemias, *strictiori sensu*, are by no means as common in man as in the lower animals inoculated with the bacteria to which they are specifically susceptible, the appearance of even a small number of germs in the circulating blood implies a most profound, extensive, and dangerous condition of general sepsis. A single word may be said in regard to the discovery, in blood specimens gathered by aspiration through the skin, of the *Staphylococcus pyogenes albus*; this coccus, which Welch has named the *Staphylococcus epidermidis albus*, has been shown by him to have its habitat in the skin in layers deeper than can be reached by any known means of disinfection. The discovery, therefore, of this germ alone in blood cultures has not the grave prognostic import which attends the appearance of the *Staphylococcus aureus* or that of the *Streptococcus pyogenes*.

E. TREATMENT.—It will be our duty in this connection to consider principally the treatment of the primary local lesion and its direct and immediate sequelae, the treatment of an ensuing pyæmia, septicæmia, or pyo-septicæmia being more fully discussed in other parts of this work. For the formulation of a rational treatment for these forms of septic infection we are considerably indebted to E. H. Ochsner, of Chicago, from whose valuable article I shall quote freely.³¹

If the infection has come from a pin prick or similar wound through a thick and calloused layer of the skin, it is advisable carefully to shave away the horny layer at the point of infection till one gets down to the quick, but one should avoid cutting into the healthy tissue. If now a little pus should form at the point, it will work its way to the surface and discharge spontaneously, or it can be released as soon as there is macroscopical evidence of pus.

If ever so slight a wound be received upon the hands during the performance of a surgical operation or of an autopsy upon a subject with puerperal fever, pyæmia, septicæmia, a carbuncle in its acute stage, malignant erysipelas, phlegmonous cellulitis, or suppurative peritonitis, it is worthy of the gravest consideration and of the most scrupulous care on the part of the surgeon. This suggestion of Dr. Ochsner, viz., that of shaving off the superficial epidermic layers, is very valuable, but this should be followed by active measures for disinfection. One of the most effective of these measures is the immediate application of a drop of ninety-five-per-cent. carbolic acid; indeed, the investigations of Seneca D. Powell have taught us that so efficacious is the antidotal effect of alcohol in removing the excessive destructive effects of carbolic acid that the hands can be washed with impunity in ninety-five-per-cent. acid, if alcohol is at hand in which to bathe them afterward. If carbolic acid is not at hand, glacial acetic acid is a very valuable application, or any strong acid whatsoever; one means will always be at hand during a surgical operation, namely, the disinfectants by which the hands were disinfected in the

first instance, e.g., oxalic acid and permanganate of potassium or chloride of lime and sodic carbonate, or at least bichloride of mercury solution, and the reesterilization of the hands with these should be resorted to without delay, the operation even being interrupted, if necessary, for the purpose.

It is well to repeat, for the sake of emphasis, that on the receipt of the most trifling scratch during the performance of an operation or of a post-mortem section, in the presence of any of the diseases enumerated above, some one of the means suggested should be applied without delay. If it should be absolutely necessary for the surgeon to continue the operation himself, he should recognize the fact that he resumes his duty with considerable risk, and that every effort should be made to protect the tiny wound from further contamination, by the use of a finger cot, of a collodium film, or, at the very least, of a small gauze dressing.

The homely but simple recommendation to suck the wound vigorously has much to recommend it; not so much with the view, in which it was originally recommended, of "drawing out the poison," but rather because vigorous sucking occasions mechanically a certain amount of diapedesis of the blood corpuscles from the vessels, and creates artificially a chemotaxis whose default, as we have seen above, was a factor of some moment in allowing the insidious development of bacteria in cases of inoculation with but slight trauma. Similarly the constriction of the base of the finger occasions an engorgement of the part with blood, and a diapedesis of the blood corpuscles—a measure which has been recommended for use in the treatment of tuberculous joint lesions. Of the two, it would seem likely that vigorous sucking of the wound would be the simpler and at the same time probably the more efficacious.

In discussing the treatment of the kind of infections we are considering, Ochsner groups his cases under four heads:

Class I., that form of infection which betrays itself by a marked local disturbance with the formation of pus at the point of infection, the systemic disturbance being relatively slight.

Class II., that form in which there is marked local disturbance with the formation of pus at the point of infection and with an ascending cellulitis, the systemic disturbance being usually more marked than in Class I.

Class III., that variety in which there is only slight disturbance locally, but in which there is an early and severe involvement of the regional lymphatic glands and severe general disturbance.

Class IV., that form in which there is no demonstrable local disturbance and only relatively little disturbance in the regional lymph glands, but in which there is severe general intoxication due to the presence of the pathogenic bacteria or their ptomains in the blood.

In the first two classes the indications are plain and the treatment is relatively simple: elevation of the extremity at the very onset, copious wet dressings; free incision and free drainage, just as soon as there is macroscopical evidence of pus. It is well in these cases carefully to apply an Esmarch constrictor to the limb, proximal to the inflamed area, before the incision is made. It is claimed, and, says Dr. Ochsner, "I believe correctly," that the danger of disseminating the infection is greatly reduced if this precaution is observed; the theory being that, while the incisions are being made, it is best to compress the lymphatics and veins, thus closing them until thrombi have formed in their cut ends, so as to prevent particles of infected material being taken up by either of these systems and disseminated through the body, thus furnishing foci for pyæmic abscesses, septic endocarditis, or septicæmia. (See also in this connection the observations of Billroth³² on the provocation of chills in pyæmia, by dressing the wound.) One other caution Dr. Ochsner emphasizes, namely this, that the incision (or incisions) should be made wholly within the infected area; that is, they should not pass beyond the line of demarcation, if such exists, as is usually the case, to a certain extent at

least. By following these rules the pus can be evacuated with safety without opening up new areas to infection, and the danger from the above-mentioned complications or sequelæ is reduced to a minimum.

In considering the treatment of the third class of cases, those in which there is only slight disturbance locally, but an early and severe involvement of the regional lymph glands and quite marked systemic disturbance, Dr. Ochsner remarks that while in Europe he noticed that surgeons and pathologists differed very markedly in their treatment of this class of infections acquired during surgical operations or necropsies. Most of the surgeons seemed to favor early and free incisions, while the pathologists had learned better. They are infected so frequently that they have learned to treat themselves much more satisfactorily than even the surgeon could. He quotes a conversation which brings out this point forcibly: One day one of the surgical assistants came to the pathological laboratory with his arm in a dressing, suffused eyes, pyrexia, and considerable systemic disturbance. The director of the laboratory, Dr. E. Fraenkel, of Hamburg, stepped up to him, asked him what had happened, and, after being told that he had an infected finger with enlargement of the lymph glands in the elbow and axilla, as well as a slight lymphangitis, said about the following: "Now do not let the surgeons get at you; go to bed, put on a copious wet dressing and you will be well in a few days, while if you let them lance it, you may be laid up for weeks; at best you will not be able to resume your work for some days if you have a gash in your finger."

The sick assistant very wisely followed the advice and was back at his work in less than a week. This he certainly could not have done with safety to himself or justice to his patients if he had an infected knife wound in his finger, as he surely would have had if he had permitted it to be lanced.

Dr. Ochsner thus briefly outlines the treatment which he has used in a large number of cases: "I insist upon rest in bed, elevation of the infected extremity, free evacuation of the bowels by means of calomel and saline cathartics, not purging, simply free evacuation, that is, three or four bowel movements the first day, plenty of good pure water, preferably presented at regular intervals so that the kidneys are able properly to perform their function. It is quite noticeable how much better patients do in hospitals as well as in private practice if they are given a definite quantity at definite intervals. They suffer less from headache, pyrexia, and gastro-intestinal disturbances. To continue, I insist further on liquid diet, avoidance of constriction to the lymphatic channels and blood-vessels, avoidance of pressure upon the lymph glands, and, finally, copious wet dressings. The dressings must be copious in order to be effective. It is in the way of putting on too small a wet dressing that many general practitioners and even surgeons often err."

"I experimented," he says, "for some time to determine the best form of wet dressing for these as well as other purposes, trying to find out the best combination, both as to efficiency and comfort to the patient, and my final result is the following:

Boric acid, sat. sol.	6 parts.
Carbolic acid, 5-per-cent. sol.	1 part.
Alcohol, 95-per-cent.	1 "

The solution should be applied hot.

"This formula may sometimes be modified with advantage. If the part is not painful I often leave out the carbolic acid entirely. Again, some patients do better if the proportion of alcohol is increased. The boric acid is put in because of its well-known germicidal effect; the carbolic acid, because of its anæsthetic effect; and the alcohol, because of its action as a germicide, and that it keeps the whole limb warm and comfortable. I use the plain sterile gauze for dressing by preference, because I believe it to be more effective and certainly more comfortable than cotton."

Should softening of the affected lymph glands take place, a sequel which very rarely occurs if the dressings

have been properly and conscientiously applied from the very onset, they should be freely incised and drained with a gauze (or a rubber?) drain, but should not be enucleated, as whatever can be left may some day act as a barrier against general infection. (N. B. This last recommendation of Dr. Ochsner's appears to me to be one of questionable wisdom; see the case of Dr. Park detailed above.)

The following are the theoretical reasons for believing that the conservative treatment just outlined is more rational than early free incision: The infective agent is usually introduced in minute quantities, it is virulent, and is rapidly carried to the nearest lymph glands. Contrary to the contention of even very good surgeons, I am of the belief that the original point of infection soon ceases to play an important rôle in the progress of the disease. If it is just left alone, the inflammatory reaction at this point, if it has not all subsided, will do so in a very short time. The leucocytes are rapidly getting the upper hand. The conditions become entirely changed, however, if the already injured part is now subjected to a new traumatism, as a cut, for instance. Now the bacteria are again given a chance. The tissues, which are full of militant leucocytes, are killed, so to speak, by the incising knife, and they then furnish an excellent culture medium for the bacteria which may not have been destroyed; the result being a rather profusely secreting, unwholesome-looking, slowly healing ulcer.

In the fourth class of cases, those where there is practically no reaction at the point of infection, or where this may be undiscoverable; where there may or may not be involvement of the regional lymph glands, and where the general septic intoxication is severe, Dr. Ochsner recommends practically the same course of treatment as in class three just discussed.

He says, most properly, that even the most aggressive surgeons have given up incising the point of infection if there is no inflammatory reaction at all; but he opposes the practice of some who "still persist in taking out the involved lymph glands." The fortunate issue of Dr. Park's case, just alluded to and described above, would indicate that the removal of the affected lymph glands is in proper cases good, and, it is not too much to say, the only good practice.

Recent advances in bacteriology would indicate that in this fourth class of cases, whose prognosis is always grave and often desperate, another means, not distinctly surgical, may be available for combating the bacteria which are causing the profound sepsis which threatens the life of the patient, namely, the introduction into the system of specific remedies calculated to destroy the bacteria and to neutralize their toxins. Experiment has seemed to indicate that nucleinic acid and some of its derivatives and analogues have in a measure both of these properties, that of inhibiting the development of the bacteria, and that of neutralizing their toxins. A proprietary remedy, claiming to present these substances in available form, has been placed on the market under the trade name of "protonuclein"; whether this particular substance, which is recommended both for hypodermic use and for administration "per os," would be valuable in the treatment of these cases may or may not prove to be so, but it is not unreasonable, in the light of modern investigations, to suppose that some chemical body of that order could be supplied to the system, by the mouth or through the skin, which should greatly aid the system laboring under an overwhelming dose of septic poison, and in just so much rendered incapable of manufacturing for itself a supply of defensive proteids, sufficient for its pressing needs.

Certain favorable reports, furthermore, come to us in regard to the general use (in distinction from their local use) of certain silver salts, by inunction, in a manner similar to the use of mercurial inunctions in syphilis. In some cases of general sepsis, presumably of a streptococcal type (puerperal fever), half an ounce, or even an ounce of Credé's ointment rubbed into the flanks or the belly twice a day has appeared to influence very favorably the course of the disease.