ligament, runs up under the superficial fascia of the forearm, and finally ends the process of suppuration at the elbow-joint. We see such cases where the arm and hand are subsequently crippled by the adhesions that have taken place.

The only treatment is early and thorough and deep incision; and it is a mistake to wait for it to ripen; the ripening is its destructive process. It never should be allowed to ripen; and a deep incision, made at once, will frequently abort the suppurative process, and lead to healing with granulation, in a very few days.

As a rule, pus is always to be sought for on the palmar side. On the dorsal side it is generally only a secondary consequence. On the palmar surface the pus is to be found. A good deal is said of the propriety of opening on the side of the finger. The danger on the side is damage to the nerve and vessels. The danger of damage to the nerve is somewhat serious.

When there is palmar abscess the patient is very sick indeed. The forearm is swollen and œdematous; constitutional symptoms are severe; chills; high fever and exhausting sweats. In these cases it sometimes becomes a question whether to seek for pus in the forearm. We suspect it is there. The symptoms are not relieved. The œdematous condition goes up the arm. The patient does not experience any relief from his pain. The safest place to reach it is in the centre of the wrist, above the annular ligament. Cut down until you reach the superficial fascia and come to the long flexor and palmaris tendons. Now take the dressing forceps and director and pick away between the tendons, until you come to the space upon the interosseous fascia; and there, you almost invariably, get a gush of pus. This is to be kept open and irrigated every day. Occasionally it becomes necessary to make additional openings higher up. This is good surgery. It saves the limb and life; but does not cure the member. The hand is not restored. Patients must expect, subsequently, some adhesion and stiffness of the tendons. If such adhesion and stiffness result, it occurs from the long continuance of the inflammation; from the fact that gluing together of the tendons has occurred, and contraction of the parts with a comparatively useless hand, in many cases; in no sense is this to be ascribed to anything the surgeon does; but wholly to the progress of the disease, before the surgeon was called in. You will find, often, the physician or surgeon blamed for consequences about the usefulness of the hand and arm, where really he saved what could be saved; but could not cure the part.

BUNION.

Bunion is usually upon the great-toe joint and is an enlarged bursa. Usually it is there for the purpose of protecting from friction against the side of the boot. When irritated and inflamed by pressure; when the joint is thrown out of its normal position by shoes which are too short; the end of the toe begins to be thrown in; the joint projects, and it becomes inflamed and tender. A sac is evident upon the surface of the bone; fluctuation can be felt. This sac is an inflamed bursa. Occasionally, by careful treatment, it may be made to subside without suppuration. This treatment should consist in the taking off of pressure; either by cutting the shoe; or by wearing a very large or thick corn plaster, which encircles the joint and allows it to

ride free beneath the plaster. Applications may be used at night to allay the inflammation in the part itself. Sometimes a poultice is very useful. You must not be carried away with the idea that we always apply a poultice to produce suppuration. It sometimes prevents suppuration; softens the skin; allays the heat; sweats and foment the part; and frequently produces absorption instead of suppuration. When suppuration exists and is unavoidable, it bursts and discharges through a minute opening. Then it is a long while in healing, because you have a little thickened sac or cyst, which continues to secrete, and it is most speedily cured by laying it open. You must investigate the sac and see whether it goes into the joint. If it does, it must be laid open freely and irrigated; and the part put on a splint. If it does not, the sac may be laid open, scraped out and forced to heal, just as any bursa would. The most important point in treating the early stages of bunion is to get the great toe on a line with the inner border of the foot as it was intended to be by nature; and as you see it in all the old statues. The old sandal prevented the possibility of bunions; dragging the great toe out by a strap between the great toe and second toe. It is a good practice to put between the great toe and next toe a thick piece of paino felting, which can be inserted to keep the toe out, while the patient walks. The shoe must be made on a straight last; and with these means, a great many persons can get along, and prevent the formation of bunions.

Original Articles.

ANTHRAX FACIEI: REPORT OF A CASE.¹

BY S. E. WYMAN, M.D., CAMBRIDGE.

THE occurrence of such cases is sufficiently rare to justify the publishing of notes connected with this dread malady; and a brief *résumé* of the history of anthrax as it occurs in animals and in man will form a fitting introduction to this paper. Anthrax, charbon, milzbrand or carbunculus contagiosus, as a disease in animals, is perhaps the one whose knowledge by man dates back to the earliest period. This is the disease referred to in Exodus, ninth chapter, third verse: "Behold, the hand of the Lord is upon thy cattle which is in the field, upon the horses, upon the asses, upon the camels, upon the oxen, and upon the sheep: there shall be a very grievous murrain." And in the sixth verse: "And all the cattle of Egypt died."

Among the Greek and Roman veterinarians it was known as *Oidhna*. The name of "anthrax" was used by the Greek, and "carbunculus" by the Roman physicians. The Arabians described anthrax in man with even greater accuracy as *Atshac*, *al Humrah*, or Persian fire.

From the fourteenth to the eighteenth century the disease of anthrax was covered up under different names given to various diseases; and only toward the end of the last century was it shown that these manifold diseases were, in reality, only different forms of the same disease.

Chabert, in his monograph,² brought order out of

¹ Read before the Cambridge Society for Medical Improvement, May 22, 1893.

² Description et traitement du charbon, Paris, 1780.

chaos, and grouped what had been hitherto considered many and various diseases as one malady with varying manifestations; and his classification has been adhered to, not only in France, but in all countries even to this day.

No infectious disease in man or animals (with the exception of tuberculosis) has been more generally recognized, and cases of the same reported, as has been the case with anthrax. Heusinger,³ in his work on *Milzbrandkrankheit*, has found the evidences of its presence in almost if not all countries, whether in the most northern or most southern latitudes, in the Old World and in the New. It seems, at first thought, strange perhaps that, although the contagiousness of anthrax has been abundantly proved by numerous observations in the eighteenth century, authors in the beginning of this century should have denied that there was any contagion in anthrax; as, for instance, Delafond, who, in his particular study of anthrax in sheep (*maladie de sang*), considered the rennet, stomach and intestines the special seat of the disease, and ascribed as its chief causes overfeeding and the condition of the soil.

Among animals anthrax is found most frequently where agriculture is in its most primitive condition; and while it may occur in all soils, yet those most favorable to its growth and propagation are soils which are close, impervious, clayey or peaty, and such as are habitually over-manured. Anthrax occurs most often among herbivora; least often among carnivora; omnivora being less susceptible than herbivora, and more so than carnivora.

It would exhaust your patience and time to go further into these details, for which the reader is indebted to the articles by Bollinger, in "Ziemssen's Cyclopadia," Vol. III; James Law, F.R.V.C.S., in "Pepper's System of Medicine," Vol. I; and E. M. Moore, M.D., in "Ashhurst's International Surgery," Vol. II.

As to the etiology of anthrax, Pollender,⁴ in 1849, found in the "blood of animals suffering from anthrax a countless mass of fine rod-like bodies, which in appearance and figure resembled vibriones, and in their micro-chemical behavior were seemingly of a vegetable nature." Brauell⁵ (in 1857), independently of Pollender,⁶ "found the same little bodies in the blood of men, horses and sheep which had died of anthrax." Davaine,⁷ however, was the first who associated the presence of these bodies (which, after experiments, he pronounced in 1863, to be bacteria and later bacteridia) as standing in the relation of cause and effect in producing anthrax. Later investigations have substantiated his theory, and to-day the bacilli anthracis and their spores are the recognized cause of anthrax.

The bacilli anthracis in the blood are found to be in the form of fine rods, straight, only occasionally bent or angular, from 0.007 to 0.012 mm. in length, devoid of motion (a valuable aid in their differentiation from the motile bacteria of putrefaction); smaller forms, minute ovoid or oblong bodies are found. The smallest (micrococci) under the highest powers of the microscope are seen, but always with clear-cut, even margins, thus distinguishing them from the normal irregular gran-

ules of the blood. Spores are never found in the blood of the living animal; but when the bacilli are grown in organic infusions outside the body, the anthrax germ develops from bacillus or micrococcus into a long, branching filamentous product, which, if oxygen be present, develops into spores. The anthrax germs are very tenacious of life, and the spores to a much greater degree. "Meat cooked for hours, or broth boiled similarly, when taken from anthrax-infected animals, has caused symptoms of anthrax in persons partaking of such food."⁸

In man, Fournier⁹ was the first who was able, in 1769, to trace the cause of anthrax to the consumption of anthrax-diseased meat, and to the handling of the wool of such animals.

With the course, symptoms and other interesting topics naturally suggested by internal anthrax, nothing can be presented in this brief article. It is with the external form, which has usually been relegated therefore to the domain of surgery, of anthrax carbunculus, to which attention is specially directed.

Theoretically, man might be infected, as are herbivora, from the soil; but practically such is not the case. The principal ways of infection are immediate and mediate. Of the former may be cited cases caused by handling hides, wool, hair, flesh and other parts of diseased animals. But as to the mediate causes, we have to deal with a more extended number of possible sources of infection. Bites of insects, mosquitoes, blue-bottle flies, and others of a like nature (blood-suckers), which have been previously in contact with anthrax-diseased carcasses are among the well-known causes. Well-attested cases are reported where men or animals, themselves not infected, have been the carriers of the anthrax germs to others. Other ways of catching the infection are by handling harnesses, stable utensils, hay, fodder, the surgeon's knife, etc.; drinking contaminated water; and, in animals, the feeding on meadows containing the buried remains of anthrax-diseased animals.

It is very interesting to note in this place that the site of the primary seat of infection (the anthrax node) is constantly on the exposed parts of the body. Bourgeois¹⁰ long since called attention to the fact that this was most frequently the face, neck, hands or arms and almost never on the trunk. Dr. A. W. Bell,¹¹ of Brooklyn, in 60 cases reported by him, found that 56 were on the face, two on the hands, one on the wrist, and one on the forearm; and that often the disease had started from the bite of a fly or a mosquito in many of these cases. Bollinger¹² has found in the stomach of such flies as feed on the flesh and blood (horse-flies, blue-bottles, etc.) the bacillus anthracis, thus completely showing that bites from such insects may cause anthrax.

As to the symptoms, these usually appear within twenty-four hours after inoculation. The patient complains of a stinging sensation in some spot to which previously his attention has been called by an itching. When examined, a small red spot, like a mosquito bite, is seen, but with a small, central, black spot. The further description, taken from the standard authorities, of the *natural* progress of the local manifes-

³ Die Milzbrandkrankheiten der Thiere und des Menschen, Erlangen, 1850.

⁴ Ziemssen, vol. III, p. 375.

⁵ Brauell: Versuch und Untersuchung, betr. den Milzbrand des Mensch. u. d. Thiere.

⁶ Virchow's Archiv, Bd. xl, p. 132, 1857.

⁷ Compt. Rend., T. lx, p. 1296, 1866.

⁸ Pepper's System of Medicine, vol. I, p. 939.

⁹ Fournier: Obs. et Expo. sur les charbons malins, Dijon, 1767-1769.

¹⁰ Bourgeois: Traite pratique d. l. pustule maligne, etc., Paris, 1861.

¹¹ Pepper's System of Medicine, vol. I, p. 926.

¹² Op. cit.

tation was not watched in the case of the patient, whose history will soon be given. "This speedily increases to a small round swelling (papule), which in fifteen hours is surmounted by a minute vesicle with dark-red or bluish contents. This increases from the size of a millet-seed to that of a pea, and in thirty hours bursts spontaneously or under friction, forming a dark-red, indurated, comparatively painless nodule (parent nucleus of Virchow). The areola is swollen, livid and red, and on this appear vesicles similar to the first; these pass through a similar stage, leaving a doughy, gangrenous or hard, livid surface. By this time the surrounding skin is shiny red and livid, and the disease spreads by the same method of extension."

Constitutional symptoms vary: fever at first is slight, but may reach a high point, attended with occasional chilliness, pains in back and loins, languor, great prostration; in fact, such symptoms as are met with in cases of general blood-infection.

The disease lasts from six to ten days.

As to the diagnosis, it must be remembered that the anthrax nodule begins with a small red papule having a dark central point, from which the disease extends as above described. The simple furuncle lacks this black centre and the rapidly rising elevated red areola. Simple carbuncle tends to appear on covered parts of the body, anthrax on uncovered places. In carbuncle, simple, several boils rise and burst simultaneously, and break into one sore; whereas, anthrax extends by separate, isolated nodules like the "parent nucleus." The finding of the anthrax bacillus by microscopical examination would be conclusive if resorted to.

The disease anthrax is very rare: Billoth says, "Even simple, benignant carbuncles are so rare that in the extensive surgical polyclinic in Berlin, where every year 5,000 or 6,000 patients presented themselves, I only saw a carbuncle once in two years or so. In Zurich, also, they were rare." Bryant, in his "Practice of Surgery" (p. 408), says, "Malignant pustule, or charbon, is a disease with which I have no personal experience."

As to prognosis, much if not all depends on the early recognition of the true nature of the malady. In anthrax districts, where the physicians are familiar with its appearance, astonishingly good results have been attained. Nicolai¹⁵ reports a mortality of five per cent, Lengyel and Koranyi nine per cent. (There is no statement made as to the site of the nodule in these reports.) But the prognosis in other districts where anthrax is not so general is worse, the mortality reaching forty to fifty per cent. In considering this part (prognosis), it must be borne in mind that anthrax of the face, especially of the upper lip, is almost always fatal.

As to treatment, the most approved method consists in the excision of the parent nucleus, or cross incisions with the subsequent use of the most powerful germicidal agents, cauterization or local germicidal lotions, injections and applications. The constitutional treatment must also simultaneously be carried out by stimulants, and carbohc acid internally to the extent of fifteen drops daily.

CASE. The patient who forms the basis of this paper was a young man of stocky frame, American born, and nearly twenty-five years of age. He was a teacher, and absent from his school at that time, November, 1886, on a vacation. On the night of November 19th,

when going to bed, he noticed a pimple on his upper lip on the left side, just below the ala nasi and at the upper part of his mustache. This pimple he pricked with a needle, and applied cuticura soap to the spot.

November 20th, he was one of the spectators at a football game on Jarvis Field, during which game he sat on the ground, but with thick wraps under him. After returning to his temporary home the spot began to grow painful, and the lip to swell toward bedtime. Sleep was somewhat disturbed, and he presented himself for advice on the following morning. At that time the upper lip throughout its entirety was much swollen; the mucous membrane tense and shiny; the local papule was hard, with a black central spot, tender to the touch and surrounded by a raised, livid areola. Only a minute drop of pus followed the introduction of a grooved needle. The patient was sent to his room, and seen later at 11.30 A. M. At this time free crucial incisions were made through the base of the nodule, and corrosive sublimate solution (1 to 1000) freely injected with a hard-rubber syringe. Thorough washing of the parts with bichloride solution (1 to 1000), was ordered at each application of hot flaxseed-meal poultices.

The wound on the next morning was found tending toward union, and had to be reopened. His sleep had been bad; he was nervous, and had slight chills. The night visit showed the wound more inclined to gape; the central part, which had been kept from closing by the insertion of a plug of cotton saturated in corrosive sublimate solution, was necrosed, and a very small amount of thick, inspissated pus was extracted by means of forceps. There was no fever as yet, and the pulse was only 84; opium was required in order to obtain rest.

On November 24th, the symptoms were more grave; and our esteemed fellow-member, Dr. J. T. G. Nichols, saw the case in consultation at 11 A. M. The swelling had, through its extension by the subcutaneous cellular tissue, formed a second nodule just above the ala nasi, with the swelling and enduration extending upwards toward the left eye. As there were evidences of nervous and general weakness, brandy (two drachms every two hours) was ordered. The swelling extended further at night, and the whole side of the face was markedly red and shiny. For the first time the temperature was elevated to 100.1°, with the pulse at 90.

On the morning of November 25th, the fourth day after seeking advice, all the symptoms were so greatly aggravated that Dr. R. M. Hodges kindly consented to give his services and advice in the case. The pulse in the morning early was 90, the temperature 99.4°. Dr. Hodges saw the patient at 11.15 A. M., and considered the case very grave, with the probability of a fatal termination. The pulse at that hour was decidedly irregular and weak, and it was plain to Dr. Hodges that the patient was less strong than he seemed. Radical operation was however advised, and agreed to by the patient and his friends.

Under ether, Dr. Hodges performed the operation, which may be designated as the subcutaneous one, of cutting up thoroughly all the diseased tissue (then occupying nearly the whole of the left cheek) by inserting his knife into the original wound between the outer skin and the mucous membrane and carrying the blade by generous sweeps throughout the whole territory. The hemorrhage, which was considerable, was stopped, and disinfection accomplished by plugging the

¹⁵ Nicolai: *Pepper's System of Medicine*, vol. 1, p. 943.

entrance wound with cotton saturated with corrosive-sublimate solution.

The patient rallied well, and in the afternoon seemed fully as comfortable as before the operation. The cotton plug was removed, the wound syringed with corrosive-sublimate solution, and plugs of necrosed tissue removed by forceps. There had been some sweating. His pulse varied from 88 to 90, and was rather weak; temperature 100.2°. When a night visit was made on this same day, little change was noticed, except that the left eye (which the swelling had succeeded in closing in the early morning) was even more tightly closed.

On the following day the patient was no worse; in fact, there was scarcely any change. Plugs of necrosed tissue were removed, and the same treatment carried out.

The symptoms were improved on the following day. The patient had slept without opium, and the necrosed tissue came away more freely. It was a disappointment to learn at the visit in the afternoon (3 o'clock) that a third focus had started on the left cheek on a level with the angle of the mouth. This was hard and tender. The breath was offensive, but the general condition was good. This spot extended in its progress along the lower border of the inferior maxilla, involving the lower lip as far forward as the median line. The area which at this time was involved measured two and one-half by three inches, practically the whole of the left side of the face.

No further cutting was done, but by forcing lines of communication from one focus to another, by means of a director and probe, it was possible to reach the whole diseased area by injection with the syringe; and later the necrosed tissue was pressed out from the lower angle of the jaw through the opening first noticed.

His recovery was gradual. He was able to sit up for a while on November 30th, after which date convalescence was rapid, so that he was discharged well, December 3d. Almost no scar remained, and none which is not now covered by his mustache.

PUERPERAL ECLAMPSIA.¹

BY T. E. CUNNINGHAM, M.D.

It must be conceded, I think, that this is one of the most dangerous and alarming conditions to be met with in the practice of obstetrics. It destroys more lives than any other puerperal affection, in proportion to frequency. Statistics are not very reliable on this subject; but taking a moderate estimate, it probably occurs once in four or five hundred deliveries, with a mortality of about thirty per cent. for the mothers and fifty per cent. for the children, although some authors place it much higher.

In an experience of two thousand obstetric cases, eclampsia was encountered three times, twice at the commencement and once before labor, and all were primipara who were suffering from albuminuria. One of the patients was very dropsical; and owing to the difficulty of re-establishing the function of her kidneys, complications rapidly followed, which caused her death. The other two slowly but perfectly recovered; one has

been delivered since of twins and enjoys good health, whereas the other, who was delivered last December, and apparently made a good recovery, is suffering from chronic parenchymatous nephritis, which, judging from a recent examination of the urine, is in the inactive stage. Two of the children were born dead, the other dying on the third day. This is not a very brilliant showing; and yet it would seem that, in the light of modern science and with the wisdom of the ages to guide us, one ought to be able to cope more successfully with this terrible malady.

Our literature is replete with theories relating to the mysteries which surround its etiology and therapy; but considering that the questions are still *sub judice*, we take up each new journal wondering what the next speculator will have to say. From the repletion and depletion theory of Hippocrates to the bacteriological theory of Gerdes is quite a lapse of time; but it requires very little knowledge to enable one to appreciate the clinical value of the ancient as compared with this modern view of the subject. From a study of the works of different authors and a limited bedside experience, it would seem that we are in possession of all the theories for the explanation of the obstetric phenomena. The difficulty all along appears to have come from trying to make one or two factors do what it takes several to accomplish. We have been taught so long to consider eclampsia as closely allied to albuminuria, that disturbance of functions, other than those of the kidneys, has received but indifferent attention until within a comparatively short time. It is not to be inferred that this is not an important factor, but that the renal affection alone rarely is sufficient to produce convulsions. It is only a part of a whole, a collective cause, the other parts consisting of pregnancy — usually the first — a watery condition of the blood, and high nervous tension. It is a matter of common observation that women looking forward to first motherhood suffer more from excitability of the nervous system and from emotional disturbances than they do in subsequent ones; and when it is realized that this state of things is kept up, perhaps for weeks, exhausting the nervous system and lessening the power of resistance, it is easy to conceive how favorable the conditions are for an explosion, particularly after the noxious elements begin to accumulate, through faulty elimination, whether it be due to pressure on the ureters, renal insufficiency pure and simple, hyperæmia, or acute or chronic nephritis.

The treatment of eclampsia is as varied as its etiology. For the sake of brevity the various means may be enumerated as follows: (1) chloral or chloroform, (2) morphine, (3) venesection or *veratrum viride*, (4) induction of labor. Of course, other medication is called for, such as cathartics, diuretics, diaphoretics, cold to the head, sinapisms to the extremities, and proper conditions of temperature and ventilation, according to the special indications of the case. As the trouble may appear before, during, or after labor, an opportunity is offered for the exercise of good judgment in the selection of the right method or methods of treatment.

Owing to a lack of experience, the third class or post-partum form will not be discussed.

In the second class of cases, which is by far the most numerous, the consensus of opinion seems to be in favor of hastening delivery. I adopted this teaching in two cases of this class, but do not think I would

¹ Read before the Cambridge Society for Medical Improvement, May 22, 1893.