the lining of the cavity has become healthy, or it may be kept patent by a small metallic tube which a dentist may fasten to an ordinary plate and which may be closed while the patient is eating by a small cork. After the operation the subsequent treatment of the case consists of washing out the cavity with antiseptic and astringent solutions. I have used with greatest satisfaction a spray or small injection of peroxide of hydrogen three or four times a week and a wash of listerine 3ss—3i to 3i of saturated solution of boric acid twice a day. This wash should always be used luke-warm.

If there is no necrosis of bone the case may be expected to recover in from two to six weeks, though occasionally a tendency to renewed inflammation may make it expedient to keep the opening much longer.

I have seen six cases of this disease.

Case 1 was that of a man about twenty-five years of age who came to me six or seven years ago. He suffered no pain and complained only of catarrh. There was a free opening into the naris and the discharge was not very abundant. The annoyance was so slight that he disliked to have the antrum opened. I saw him about five years later and found him still in the same condition. He had done nothing for it and still objected to the necessary operation.

Case 2. Mrs. A. D. C., æt. 44, came to me from Wisconsin two years ago. For one year had been troubled with discomfort and often pain in the left cheek, which became worse and swelled whenever she took cold. She was also annoyed by a purulent discharge from the nostril and into the throat. I found that there had been a spontaneous opening into the mouth which had left a small fistula, but it was so small that pus constantly filled the antrum and escaped from the nose. I had the cavity syringed out through this small opening twice a day with a saturated solution of boric acid. In three weeks the purulent discharge had entirely ceased, but the washing was continued less frequently for four or five weeks longer. The patient had suffered slightly for eight years with rheumatism, which may possibly have been the cause of the disease in the antrum. For this she was given small doses of iodide of potassium. She returned to her home apparently perfectly cured and I have reason to believe there has been no return of the disease.

Case 3. Mrs. J. L. F., æt. 48, came to me in February of this year complaining of pain in the left cheek with some purulent discharge into the left naris. The trouble had begun four years previously when she had had her teeth drawn. I found that there had been a fistulous opening near the site of the canine tooth, but of this there now remained only a *cul-de-sac* about three eighths of an inch in depth and an eighth of an inch in diameter. Through this I perforated the antrum with a drill, and subsequently washed the cavity with peroxide of hydrogen and had her inject it twice a day with a warm saturated solution of boric acid. At the end of three weeks all purulent discharge had ceased and the patient felt perfectly well. She then returned to her home with instructions to continue the wash for two or three weeks.

Case 4. E. R., æt. 34, came to me March 8th, 1887. He had suffered greatly with the nasal symptoms of suppurative inflammation of the antrum for about two years, though during a part of that time he had been free from the symptoms. This had been caused by a diseased tooth which the dentist had tried to save until six months previous to his consulting me—when it had been drawn. Subsequently he seems to have nearly recovered, but for two months he had been greatly distressed by the offensive discharge into his throat. I opened the cavity with a large drill at the site from which the first molar had been removed and subsequently washed the cavity as already recommended. At the end of three weeks there was very little purulent discharge but the opening was closing rapidly. I did not see the patient for a week afterward, but he then reported that two or three days after his last visit the opening closed completely and remained so a few days when he again began to have pain in the cheek. I then enlarged the canal with the same drill and renewed the treatment. Three weeks later the secretion of pus had entirely ceased. There was no secretion of pus for a week afterward, when he caught a bad cold and the cavity filled with muco pus in thirty-six hours, during which time he had omitted to remove the pledget of cotton from the opening. In this case the inferior turbinated body was greatly swollen and the opening into the nostril from the antrum comparatively large. I thought that the secretion from the nose had filled the cavity, I therefore cauterized the turbinated body to reduce its size. Continued the same local treatment and directed him to have a tube fitted to the opening to keep it patent for several months. He did not follow this advice, but allowed the opening to close; however, there has been no purulent discharge since.

Case 5. Mrs. L., æt. 36, sent to me from Minnesota March 22, 1887. Suppurative inflammation of right antrum, due to a diseased tooth, of a year's duration. I opened the antrum as in the last case and used the same local treatment. At the end of three weeks all purulent discharge had ceased and it has not returned. But the cavity was kept open for two months and then she was directed to leave out the cotton and allow it to heal. Recovery seems perfect.

Case 6. A young woman æt. about 25. Has complained of catarrh for many months, and recently of swelling of the right cheek and a gum boil near right canine tooth. The symptoms and signs in this case are very indistinct, but Dr. Brophy confirms my suspicions of suppurative inflammation of the antrum. I expect to open the cavity soon.

64 State Street, Chicago, June 9, 1887.

SOME CASES OF COMPOUND FRACTURE; WITH REMARKS ON TREATMENT.

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Case 1.—About noon on June 19, 1886, H. M.,

æt. 32, married, railroad conductor by occupation, was thrown from his train immediately in front of a flat car which was backing up at a rather high rate of speed, both wheels of the rear truck passing over patient's legs below the knee. I saw the injured man about forty minutes after the accident. He was suffering somewhat from shock, from which, however, he soon rallied under mild stimulation. He was placed in a large room on the first floor at his boarding-house. A bed having a hard mattress was used, and all furniture removed from the room except a table and chairs. Preceding the anæsthetic I gave a hypodermic injection of $\frac{1}{8}$ gr. morphia. Anæsthesia was then begun with pure chloroform (Squibb's). In fifteen minutes the patient was thoroughly under the influence of the anæsthetic. An examination of the injured parts was now begun. After removal of the clothing we found a compound comminuted fracture of both bones of the right leg, and extreme laceration of all the important soft tissues; both the anterior and posterior tibial arteries were severed, but hæmorrhage had not been severe. The tibia and fibula of the left leg were fractured through the upper third. On consultation with other surgeons present it was decided to amputate the right leg below the knee; the left leg to be treated with suitable splints. After adjusting the Esmarch bandage, I performed bloodless amputation by the antero-posterior flap method, four inches below the right knee. The instruments, sponges, and ligatures used during the operation, were kept in a 10 per cent. solution of carbolic acid.

After the amputation was completed the stump was irrigated with bichloride solution, 1 : 1,000, then the flaps brought together with silver wire, a drainage-tube inserted, and the stump dressed with dry antiseptic gauze held in place by a few turns of the roller bandage. The fracture of the left leg was then reduced and suitable wooden splints adjusted. By this time the patient had recovered from the anæsthetic, another hypodermic of $\frac{1}{8}$ gr. morphia was given, and our patient left to rest in a clean bed which had been prepared during the operation. Everything looked favorable for a good recovery. During the evening of the same day I saw patient again; he had taken some light food; bowels and kidneys had operated normally. He seemed to feel cheerful, and congratulated himself on his escape from more serious results during a railroad accident.

June 20. At 9 A.M. I saw patient again. Temp. 99°; pulse 90, full, soft, regular; some pain at seat of fracture, no pain in stump. Patient had slept well after midnight on having taken $\frac{1}{8}$ gr. morphia. Had taken breakfast of beef-tea, eggs and milk. Patient cheerful and comfortable. At noon of this day I received notice, purporting to have come from the patient, that my services were no longer needed and that other physicians had taken charge of the case. Nothing was said, and the man left to his fate. I afterward learned, to my chagrin, that the methods by which the patient passed into other hands were much more unique than honorable. Suffice it to say that all antiseptic methods of treatment in this case were now discarded, the stump was left open, and

simply a cold water dressing applied, which was renewed daily. The fracture was put up in plaster-of-Paris, *no cotton batting was used*, simply a drawer leg between the plaster and the man's skin (a most lamentable and inexcusable blunder). I soon heard that the patient was going from bad to worse, the limb that had been "done up" in a plaster-of-Paris vice (for such it was in this case) became intensely swollen, the foot discolored, and finally, at the earnest solicitation of the patient, the plaster was removed, when a large slough presented itself on the inner aspect of the limb over the seat of fracture. This sloughing surface separated, and the injury was thus transformed from a complete to a compound fracture with very unhealthy condition of tissue surrounding. The cold water treatment was continued as before. Condition began to be more unfavorable from day to day, until the twelfth day after injury, when a wild delirium developed, with a high temperature (104.5°, according to the nurse), some emesis, anorexia, diarrhoea, profuse sweating, granulation process in stump has ceased, sloughing process in left leg extending, and emitting a very offensive odor.

At this time Dr. W. J. Herdman, of Ann Arbor, Mich., surgeon-in-chief of the road, saw the patient, and gave a very unfavorable prognosis, as the man was suffering from advanced septicæmia. At the earnest solicitation of the relatives of the patient, I saw him again on the twenty-seventh day after the accident. The only thing to do at this stage of the case was to pay the last tribute of relief to a dying man, and I so informed the friends. I found the patient almost pulseless, markedly tympanitic, a low muttering delirium. Temperature 97°, involuntary green stools, urine offensive. I also found a large abscess in the left thigh which, on being incised, discharged a large quantity of fetid pus. Another large abscess was detected between the muscles above the crest of the ilium on the right side; this was filled with a mass of stinking pus. The stump had not healed and was sloughing, the fractured bones in the left leg were bare, and the upper fragment of the tibia was denuded of periosteum about $1\frac{1}{2}$ inch back from line of fracture. The bones had not united and were being rapidly disintegrated at the injured points. I irrigated the wounds thoroughly with bichloride solution (1 : 1,000), and put the patient on brandy, quinine, and digitalis. However, he did not rally, and finally died on the thirtieth day from date of injury. He was markedly jaundiced, and probably the subject of pyæmic (metastatic) abscess of the liver. No autopsy.

Case 2.—C. R. A., male, married, æt. 24, has always been healthy. By occupation a brakeman on railroad. About noon on June 29, 1886, while unloading gravel from a construction train, the wire cable struck the patient on the right leg with sufficient force to produce a compound comminuted fracture of the tibia in the lower third. I saw the patient about ten minutes after accident. His condition at this time was as follows: No shock, very little hæmorrhage, large lacerated wound in lower third of right leg, fragments of bone exposed to view. The patient having been anæsthetized, and the wound

thoroughly irrigated with a 1 : 1,000 bichloride solution, I proceeded to repair the injured parts. Found the upper end of the tibia broken squarely across, while the lower part was fractured obliquely, very ragged, and denuded of periosteum to about one inch below the line of fracture. All fragments of bone and lacerated tissue were carefully removed, the bone denuded of its periosteum was excised, and a free opening made through the limb posteriorly for drainage. All operative measures having been completed, the wound was again irrigated with the bichloride solution, a drainage-tube inserted, and the wound dressed with moist sublimated cotton. The limb was now placed in an ordinary fracture box having a slot over seat of injury, and moderate extension applied. The combined length of bony fragments removed was $1\frac{1}{4}$ inch. The wound began to repair immediately, the patient had no untoward symptom, the temperature reached 101° on but two occasions, and at eight weeks from date of injury the patient was able to walk on his foot. The moist sublimated dressing in this case was renewed every twelve or twenty-four hours, and continued until the wound had been filled in with granulations, when the moist dressing was withdrawn and dry boric acid dressings substituted. This was continued until the healing process in the wound was complete. This man began work again as watchman at a railroad crossing ten weeks from date of injury; here he received a slight injury at the point of fracture, which, however, was soon repaired by rest to the limb, by means of a plaster splint adjusted by Dr. W. J. Herdman, of Ann Arbor, where the patient was living at this time. I saw the patient about two weeks ago, when he was in all respects as sound as ever, although a shortening of about $\frac{1}{4}$ inch was still present.

Case 3.—Wm. P., æt. 55, married, carpenter. Has never received a severe injury, but is addicted to the use of alcoholic drinks. On August 21, 1886, he fell a distance of twenty-five feet, striking first upon the heel of his left foot, then upon the left knee. I saw the patient about ten minutes after the injury. On examination under an anæsthetic, I found dislocation outward of the astragalus, with Pott's fracture of the fibula, and a compound complicated fracture of the tibia and fibula in the upper third of the same leg; the injury at this point consisting of a transverse fracture of the tibia and fibula three inches below the knee-joint, and also a longitudinal fracture of the tibia running into the joint. The outer and inner tuberosities of the tibia were both distinctly movable. Over the line of transverse fracture was a deep penetrating wound caused by a large nail or other pointed object. Hæmorrhage was quite severe; patient suffered somewhat from shock, from which, however, he soon recovered. I reduced the dislocation at the ankle joint and placed the lower limb in Koehler's adaptable splint (carbulated). Adjusted the fractures above, and irrigated the wound with 1 : 1,000 bichloride solution. The whole limb was then placed in a fracture box, with moderate extension and counter-extension, and the wound dressed daily with moist sublimated cotton.

On the third day after date of injury the tempera-

ture was 103° . Pulse 110, hard and bounding. I began to feel fearful of my patient. Suppression of urine and fæces. I used a Nélaton's catheter, which relieved the bladder, and gave a brisk cathartic. On the fourth day the temperature had gone down to 100° , pulse 110, patient feeling better, circulation in foot good. From this date temperature and pulse gradually went down until the end of the second week, when both were normal, where they remained until recovery. Patient began to eat; bowels regular; sleeps well. This course was not materially changed until November 10, 1886, or ten weeks from date of injury, when patient began to walk with crutches; and at the present writing the patient's limb is practically as good as ever, although there is about one-half inch shortening, with some contraction of the plantar fascia.

*Case 4.*¹—Male, æt. 26; married. On September 8, 1884, while riding over a bridge on a traction threshing engine, the bridge suddenly gave way, precipitating engine and patient into the river below. In this accident the right limb of the patient was caught between the heavy traction chain and the forward wheel of the engine, thus producing an extensive lacerated wound, with an oblique fracture of the tibia at the middle of the lower third of the leg. I saw the patient shortly after the accident, and found him suffering somewhat from shock, and faint from the loss of blood. Several fragments of bone were removed, and the bleeding vessels controlled by torsion and ligature. Splints were adjusted with an aperture over seat of injury, and the wound dressed with carbolized cotton. This was laid aside on the third day after injury, owing to symptoms of carbolic acid poisoning, and iodoform dressings used instead, which were renewed daily. The temperature in this case did not go above 102° , and no untoward symptoms developed from day of injury until final recovery, with the exception of the slight toxic effects of the carbolic acid. The patient has a sound limb, and is able to follow his vocation as a farmer.

Case 5.—Male, æt. 14. On October 16, 1886, he sustained a compound dislocation of the ring finger at the metacarpo-phalangeal articulation. The injury was caused by a base-ball striking the end of the finger with great momentum, throwing the phalanx out so that it rested on the dorsum of the hand. I saw the patient about ten minutes after the accident. Very little hæmorrhage. Advised amputation, but this was refused by the parents. I then reduced the dislocation, irrigated the wound with bichloride solution, applied a splint to the palmar surface of the finger, and dressed the wound with moist sublimated cotton. This dressing was renewed daily, with bichloride irrigation. The wound began to heal immediately, and on November 23 the patient was discharged cured, with a useful though somewhat deformed finger.

Remarks.—In *Case 1* we have a man than whom none had better prospects of recovery at the beginning, yet as soon as antiseptic treatment was withheld the patient began to fail. His wounds ceased

¹ Reported in Medical Age, vol. iii, p. 292.

to heal, became very fetid, and he went down under the devouring fire of septic poison. In the other four cases antiseptics were rigidly adhered to, the wounds were free from odor, healthy in appearance, and the process of repair went steadily on to recovery. In *Case 1*, could the exact condition of the injured bones in the left leg have been known, a synchronous amputation might have saved the patient's life. In treating these severe injuries the following are some of the precautions necessary:

1. Close attention to all the details. Keep all general attendants away from the wounds.
2. Absolute rest at the point of injury.
3. Look closely after the general health of the patient. Don't take anything for granted.
4. See that a proper mental and physical balance is maintained.

Absolute rest at the point of injury cannot be too strongly emphasized, since success or failure in treatment depends largely on the attention that is given to this principle.

In this connection I desire to call attention to a device which has been of inestimable value to me in the treatment of these cases. This apparatus is original with Dr. W. J. Herdman, of Ann Arbor, Mich., and is known as "Herdman's Lifting Device." This apparatus is simple in construction, durable and cheap. It is made of ordinary gas-pipe and wrought iron, and any ordinary machinist can make one. One man can lift a patient from the bed without causing any pain whatever, and at the same time greatly add to the comfort of an injured person, while a change of bedding or other clothing is being made. The following cut will fully illustrate the construction of the device. One thing to be remembered in constructing this device is, that the cross-bands must be the same in length as the distance between the cradle-hooks.

HERDMAN'S LIFTING DEVICE.

A, cross bar; B, legs; C, crank; D, cradle; E, L, L, L, cross bands, loop stitched at ends for sliding bar; F, sliding bar; G, cradle hooks. The device should be long enough to swing over the bed. The cradle is then lowered, the bands passed under the patient, the sliding bars passed through the looped ends of bands, then into the hooks, when a few turns at the crank lifts the patient bodily from the bed.

Finally, in the language of a well-known writer:² "In the light of the researches of experimenters in the field of bacteriological science, and the experience of those who, acting upon the suggestive results derived from these experiments, treat wounds antiseptically, in my opinion, the surgeon who does not take into account every possible source of danger that may overtake his patient, including in this the

noxious influences arising from the entrance of germs into the tissues, is criminally negligent, and directly responsible, both to his own conscience and to the world at large."

I am greatly indebted to Dr. H. N. Spencer for valuable services rendered during the treatment of these cases.

ON THE TREATMENT OF FELON WITHOUT INCISION.

Read in the Section on Medicine, Materia Medica and Therapeutics, at the Thirty-Eighth Annual Meeting of the American Medical Association, June 7, 1887.

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The teachings of instructors in surgery, and also those in the text-books on the subject, are all to the effect that felon, paronychia, or whitlow, will require sooner or later a free, deep incision, even to the bone, and that in the majority of cases the sooner this is done after the diagnosis is made, the better. I believe, also, that careful inquiry would show that this is the almost universal practice both of those who follow surgery more particularly, and of general practitioners. But little is found in writings in regard to the medical and internal treatment of these cases, other than the suggestion that tonics are often needed; and the almost universal recommendation is that poultices should be applied, both before and after the incision.

Having had quite a considerable number of cases of felon under my care in public and private practice, some of them being very severe, and having pursued a very different course of treatment from that usually followed, as far as I can learn, I beg to present the matter briefly, in order that others may make trial of the same methods, which, as I believe, have advantages worthy of consideration.

I will not attempt to enter into any anatomical or pathological study of the parts concerned, or of the affection under consideration, but in order not to be misunderstood I wish to state that by felon and whitlow I refer to the cases familiar to all, in which there is deep-seated inflammation, mainly of the ends of the fingers, tending to penetrate even to the bone, and ultimately, if unchecked, to cause necrosis of the same. Some of my cases have been light and have remained superficial; others have been first seen when the inflammation had already penetrated deeply, when the finger was hot, tense and hard, and exceedingly painful on pressure, and even after the patient had already passed sleepless nights with the throbbing pain. But for many years I have never incised a case, other than a possible slight prick, without pain, into dead skin after the pus had become superficial; nor have I ordered a poultice for such a case within the same period of time.

While a certain number of cases of whitlow seem to have their origin deep in the tissues of the finger, or even in the periosteum, in the majority of cases the inflammation appears to originate, and probably does, in a relatively superficial injury, as a prick of a pin, or needle, or nail, a scratch, or other appar-

² Geo. R. Fowler, M.D., in New York Medical Journal.