Lyman (C. B.)

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THE HAND IN RAILWAY SURGERY.*

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Laying aside the fact that a perfect hand adds to the beauty and symmetry of the human figure, we should ever bear in mind that it is likewise one of the most useful portions of the body, especially to the man who is obliged to earn his living by manual labor; that the loss of any portion of it, be it ever so small, diminishes its usefulness: a toe more or less makes no particular difference, but a finger less very materially diminishes the individuals capacity for earning a livelihood.

The study of methods of procedure to restore this member to its natural condition after injury is one which should occupy a portion of every surgeon's attention, no matter how busy he is. Too many surgeons say: "Oh, well, it is only a finger and it will almost take care of itself; no need for the attention to details as in the case of a major operation." The amputation of a leg is called a major

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operation, but in these days of asepticism is it a major operation? Is it not as much of a major operation to properly take care of a badly crushed hand and restore its several parts to usefulness?

The subject of the surgery of the hand is one which will hardly attract the attention of the modern surgeon whose mind is engrossed with the consideration of the more showy and intricate operations; surgeons are apt to think only of the greater triumphs of their art, but in the midst of the major work there will always fall to the lot of the busy surgeon a host of minor cases which should demand as much care on his part as the major; of these minor cases a large proportion will be injuries to the hand; for, as we all know, the hand is very much exposed to injury in all pursuits of life, but more especially in the case of those who are obliged to earn their livelihood by working in the repair or erecting shops or in the switchyard of a railroad corporation.

When we stop to think that the railway employes of the United States form a standing army by themselves, and when we remember also that a large proportion of them are employed in the hazardous positions, where their hands are liable to get caught in the machinery or between the bumpers or deadwoods; when we recall the fact that in every year 30,000 railway employes receive injuries and that out of that large number fully 8,000 to 10,000 receive their injuries to the hand, is it amiss to dwell on this subject?

It is a common saying among switchmen that a man is not a good switchman unless he has the "switchman's brand," which consists of a crippled hand; unless he has

this he is looked upon as a novice at the business, so frequent are injuries of this nature in that department of the railway service. We look forward to the time when a switchman can show as perfect a hand as any other laboring man, but that day will not come until there is some national legislation which will compel railway corporations to equip their freight cars with some device which will not make it compulsory upon the switchman to step in between moving cars, hold up the link with one hand and the pin with the other, in order to make a coupling; it would be of some service if all of the numerous corporations could agree upon some universal standard of couplers, for as it is now a freight train cannot be made up in any yard that does not contain cars belonging to from 6 to 20 different corporations, with perhaps as many varieties of couplers. No one knows the necessity for some such reform as this any better than the surgeon who has charge of the surgical work of a large railway corporation at one of its terminal points where cars are delivered to and received from foreign roads; injury to the hand in whole or in part will form the bulk of such a surgeon's work for the corporation.

In an experience covering nearly nine years of railway service at a terminal point and in a large city, I find that about one third of all accidents I am called upon to treat are injuries of the hand; during the twenty months just passed I find that on the division of the railroad with which I am connected there were treated 1,571 cases of injury and that out of this number 530, or 33.73 per cent., were injuries to the hand; the injuries sustained were of all varieties and of all grades of severity, from a simple contu-

sion of the soft tissues without fracture of bones or laceration of the skin, to crushes so severe that but one glance by an experienced surgeon was needed to say that the part was irreparably lost.

The points which should be indelibly impressed upon the surgeon's mind are that in the treatment of injuries of the hand conservatism is the first thing to be thought of, and next, that by strict adherence to aseptic methods many a finger can be restored to usefulness which would have been lost had the case fallen into the hands of one who, though he might be a conservative and a conscientious surgeon, was lacking in familiarity with aseptic technique.

It depends upon good judgment and experience, and as much or more upon the latter, to say whether a crushed finger, thumb or hand can be saved; or whether amputation must be done, and if the latter is the only alternative, to say where it must be done; this quality in a surgeon can only be acquired by actual experience, and the railway surgeon is the one in all probability who has had more experience than his fellow practitioners. Conservatism and asepticism go hand in hand, for it is only by the assistance of the latter that the former can be put to its best use; by strict adherence to correct aseptic methods we can with safety give Nature a show that she may, if possible, bring back to life shreds of tissue which have been badly crushed without the danger of suppuration and septic infection; we many times see tissues regain activity under aseptic dressings which seemed almost crushed to death.

The surgeon who has to deal with railway injuries does not have the best of material to work with to get aseptic

results; the very nature of the work which these men do in itself means dirt of all kinds; these cases come to us with their hands covered with oil, grease, coal dust and cinders; all of which have been ground into any wounds which may exist; in addition to this we often find these cases enveloped in tobacco juice, shellac varnish or some other popular and nasty dressing; if with such unfavorable conditions the surgeon can obtain a perfect result, should it not be to his credit as much, or more than, that he should obtain similar results in some major operation where he has had the most favorable surroundings and has had twenty-four hours in which to get the field of operation into a thoroughly aseptic condition? By proper methods of procedure the field of operation in these cases *can* be made aseptic and aseptic results *can* and *should* be obtained. To illustrate the methods which should be followed and to show what conservatism will do it may not be out of place to cite a few cases.

J. D., a car-repairer, was kneeling down to inspect the brake beam on a car which was standing on a side-track, unprotected by a flag; he had one hand on the rail close to the wheel; an engine backed in on the track unbeknown to him and started the car; one wheel ran over his hand diagonally, taking off completely the little finger at the metacarpo phalangeal joint, the ring finger at the second phalangeal joint, the second and first fingers at the last phalangeal joints, the skin and soft parts were almost entirely stripped from the bones on the dorsal surface of the hand and were hanging in shreds; there were numerous ragged lacerated wounds on the palmar surface and some of the

flexor tendons were laid bare; the thumb was torn open down to the bone from the tip down into the palm of the hand; the hand was black with oil, coal dust and cinders which had been literally ground into the wounds. He was placed on the operating table, anæsthetized and with a stiff nail brush and an abundance of liquid soap the hand was most thoroughly scrubbed, the wounds were scrubbed in the same manner as the skin until every particle of dirt was removed; the parts were then thoroughly washed out with a 1:1000 solution of corrosive sublimate. After applying the tourniquet the ragged edges of all the skin flaps were trimmed until they were made regular, and in the case of the fingers which had been amputated nothing was removed except the ends of the bones, a sufficient amount being taken off to allow the irregular flaps of the skin to be brought up over the ends. All of the lacerated skin was replaced and carefully stitched with catgut, no drainage being used; the dressings were then adjusted, which consisted of a free dusting with Sennine, an antiseptic powder which I have used for the last 9 months entirely in place of iodoform; bichloride of mercury gauze was then applied in place of iodoform gauze. The dressings were changed at the end of twenty-four hours on account of oozing of blood and after that not until eight days; the patient made a rapid recovery, all lacerated wounds healed; there was no loss of tissue by narcosis except a piece about the size of a silver quarter on the dorsal surface of the hand, which under Sennine dressings separated and the surface left healed without any suppuration.

The point of interest in this case is the fact that the

parts were very badly lacerared and their vitality seemed doubtful, even to one who had seen a great deal of that variety of injury, and still we lost only one piece of skin the size of a quarter; in these cases I rarely do a classical amputation, but resort to what I call patchwork, utilizing the skin shreds to cover the ends of the bones instead of taking the finger off higher up in order to make a pretty job. It is not beauty so much as usefuiness that these patients require, and an eighth of an inch of a finger, to a laboring man has a commercial value.

F R., a switchman, had his finger caught between the coupling-pin and the deadwood in making a coupling; the ring finger of the right hand was split open from the tip to the palm of the hand, and the flexor tendon was laid bare; the little finger had the soft parts completely severed, nothing but the bone remaining intact. He consulted another surgeon in the emergency who dressed the wounds without even washing them out and made no attempt to restore the soft parts to their natural position. I received him two hours later and scrubbed his hand in the usual manner, carefully stitched the lacerated wound together and applied a Sennine dressing. In the case of the little finger, amputation alone was indicated, but this the patient refused absolutely to have done, so the finger was washed and the same dressing applied as was applied to the other. The ring finger was well in ten days and when last seen was as useful as before the accident; the end of the little finger formed a dry slough without suppuration and was still in that condition when last seen.

Under such methods we are enabled to take our

crushed, irregularly lacerated wounds and accurately approximate the edges with sutures, whereas the surgeon who does not have absolute confidence in the thoroughness of his methods will leave such a wound open to granulate, with the certainty of contraction of the scar afterward and the probability that tendons will be bound down to such a degree as to materially interfere with the future usefulness of the part.

L. N., a section laborer, had a rail fall, striking his hand; it caught the ring finger of the left hand, cutting it completely through, with the exception of a small bridge of tissue on one side, which included the artery on that side; the parts were thoronghly scrubbed with soap, ether and corrosive sublimate solution; the fragment was stitched in place, a Sennine dressing and splint applied, union took place promptly and a serviceable finger resulted.

Compound fractures of the bones of the hand, and especially of those of the fingers, are everyday accidents, and when such cases are properly cared for they should give no more trouble than a simple fracture; such results are not to be obtained, however, except by the strictest attention to cleansing of the parts and to proper methods of dressing; a piece of iodoform gauze clapped onto a wound does not mean that the wound has been dressed either aseptically or antiseptically, but unfortunately many think so. These cases can all be made aseptic if taken in hand early; lacerations can be stitched up, tendons united, a Sennine dressing applied without drainage, with the assurance that union will take place quickly and the fracture be converted into a simple one.