alysis is a perfect index of the kidney function, and oftentimes will tell us much about other organs that might not be noticed by any other kind of examination.

After we have carefully studied the condition of the patient we turn our attention to the operation, upon which depends greatly the result. We should always know when to stop, and not to place upon the patient a greater load of shock and other handicaps than she can stand and recover under. Preparations should be made in every instance for rapid and proper operation. As very few are competent to administer anesthetics, special attention should be given to the selection of the anesthetizer. Many deaths are directly due to the anesthetic, and therefore we should carefully study the action of the anesthetic upon the patient. The most intelligent and best informed assistant should be the one to give the anesthetic; trusting this part of the operation to nearly any one that can be procured is extremely reprehensible.

The author has found the admixture of oxygen with chloroform to be very satisfactory. The amount of time consumed in giving the anesthetic is important and, of course, the rapidity of the operator will to a great extent control this. Careful and clean surgery should always be done, but no time should be used during an operation for study. The operator should be quick to appreciate the work before him in any case, and to do it in the shortest possible time consistent with good work. In cases in which we have reason to expect much shock it is very important to do everything to prevent it. The heating of the operating table by hot applications in the way of hot water pipes or hot water bags is of untold value. The temperature of the room should be about 85 degrees F., and every assistant well trained to the work. In this way only is rapid work possible. Some of the principal points to be remembered by the surgeon are to do as much of the work as possible by sight, to expose no viscera not to be removed, either to contamination with discharges in the field of operation or to the outside air. Drainage is oftentimes necessary, and probably if more drainage was practiced more permanent cures would be secured. Close all peritoneal tears if possible, and thus remove danger of intestinal adhesions; endeavor to leave no bleeding surface. It is not necessary to wait until the patient has been removed from the operating table to begin the use of stimulants. Very frequently a liter or less of normal salt solution run under the breast of a woman during operation will turn the course of her condition toward recovery. I am firmly convinced that I have seen a great many women saved by the prompt use of this agent on the operating table. I have seen bad cases recover in which artificial respiration was necessary throughout nearly the whole operation. If clean surgery has been done, when shock lessens convalescence begins and continues steadily. If intestinal tears be made during operation they should be isolated completely, that the peritoneal cavity will not be infected, and repaired as soon as possible. If the bowels are kept moving by cathartics adhesions are not so apt to occur. Over-feeding and under-feeding are bad for these cases, though the latter is the less harmful. We must not feel that our patients are out of danger when the bowels have been moved once, for many cases of bowel obstruction have been noticed as late as the second or third week, when all seemed serene, and rapidly proved fatal. Fecal fistula following operation is, to say the least, a very disagreeable complication

at all times, and if large and connected with the small intestine, will perhaps kill the patient. We very vividly remember a fistula connecting the ileum with the vagina that proved fatal about three weeks after operation.

Ureteral and kidney fistulæ may cause death by infection of these organs. Those connecting with the bladder will usually close spontaneously if that viscus be properly drained.

Sepsis is a very difficult condition to contend with. Many of the operations are for this cause, and a good many die from it that were infected during or following operations for other causes. As bacteriology is making such praiseworthy progress in sero-therapy, we can with reason hope for the successful treatment of this condition in some such manner as is being applied to puerperal sepsis.

But at present we are almost powerless against it, and the patient who has already undergone the ordeal of an abdominal operation has very little chance against it. Fortunately, we have it to contend with far less often than formerly. We must not allow this opportunity to pass for saying a good word for the infusion of normal salt solution in these cases of sepsis. It is certain we have had cases in which it acted almost magically both in reducing temperature and improving the condition of the pulse. We need say nothing more concerning accidents, except that good judgment is required, and that in ligating blood vessels in the abdominal cavity it is advisable to include in ligatures as little of the tissues about vessels as possible, thus preventing the tendency to secondary hemorrhage.

DISEASES OF RAILWAY MEN CAUSED BY THEIR OCCUPATION.

Read by title at the Third Annual Meeting of the American Academy of Railway Surgeons, held at Chicago, Ill., Sept. 23, 24, 25, 1896.

BY J. F. PRITCHARD, M.D.

DISTRICT SURGEON ON THE CHICAGO AND NORTHWESTERN RAILWAY.
MANITOWOC, WIS.

All occupations nearly, affect the human economy in some peculiar manner. Where there arises a strain of the physical system we find diseases affecting the muscles, joints, bones, etc., and when the strain is mental the nervous system is found involved. These facts are so common that they are truisms and need no demonstration.

We would expect to find among railroad men a complication of diseases from the very nature of the occupation. There is no doubt of intense mental strain at times, and the general muscular system is subject to a degree of fatigue almost past endurance, which must produce its effect; but I find upon investigation that but little attention has been paid to the subject, and my only hope now is to direct your attention in this direction in order, if possible, to reach some clear conclusion regarding the effect of occupation on railway men, and its ultimate effect in case of injury.

The following, quoted from a stray medical publication, shows evidently that others have been giving this subject attention.

"Neurologists are watching with great interest a new expression of nervous malady which has appeared since the introduction of the Broadway Cable cars and the Brooklyn trolley system. With the exception of Chicago there are no cities having so much street traffic as New York and where these methods of trans-

portation are in operation. A nervous state unlike that which is excited by great noise or sudden danger has developed in several gripmen employed on the Broadway road and among the motormen of the Brooklyn trolley lines.

The constant lookout for collisions in the overcrowded district below Canal Street in Broadway keeps the gripman in a state of extreme nervous tension from the hour he goes on his car until he goes off duty. Besides keeping an eye open for visible trouble his mind dwells on possibilities that are under his feet. He does not know when there is to be a pooling of interests between the grip and a broken strand in the cable which will whisk him along the street into trucks, smashing wagons, frightening people, and exasperating the city fathers. This nervous strain results first in wakefulness, then in loss of appetite and extreme irritability; after this a tremor in the facial muscles. At the end of a week, says the medical examiner, all of these symptoms disappear and do not come back for ten days, but afterward the intervals are regular, about a week apart. Seven days in a state of nervous terror and seven days in a healthy state apparently. These symptoms apply only to men of nervous, nervo-sanguine or bilious temperaments. While present in other temperaments they are not pronounced."

I am informed that on some English railways where very fast trains are being run, only young men as engineers are employed. After running for a length of time they can not make the schedule, and as there is a fine for delay of mail at the rate of one pound (\$5) per minute it seems to be important that the train reach its terminus on time. Why are experienced men unable to do this? Is it not from some depressing effect on their nervous system?

I have three notable examples of the influence of their occupation as engineers.

The first was an engineer on passenger trains. He never had an accident but developed severe neuralgic pains in various parts of his body, notably his head and back; was troubled with chronic cough also, and finally was pensioned on light duty on account of his disability until the road was sold, when he returned to duty on a branch line, but suffered at once from severe girdle pain and great lassitude, which finally developed into an epilepsy with gradual softening of the brain. He is now at times unable to walk, has regional paralysis, is unable to talk at all, and can live but a short time. This man is a pensioner, was discharged from the army for disability affecting the lungs, but recovered and to my personal knowledge had charge of an engine for nearly twenty years. I am satisfied that his present condition is largely due to his occupation and the nervous strain attending it.

In the second, also a passenger engineer, and one of the best, he had the misfortune to run into a washout without injuring any one except some few slight scratches, although the train was very badly wrecked. After a month or more he was set to work as a conductor, but made a failure of that as he seemed to be unable to comprehend the time-card. He could not stay on an engine when running as he seemed to become paralyzed with fear. He was given a position in a round-house and shop, which position he now fills, but he can not run an engine because of a return of his nervous symptoms, although fifteen years have passed since the accident referred to. In every other respect he is in perfect health.

In case third, also an engineer of the first-class, while running a passenger train on a branch line collided with some cattle and his engine was thrown off the rails, but no damage done. He has never since been able to run on any fast train, and is now pensioned on a short branch line where he does effective work. He informs me that he becomes nervous and unstrung when running fast or on the main line, and in deference to his wishes he has been kept on easy work since his accident, now nearly sixteen years.

I will refer to but one or two more of this class as showing in my opinion the effect of mental strain due to occupation. A case reported by Charles S. Potts, M.D. Mr. A. R., age 28 years, a railroad engineer, was perfectly well until three weeks previous to coming to the hospital. At that time while attempting to save a man from being run over he had a narrow escape himself. Since this he has been very nervous and excitable. He complains of restlessness at night, frequently walking in his sleep, palpitation of the heart, headache, and of being confused mentally. There were also dyspeptic symptoms which he says did not exist before.

The *Brit. Med. Jour.*, says that there is reason to believe that at all times there are men on the line who are working very near the breaking strain. We may in regard to this mention three well-known instances which at the least show the tension under which work is carried on. A station master seeing a man run over on the line, himself fell down dead upon the platform. Here was a shock which permanently made his heart stand still; and how many times had not that man's heart stood still before? We may feel perfectly certain that if the major shock could kill, the minor daily shocks of a railway life must have greatly damaged a heart under the influence of the nervous system.

Two trains collided at a junction. It was either the fault of the drivers or the rails, certainly not the signalman. The signals were right; yet when the box was entered the signal-man was found to have gone mad and had to be taken to an asylum, where he remained for long. He was broken utterly by the horror of the dilemma. But what shall we say about the smaller dilemmas which every hour of his working life he had to solve? Did they not also have an effect, although a lesser one, on the brain?

A few years ago it was found that the sickness rate among signal-men of certain lines was becoming excessive, and it was determined to do away with the system of leaving to one man the whole responsibility of taking charge of a signal-box. At great expense every box along the line was supplied with two men. Great evils were prophesied. It was thought the men would talk and lark and neglect their duties. This did not happen but the sickness stopped. Under the shared responsibility they no longer broke down. If then, as seems to be indubitable, railway strain can have definitely injurious effects upon the nervous system it becomes an important question for inquiry whether this nervous derangement at all frequently has the effect of impairing the nutrition of the heart. Upon this special point we do not at present possess sufficient information to warrant the expression of a definite opinion.

Now, while these cases are extreme and well marked, as a matter of convenience and for a basis from which to make deductions, I think we can fairly say that they are all due to occupation. And while all railway men of this class may not have similar experiences yet

they all have similar mental strain from constant watching to avoid teams on grade crossings in country and town, more particularly with fast trains where time must be made regardless of every other consideration, and also to avoid crushing track-walkers. By these I mean trespassers on the track. Have you ever ridden on an engine when ahead you see a man walking in the middle of the track as unconcerned as though on a promenade in the park? He is going your way. The engineer puts his hand on the air valve, watching the man intently, but not slackening speed, waiting to see him leave the track. He next blows an alarm with the whistle but does not apparently attract attention. He is now so close that he can not stop, but he makes the effort, reverses his engine, puts on the emergency brake and, when he is just on the man, turns his head away to avoid the sight, but the man steps off. Yet the mental and nervous strain is just as great as though he had killed this individual. If the trespasser happens to be a child or an intoxicated man, usually he is a subject for an inquest with all of the usual senseless blame and criticism. Every engineer has more or less of this to bear, and as a consequence there must of necessity be nervous disturbances of varying degrees of severity in this class of railway men, although I am not aware that they have been made a separate study up to the present time.

I find a great deal of complaint of backache among all classes of railway men. I think it is mostly muscular, from the mere muscular strain of maintaining equilibrium from rapid movement of the trains. Especially is this true of freight train crews and where men are obliged to be on their feet in the various duties of their work. I have not been able thus far, however, to note any unusual number of kidney diseases, but this may be modified by more extended observation. Certainly they complain of a frequent desire for micturition, an indication pointing to congestion of the kidneys, but it is so difficult to keep any considerable number of men under continuous observation, more particularly on western roads, that I at least am not prepared to say that their occupation may not be a potent cause of kidney disease.

From the very nature of the occupation we would expect digestive difficulties of all kinds with attendant diseases. Twenty minutes for a meal is the limit of time allowed in any case. The train men always have some duty to perform after the train stops or before starting which cuts out five minutes or more. They rush in, bolt their food, rarely knowing what or how much they eat. All aboard, the train starts, the men are intensely occupied with their work, and food remains either fermenting in the stomach or digesting but slowly with the subsequent troubles. I can conceive hardly of a human stomach that could digest food under such circumstances, yet many of these men appear to become accustomed to this method. Still I am sure from my contact with them that many of them suffer in this manner. In this connection I note two serious and finally fatal cases of stomach disease among very many minor ones. These two men give somewhat similar histories and required constant attention, yet they both finally died from exhaustion at about 40 years. I am well aware that digestive diseases are very common among all classes of people, but do not find such diseases prevalent among young men in any other occupation.

The second part of this paper, referring to the in-

juries to railway men and their prompt recovery or otherwise, could be easily answered if we can admit the first, viz., that railway men as a class are more subject to neurasthenia and some other serious diseases than men of similar ages in other occupations. It is very positive that men under constant nervous tension bear injuries badly; and my observation is that their prompt recovery is in proportion to their length of service. This rule, if we may so call it, admits of exceptions, but I think by investigation you will find it to be a fact.

This brings up a question in legal medicine which is important, viz., traumatic neurosis. Can we say positively that a railway man suffering from any of the forms of traumatic neurosis, that his disease was caused by the injury, or was it not in existence and the injury merely brought it to light? Is it not more probable that under nervous strain for years his nervous system was diseased and that this shock merely called the attention of his physician to it? I am strongly of the opinion that if we can carefully investigate individual cases, eliminating all pseudo cases, we will find this to be the case.

One writer in summing up a paper on traumatic neurosis says, "It can not be denied that neurasthenia when produced by overwork, exhausting disease, or any of the many recognized causes for such a condition, may cause great suffering and disability when only subjective symptoms are present, and these cases would seem to prove that traumatism should be placed among the causes." I would reverse this method and say, that the disease was existent previous to the traumatism and that the injury merely called attention to it. The symptoms of this neurosis are merely accentuated by the traumatism but not caused by it. How many cases are noted in which the symptoms are out of all proportion to the injury, and in what other manner can they be explained? Many cases of so called railway spine, and in fact all forms of neurosis, can be easily understood on this basis of reasoning.

I had only hoped in this paper to call the attention of the society to this line of study, and hope it may be a means of originating a collective investigation that may make this whole question clear. I would suggest that it be made a line of study for this learned society as I know of no better means by which to settle it.

FRACTURES OF THE FEMUR.

Read at the Third Annual Meeting of the American Academy of Railway Surgeons, held at Chicago, Sept. 23, 24 and 25, 1896.

BY E. M. DOOLEY, M.D.

SURGEON TO THE NEW YORK, LAKE ERIE AND WESTERN RAILWAY.
BUFFALO, N. Y.

The subject we have before us may justly be considered a trite one. It is one with which we are all apt to have experience of one kind or another. Some we may call fortunate, others unfortunate experiences.

With the advent of the penetrating X rays it behooves all surgeons to make a special effort in the diagnosis and treatment of fractures of the long bones.

My object in bringing this subject before you today is not with the idea that anything new or startling may be shown in the diagnosis and treatment of fractures of the femur. But my experience as regards injury to this particular bone has been more or less extensive, and I have a few observations to make which may be of interest to all. Surrounded as the femur is, especially at the upper extremity, by large