

that is more suitable to the purpose than either glass or metal. This subject will be discussed in another paper later. However, the use of the fenestrated aluminium ball in connection with this operation, as advised by Bryant, in implantation, ought also to be followed by good results. As a segment of the sclerotic has been removed, there is no longer any reason why the inside of such a sphere should not fill in with new connective tissue, which, being continuous with that of the orbit, would prevent its extrusion.

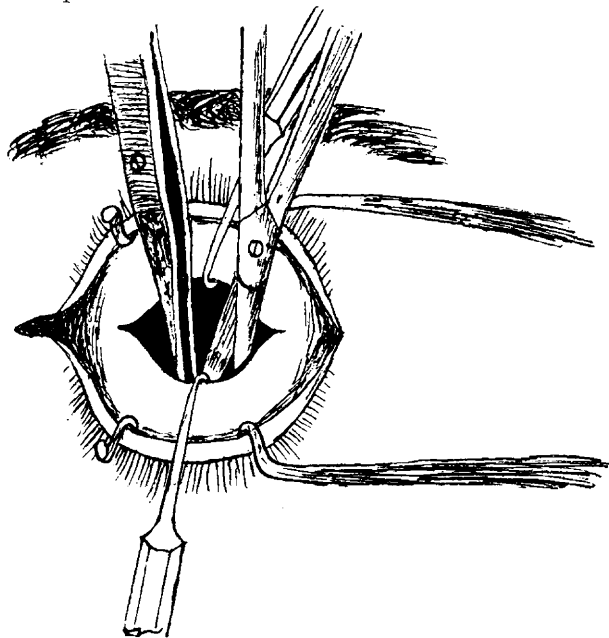


Fig. 4. - Removing posterior segment of eyeball.

The wound is closed with five silk sutures, and the after-treatment is the same as in evisceration. The local reaction following this operation has in no case been as severe as that following simple evisceration. In fact, I should say that it has been no more severe than after enucleation.



Fig. 5.—Posterior segment including part of optic nerve removed.

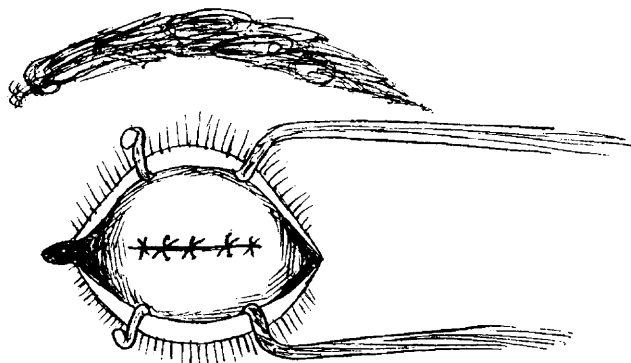


Fig. 6.—Showing sutures and stump after operation.

This operation is strictly in accord with what I consider one of the first rules in surgery, viz., to obtain the maximum in results by the removal of the minimum of tissue.

In conclusion: 1. This method, with the use of an artificial vitreous, leaves as perfect a stump as after Mules' operation. 2. It prevents absolutely the dangers

of sympathetic inflammation. 3. The local reaction appears to be no greater than after enucleation. 4. We obtain the maximum in results by the removal of the minimum of tissue. 5. We obtain, besides this, all the advantages claimed for Mules' operation, as well as those of enucleation without their disadvantages.

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## RAILWAY HYGIENE AND EMERGENCY EQUIPMENT.\*

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Coming within the province of duty of railroad surgeons, it may be said with much probability that, unless they take a positive interest in the matter, slow progress will be made in the sanitation and hygiene of railway travel. So far we have devoted ourselves chiefly to the treatment of injuries and the consideration of litigation cases. Especially are the furnishing and ventilation of coaches and first treatment of the injured matters of supreme importance and always worthy of special interest and consideration. It is often a long time after the recognition of an evil before the successful remedy is discovered and applied. The best means in the accomplishment of a given purpose is generally the result of countless theories and suggestions, and careful, patient investigation. The comfort, health and safety of employees and passengers are cardinal elements that must command the serious consideration of railway corporations and the railway medical corps. Should we examine the air of a Pullman coach, with a spectroscope, the myriad living things to the square inch revealed, many inimical to health, would be enough to cause the shades of Schwann, Helmholtz, Kircher, Pasteur and Tyndall to weep for the living.

The ventilation of houses and public buildings has never been easily accomplished, but that of a moving car is a matter of more than ordinary difficulty. The transom-window near the top promptly admits more smoke, cinders and dirt than pure fresh air, and is not a very satisfactory device. The sudden frequent and extreme change of temperature—generally when passengers and porters are asleep—is a fruitful cause of colds and sickness. The current of outside air is much influenced by the motion of the train. The sudden displacement of a large volume of air by the train in rapid motion condenses and gives increased impetus to the air without, which rushes with unusual force through car windows and doors, and always prevents a uniform, comfortable circulation of air within the car.

I may suggest that it might be an improvement if the ventilator windows were opened and closed by a valve-like arrangement, made of the usual glass and wooden frame, and fastened by hinges at one end, preferably toward the engine, on the outside, while on the inside a similar one may be placed, with the fixed, or hinge, end in a reverse direction; a fine wire screen might be placed between. This arrangement would occupy as little space or less than the tilted window now in use. The force and volume of the air current would be broken, and the inside air would be less subject to violent disturbance, and less smoke and dirt would enter the car.

The only perfect remedy for part of the evil is the more complete combustion of fuel and smoke, which is eminently desirable, not only as an economic measure

\* President's Address, delivered before the American Academy of Railway Surgeons, Omaha, Neb., Oct. 12 and 13, 1899.

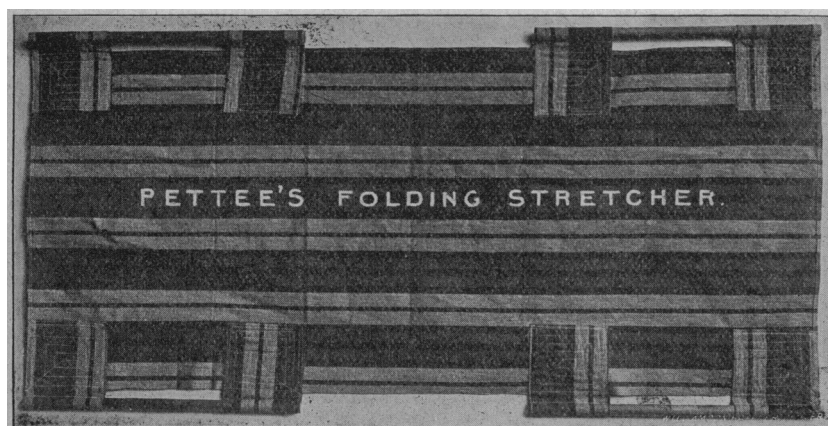
of great value, but in behalf of the comfort and health of the traveling public. Railways and road makers will exhibit commendable concern for the well-being of employees and passengers and the protection of cars and equipment if the top cover of roadbeds is composed of hard dirt, or at least something better than cinders and fine gravel. Experiments now being made with crude petroleum may prove satisfactory in allaying this nuisance.

It may be of interest to state what few seem to know, how the furniture of cars is cleaned. It is done by compressed air forced through hose, with a nozzle, and a slit in the latter. By running this over cushions, blankets, drapery, etc., the dust and loose dirt are effectually removed. But this does not meet the indications as to disease germs and the prevention of infection. I have recently seen, on Pullman coaches, two cases, and they are common, which strongly illustrate the necessity of more positive action to protect the public against infectious diseases in railway transit. One was a patient with scarlet fever, lying in a berth all day, exposing every person in that car and in particular those who might occupy that berth soon after. The other, on another road, was a patient with advanced tuberculosis. She should never have left home, but like many others was, as a last resort, put on a Pullman car (at noon) and a berth prepared for her, as she was too weak to sit up.

Besides, it must be manifest that the employees can only detect infection, if at all, in the most advanced or pronounced cases.

Fully half of the state boards of health, the American Public Health Association, and the General Baggage Agents' Association have formulated very rigid rules governing the transportation of dead bodies. Those dead of smallpox, cholera or yellow fever, can not be shipped. Those dying from ordinary infectious and contagious diseases can only be shipped after the thorough application and injection of antiseptics, the body put in an air-tight case. These rules are in the main commendable. With their execution there is no danger to employees or to the public. But I may be pardoned for noting the grave inconsistency in the treatment of those bodies for shipment and the transportation of the living subject. The time will doubtless come when people suffering from infectious and contagious diseases will travel in cars or compartments specially provided for them. At present there is but one considerate course for railway companies to pursue, and the only safe one for the public, and that is not only the cleaning, but the disinfection, of coaches and furnishings with every trip. This is of special importance to those roads going to the health resorts of the country.

The importance of renovating and disinfecting a house that has been inhabited by patients with a *con-*



She was coughing and expectorating constantly. Nothing but boiling water, or fumigation with some antiseptic, such as formaldehyde gas, could make those berths safe for the next occupants.

In some investigation and correspondence as to what action is officially taken by the Pullman Company to protect the public from infectious and contagious diseases, I am able to state on the authority of the general superintendent, at Chicago, that "no printed regulations or instructions to employees, relating to hygiene, protection of patrons from contagious diseases, nor in reference to car cleaning, have been issued, though it is admitted best that cars should be fumigated after being occupied by a consumptive. Instructions were issued to district superintendents, in 1898, that all cars running into Colorado and California should be fumigated at least once a month. My investigation and information is to the effect that employees report few cases of contagion or infection, even if recognized, which is not often; that blankets are seldom washed or fumigated, and that no complete or systematic effort is made by the company or corporation to meet the condition in either a scientific or thorough business manner. The whole question is treated in a perfunctory sort of way.

*tagium vivum* is not to be questioned, and the necessity exists with as great force, certainly, to the more closely confined and vitiated air of passenger coaches and Pullmans, containing at least a surplus of carbonic acid gas and a minimum of oxygen.

It must be conceded that the materials used in furnishing railway coaches—plushes and velvet cushions, woollens and draperies of every kind—afford the best possible nidus for the protection and preservation of germs, and they are also the most difficult to clean. Every consideration of hygiene and the public health demands their abolition for such purposes. Cars can be finished and furnished in material with a smooth surface, such as hard wood and leather, which can be more easily, perfectly and quickly cleaned, and yet be as elegant as the most refined taste could desire. Less carving and embossing, less plush and velvet and drapery that protect and preserve filth is the dictate of every principle of hygiene. The railway company, with its army of employees and passengers, should be fully abreast of the time in word and action in its humanitarianism, which demands that adequate and suitable preparation shall be made for the immediate care and comfort of the injured.

Railway accidents are common and injuries frequent, yet few roads are prepared to meet these exigencies promptly and well. Herrick, in *Railway Surgery*, recommends a small tin box with four roller and four triangular bandages, sterilized gauze and a solution of morphin and strychnin for every train. Litters are advised for certain stations.

Whatever conduces to the comfort and health of passengers evinces a thoughtful regard on the part of the company that is commensurate with its responsibilities. Such a sense of obligation is certain to meet an appreciative response on the part of the public. When a train starts on its journey, it should be supplied with a box containing at least half a dozen first-aid packets similar to those supplied to the army, besides a few roller bandages and splints of felt, or binders' board, and absorbent cotton. The emergency package should contain at least a folded strip of sterilized gauze about three inches wide and twelve inches long, a wad of absorbent cotton, an envelope with a dram or two of antiseptic powder, composed of salicylic and boric acid, in the proportion of about 1 to 4—as recommended by Senn—and a strip of rubber plaster one by eight or ten inches. The powder should be applied directly to the wound, covered by cotton, and a pad of gauze held in place by the plaster. The bandage may be applied over all. This should be done at once, in the car or on the ground, and employees should be instructed as to the use and application. It should be remembered that it is sometimes hours before the service of a physician or surgeon can be secured, and the prompt use of the first-aid dressing would undoubtedly be the frequent means of preventing infection of the wound, and in consequence assure an earlier recovery.

For handling and removing a patient to a place of safety, there should be a litter with every train. I have the pleasure of presenting for your inspection and consideration two simple, convenient and inexpensive emergency stretchers, the recent invention of an old soldier of the Civil War, Mr. William Pettee, of Denver. They have the endorsement of the regular army surgeons and officers of the Department of the Colorado, and of the surgeons and officers of the National Guard of Colorado. They will fill a useful place in certain army contingencies, in hospitals and in the medical department of the railway service.

The small hand litter is fifteen by nineteen inches, and weighs eight ounces. The large one is about six feet long and nineteen inches wide, and weighs about two pounds. The former can be used by one or two men, the latter by two or four. The large one can be so folded as to supply the place of the small one, which can be dispensed with. They are made of strong ducking, and have short, hardwood handles. This stretcher is the first of its kind and will especially fill a needed place in the surgical equipment of the railway service.

The improved ventilation, better and more uniform heating of cars, though the latter is largely a matter of management, clean water tanks and the occasional flushing of drains with antiseptic solutions, higher regard for the public health in the equipment and management of cars and the railway service as to infectious and contagious diseases, are matters of too much concern to be treated indifferently. These, with proper preparation and regulations for the treatment of the injured, I have deemed it appropriate to commend to the considerate attention of railway officials and surgeons. The criticisms and suggestions are made in the firm conviction that those who promote and manage railway enterprises

have a conscientious regard for the public weal, and will correct evils when their existence is known; while the life, service and aims of medical men find them always willing advocates in every effort for the alleviation of suffering and the promotion of needed reforms.

## OPERATIVE TREATMENT OF CHRONIC GLAUCOMA.\*

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The subject of the operative treatment of chronic glaucoma was chosen for me by the worthy president of our Section. It is not that part of this symposium which I should myself have chosen, because it is a somewhat unsatisfactory one. There is so much diversity of opinion as to what constitutes simple glaucoma that when one surgeon speaks of it, another may be putting the same case down as optic atrophy. Then, in considering the results of treatment, there has been no agreement as to what is meant by iridectomy. To compare treatment by myotics with treatment by operation, which is the point of importance in this branch of the subject, it is necessary that we know exactly the nature of the operation, as well as the composition and use of the myotic. Especially is it important that a clear distinction be drawn between iridectomy and iridectomy-dialysis, which in their relation to glaucoma are very different operations; and I would suggest again, as I have already suggested elsewhere<sup>1</sup>, that in the future statistics, which it is important should be compiled, stress should be laid on this point. As it is, it is simply impossible in comparing treatments to give anything better than impressions; and as the opposing camps are markedly and not unequally divided there is no certainty as to the ultimate outcome of the disagreement.

In writing this paper I might have put down the various arguments at length, as I at first intended to do, but I find that that would occupy more than the allotted ten minutes, so I have decided to lay the matter before you in a condensed form, which will, however, suggest points of interest for discussion.

The subject is dealt with under the following heads:

1. The object to be obtained. 2. Operation *versus* myotics. 3. Iridectomy. 4. Sclerotomy. 5. Other operations. 6. Time to operate.

1. *The object to be obtained.*—It is important to bear in mind that though there may be no apparent rise of tension or shallowing of the anterior chamber, the tension may really be at times above the normal of the affected eye, and the invisible periphery of the iris may be in contact with the cornea. The primary object of both myotics and operation is to open the angle of the anterior chamber by separation of the iris from the cornea. When these are actually firmly adherent, neither treatment will be successful, but operation may benefit by establishing a new filtration area through the walls of the globe at the position which may include the adherent root of the iris. Fistulous openings are common after operation, and are then frequently due to the inclusion of atrophied iris or ciliary processes.

2. *Operation vs. Myotics.*—There is still great difference of opinion as to which of these gives the better re-

\*Presented in a Symposium on Chronic Glaucoma, before the Section on Ophthalmology at the Fiftieth Annual Meeting of the AMERICAN MEDICAL ASSOCIATION, held at Columbus, Ohio, June 6-9, 1899.

<sup>1</sup> Glaucoma: Its Symptoms, Varieties, Pathology and Treatment. Jones H. Parker, St. Louis, 1898.