service rendered during the past year. For myself, the honor of having served as your first President is sufficient recompense for whatever effort the filling the position has cost.

ORIGINAL ARTICLES.

WHAT SHOULD EXCLUDE APPLICANTS FROM RAILWAY SERVICE?

Read at the Second Annual Meeting of the American Academy of Railway Surgeons, held at Chicago, Ill., Sept. 25-27, 1895.

BY JOHN E. OWENS, M.D.

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CHICAGO, ILL.

It is a matter of practical interest to determine what should and what should not exclude applicants from railway service.

The formulation of any set of rules intended to govern examinations presupposes the adoption of a working basis, and the classification of the applicants for service.

So far as disabling diseases are concerned, it will not be necessary to mention those which are so disabling as to discourage the sufferer from following any pursuit. Others, again, are more or less insidious in their progress and for a time do not furnish symptoms which make the patient aware of their existence. Certain conditions interfere with the healing of wounds, impede recovery, entail an undue loss of time, and become aggravated by the injuries which are received in the line of duty. It would be useless to enumerate all the diseases which would disable the applicant. From a medical standpoint the following will perhaps be sufficient to turn the attention of the medical examiners in the right direction: Diabetes, cancer in all its forms and in all localities, chronic diarrhea, the presence of gallstones, chronic inflammations, hemoptysis, tuberculosis, asthma, organic cardiac disease, evidences of organic disease of the brain and its meninges and of the spinal cord.

From a surgical standpoint the following should exclude the applicant from service: Necrosis, ulcerations in any region, scrofula, bubo, malignant tumors, phlebitis, varicose veins, aneurysm, acute and chronic periostitis, synovitis, arthritis, floating cartilages, old depressed fractures of the skull, or any fracture followed by head symptoms, suppurative ear diseases, antero-posterior spinal curvature, severe injuries of the back, recurring appendicitis, abdominal hernias, acute and chronic cystitis, acute gonorrhea, epididymitis, enlarged testicle, certain visual defects and deafness.

INSTRUCTIONS GOVERNING SURGEONS IN CONDUCTING EXAMINATIONS OF APPLICANTS FOR EMPLOYMENT ON RAILROADS.

When making application for service, engineers, firemen, agents, operators, conductors, brakemen, engine dispatchers, train baggagemen, station baggagemen, crossing flagmen, switchmen, switch tenders and signalmen must be examined for color perception, hearing, and for visual and other physical defects.

Examining surgeons are requested to select a time and place at which they will conduct examinations, and to notify the proper officer.

Examinations are to be conducted in a well-lighted room at least twenty-two feet in length. In testing visual acuteness, only one applicant should be present

in the room at a time. In testing color perception and hearing, any number of applicants may be present, but must maintain silence.

Examining surgeons are provided with the following articles to be used in making examinations:

1. Two cards of test type (Snellen's). (One for illiterates.)

2. A set of wools for testing color perception.

Applicants will bring with them application forms, *in duplicate* on which will be found a blank certificate, to be filled out and signed by the examining surgeon.

EXAMINATIONS IN VISUAL ACUTENESS.

The card of test types should be fastened in a good light to a wall, the bottom of a card being about five feet from the floor.

A distance of twenty feet should then be measured off on the floor at a right angle to the plane of the card. Applicants are then to be admitted singly and instructed to read the card from above downward without assistance. In cases of defective vision, after testing vision for both eyes, each eye should be tested separately. The last five letters read correctly are to be recorded in the report.

Examiners are reminded that the normal-eyed should read at twenty feet the line marked 6 m.

EXAMINATION IN COLOR PERCEPTION.

Examiners are furnished with a set of colored wools, lettered A, B, and C, and numbered from 1 to 40. These wools are divided into three groups, distinguished as follows:

Group A, containing the light green skein A, the green shades numbered 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20, and the gray confusion colors numbered 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19.

Group B, containing the pink or purple skein B, the pink or purple shades numbered 22, 24, 26, 28 and 30, and the blue confusion colors numbered 21, 23, 25, 27 and 29.

Group C, containing the red skein C, the red shades numbered 32, 34, 36, 38 and 40, and the brown confusion colors numbered 31, 33, 35, 37 and 39.

MANNER OF USING THE WOOLS.

Mix the forty skeins thoroughly and throw them on a table in a good light; select skein A, and, placing it about twelve inches distant from the pile of wools, instruct the applicant to pick out the different shades of the same color.

The examiner, having satisfied himself of the ability or inability of the applicant to select the proper skeins, should record the numbers of the skeins selected and return them to the pile. The examiner should then place the skeins B and C successively near the pile of wools, to be treated in the same manner.

In testing for defects in color perception, examining surgeons may be guided by the following brief suggestions:

1. Any number of applicants may watch the test in operation, provided they maintain silence. In case an applicant fails to comprehend the test, he may be directed to step aside and watch another applicant select the skeins, or in the absence of another applicant the surgeon may himself make the selection. This method is valuable in case of color blindness, as the applicant is convinced against his will that the test is a fair one.

2. Do not under any circumstances call the color of a skein. All tests in which the applicant is requested

to name colors or shades are incorrect. The object of the test is to discover whether the applicant can properly classify shades of primary colors, and it is important after he thoroughly understands what is expected of him not to render him any assistance.

3. It is well, if necessary, to explain the difference between colors and shades, for example: Blue, green, red, are colors. Light blue, dark blue, pea green, Venetian red, are shades of these colors.

The examiner should watch the applicant closely and note any hesitancy in selecting the skeins, especially when he appears undecided whether or not to select a confusion color. Should he evince a strong tendency to select any confusion color, even if he does not actually select it, the number of the color should be recorded. Those who are defective in color sense, either select the confusion colors or want to do so.

4. Recollect, however, that blue is not a confusion color for green but only for pink (purple). It must be borne in mind that many men, not particularly ignorant in other matters, find it difficult to distinguish between light shades of blue and green, or between red and orange. This defect is one merely of education. It is the result of color ignorance, but not of color blindness, and should not reject a candidate. In case such ignorance is manifested, it may be well to call the applicant's attention to the fact that he is not well posted in colors.

5. In case of color blindness, the applicant usually adopts one of two courses. He may boldly and rapidly select a number of skeins at random, throwing them down with a great show of confidence, or he will laboriously study over the skeins, carefully selecting a few of the correct colors, and a few—often not more than one—of the confusion colors, always hesitating and usually selecting shades of nearly the same intensity in color and confusion of colors, for example: light green, light gray, light purple and light blue.

The infirmity of applicants adopting the first course is usually easy to detect, but it is often difficult to distinguish between a man who is hesitating and vacillating on account of lack of purpose or color ignorance, and one who does so on account of actual deficiency in color perception. In these latter cases it is well to instruct the applicant not to handle the wool until he has determined what skein he wishes to select. The applicant may also be permitted to watch another while making the test.

6. In case more than one applicant is present during the examination the wools should be frequently mixed, and other applicants should stand far enough from the table to be unable to read the numbers on the skeins, or the skeins may be arranged with the numbers turned down.

Inasmuch as the duties for the different railway employes are widely different, the requirements for efficient service would likewise vary. It would therefore be judicious to formulate the following classification:

In the first class, or those with normal hearing, color sense and visual power, are included the following: Engineers, firemen, engine dispatchers, brakemen, signalmen, conductors and train baggagemen.

In the second class, in which normal color sense and normal hearing are demanded, and also perfect visual power in one eye, while the other might attain to only 20-40 of the standard, or 20-30 visual power in both eyes, or both of which may be made so by the use of glasses, are included switchmen, switch

tenders, agents, operators, station baggagemen and crossing flagmen, or gatemen.

PHYSICAL DEFECTS.

1. Applicants with trachoma or other inflammatory conditions of the eyes, or with chronic discharges from the ear, are disqualified.

2. Hernia, varicose veins of both legs, or very marked varicosity of veins in one leg, phlebitis, skin diseases—especially eczema, or even a strong tendency to it, loss of entire thumb or loss of two fingers of one hand, disqualify the first class, and station baggagemen, switchmen and switch tenders in the second class, while crossing flagmen, agents and operators may be accepted with hernia and also with loss of thumb or loss of two or more fingers of one hand.

3. Unmistakable evidence of chronic alcoholism disqualifies both classes.

4. Acute gonorrhea and the primary and secondary manifestations of syphilis, traumatic and pathologic bubo, disqualify both classes as long as the symptoms are apparent.

5. Orchitis, epididymitis, malignant tumors, recurring appendicitis, old depressed fractures of the skull, or any fracture followed by head symptoms; spinal injuries, epilepsy, antero-posterior curvature, severe injuries of the back, tuberculosis, marked scrofulous cachexia, aneurysm, necrosis, acute and chronic periostitis, acute and chronic cystitis, disqualify both classes. Agents, operators and crossing flagmen may be accepted with antero-posterior curvature without symptoms.

6. While synovitis, arthritis, floating cartilages and impaired mobility of joints disqualify the first class, and switchmen, switch tenders and station baggagemen in the second class, the latter need not exclude agents and operators, provided inflammation has long since subsided and the affected joints be free from pain.

7. From a medical standpoint, diabetes, chronic rheumatism and gout, chronic diarrhea, chronic hepatic disorders attended with jaundice, are disabling in their nature; hepatic, cardiac or renal dropsies, asthma, hemoptysis, valvular disease of the heart, angina pectoris, evidences of organic disease of brain or spinal cord, insolation, inveterate neuralgia of the larger nerves, disqualify both classes, while crossing flagmen may be accepted with a moderate amount of chronic rheumatism.

8. Under the head of disqualifying defects, surgeons will be careful to note any physical defects that would impair the usefulness of the applicant, that would be more or less aggravated by the service, or would contribute to the prolongation of disability in case of injury.

9. In order to prevent fraud in subsequent claims for personal injury, a careful record must be made in the proper place of physical defects which do not impair the usefulness of the applicant, that would not be aggravated by the service, or would not contribute to the prolongation of disability in case of injury.

10. In case the applicant does not show evidence of having been vaccinated since attaining to adult years, he should be vaccinated.

After making the test of vision, color perception, hearing and examination for physical defects, the examination surgeon will fill out and sign in duplicate the blank certificate found on the application blanks.

One of these is sent to the Division Superintendent or Master Machanic, and the other to the Chief Surgeon. The fee for making such examination will be paid by the company unless the applicant is accepted as an employé, in which case the amount of the fee is deducted from his wages. The certificate referred to is as follows:

SURGEON'S CERTIFICATE.

(Here follows a list of stations where examinations may be made.)

The following is the report of the result of my examination of Mr.

1. When placed at a distance of twenty feet from the test types, the last five letters read correctly by the applicant are: Right eye,; left eye,; both eyes,

2. A. The applicant selects skeins numbered as follows, as being the same color as test skein A: B. The following as being of the same color as test skein B: C. The following as being of the same color as test skein C:

3. The applicant hears the tick of a watch with the right ear at inches; with the left ear at inches. For ordinary conversation at a distance of twenty feet, the hearing is impaired.

I hereby certify that, having examined the visual power, color perception and sense of hearing of the applicant, I find him { qualified } to fill the position of { disqualified }

I also certify that there is evidence of his having been successfully vaccinated, that he is not suffering from any disease or disability, nor does he manifest any evidence of an abuse of intoxicating liquors.

Disqualifying defects; defects that do not disqualify (Signed.) Surgeon.
Dated at 189

In presenting this paper, my desire is to formulate a tentative working basis for the purpose named. In all probability its practical working will suggest useful changes, and I am glad to avail myself of this opportunity for conference with the able Fellows here present, and hope that they will make important suggestions.

DISCUSSION.

DR. WEBB J. KELLY—I was very much interested in the paper of Dr. Owens, probably on account of the fact that in Ohio the railways have to a certain extent evaded the law. The law compels them to have the test for color blindness made, and it has been the custom of some roads—I will not say all—to select some one of the trainmasters to make the examination. The doctor in his paper calls attention to one point that impressed me very much, and I think the management of railways should have their attention called to it, namely, not designating what color they are to select as a color, giving it the name. As the doctor says, the test color is placed on the table and then the parties to be examined are asked to select the colors that match it. I have known instances that have come up on one of the roads I represent in which an employe would be examined for color blindness, and he would be asked to pick out all the greens in the bunch, and in that way the examiner would get the man confused. Were he to take the original green and ask the man to match it, I have no doubt the man would have done it correctly. I think this an important point in the doctor's paper to which we should call the attention of the management of our roads where they do not have a regularly employed surgeon to make these examinations.

DR. F. K. AINSWORTH—There is very much to commend in the paper of Dr. Owens and very little to criticise. I would ask the doctor what he does in the case of crippled employes? For instance, a man is employed in some branch of the railway service who has not had an examination for color perception, etc., who has lost a leg or some other member, and the company is anxious to do something for him—what can be done in such case? Under the rules of Dr. Owens that man could not become a flagman. It is becoming a question what to do with

the crippled employes of our railroads. We have filled the positions of flagmen with these men, or in some cases with old engineers who are unable to do anything else.

In regard to the test for color perception, the doctor's rules are the same practically as ours, and I will only speak of one point that seems of great value. I have many times had men fail in the color test when made by the worsteds. Of course, in many instances I believe it was due largely to ignorance of colors, while in others it was attributable in greater or less degree to color blindness. These men, if given low surface flags, can pick them out every time without making any errors. They can pick them out in a dark room. If a man recognizes smoky lights without error, I should think it would be safe enough to put him on duty even if he had failed in distinguishing the wools.

DR. D. S. FAIRCHILD—Beginning with this month I have examined two hundred men under the regulations which have been adopted by Dr. Owens, and I have been astonished at the number of men who could not come up to the standard. Out of fifty-one men examined, twenty-four of them had either defective vision, defective hearing, or had large abdominal rings. Now, I have been making a note of all those cases in which there were large addominal rings. While these men are not disqualified, as far as the railway service is concerned, it is quite possible that some time in the future difficulty will develop. It not infrequently happens that an injured man, either a switchman or brakeman, comes into our office and says he was hurt in consequence of trying to climb on a moving train. The round of the ladder gave way, he fell, and hernia followed. Now, it is quite possible that such a man had weak abdominal walls previous to this time, that the hernial rings were large, and that in consequence hernia was developed and the railway company has to pay for an injury which they ought not to pay for. I do not know what regulations Dr. Owens makes in regard to the acceptance of candidates who have such abdominal rings. To my mind, in a certain sense it would be disqualifying evidence. I have observed that men over 30 years of age, in a large percentage of the cases examined, had defective vision, and that 20-30 was about as far as they could see with both eyes. I find also in a number of instances that vision in one eye would be 20-30 or 20-40, or in both eyes 20-20.

In regard to the color test, I have observed a good deal of ignorance on this subject, and if the applicants were required to name the colors there would be many that would be considered color blind. To mention color does away with the element of ignorance. The candidate on being asked to select the skeins at once says he has been engaged in the kind of work that enables him to learn different colors. Not a few clerks in a drygoods store fail in naming certain colors. He has to simply select two colors and all shades of those colors, and in this way he is able to determine what belongs to the reds and the greens and avoid putting in any combination colors with them. Out of fifty-one cases examined, I found one candidate color blind, and one with a fully developed direct inguinal hernia with an extremely large external ring on either side, which would permit of the introduction of two fingers. I found one case of mitral insufficiency with compensatory hypertrophy. In this case the condition would not disqualify him for employment now, but of course the compensatory hypertrophy would be against him sooner or later. On our road the superintendent is required to have all applicants undergo this examination. When the slack time came last year and year before, instead of laying these men off for a period of time, they were discharged, but were obliged to seek reemployment under the same rules that new or recent applicants would have to observe. These men have all been examined, and I think it is the intention of our superintendent, so far as he has jurisdiction over the matter, not to employ any men over 30 years of age unless they come up to a high standard, and as previously stated, I have

observed that those men who are over 30 years of age have some defect of vision.

There is another point in regard to hearing. We find men in the engineering department—I mean the locomotive engineering department—employed as either firemen or otherwise, in the machine shops, who have defective hearing so far as the watch is concerned. In some cases they can hear a watch tick only eight or ten inches, in one case I recall only four inches, and in another the man could only hear the watch tick two inches distant from one ear, and not at all with the other ear; yet the hearing at a distance did not seem to be materially defective. I requested this last candidate to have a specialist examine his ears and determine whether or not there was any disease of the organ. The aurist returned a written report saying that there was no disease of the ear, and that the watch test was not a fair one in this case; that he could hear easily at a distance of twenty feet, whereas he could not hear the watch at all with one ear, and with the other only a distance of two inches. The opportunity of making these examinations has revealed to me a risk which railway companies have taken heretofore in employing men in this capacity, so far as their physical condition of hearing and seeing is concerned.

DR. OWENS (closing the discussion)—This matter of examining applicants for the railway service is an exceedingly important one, and I might say that an examiner is not made in a day. When I first took the matter up, it took me some three months to investigate it, before I felt justified in doing this important work. Now, we have examiners on our roads who do not really know how to examine these men. Perhaps I ought to be ashamed to say it. I know they will be able to do it after a while. The reports come to me and I pass on them. If there is anything wrong we rectify it in some way. How can we get our examiners to thoroughly examine these applicants? In the first place the matter must be thoroughly studied. I have recently come in contact with the report of a committee of the Royal Society of London on this subject. It takes the subject up in all its relations, criticising the methods of the Board of Trade which seem to be so very defective that they were not accepted at all. It is one of the most valuable pamphlets on the subject that I know of. Then there is a book just issued, the "Dalton Lectures," which treats of the subject of color blindness. There are various text-books on diseases of the eye that one may pick up, but they do not go into the subject of color blindness to a sufficient extent to enable the examiner to do his work well. I intend to get a number of these reports and will have the surgeons connected with our roads procure them through us.

It is said that applicants who have made some mistakes with worsteds are able to name the colors of the flags and the lanterns correctly. The question is whether a man who makes mistakes with worsteds and does not in the case of flags and lanterns should be accepted. That throws into the examination the naming of colors which is a defective method. On the Illinois Central Road the examinations were made first with worsteds, and then Mr. Jeffrey ordered that the examinations be repeated, and the applicants were examined with flags and lamps. I was timid as to the efficiency of the latter method. My assistant, Dr. Allport, of the Illinois Central Road, has examined many applicants with flags and lanterns, as well as with worsteds. The conclusion has been reached that men who are color blind with worsteds will make mistakes with flags and lanterns.

Forty Thousand Acres of Land for Insane Asylum.—One of the acts of the South Dakota Legislature in 1895 was to appropriate and set apart for the use and benefit of the Northern Hospital for the insane, forty thousand acres of the land granted to that State for "other educational and charitable purposes."

APPENDICITIS; PROTEAN TYPES.

Read before Jackson County Medical Society at Kansas City, Aug. 22, 1895.

BY A. H. CORDIER, M.D.

Lecturer on Abdominal Surgery Kansas City Medical College; Vice-President American Association of Obstetricians and Gynecologists.

KANSAS CITY, MO.

To the members of the Jackson County Medical Society a paper on appendicitis may, on first thought, seem a trite topic for discussion, yet when the many phases of this treacherous disease are called to mind we at once realize that it is a topic the importance of which demands oft repeated discussions, that a more unanimous opinion of the pathology of the disease may be obtained, and its proper treatment better understood. In the face of our more advanced and modern pathologic knowledge we yet have conscientious practitioners who claim that they have never seen a case of appendicitis, and another class also exists, that admit having cases, but claim the ability to cure them, denying the probability of a death from the disease. A still more liberal class may be found that is willing to meet the surgeon halfway and become associated with him in the case, waiting and watching for the so-called operation indications to spring up. It is just this delay, too often, that results in the signing of a death certificate. A few days ago a very intelligent, thoughtful professional gentleman (a minister) met me on the street, and referring to a late case of appendicitis upon which I operated said, "I am glad to hear that one case of appendicitis has recovered after an operation." It has crept into the minds of not only the laymen but of the profession, in many instances, that the mortality from this operation is high. This deduction is in part correct, but thanks to the converting evidence of the post-mortem and operating tables the deaths from delayed surgery are of less frequent occurrence than formerly. If any one disbelieves in the advisability of operating in appendicitis in almost every case, he will quickly change his views if present at a number of operations, or if he witnesses a few post-mortems on patients dead from the disease. I do not believe that every patient with a pain in the region of the appendix should be subjected to laparotomy, but I do think that when the diagnosis of appendicitis has been made, if every case was operated upon by a skilled surgeon, the mortality from the operation and the disease would be almost *nil*. A great and dangerous mistake is often made in waiting for the operation indications, as they are usually called, to spring up in these cases. Every case of appendicitis is symptomatically an individual, and the surgeon or physician who looks for a stereotyped case will hunt a long time before the case will be found that exactly tallies in its manifestations with a book description. A large and varied experience engenders the best judgment in correctly interpreting the manifestations of the protean types of this pathology; not only experience in seeing the cases from a practitioner's point of view, but from the surgical and pathologic.

A bright but decidedly conservative practitioner once told me, as I was making preparations to operate on an appendicular abscess, that if the subject was his child he should not be operated on, but after witnessing an operation that revealed a large amount of stinking pus, and a gangrenous appendix, he at once turned over a new leaf, and I have since operated upon three cases for him, with success in all four cases.