report concerning the requirements for color sense except as found in Section 6, which contains nothing of an obligatory or mandatory character. The only explanation for this omission is of course the presumption that it is an oversight and I should recommend that a clause be inserted in Section 5 (in the House of Delegates report), requiring perfect color sense.

Under Section 5, House of Delegates report, class A employees must possess a vision of $^{20}/_{30}$ with both eyes open, without glasses. "Each eye should also be tested separately and the vision of each noted." This opens a wide avenue of discussion. The report of the Ophthalmological Section concerning this same point, says that "employees enumerated in class A shall not be retained in such positions if vision sinks below $^{20}/_{30}$ in one eye and $^{20}/_{40}$ in the other." In other words, a reasonable standard is required of each eye.

I cannot endorse the idea of testing with both eyes open, and of ignoring the condition of a man's worst eye. We must be liberal in our concessions to old employees. A large proportion of old engineers have poor vision. As a man gets older he also usually gets more experience and good judgment, and what he lacks in vision and other physical conditions he makes up in other qualities, nearly if not quite as valuable. I do not recommend the same degree of latitude for firemen that I do for engineers. Firemen are usually young men and have not had the experience and do not possess the ripe judgment of engineers. They should, of course, possess perfect eyes before they become firemen, and this same standard or a very small departure from it, should obtain when their re-examination for promotion as engineer occurs. After they have become engineers, they are entitled to the latitude already referred to. I sometimes feel that the visual requirements of engineers should be graduated from time to time in accordance with their age and years of service, but this solution of the problem complicates a situation which we are endeavoring to simplify. It therefore seems best to state what we believe to be the extreme limits of visual safety for old engineers in the requirements, and then trust in the good judgment of the company surgeon or oculist to settle each case without indulging in hair-splitting technicalities.

A large proportion of engineers past 55 years of age would fail in a strict visual test for distance, unless they used glasses. This means that at the very time when engineers are most valuable to a railroad they must be discharged, because their vision has fallen one point below a prescribed theoretical standard, and although glasses can perhaps give them perfectly normal vision on both sides, they may not be worn. I understand all of the arguments against the use of glasses, they become misty on cold and foggy days, sweaty on hot days, and speckled with dirt and cinders. I question very much whether we have the right to enforce requirements of overpowering character upon old engineers at the present time. No strict requirements were in force years ago when these men were admitted to work. They were accepted with but little ceremony, and now they have grown old in the service, and should be dealt with as leniently as is consistent with safety. But new firemen, who, notwithstanding they possess a vision of $^{20}/_{20}$ in each eye, yet have an apparent substantial hypermetropia of, say, 1½ diopters, should not be accepted. Although this is easily overcome in young life by an active ciliary muscle, it shows itself unmistakably as age advances, and as the muscle loses its power.

Another phase of the matter which cannot be ignored is the labor problem. The removal of a single man, even though he is merely taken from one job and given another, is perhaps sufficient to tie up an entire railroad system. It is well to be sure we are on safe grounds when we remove a good engineer.

I recommend that the House of Delegates' report be further amended by inserting under "Class A" and also under the caption "Entrance to service or promotion" and after the words "$^{20}/_{20}$ in each eye, tested separately without glasses," the words "The applicant shall not possess more than 1½ diopters of apparent hypermetropia."*

Under the heading of Class A, "Re-examination," the testing with both eyes open should be done away with as inaccurate, misleading and unscientific. I recommend that "enginemen shall not be retained in their positions if vision sinks below $^{20}/_{40}$ in one eye and $^{20}/_{50}$ in the other, or $^{20}/_{30}$ in one eye and $^{20}/_{70}$ in the other. Distance glasses must be worn when on duty provided such glasses are necessary in order to bring vision up to the required standard. Extreme indulgence and concessions shall only be made to old and trusted enginemen, at the discretion of the company surgeon, it being remembered that the best vision is desirable and that glasses are undesirable. Firemen shall not be eligible for promotion to enginemen if vision sinks below $^{20}/_{30}$ in either eye without glasses, and shall not be retained as firemen if vision sinks below $^{20}/_{30}$ in one eye and $^{20}/_{40}$ in the other. The whispered voice must be heard at not less than 15 ft. in a quiet room."

Under the heading of Class B "Re-examinations of those in the service," instead of the words "$^{20}/_{40}$ with both eyes open, etc.," I suggest the words "Employees shall not be retained in these positions if vision sinks below $^{20}/_{40}$ in one eye and $^{20}/_{50}$ in the other eye, or $^{20}/_{30}$ in one eye and $^{20}/_{70}$ in the other. Glasses must be worn if they are necessary to secure adequate vision. The whispered voice must be heard at not less than 10 ft. in a quiet room." I suggest the same words in the same section of both Class C and Class D. I recommend striking out entirely Section 7.

*If the applicant can have a 1.00 diopter lens placed in front of each eye (separately tested) without blurring his vision, he has one diopter of apparent hypermetropia. If a + 1.25 or a + 1.50 diopter lens does not blur his vision, he has more than one diopter of apparent hypermetropia.

All-Electric Interlocking at Chillicothe, Ill.

The Atchison, Topeka & Santa Fe has contracted with the Taylor Signal Company for electric switch and signal apparatus at the drawbridge over Illinois River, at Chillicothe, Ill. The machine is to have six levers, to work two home signals, two distant signals, two derailing switches and one bridge lock. The railroad is single-track.

The bridge locking will be accomplished by applying a plunger to the operating lever of the engine, which will lock it in a central or non-operative position until all the interlocking levers are in the normal position, when the lever operating the lock will be released, allowing the bridge tender to apply power to a solenoid and withdraw the plunger. Reciprocally the indication on the lever operating the bridge lock will be controlled by circuit breakers on the lock plunger and at the ends of the draw which will only be closed when the operating lever is locked, draw in place and the rails safe to run over. Additional protection will be afforded by controlling the main battery through the same channels so that improper movements cannot be made by plugging the levers.

Track circuits will be provided through the entire limits of the plant to serve in the place of detector bars and to set signals at "stop" behind trains. A circuit will also be provided which will prevent the bridge tender opening a derail after a train has passed the distant signal; but he will be free to close a derail under any conditions. The drawbridge approaches and the signals will be lighted by electric lights. Power will be obtained from a 75 A H storage battery which will be charged from a 1 k.w. generator driven by a 2½ h.p. gasoline engine.

The estimated cost of this interlocking is a little over $3,000.

Foreign Railroad Notes.

The traffic on the Paris Metropolitan Railroad after the fearful accident last August fell off from an average of 260,000 daily just before the accident to 130,000 immediately after it.

It is reported that the Negus of Abyssinia has granted the French Ethiopian Railroad Co. a concession for 125 miles of railroad in the Anasch valley, said to be the paradise of Abyssinia.

Oct. 1 last there were 2,104 miles of electric railroad in Germany with 3,200 miles of track, in 125 different places. These were served by 12,352 motor cars and 7,967 trailers. Nearly all the old street railroads had adopted electricity.

The third section of the Jungfrau Railroad was opened June 28, extending wholly through a tunnel in limestone rock, from Rothstock to Eizerwand, which latter is 9,445 ft. above the sea. It is affirmed that capital is already provided for a further extension to Eismeer.

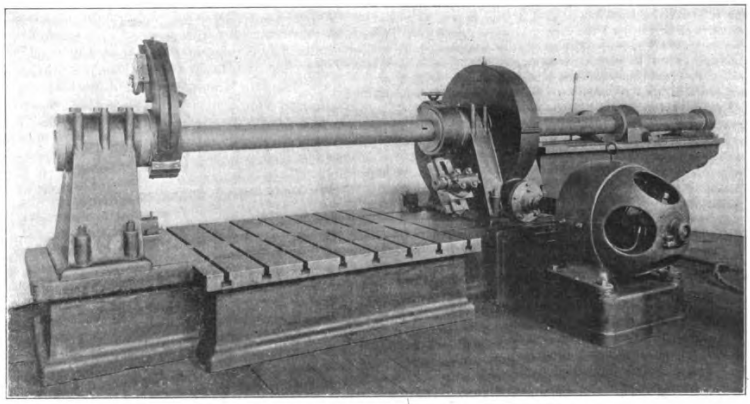
The great electric manufacturing companies have for a long time pressed the management of the State Railroads to permit them to equip certain suburban sections of the railroads out of Berlin with an electrical equipment, and Aug. 15 last the running of electric trains began on one section. Very much is hoped from the experiment. It is claimed that power can be provided at one station for the suburban sections of all the Berlin railroads, and at less cost than by locomotives.

In August the excavation of the Simplon Tunnel from the south penetrated a spring delivering more than 20 gallons per second of water of a temperature of 104 deg., which so warmed the air as to make work very difficult, until refrigerating apparatus was provided. The old spring, which for some time interrupted the work at that end of the tunnel, is now delivering about 375 gallons per second. The extension in July was 713 ft. at the north end and 575 ft. at the south end. The number of men at work was 3,141. Work was suspended at the north end 39 hours during the month on account of high water in the Rhone.

A Motor-Driven Horizontal Boring Machine.

A simple and successful arrangement of applying individual motor drive to a horizontal boring machine is shown in the accompanying illustration. The tool is a Barret No. 3, similar in all particulars to the belt-driven style, except that the cone pulley is replaced by a Crocker-Wheeler 13-h.p. motor mounted on a special cast-iron base which is bolted to the bed of the machine proper. Over all, the equipment occupies a floor space 18 ft. 1½ in. long, exclusive of the projection of the boring bar, by 7 ft. 4 in. wide. The boring bar is 6 in. in diameter and 16 ft. 8 in. long, and is made of hammered steel. An Albro worm and worm-gear with a ratio of 70 to 1 transmits the power, affording a smooth and even motion to the boring bar, particularly desirable in cylinder boring and work of a similar character. The worm and worm-gear are encased in one casting, which protects the gears and confines the lubricant with the assistance of a stuffing box surrounding the worm shaft.

The bearings in the pedestals supporting the boring bar have their centers 24 in. from the surface of the bed and are bored out 9 in. in diameter. Each bearing contains a sleeve, the one in the tail pedestal being 23 in. long, and the other, which forms the hub of the worm wheel being 30½ in. long. These sleeves are fixed against endwise displacement but are provided with feathers which engage the keyway extending the length of the splined boring bar so as to cause all to rotate simultaneously. On extensions of the sleeves between the pedestals are mounted arms which carry facing blocks. The latter support the facing tools and are arranged to feed axially or at right angles thereto by the turning of star shaped hand-wheels. To make the feed automatic, tripping blocks may be fastened to the bed and set so as to revolve the screws one-fifth of a turn at each revolution of the boring bar.



Barrett Horizontal Boring Machine with Individual Motor.

For inside boring a cutting head, not shown in the illustration, is secured to the boring bar, the feeding being accomplished by sliding the whole bar endwise. The extended frame at the right of the machine, with a third bearing at its outer end, adds to the rigidity of the bar and supports the feeding mechanism. This consists of a sliding carriage containing a sleeve that revolves with the boring bar, and which may be secured to it at any point. Any shifting of the carriage causes a lengthwise movement of the boring bar. A pinion on the carriage engages a rack on the frame, allowing direct hand feeding, and there is also a system for automatic feeding much the same as that commonly used on lathes. By this arrangement the bar can be handled very rapidly, and, it is claimed, as easily as a carriage of any 30-in. lathe. The machine has a continuous feed travel of 48 in. in either direction and will bore and face both ends of a cylinder at the same time.

With but the one speed reduction the machine is capable of 12 speeds in either direction varying from $2^2/_7$ to $15^1/_7$ r.p.m., obtained by altering the speed of the motor. The latter is equipped with the Crocker-Wheeler system of multiple voltage current supply, giving six fundamental speeds by distinct voltages increasing by increments of 40 from 0 to 240 volts, and six intermediate speeds secured through the use of a small resistance between each fundamental step.

The Barrett boring machine is built by the Meadville Vise Company, Meadville, Pa., and the motor is the regular semi-inclosed type, size 10-I, shunt-wound, of the Crocker-Wheeler Company, Ampere, N. J.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Jon R Roma (University of Illinois at Urbana-Champaign) on 2015-05-20 21:57 GMT / http://hdl.handle.net/2027/mdp.39015013053841
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google