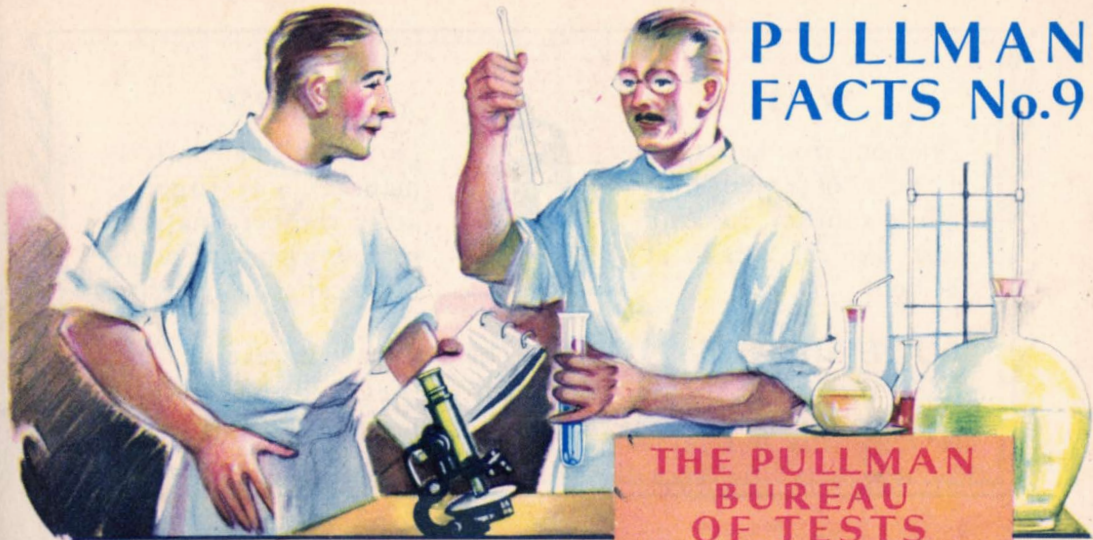


PULLMAN FACTS No.9



THE PULLMAN
BUREAU
OF TESTS

WHY

Does one iron bar stand a "pull" of 125,000 lbs., while another, looking just like it, breaks at 45,000?



HOW

Do the Pullman builders manage always to get exactly the best material for every part and detail of the car's construction?

FOOLISH QUESTIONS? The Pullman Bureau of Tests finds answers to thousands of such queries, and that's why a Pullman car represents perfection of material and construction.

THE PULLMAN BUREAU OF TESTS

JUST as the United States Government maintains a great Bureau of Standards, the Pullman Company has its Bureau of Tests for quality, performance and value of all materials and supplies it uses.

The Pullman Bureau of Tests maintains relations with the government's Bureau of Standards, also with scientific and technical or-

ganizations concerned with such problems. No discovery, invention or technical advance which represents possibility of bettering the Company's products or service has a chance to be overlooked.

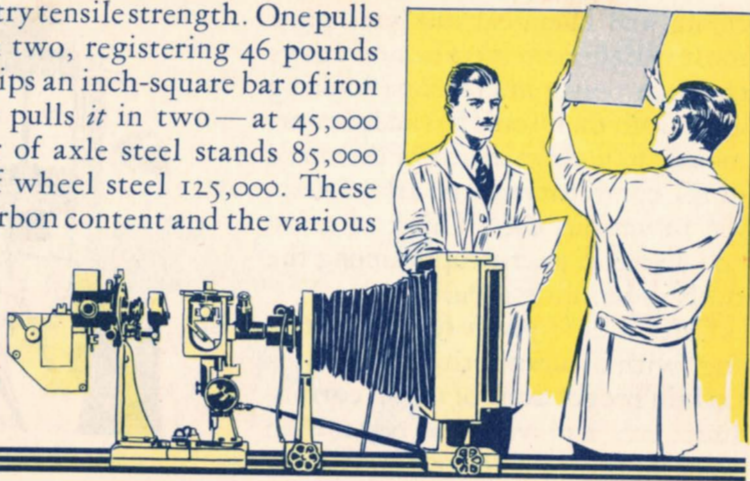
The progress in metallurgical knowledge has been almost unbelievable, and still goes on. At the Bureau of Tests you will be



A CORNER IN THE LABORATORY, BUREAU OF TESTS

shown machines to try tensile strength. One pulls a sheet of paper in two, registering 46 pounds tension; another grips an inch-square bar of iron and just as calmly pulls *it* in two — at 45,000 pounds. A like bar of axle steel stands 85,000 pounds, and one of wheel steel 125,000. These variations reflect carbon content and the various alloys. Until recent years, expe-

PHOTOGRAPHY LOOKS
INTO THE SOULS OF
THINGS



rience and chemical analyses gave most insight into metals; nowadays the high-power microscope looking down into their souls has added enormously to understanding of them and of the combinations and alloys adapted to various uses. Think of using 200-diameter microscopes among the tools in building a Pullman!

Offer a new plush for upholstering, with assurance that it contains certain proportions of wool, cotton, linen, etc., and will wear better than something else. The Bureau will test



PULLING AN IRON BAR IN TWO

one sample in the pulling machine; put another in a rubbing machine that in a few minutes will apply rubs comparable to the friction of passengerial clothing for a year; then a weighted sample will be dissected under a microscope into its components, and these weighed on delicate scales. Chemical tests will be applied—and when it is done the Bureau will know all the maker of that plush



knew. Comparing its showing with results from other plushes, values will be determined.

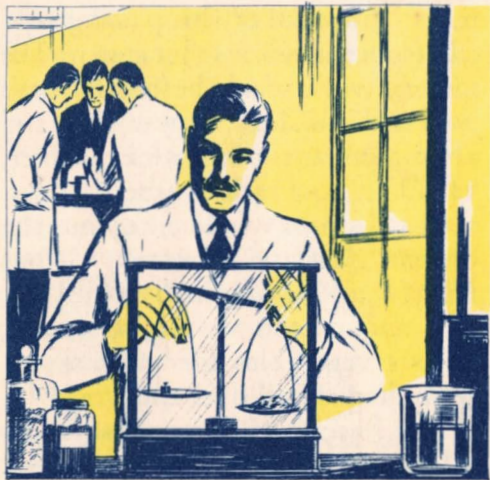
Take paint and varnishes. For wooden cars the ideal paint was one that soaked into the wood's pores.

With steel a sand blast is used to roughen the surface and give paint a good hold. Experiments developed the best paint for the purpose. But nothing of this kind is ever static;

more studies, experiments, experience are constantly bringing better results. A railroad car may be traveling 60 miles an hour through hail, sleet, rain or sand driving against it at 40 miles; may be blistering under southern sun or freezing up north. Its paint must stand all these vicissitudes.

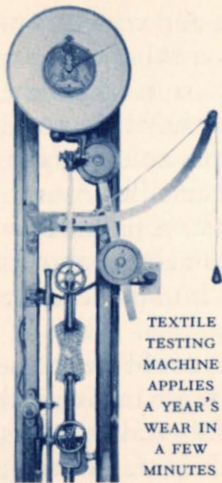
For the wide range of materials used in building Pullmans, an equally wide range of testing methods must be employed. Thus, there are $2\frac{1}{2}$ pounds of the best goose feathers in





the Pullman pillow, and widely separated parts of the world are drawn on for them. The best feathers are American, because they are from larger birds and therefore are larger, more resilient feathers. But Americans are large consumers of feathers and comparatively small producers of geese; so the deficit must be made up by importations.

If a Pullman car could be completely disintegrated into its original elements, its materials and contents reverted to their ultimate sources;



TEXTILE
TESTING
MACHINE
APPLIES
A YEAR'S
WEAR IN
A FEW
MINUTES

and if then the branch of industry or science could be shown, by which they had been transformed or fabricated, it would make a huge catalogue. There would be the hides of animals, the tails of horses, the feathers of

birds, the wool of sheep and goats, silk from the worms that spin it. The mineral world would be found to have provided iron, lead, copper, zinc, tin, aluminum, antimony, nickel, silver, vanadium, and various others. Rocks, sand and stones would enter into the cement, glass and abrasives; various resins would appear in the varnishes; flax and cotton would be found; fibrous vegetables for insulation—from literally all over the world.

The Bureau of Tests must know all the materials and testify to their

character, quality, fitness. In one week 44 analyses were concluded, among them:

ARTICLE	TO DETERMINE
Wrought steel wheels	Conformity to specifications
Alloy elliptical springs	Capacity
Boiler coal	Quality
Exterior cleanser	Effect on varnish
Brake shoes	Wear on wheels
Blanket	Quality
Laundry bleach	Strength
Diaphragm belting	Weave
Japan colors	Shade
Carpet	Grade
Paint oil	Question of use
Cotton ball wicking	Quality, size

Detailed statistics are kept showing results, in actual service, from materials, methods, devices. These serve the same purpose for the Pullman Company as do its actuarial statistics for an insurance company. Largely because of these tests, analyses and studies, the Pullman car has gained its acknowledged place as the world's standard for safety and character among railroad vehicles. The rider in a Pullman-built car knows that he is getting the best that experience and skill can build into it.

PULLMAN TICKETS *are on sale at 4,200 railroad ticket offices in the United States.*

It is advisable to secure your Pullman accommodations at the earliest moment.

All ticket agents and Pullman employes will help you in arranging this detail of your journey.

THIS IS ONE OF A SERIES OF TWELVE BOOKLETS,
THE TITLES BEING AS FOLLOWS:

1. Service You Get With Your Pullman Ticket
2. The Evolution of the Pullman Car
3. The World's Greatest Housekeeper
4. Building a Pullman Car
5. Safety First, Last and All the Time
6. Scientific Ventilation in a Pullman
7. How a Pullman Car Is Lighted
8. Hidden Mechanisms of a Pullman Car
9. The Pullman Bureau of Tests
10. The Peripatetics of a Pullman Car
11. Exploding the Myth of Cheaper European Rates
12. Travel the Educator

COPIES OF ANY OF THESE BOOKLETS WILL BE MAILED ON APPLICATION TO
THE PULLMAN COMPANY, CHICAGO, ILL., U. S. A.