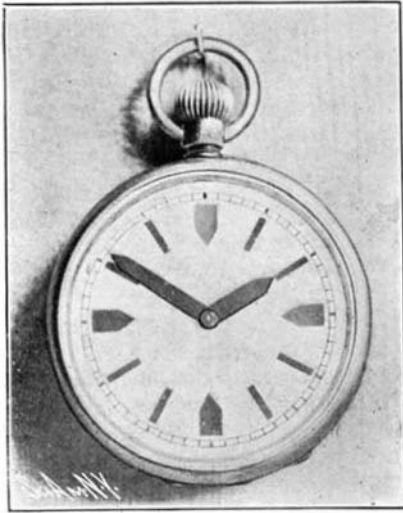


A NOVELTY IN WATCH DIALS.

Major-General Baden Powell, of Mafeking fame, and the author of more than one valuable handbook on military matters, is responsible for an invention illustrated here with which scarcely needs description. It appeals alike to the short-sighted civilian and the soldier employed on night scouting. According to one of the most fashionable jewelers in London, a number of eminent military and naval officers have had the "B-P" dial adapted to their chronometers.



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A CURIOUS ARCHED TREE.

John S. Welter, of Upper Sandusky, Ohio, sends us the accompanying photograph of an oak tree which is a most striking natural growth. The tree is near the village of Wharton, Wyandotte County, Ohio. The roadway which it arches is forty feet wide. At the base the diameter of the tree measures two feet.



AN ARCHED TREE OVER AN OHIO ROAD.

THE "AUTO-CARTE."

AN INGENUOUS DEVICE FOR SHOWING THE LOCATION OF THE CAR AT ANY MOMENT.

The "Auto-Carte" is an ingenious little device which is mounted on the dashboard of the car, and which, by the unrolling of a band of paper, shows the exact position of the car upon the road at any moment. With the high speeds which are now used, signposts are becoming of little use, seeing that they cannot be read usually without slowing up. This is especially true when traveling at night. The "Auto-Carte" has been invented to provide for this case and it will no doubt be much appreciated, as it avoids the handling of maps and gives a sure indication of the road. The strip of paper has printed upon it a map of the road on a sufficiently large scale so that all the needed points can be indicated. It is unrolled automatically by a friction roller arrangement mounted beside the road wheel and connected by a flexible shaft and worm gear to the rollers upon which it is wound. The friction gear can be readily adjusted to suit the diameter of the car wheel should it wear down, and besides the apparatus can be adjusted if need be when passing by some well-known point, such as a town. By using this device the driver can see at just what part of the route the car is traveling, and he can read ahead for a distance of 5 miles, thus finding all the obstacles, turns, descents, etc., long before they are reached. One advantage lies in the fact that as the map is quite exact the driver is not obliged to ask the way, and this is an especially good point when passing through towns. The inventors pay attention to this latter point, and take care to indicate on the band the exact passage through the towns as much as possible. This point will be greatly appreciated. When traveling at night the "Auto-Carte" will prove a boon to chauffeurs, as it is always illuminated and enables them to travel with security at a higher speed than usual.

Bees, Insects, and Flowers.

It is a much contested question, whether insects in general and bees in particular are attracted by the brightness of flowers, or by their perfume. A few weeks ago M. Félix Plateau described at the Brussels Royal Academy the following case: If we place a mirror with a convenient inclination twenty or forty centimeters (from about seven to fourteen feet) from natural flowers, the insects that come and place themselves upon these flowers seem to pay no attention to the reflected images. The Belgian scientist thought himself authorized to conclude that it is not the sight of the flowers that attracts the insects.

M. Gaston Bonnier, who shares this opinion, has just communicated to the Académie des Sciences the result of observations showing, especially, how difficult it is to give a decision in so delicate a matter. When bees are busy in the afternoon collecting water upon the leaves of the aquatic plants, they do not touch the honey that we offer them upon those leaves, or upon floats of various colors. If, on the contrary,

we make the experiment in the morning, the drops of honey are quickly carried away. The learned professor explains the matter by the "habitual" strictness with which bees obey their orders. When they are "commanded" to go for water, they would not allow themselves to gather any honey. In the morning, on the contrary, it is quite natural that the "explorer" bees sent reconnoitering to find a field of plunder hasten to describe to the swarms the honey which they find. What we know of the habits of bees renders pretty probable this ingenious interpretation.

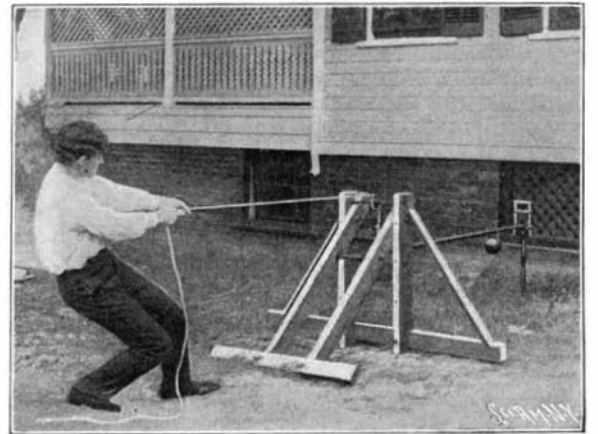
A SIMPLE DYNAMOMETER FOR SCHOOL GYMNASIUM TESTING.

BY THOMAS R. BAKER.

At a trial of pulling strength between two classes of college boys in a "tug of war," the boys grasping, at convenient distances apart, the halves of a strong rope, and the classes pulling against each other with the combined strength of the members of each, the question as to how much a boy could pull in such a contest of strength was naturally suggested. No answer was at hand, not even in the books on mechanics that were accessible, and no means were available for determining this pulling strength experimentally.

An accurate dynamometer is an expensive apparatus, and therefore not conveniently procurable for incidental testing of this kind; and as the cheap spring-balance form of the instrument could not be relied upon on account of its inaccuracy, I concluded to make a simple apparatus for pulling-strength testing involving the lever principle. The apparatus is shown

the frame, to enable the pulling to be done in a horizontal direction; the weight is an iron ball, movable along the long arm of the lever, to adapt the leverage to the strength of the puller; the fulcrum consists of two steel rings fixed in the inclined legs of the frame. The form of support adapted to the working of a



A SIMPLE DYNAMOMETER.

lever for making the tests was carefully determined by first making a model that would work satisfactorily. Two of the legs of the support are vertical and have a cross-piece, whose length is more than twice the width of the apparatus, bolted to their lower ends to serve for lateral bracing. The other two legs make an angle of about 45 degrees with the vertical ones, and their ends, which are let into the ground several inches, are made wedge-shape with the faces of the wedges toward the puller, and vertical so as to enable the ground to offer the greatest resistance to any tendency of the apparatus to move in the direction of the pulling. Outside lateral braces extend from the ends of the cross-piece to the upper ends of the vertical legs, and opposed to this bracing, to increase the rigidity of the apparatus, a piece of inch water-pipe with a connector on one end screwed on as far as it will go, is fitted between these legs; and the bracing is effected by unscrewing the connection.

The lever is a piece of inch water-pipe seven feet long, and to guide it in moving in a vertical plane, it has a short cross-piece of inch pipe screwed to the fulcrum end, giving this end the form of a T. The ends of a steel bar which passes through the cross-piece project from it, and are made with knife-edges to work against the inner side of the ring fulcrum. The iron ball used as the weight weighs 16 pounds. The resistance capacity of the lever varies from 50 to 210 pounds, and the arm is graduated to indicate differences of two pounds. The pulling rope is about three-fourths of an inch in diameter—a suitable size to be conveniently grasped by the puller.

The lever is adjusted to a horizontal position for pulling tests, and is controlled in its upward movement by a stop placed at the end, permitting it to rise only a few inches.

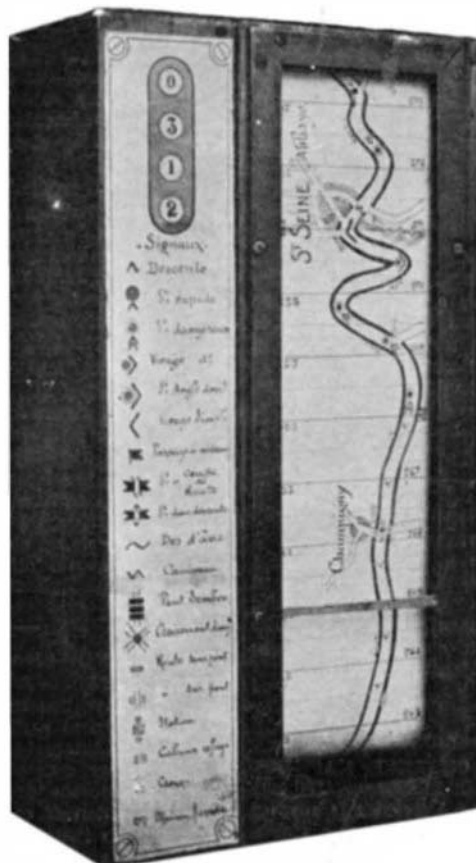
The lever was graduated by bringing the pulling rope, one end remaining attached to the lever, over a pulley fixed in the ceiling of the room, and attaching a board for a scale-pan to the other end; then using carefully weighed bricks in the scale pan to lift the lever weight, adding bricks as the leverage was increased by moving the weight outward. It was found, however, that the graduating could quite readily be done by means of an accurate steelyard.

To render the apparatus more readily transferable, the frame is put together with bolts, and the lever is made removable.

This apparatus has proved interesting and valuable, many of our students having used it to determine their pulling strength in pounds, to find out how much stronger in this respect one was than another, and to find who was the strongest among a crowd of boys making the tests. Moreover, the apparatus may serve a good purpose in gymnasium work as a strength developer. Indeed, it would seem to be a desirable apparatus for common gymnasium outfits, and on account of its easy construction and small cost it is readily procurable.

The number of pounds that could be pulled was, very naturally, found to depend greatly upon the foot resistance that could be secured, other things being equal. If the puller dug a hole in the ground with his heel, and pulled against this resistance, he could pull considerably more than he could simply against the resistance afforded by the level ground. Of the fifty or more boys who tested their pulling strength with the apparatus with ground heel-supports, their pulling varied from 125 to 210 pounds; and without these supports, from 35 to 50 pounds less was recorded upon the apparatus.

in the accompanying cut. It is essentially a third-class lever working in a strong wooden frame with spreading legs, and somewhat like the trestle used by mechanics. The pulling force is the power, and it is exerted through a rope attached to the lever, and running over a pulley supported by the upper part of



AN AUTOMOBILE ROAD INDICATOR. THE DEVICE TELLS THE CHAUFFEUR HIS EXACT LOCATION AT ANY MOMENT AND THE CHARACTER OF THE ROAD BEFORE HIM.