

THE CAPTAIN

A MAGAZINE
FOR BOYS & "OLD BOYS".



VOL. IV.

OCTOBER, 1900, to MARCH, 1901.

London :

GEORGE NEWNES, LIMITED, 7 to 12, SOUTHAMPTON STREET, STRAND.

CONCERNING CYCLOMETERS.

BY HAYDON PERRY.



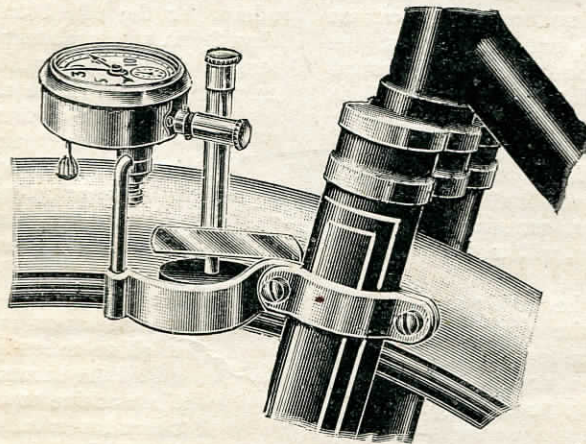
THE growing popularity of the cyclometer among cyclists is not to be wondered at, for it is an instrument at once useful and neat, and its inner mechanism is exceedingly clever and pretty. Most boys have a liking for machinery, and this natural instinct, if I may so call it, has been greatly stimulated by the bicycle. The necessary interest taken in the machine and its working parts is readily

extended to other forms of mechanism, and the cyclist unconsciously becomes something of an engineer. I should think there are very few boys who have not at some time or other had their curiosity prompted to examine the works of a clock or a watch. That is the preliminary to the second step of trying to take the clock to pieces. This accomplished, there still remains the third process of putting the parts together again. Such a task, when undertaken for the first time, generally presents many very puzzling difficulties—a warning which I offer to such as may be a little less clever with their hands than some of their comrades are. With this caution, meant to prevent the wholesale destruction of cyclometers by such as possess them, I may say that any boy with a mechanical turn who will take the pains to dissect his own will find that it contains as compact and pretty an arrangement of watchwork as he could wish to see. Indeed, the cyclometer resembles the watch inasmuch as both are really nothing else but counting machines. The purpose of a watch is to count fractions of time,

and add them up as it goes. It is usually constructed—although not always—to count quarter seconds, and the balance wheel, which accomplishes this, is connected with a series of other wheels so arranged as to add the fractions up into minutes and hours, and show the total as it grows by the movement of the fingers on the dial. If at the end of a day or a week the watch is still found to be compiling its total punctually we say that it keeps good time. But no one expects a watch, however costly a one it may be, to remain for any great length of time absolutely accurate. It will, sooner or later, get ahead of the sun, or lag behind him, and we shall say that it is either fast or slow.

Now, if clocks and watches were worked by the sun,³ instead of by springs or weights, they would always tell the right time. A moment's consideration will show that a cyclometer is really a kind of clock which is worked by its own sun, that is to say by the little "striker" or knob which is fixed to one of the spokes, and the revolutions of which it is the function of the cyclometer to count. A watch may fail to count accurately the apparent motions of the sun; but a cyclometer cannot err in counting the revolutions of the striker,

because as the striker comes round he hits the cyclometer's star wheel and so actually sees to the counting himself. Are cyclometers, then, all absolutely accurate? Yes, as counting machines pure and simple they are. They cannot help counting correctly; where they are at fault is in converting the counted quantities into miles, and this is due to no defect of their



THE "METROSCOPE" CYCLOMETER.

own, but to sources of error outside them—so numerous, that when I have told you a few of them you will be astonished that a cyclometer can be made that is any good at all.

The cyclometer is the direct descendant of the old pedometer, which, when carried in the pocket, was supposed to keep a record of the

distance its possessor walked. It was worked by the up-and-down motion of the body, and was really a very simple counting machine, but unless its owner made the proper number of steps to the mile, as estimated by the inventor, the mileage recorded at the end of the walk would be wrong. Some pedometers were made so that they could be regulated to the walking habits of the individual. But the same person does not take the same length of stride at all times. It varies with his pace, with the object in view, with the mood of the moment, even with the time of day; not to mention the kind of boots or shoes he may happen to be wearing. So that at the best the poor pedometer was but a sorry guesser at the truth. The inventors of the cyclometer argued that a man on a bicycle was perforce compelled always to take the same length of step, and for the earlier kinds of recording instruments absolute truth was claimed. We shall see that this argument was wrong, and that truth is more than can be expected from even the best and latest types of the instrument. To begin with, nobody knows exactly by how many a diameter must be multiplied in order to get a circumference. The wisest mathematician cannot answer you the question, but will only put you off with sage remarks about the quantity called π . Let us suppose this to be 3.14159, which is certainly very near the mark. Then a 28-in. wheel is just 88 ins. round, and will consequently travel that distance in making one turn. You will find, if you work it out, that 88 ins. are contained in a mile exactly 720 times, with nothing over.

It might, therefore, be rashly supposed that all that the cyclometer maker had to do would be to so arrange the mechanism that 720 strokes from the little striker should move one digit in the mileage total, just as 240 quarter-second swings of the balance wheel of a watch are arranged to move the hands over the space marked for a minute. But a bicycle wheel is not always the same size. When we say it is a 28-in. wheel we mean that 28 ins. is its maximum size. It is only that size when the tyre is hard blown, and when there is no weight in the saddle. The moment a tyre is depressed

a flat place is formed in it, and it measures slightly less round than before. If a 28-in. wheel is depressed sufficiently to make it only effective as a 27½-in. wheel it will have to

turn round thirteen more times to run a true mile—that is, it would register its mile thirteen turns too soon. It is clear that the actual size of a bicycle wheel must be constantly varying. It gets smaller and smaller during a ride, and then suddenly goes back to its largest again the moment it is re-inflated. In addition to this there may be circumstances to change the size of a tyre all in a moment. In riding downhill the weight is thrown forward, and unduly depresses the front tyre, slightly easing the back one; while in hill climbing, on the other hand, weight is taken off the front wheel at the expense of the back one, and the former thus becomes momentarily rounder and larger. Hence it

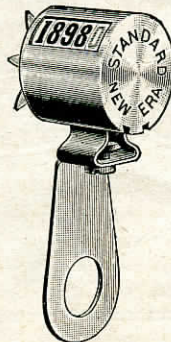
will be seen that if the cyclometer manufacturer wishes to make allowances his task is a very difficult one, and all that we are entitled to expect of him is that he shall make the best guess he can. The makers of the "Veeder" cyclometer consider that 728 revolutions to the mile for a 28-in. wheel is a fair average. This allows for the wheel travelling scarcely more than 87 ins. with each turn. But there are other factors of error for which the maker cannot calculate with any hope of accuracy, and nearly every one of them tends to make the cyclometer "gain," by which I mean make it count up its miles faster than they are actually covered.

Just a very few factors act the other way, that is, tend to make the cyclometer "lose." For example, there are some riders who, when they find themselves on a winding road, and have it all to themselves, will keep cutting off all the curves. This practice helps the machine to bridge the distance between two milestones before it has itself travelled a full mile. This is because in road measurement it is common to lay the chain along the centre of the way, following all the bends and turnings. If you keep down to the left

hand side of the road, in your proper place, your course will, in the long run, be of the same measurement as that of the central line, to which it is parallel. But how many riders,

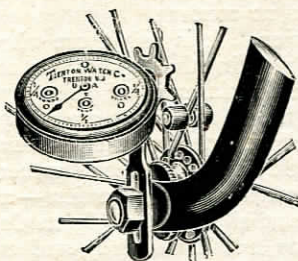


THE "VEEDER TRIP" CYCLOMETER.



THE "NEW ERA" CYCLOMETER.

instead of riding a shorter line than this, habitually ride a longer? There is traffic to be dodged. There are stones which it is well to swerve out of the way of. There are strips of



THE TRENTON CYCLOMETER.

metal, better than the average, towards which the cyclist instinctively deviates. If he keeps straight on, without picking his way, there are lumps and hollows in the road, all of which are measured out by

the cyclometer as if they were extra bits of straight.

But there is another, and, perhaps, the most variable factor of all, against which the cyclometer can make no provision. In order to maintain the balance on a bicycle constant departures from the true course must be made. These are imperceptible in the case of the old rider. He makes what we call a straight line, even at very slow paces, and no rider should be satisfied until he himself has learnt to do this. But it is not really a straight line, even with the best of riders. With the novice the deviations are very marked. I leave out of account the period during which he wobbles all over the road. There is a time, much later, when he thinks he can ride, but when a comparison of wheel-marks will reveal the fact that he rides a much longer distance than the old hand does who covers precisely the same journey. This kind of error tends to disappear with skill; but, so long as it is there, the usual method of fixing the cyclometer exaggerates it. Has it ever struck you that the two wheels of a bicycle do not travel the same distance in the course of a run? The front wheel always goes further, for at all times when the machine is not making a dead straight line the hind wheel is trying to cut off and lessen the curve made by the front one. You can prove this by wheeling the machine about and observing. It is impossible to wheel it so that what I have said does not apply. Even if you wheel it backwards you will see it is still the driving wheel which makes the shorter course, and the steering wheel the longer. Now, as the cyclometer is, for a number of reasons, nearly always fitted to the front wheel, there is here another circumstance which gives to it a tendency to "gain."

In spite of all I have said I should recommend every cyclist to invest the few shillings required in order to make him the possessor of

a cyclometer. A record of mileage is not only interesting in itself, but it has a practical value, inasmuch as it makes it easy to find out the length of life of a tyre, a chain, or any other working part. You can, of course, keep a record by measuring off your distances on the map, or by carefully noting the figures on mile-stones. But human errors—especially those of exaggeration—are, as a rule, far greater than those of the cyclometer. Any one of the instruments illustrated in this article will keep a more faithful record than 999 riders in 1,000 are able to keep. All the cyclometers do the same thing, although not quite in the same way; and their allowances are not all alike. The way to get the fullest and most faithful service out of a cyclometer is to do a bit of averaging of your own, in addition to that which the maker of the instrument has done before. Notice on some length of properly measured road how far your readings disagree with the milestones, and from this you can discover a percentage of correction which you can apply to all readings.

The majority of cyclometers, although not all, hail from America. Somehow, our friends across the water always excel us in making little knacky bits of mechanism. I am indebted to two of the largest importers—Messrs. Markt & Co., of Shoe Lane, and Messrs. A. W. Gamage, of Holborn, for the illustrations to this article. They show a considerable variety of typical cyclometers, each possessing its own special merits and claims for consideration. The "Veeder" has already been mentioned. An amplification of it, called the "Veeder Trip," shows in addition to the grand total compiled to date, the mileage of the last run or tour. This idea has also been employed successfully by the American Watch Company, of Boston, U.S.A.; but their cyclometer was not in the neat barrel form of the "Veeder." Another nice little instrument in this form is the Standard "New Era." The "Trenton" cyclometer is of the ordinary dial pattern, but is made of aluminium and is characterised by extreme lightness.



THE "VEEDER" CYCLOMETER.

Then there are cyclometers which do something more than move figured wheels to record the distance run.

The "Signal" cyclometer sounds a little gong to mark each completed mile, and is a not unpleasant companion on a solitary ride. The "Metroscope," of which an illustration

is given, has the added merits of a speed indicator. A light spring holds a small wheel against the rim, and at all speeds exceeding five miles an hour it transmits to ingenious mechanism in the instrument an impulse that serves to actuate a sensitive hand which indicates the speed by pointing to figures on the dial. Mention should not be omitted of the "Security" cyclometer. In practice it was found that cyclometers were particularly liable to injury, especially in such places as guards' vans, where heavy luggage might bend the light bracket of attachment or do other serious damage. The inventor of the "Security" cyclometer places his instrument inside the wheel, the striker being a stationary fixture to one of the front forks. It is there kept neatly out of the way. You see, for purposes of reckoning

time it would not matter whether the earth went round the sun or the sun round the earth. So with the "Security" cyclometer. It gets its motion from the striker at each revolution, and the fact that it turns a somersault between each contact is a matter of no concern.

A word in conclusion. It is only those who are incapable of appreciating the highest joys of cycling who will ride for the sake of piling up great cyclometric totals. Such riders are really the slaves of the cyclometer, and make it their tyrant instead of their friend. It should rather be regarded as a serviceable companion—a willing little drudge at all times, ready to do your counting for you, and if rationally used in this way its merry little wheels will serve to add to the interest of the afternoon or evening spin, or to the more protracted delights of touring.

THE HERRING INDUSTRY.



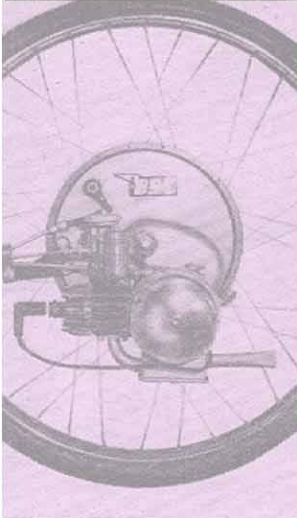
PEOPLE who live far away from the coast towns in which the herring industry is carried on have very little conception how these towns are dependent upon it for their very existence. Take Peterhead, for instance. It is no longer the chief centre of the whaling industry, as it once was. From a fleet of over thirty splendid whalers, which sailed from its harbour every year to the icy regions of the Arctic, there remains not one! Dundee has now the monopoly of this industry. Peterhead had to find something else for a livelihood, and naturally turned to the herring. Every year a fleet of from three to four hundred boats—two-thirds of them belonging to smaller towns and villages around the east coast of the North of Scotland—engage in the industry from this port. The herring swim in shoals, and sometimes within a couple of miles from land. The fishing is done at night, and, of course, by means of nets. When the herring are close in shore, and the sea is calm, you can see the lights of the boats stretching right along the horizon. The nets remain in the sea all night, and are hauled up early in the morning. The catch is estimated by "crans" (a cran being four pretty large baskets of exactly the same size, made for the purpose) and one boat can contain about a hundred crans.

As soon as a boat arrives in the harbour with a

"shot" (as the catch is called), a few herring are put into one of these baskets as a sample. The herring-buyers (or fish-curers, as they are called) take the sample of the boat's catch to the sales-room, and "bid" for it. The price varies very much, according to whether the fishing is good or bad. After the fish have been bought they are at once carted to the yard of the fish-curer who has bought them. Here they are emptied into great, deep, oblong boxes and "gutted." This is done by fisher girls chiefly. It is a sight to see them do it. One clean, swift cut with a knife, and the herring is tossed aside into a barrel, where a man throws salt over it. This is to make them keep, as they have to go to the continent. The girls are paid according to the number of barrels which they fill, and it is astonishing how many they can fill in a day. If there has been an exceptionally heavy fishing they work all night, by the light of torches attached to anything near at hand. If the fishing is a very light one, the herring are usually "smoked" and converted into kippers. As I stated before, the herring sometimes approach to within a couple of miles of the land. At other times the boats have often to go nearly a hundred miles for them. The boats are often at sea from Monday till Saturday. The fishermen are a hardy, cheerful race. They have to be hardy to face the storms which the North Sea is so subject to, and often need all their cheerfulness, as, for instance, last year, when the fishing was a total failure. Let us hope it will be successful this year!

GILDART J. WALKER.

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