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RATE OF BICYCLES.

PERFORMERS on the bicycle are interested in knowing the speed at which they may at any moment be travelling. It is therefore well to remind them that they may learn it by means of a seconds watch, or, better, by means of a miniature pocket sand-glass, constructed with reference to the size of the wheel of their bicycle. It would consist of a bit of glass tube 2in. long, containing some sand, sealed at both ends, and constricted in the middle, and could of course be easily carried in the waistcoat pocket. In using it the person on the bicycle has only to hold it upright and to count the number of strokes that he makes with *one* of his feet on the treadle during the time that the sand is running. That number of strokes gives the number of miles per hour at which he is proceeding. The following table shows the period of the sand-glass appropriate to wheels of different sizes. Makers of bicycles might do well to get opticians to make some of these little instruments for them suitable to the different sizes of wheel that they employ. The cost would be trifling.

Circumference of the wheel.	Diameter of the wheel.	Appropriate period of the sand-glass.
ft. in.	ft. in.	sec.
8 9½	2 9½	6
10 3½	3 3½	7
11 8½	3 8½	8
13 2½	4 2½	9
14 8	4 8	10
16 1½	5 1½	11

EXPLANATION.—Suppose for a moment a gigantic bicycle, whose wheel was exactly one mile (or 1760×36 inches) in circumference, then, when it was proceeding at the rate of one mile an hour, the wheel would make one revolution in one hour (or in 60×60 seconds). If it was proceeding at the rate of two miles an hour, it would make two revolutions in that same period; if at three miles, three revolutions; and so on. Next imagine a Lilliputian bicycle, whose wheel was only one inch in circumference; when it proceeded at the rate of one mile an hour its wheel would make one revolution in $\frac{60\times60}{1760\times36}$ seconds (that is, in $\frac{10}{176}$ seconds); and, as before, if it were proceeding at two miles an hour it would make two revolutions in that same period, and so on. Hence generally, if the wheel be n inches in circumference, the number of revolutions that it makes in $\frac{10n}{176}$ seconds will give the number of miles per hour at which it is travelling.

I was originally indebted for this idea to the late well-known mathematician, Mr Archibald Smith, who applied it to paces; and I published an account of the method, but not with reference to bicycles, in my "Art of Travel."

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