

PHILADELPHIA ICE BOATS.

Some years since the city of Philadelphia built three boats specially designed for the work of breaking up the ice in the Delaware in front of and below the city, the river often freezing up in winters of no very great severity, so as to seriously interfere with navigation. Our picture represents the largest and most powerful of these boats at work, and it is said that any one of these boats will readily plow through twelve inches of solid ice. The boats are built of iron, including the wheel boxes, and were designed under the supervision of Captain H. E. Melville, who has since had charge of their maintenance. The following are the dimensions of the boat shown. Extreme length, 216 feet; length on load line, 200 feet; extreme width, 72 feet; beam moulded (hull), 34 feet; depth, 17 feet. She has two independent condensing engines of 3,300 total horse power, and eight Scotch boilers, each 10 feet in diameter and 9 feet 6 inches long. Her coal consumption is 3,960 pounds per hour, and she has a crew of thirty-one men.

During the present winter all these boats have been in active service, but they were not in use at all last

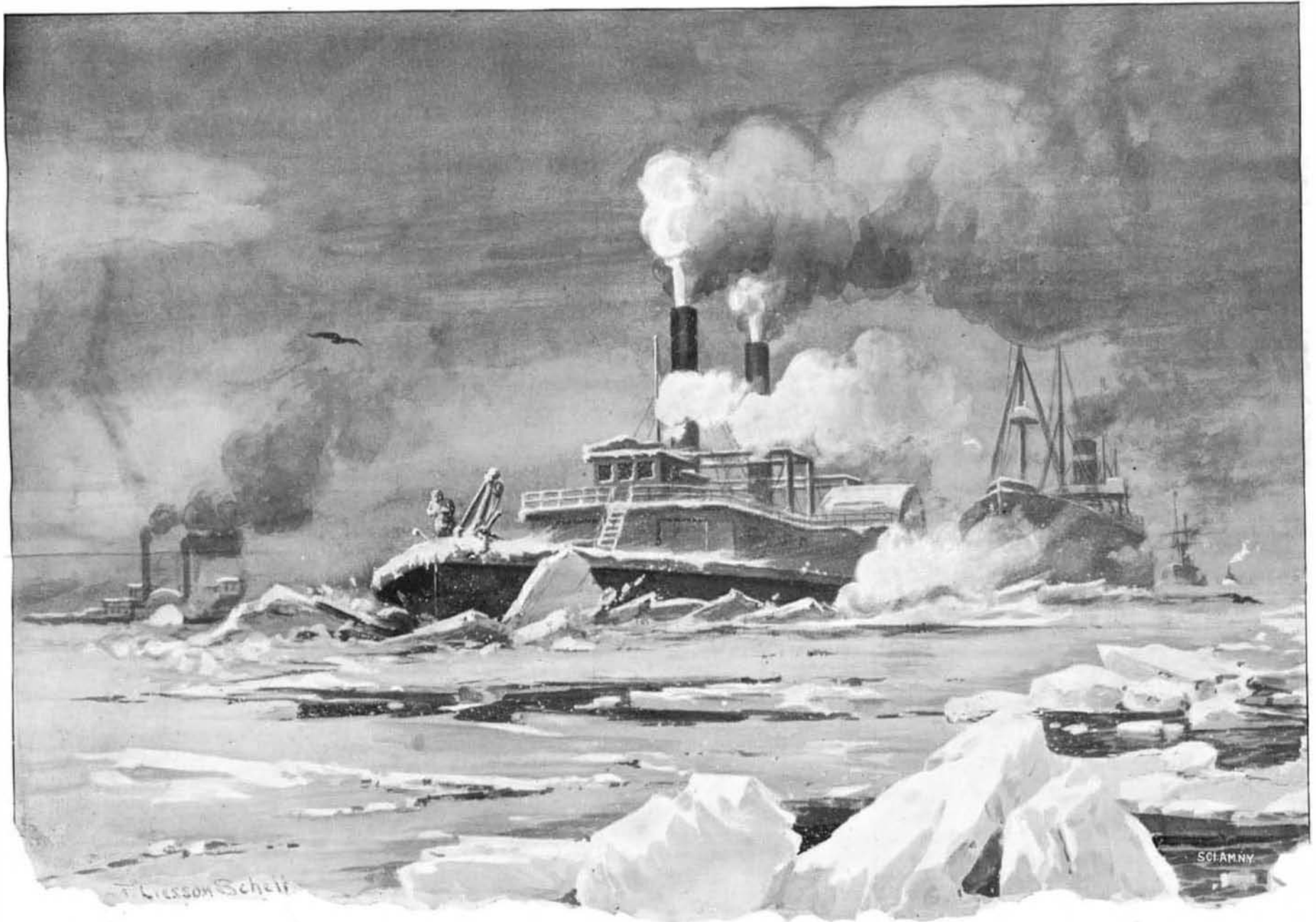
drive machinery of any great magnitude. At the present time, however, they are built in sizes considerably larger than 100 horse power.

It is not many years since it was generally thought that the gasoline engine was doomed, that it would soon be obliged to give way to the electric motor. There are numerous objections to the electric motors. In the first place the expense of current is greater than the public had expected it to be. While the motor itself is a simple affair and not likely to get out of order, the machinery at the power station is likely to meet with a serious breakdown and without a moment's warning. Such breakdown during the busy part of the day is a matter of no small consideration. It is said that the shutdowns for repairs to the machinery or the line, the latter particularly, as it is exposed to many risks—fire being the most annoying—are not more numerous or otherwise damaging than those which occur in the small independent plant, but it is a peculiarity of human nature to experience less exasperation with trouble from a domestic than from an outside source. Another inconvenience of the electric motor is that it cannot be used even a little after the

the engines will have to hold back for a time in order to retain the standard number of revolutions. Every mill and elevator man has learned to appreciate a regular speed. Taking everything into consideration, it is quite probable that the next ten years will witness the development and use of gas engines to an extent little dreamed of by the average person.

Dangers in the Pocket.

If the reports in several papers recently are to be credited there may exist considerable danger, of which the public should be warned, in the act of carrying in the same pocket certain articles which are in popular request, but which together, as would appear to have been demonstrated, may form a firework ready to "go off" on the slightest provocation. Thus it seems that the simultaneous occurrence of a safety match box and chlorate of potash lozenges in the same pocket led to a series of small explosions, setting fire to the clothes of the unfortunate wearer and severely burning his legs. It is a well known fact in chemistry, of course, that red phosphorus—one of the constituents of the safety match box rubber—combines with explosive vio-



THE PHILADELPHIA ICE BOATS CLEARING THE CHANNEL ON THE DELAWARE RIVER.

year. Each boat has its own work laid out for it. No. 1 patrols the Delaware and Schuylkill fronts and the Horseshoe, at the lower end of the city. It is at this latter point the most difficulty is met, the ice here becoming jammed by the recurring tides so that few vessels can pass through it unless convoyed by the ice boat. Boat No. 2 keeps the channel open between Fort Mifflin and New Castle, and No. 3 plows her way from the head of the bay to the breakwater. The trip of one of these boats makes a most interesting picture. Following closely in her wake is a fleet of steamers and sailing craft under tow of tugs, and frequently large fleets of oyster boats and fishing vessels bring up the rear. No charge is made for the service of the boats unless a tow is required, which service is not given unless the ice should be too heavy for the ordinary tugs.

Gasoline Engines.

Says a writer in *Milling*: The word gasoline suggests danger in the minds of many. It is nevertheless a fact that fewer accidents occur with gasoline engines than with steam power. The very fact that insurance rates are considerably less where gasoline engines are used is evidence that they are less dangerous. It has been but a few years since this type of engine was built in small sizes only, and were not intended to

hour for current to be shut off without nearly double the expense. One may require power but a few hours during the day. Were it not for the city ordinances requiring a licensed operator for every steam engine plant, large or small, the electric motor would have made even less progress than it has. Nearly all the objections are overcome by the engine which can be operated with the gas from the city retorts or made from gasoline on the spot. It can be used at any time. When not in use it is not an expense. It requires no licensed operator.

The advantages claimed over steam engines are also quite numerous. Every one knows the tedious preparations required before starting a steam plant and the constant care and anxiety to keep engine, boiler, pump, heater, and piping in order. There is frequently an endless amount of trouble in cold weather on account of pipes freezing. One of the great advantages which the gasoline engine possesses is that it can be operated with a reasonable amount of regularity. The fuel can be turned on and safely relied upon that it will be delivered with a certain degree of regularity. There are many cases where the engine is practically allowed to take care of itself for a half a day at a time. We have only to observe the smoke rolling out of the tall smokestack to be convinced that at times a great deal of coal is being wasted, and heat as well, and that

lence with chlorate of potash; but the possibility of such a reaction taking place in a person's pocket has not been foreseen, although, on reflection, we easily see that in these materials there occur two powerful elements—oxygen and phosphorus—which simply yearn, so to speak, to combine. This effected, the lively combustion of the sugar of the lozenge would follow as a logical but very unpleasant sequence. When, therefore, a chlorate of potash lozenge is placed in the same pocket as the safety match box, the pocket is unwittingly converted into a miniature magazine for fireworks, which, if they happen to "go off," cannot certainly be for anybody's "benefit." In any case, a person commits a breach of sanitary law surely when he keeps soothing medicaments in the uncongenial company of a safety match box.—*Lancet*.

The Phonograph in Typography.

As a matter of interest, Sir B. W. Richardson mentions that the first article in the current issue of the *Aselepiad*, occupying some twelve pages, was dictated by him into Messrs. Hazell, Watson, and Viney's phonograph. The operation occupied rather more time than reading the same article aloud from print, but yet was surprisingly rapid, and the compositor set up the type from the phonographic "echo" with extraordinary correctness.

[BOSTON COMMONWEALTH.]

Latest News From Mars.

Mr. Lowell's four lectures on the planet Mars were heard by crowded audiences of people who filled every seat and all the standing room in Huntington Hall. For once, we got the very latest advices from that planet. The observatory in Flagstaff, as our readers know, was established by Mr. Lowell himself, and the position of Mars in the last summer gave him opportunity to make such observations as have never been made before, and to reveal to us what are marvels indeed. The result, as our readers know, is the firm conviction in his mind that intelligent beings occupy the planet Mars, who know how to work in the common good, who have contrived public works of vastly larger extent than we of the earth have dreamed of, and have carried out their contrivances with a precision and strength wholly unknown in mundane affairs.

It is impossible in print to describe the charm of Mr. Lowell's lectures. His humor, his ready wit, his complete knowledge of the subject with which he deals, are such as one has no right to expect in the same public speaker. The most serious considerations are made interesting by analogies with affairs with which we are familiar and in which we are at ease. Everybody knows how light his pen is when he writes of his travels, and his ease as a public speaker and the readiness with which he takes his audience into his confidence give an additional charm to the lectures as he reads, or rather, as he delivers them.

There are not more than twenty people in this earth who have seen what he has seen. Even some of the great observatories of the world are so situated that they have not noted the marvels which the Flagstaff observatory has revealed to us. But truth is truth, and it matters but little whether at this moment it have twenty apostles or two thousand. It is certain that the revelations which the Flagstaff observatory has made from its signal station to the world are revelations which will be accepted.

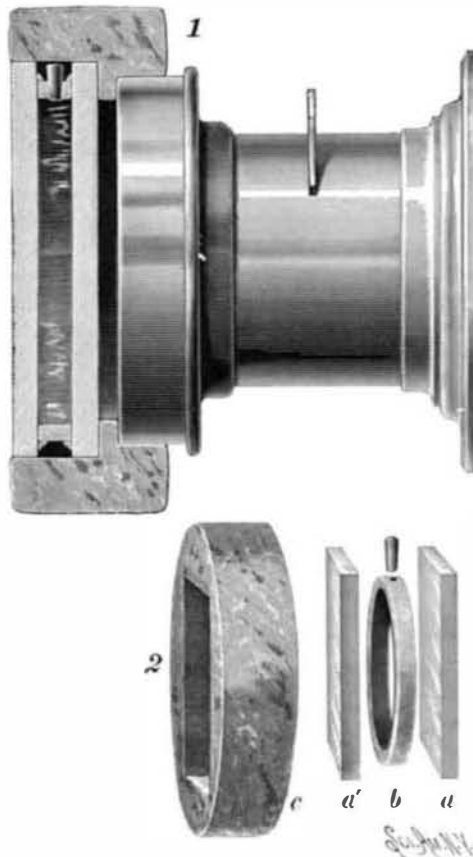
It was Mr. Lowell's good fortune to reveal the relations of what he calls so well the "oases" with which the great canals of Mars communicate. These "junctions," shall we say, where two, three, four or even seven canals meet each other, seem to be the fortunate spots on the surface of Mars where one supposes that the inhabitants live in luxury, which they have secured for themselves by the diligent work, perhaps, of ages upon ages in the past. That is to say, an "oasis"—and of the oases one dares not say how many there are; they are to be counted now by hundreds—an oasis is a circular or oval spot, perhaps of a hundred and fifty miles in diameter, of living green. Its green is so dense and dark that when we are forty million miles from it, its rich verdure may still be made out, if we have an air as clear as they have at Flagstaff. The readers of the Commonwealth must not regret that this green fades away in its season. They must remember that Boston Common to-day does not present, even to their own eyes, the same aspect with which they regarded it in July or in August. It cannot be doubted that in the period of vegetation these strong-minded and strong-limbed men have been able to lay up, perhaps, the barrels of flour, perhaps the bales of manioc, perhaps the bananas or oranges, with which in the long winter of Mars they shall make life tolerable and even luxurious.

Mr. Lowell, with great humor but with absolutely accurate mathematics, showed to his hearers how large and tall and strong the Martian people might be. The attraction of gravitation is only one-third what we have here. The mathematical reader will see at once, if he be an anatomist as well, that there is no reason why the men should not be nineteen feet tall and why the Venus of Milo of Mars should not be sixteen or seventeen feet high. The physical power of this man is as great in proportion, his memory of the past may be more accurate, as it would seem that his foresight for the future is more sweeping. So it is that a population quite as dense, we may believe, as the population of this world, a population which has not spent, apparently, most of its history in mutual throat cutting and constant quarreling, has achieved the marvels of irrigation and vegetation which we see upon the planet Mars to-day. EDWARD E. HALE.

RAILWAYS in Holland are carefully managed. Accidental deaths on them average only one a year for the entire country.

CLOUD PHOTOGRAPHY.

The difficulties in obtaining good cloud effects in pictures are very well known to photographers. To the majority a good photo with a fine cloudy sky is an exception, not to say an accident. We think it is not

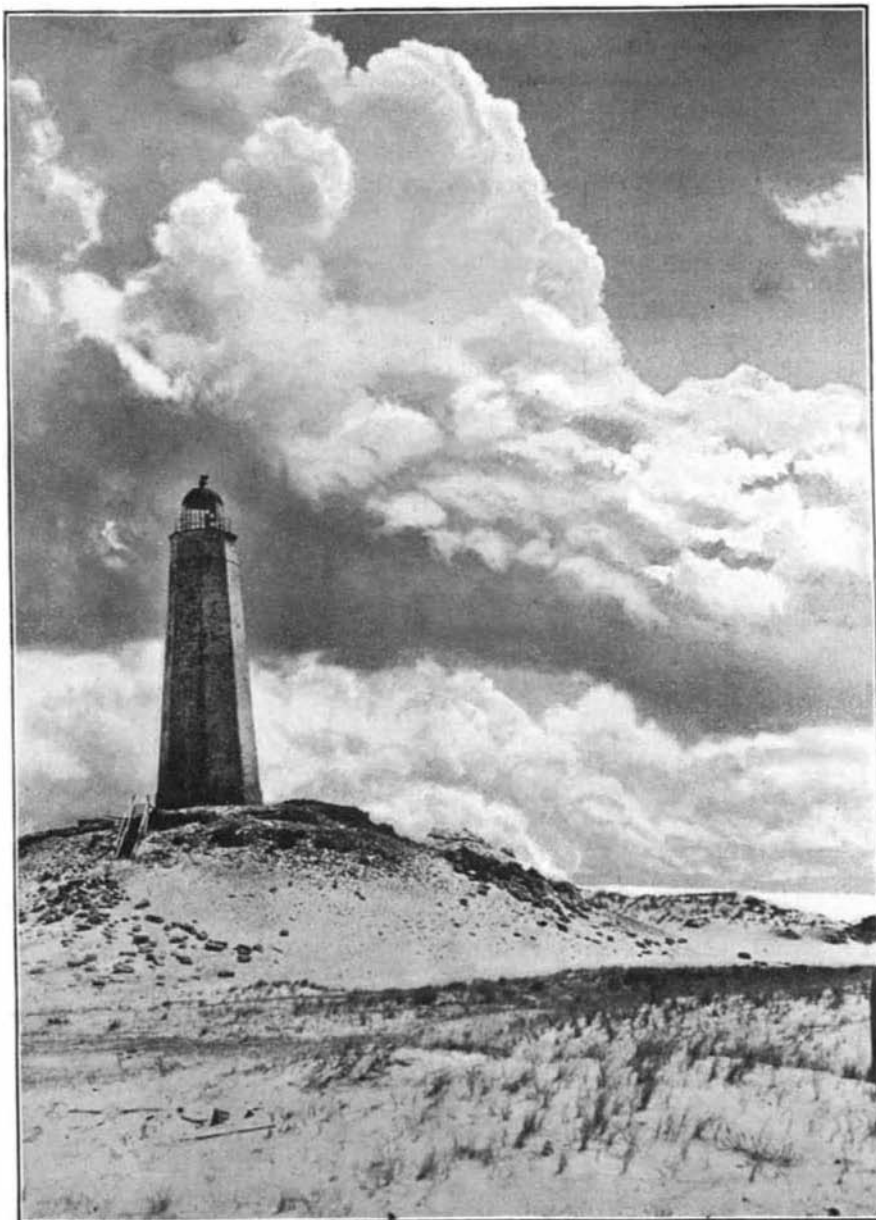


ARRANGEMENT OF THE BICHROMATE CELL.

generally known that the Weather Bureau, at Washington, is constantly engaged in making meteorological photographs, cloud photography having received much attention.

We give a half tone engraving of a cloud photograph taken by Mr. A. J. Henry, of the Weather Bureau. This print was made from a single negative taken with one exposure, and it is through the courtesy of Mr. Henry and Mr. McAdie, of this Bureau, that we are enabled to give our readers the secret of this remarkable effect.

The picture is taken through a monochromatic



NEGATIVE TAKEN THROUGH BICHROMATE CELL.

screen. The one found most effective is that formed of a saturated solution of bichromate of potash enclosed in a plate glass cell having parallel sides. The construction of this cell is shown in the second engraving, in which a' are squares of plate glass and b is a ring cut from a glass tube and ground to render its edges parallel and smooth. One side of the ring is perforated and furnished with a stopper. The ring is cemented between the two glass plates with balsam of fir or other suitable cement. The saturated solution of bichromate of potash is introduced through the perforation, and the cell thus made is inserted in a piece of cork, c, which fits over the collar of the camera lens. The proper thickness for the cell is shown in the engraving; the diameter will of course vary with the size and the angle of the lens. The exposure for the negative from which our illustration was taken was four seconds.

We have no doubt this simple device will furnish the basis of many experiments for both amateurs and professional photographers.

Riding a Wheel.

The proper position for a bicycle rider is, in the first place, an upright one, says a writer in Harper's Young People. He should push nearly straight downward with his legs—not backward, as one must do who leans far forward. His arms should not be rigid and extended to their full length, but a little bent, and the handles can be easily adjusted to bring this about. The reason for the bent or slightly bent arm is evident after a moment's thought. If the arm is stiff, rigid, and extended to its full length, the "pull" which you give the handles on going up hill, or indeed, while running along a level road, is a dead pull. There is no life in it. Each jar to the machine is a jar to your body, your head and neck, and consequently a jar to your whole system. On the other hand, if you ride with your arms a little bent, and acting as a kind of a buffer to all jarring influences, they will save you an injurious, though unnoticeable, shaking up each time you go out. The only way in which you will notice a change will be after you have become accustomed to the bent arm method. Then you will find you can ride longer without becoming tired.

Another feature of this stiff arm is the position into which the shoulders are thrust. Try it; grow a little tired with a long ride, and then see where your shoulders are. You have gradually come to lean on your arms for rest. Both shoulders have been thrown far back; your head and neck are stretched far forward, and your chest has, so to speak, sagged forward out of its natural position. Keep this up long enough, and you will be a fine-looking specimen.

No; the weight of your body should never come on the hands and arms, but on your thighs, and thence be transferred to the seat, with the unconscious, springy action of your legs, which in a measure allows some of your weight to come on the pedals. In this position your hands are free to guide your wheel, your body is erect; you do not then get into the habit of swaying from side to side to put your weight first on one side and then on the other; and your whole muscular movement is regular and normal. Try riding without putting either hand on the handles and sitting erect. If you ride well, you can easily keep your balance, and in an instant you will be in the correct position. Once in this position, place the hands lightly on the handle bars, and you will be in a healthy, a proper situation to gain benefit from your riding.

In riding ten miles, for instance, I should never go the whole distance at one pace. Slow, steady riding has its merits; so has sprinting for short distances. When a good clear road looms up ahead, have a brush for two or three hundred yards with the boy who is with you. These little races are good things. They quicken your movements and they keep you from forming bad habits or letting your body sag into set, immovable positions. They also bring the muscles into a different kind of play.

In fact, in bicycle riding, as in about everything else, you should remember that there is a right and a wrong way; that you need not only endurance, but speed, and that changing from one to another, keeping up variety, is one good way of avoiding bad habits.

THE southwest wind is the most prevalent in England. It blows on twice as many days as any other.