A DOG BICYCLIST.

We reproduce herewith a photograph representing a Scotch Gordon dog of pure breed accompanying his master upon a tandem bicycle. The dog is here simply a tourist that rides on the bicycle only on a level and during descents. In going up hill, he trots alongside of the machine. Our bicycle readers who have dogs might turn their attention to such training of their animals, for whose convenience a small and well balanced seat might be attached to the machine.—La Nature.

DOG TRAINED TO RIDE ON A BICYCLE.

The Lowest Temperature of Luminescent Visibility.

A new determination of the lowest temperature at which a hot body becomes visible is published by Signor Pettinelli, in the Nuovo Cimento. He heated a cast iron cylinder 30 cm. long and 14 cm. broad in a wrought iron jacket, over a Bunsen burner, to a temperature of 460° C., as indicated by an air thermometer, and then observed its flat end in a dark room from a point 60 cm. above it. When it had cooled to about 115° the red heat vanished and gave way to an indefinite hazy glow. This glow completely disappeared at 404°, and repeated observations gave an error of only 3°. High emissive substances, such as the mantles made by Auer and others for incandescent gas lighting, became visible at the same temperature, but reflectiug surfaces had to be heated 20° higher before they appeared to the eye, and glass still more. These low temperature rays were found to traverse glass and water like ordinary light rays, but they suffer a comparatively greater absorption. Different eyes differ slightly in their capacity for seeing them, the maximum divergence being about 6°. But the extent of surface must be the same. Signor Pettinelli found that if he screened off all but one-fortieth of the surface, the body had to be heated 6° higher than before to become visible.

A NEW MOTOR CYCLE.

Inventors have for a long time been working on the problem of the propulsion of bicycles without the aid of muscular power. Unlike the motor carriage the advantage of the motor cycle cannot be so easily demonstrated, for bicycle riders use their wheels very largely for exercise and for the pleasure in riding, and anything in the way of power propulsion would not be received with favor by them.

There is, however, a class of people who would welcome the advent of a practical motor cycle, as it would enable them to prolong their excursions and would eliminate the element of fatigue.

We present an engraving of an experimental motor cycle, built by Nelson S. Hopkins, of Williamsville, New York. The motor is heavier (it weighs 12 pounds 4 ounces) than would be ordinarily required for use on a bicycle. Mr. Hopkins has succeeded in building a motor which will propel a wheel and rider over moderate grades, and weighs only 8½ pounds.

The motive power is derived from gasoline which is contained in an aluminum reservoir which is strapped to the upper part of the diamond frame. From the reservoir the gasoline is conveyed to the carburetor by means of a small pipe. A valve limits the quantity of the gasoline which is admitted to the carburetor. This valve may be operated from the saddle by means of a rod. The valve stops and starts the motor and regulates the speed. From the carburetor, where the vapor of the gasoline has been mixed with air, the mixture is drawn into the compressor and is then forced into one of the two explosion cylinders, where the charge is ignited by an electric spark, contact being controlled by the movement of the piston. The use of two cylinders makes it possible to obtain an impulse at every turn of the shaft and by means of gears the wheel is propelled with great freedom from jerkiness and vibration. The battery is placed under the saddle in a tool bag, and the spark coil is fastened to the diamond frame, but in later experiments both the battery and coil have been carried in the tool bag.

At the back of the shaft is a small steel gear wheel, which runs with a larger one of phosphor bronze secured to the hub of the wheel. This large gear wheel is movable, and it is arranged so that the motor can be entirely disconnected from the running gear, thus allowing the wheel to be propelled in the ordinary manner. The feet are rested on coasters or on the pedals. Usually the chain is thrown out of gear by the aid of the clutch, but in hill climbing both the motor and pedals are used to propel the bicycle.

It is, of course, impossible for the wheel to run without a rider upon it to keep it balanced, and should he fall, the wheel would stop of its own accord. The weight of the motor being on one side, of course, tends to throw the wheel out of balance, but this is remedied by throwing the center of the saddle over a trifle. All the working parts, except the gears, are inclosed.

HOPKINS' GASOLINE MOTOR CYCLE.

Human Endurance of High Air Pressures.

A series of interesting experiments as to human endurance of higher pressures than are usually employed in compressed air work has recently been made by Mr. Hersent, the engineer in charge of the new harbor works at Bordeaux, France, where the quay foundations are being constructed by the compressed air system, and we take the following particulars of these tests from Engineering, of London. As the sponge divers descend from 160 to 200 ft. without injury, it was considered that workmen should be able to endure corresponding pressures under the better conditions of an air chamber, and Mr. Hersent therefore formed a commission of doctors to work with him in ascertaining if men could safely sustain a pressure of 70 lb. per sq. in. The test chamber was fitted with windows, a telephone, electric light and a steam coil, by which any desired temperature could be maintained.

Three men volunteered for the tests; one being a regular compressed air workman, the second an occasional workman, and the third a man who had only entered the working chamber on a few occasions. These men were subjected to pressures for a length of time, usually about one hour. The tests were commenced with a pressure of about 28·4 lb. per sq. in., and the pressure increased very gradually, by about 4·27 lb. per day, to 76·8 lb. per sq. in., while the time for the pressure reduction was increased about ten minutes for each 1·42 lb. increase in pressure. The period of compression was also increased, but to a smaller degree, this being of less importance. All three men sustained without difficulty a pressure of 46·9 lb. with a reduction period of 56 minutes. One of the men, being indisposed from an independent cause, was then withdrawn. At 58·3 lb. pressure the man who was used to working in the chamber felt some temporary inconvenience, and at 65·4 lb. his companion, who was not accustomed to compressed air work, had to be withdrawn, as he suffered from pains in the side. There was no trace of paralysis, but it was not considered safe for him to continue the test, which was finished by the first man alone, who sustained a pressure of 71·1 lb. for one hour, the pressure being then reduced in 2h. 25m. When released from the chamber this man took some sulphurous baths, which had cured the pains of his companion, and then underwent the final test, in which the pressure was raised to 76·8 lb. in 45 minutes, continued for an hour, and then reduced to normal pressure in 3h. 3m. The temperature was increased from 56° F. to 68° F. during the compression, maintained at 68° during the test, and then gradually increased to 86° F. during the reduction of the pressure. The man suffered no inconvenience, with the exception of a tingling sensation, which passed away after a short time. It is considered that, if certain precautions are taken, men in good health can sustain a pressure of 76·8 lb. per sq. in., that means should be provided for heating the chamber at will, and that good ventilation should be maintained during the reduction of the pressure.

As it has been proved that the workmen should rest after leaving the air lock, especially after working under high pressures, elevators should be provided to bring the men to the surface. These experiments go to show the practicability of men working under compressed air at greater depths than have yet been attempted.

The greatest pressure thus far used in compressed air work was 52 lb., corresponding to a head of 120 ft., in the East River Gas Company's tunnel. This was the extreme reached on this work. The ordinary pressure was about 45 lb., corresponding to a head of 104 ft. At the Limfjord Bridge, in Denmark, men worked for some time at a depth of 113 ft.

Our Coal Supply.

In the March number of the New York Bond Record is an article on anthracite coal by William Griffith, which seeks to answer the questions: "How much anthracite is there, and how long will the supply last?" and "What proportion of the future supply do the various interests control and how much can they ship to market?" Mr. Griffith begins by quoting liberally from an article by President Harris, of the Reading Railroad, on this question, in which Mr. Harris estimated that the original contents of the anthracite fields amounted to about 14,453,400,000 tons, of which 82½ per cent, or about 11,921,400,000 tons, remained to be worked. With a production of 45,000,000 tons a year, this supply would last for 265 years, although Mr. Harris estimated that of the actual coal unmined only 5,960,700,000 tons would probably be actually available, which would shorten the period of use one-half. Mr. Harris said we could have coal for 100 years at the rate of 60,000,000 tons a year. Mr. Griffith, in his article, which is an elaborate one, accompanied by long tables and detailed maps, works out estimates on a basis of his own. He gives a tabulated estimate of the approximate future supply of the railroads entering the Wyoming region. He claims that Delaware & Hudson's supply, at the rate of 1895 shipments, will last 26 years; Ontario & Western's, 9 years; Erie Railroad's, 21 years; Susquehanna & Western's, 18 years; Pennsylvania Coal Company's, 54 years; Lackawanna's, 51 years; Lehigh Valley's, 57 years; Central New Jersey's, 124 years; Pennsylvania Railroad's, 52 years. The grand total of unmined coal in the Wyoming region he estimates at 1,278,130,750 tons, with a duration of 52 years. The table gives no figures as to other coal fields.

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