A FOLDING BICYCLE.

The bicycle, as ordinarily constructed, has only one real fault, which is that it is a clumsy machine to transport. It is difficult to ship an uncrated bicycle by rail or water without its running some risk of being injured. The folding bicycle largely obviates this difficulty and also permits of the wheel being stored in houses with great convenience, but the folding bicycle has another and often more valuable use. In France, where the bicycle has been made considerable use of in military maneuvers, the folding bicycle has been used with great success. The construction of the ordinary bicycle, valuable as it is in transporting soldiers, becomes, as soon as he dismounts, a hindrance to his motions and a burden which cannot be carried with ease, but must be trundled along.

Under such circumstances it is difficult to see how a soldier can handle a gun. If he lays his bicycle upon the ground, it runs a great risk of being injured and would offer an impediment to the free movement of the troops, and, if surprised by the enemy, it may cost him the loss of it; like a rider without a horse, he would be very liable to be captured. Military bicycles often have to be transported very long distances through woods and swamps and hoisted over hedges and walls. The difficulty appears to have been solved by causing a machine to be constructed which can be carried by man when man cannot be carried by the machine. Various devices have been made to permit this folding. We illustrate an American invention of this class, the wheel in our engraving being made by the Dwyer Folding Bicycle Company, of Danbury, Conn. We illustrated the folding military bicycle of Capt. Gérard in our SUPPLEMENT, No. 1044. This bicycle has been put to actual use in military maneuvers and has been found very satisfactory. The Dwyer machine is arranged so that both diamond and drop frame wheels can be built capable of folding.

In the diamond frame wheel the joint is arranged in the middle of the frame, and in the drop frame wheels a similar plan is employed. The wheel is manipulated as follows: Stand on the left side with the left hand on the handle bar (to keep the front wheel from falling around) and the right hand on rear brace. Then press bolts forward and into recesses in locking tube, and with right hand lay rear wheel around against the front. If an ordinary handle bar is used, set the handle bar and saddle so that the handle bar will go under or over the horn of the saddle. Special handle bars make the folding more compact. The military wheels are especially ingenious and do not differ much in appearance from the ordinary drop frame wheel. It is the work of an instant to fold the bicycle. The soldier can then have free use of his hands to assist him in climbing or handling his gun while the wheel is hung over his shoulder. The folding bicycle proves especially valuable to those who wish to make excursions on boats and cars. The wheel can be folded up and placed in the cabin of a very small yacht. The folding bicycle is especially convenient when it is desired to take it into the house and the wheel is reduced to so small a compass that it can be readily packed in a trunk or box. The wheel has as much strength as the ordinary bicycle and it weighs only twenty-five pounds.

THE DWYER FOLDING BICYCLE.

THE Chilean government telegraph lines comprise 7,500 miles.

AN ELECTRIC HANSOM.

During the past year we have received hundreds of letters regarding horseless carriages. These letters have come from all over the civilized world. The correspondents have usually either anxiously inquired whether the automobile vehicle was in reality a practical means of transportation or where such vehicles could be purchased.

The number of American built motor carriages which have been offered for sale has been small, and the few manufacturers who have pretended to do any business have been somewhat reluctant to put carriages upon the market. In this respect they have been wise, and their action will only result in doing good to the motor industry. In its present state of development the horseless carriage can hardly be trusted in the hands of those who have not some acquaintance with machinery or those who may not be favorably disposed toward the new vehicle. The three races which have been held in America have had the effect of awakening public interest in the subject, if they have subserved no other useful purpose. If the manufacturers had greater capital at their command, the perfecting of their machines would have proceeded at a more rapid rate, but the results would probably not have been more satisfactory. We are glad to be able to chronicle the fact that for the first time in America the horseless vehicle has now entered into competition with the public cab in the city of New York.

The Electric Carriage and Wagon Company, which has offices at 66 Broadway and a depot where cabs may be hired at 140 West Thirty-ninth Street, has now several electric hansom cabs which will be hired at the legal rate of the public cabs. In a short time twelve of these vehicles will be at the disposal of the public and an electric brougham will probably be added. It will be little wonder if the public does not take favorably to these handsome vehicles, which seem the perfection of the carriage maker's art.

Unlike the ordinary hansom cab, they are mounted on four wheels. To an ordinary cab body a battery box is attached, forming an extension in the rear. Upon this is situated the seat for the driver. The weight of the carriage is about 2,500 pounds, the weight of the batteries alone being from 800 to 900 pounds. The diameter of the large wheels is 43 inches, while the diameter of the small wheels is 32 inches. The wheels run on ball bearings that have tangent wire spokes, steel rims and thick pneumatic tires. Each of the front wheels is connected with a motor of the Lundell type, of nominal 1½ horse power. Each motor is inclosed in an iron case and drives each wheel independently. The pinion from the armature shaft meshes with the internal gears of the wheels. The internal gears permit of turning corners with ease. The storage batteries which are used are supplied by the Electric Storage Battery Company, of Philadelphia, Pa. They are chloride accumulators of 70 ampere hours capacity. It is arranged so that automatic connection is made when the batteries are run into the battery container, by means of contact plates, and fuses are provided as a safeguard. The controller is situated at the left side of the driver's seat, so that it is easily manipulated with the left hand. There are three speeds forward and one speed backward. The first notch of the controller gives a speed of five miles per hour; the second notch, eight to ten miles; the third, thirteen to fifteen miles. Fifteen miles may be regarded as about the maximum speed which is desired or can be obtained with the hansoms. These speeds are obtained by various groupings of the batteries and motors in series and parallel.

Directly in front of the driver is a lever which controls the steering mechanism, which is extremely ingenious. The steering is accomplished by turning the rear wheels parallel with each other from a point directly over the tread of the wheel. The wheels are connected by rods to a vertical lever of a convenient height to be operated from the front seat of the carriage. In reality the steering mechanism looks like an enormous hollow hub which turns freely, horizontally, upon the vertical rod which supports the body of the carriage. The steering mechanism enables the carriage to be turned completely around in a very short space.

A powerful roll-

THE NEW ELECTRIC HANSOM CABS IN USE IN NEW YORK CITY.

er brake adds to the safety with which the carriage can be driven, but one of the things that is remarked by persons who ride for the first time in the horseless carriage is the ease with which it may be stopped. In this respect it compares very favorably with any horse vehicle. From the driver's seat the doors of the cab are also opened and shut and the electric light is turned on or off. An electric bell under the footboard gives warning of the approach of the almost noiseless vehicle, and when used with discretion will add very much to the safety of the carriage.

Each of the carriage lamps has an incandescent lamp, and there is also an incandescent lamp in the cab, so that the passenger can sit and read if he desires. A speaking tube runs from the interior of the cab to the driver's seat, where the mouthpiece is secured by a holder, connection being made with a flexible tube. The attention of the driver of the carriage is attracted by a whistle which is actuated by a rubber bulb in the inside of the cab. This bulb forms the mouthpiece of the speaking tube, a plug being removed when conversation is to be held with the driver.

The motion of the cab is pleasant in the extreme. There is no vibration such as is often found in carriages driven by one of the petroleum products. The ease with which the electric carriage can be started and stopped, the absence of vibration and disagreeable odors, are points in its favor. The batteries afford power sufficient to propel the carriage from 18 to 25 miles on the level, depending upon the state of the road. With a private plant the batteries may be charged at an expense of from ten to twelve cents. The cost is increased where the electricity must be purchased. It is estimated that the carriage can be run at an expense of about a cent per mile. Riding in a hansom cab of this kind is pleasurable in the extreme. There is nothing whatever to interrupt the view of the passenger.

The carriage proper was built by the Charles Caffery Company, of Camden, N. J., and the motors were built by the Interior Conduit and Insulation Company, New York City. The carriage was invented by Messrs. Morris & Salom, of Philadelphia, Pa. It will be remembered that their "Electrobat" obtained the gold medal at the Chicago Times-Herald race in 1895 upon the following points, to quote from the report of the judges: "Safety, ease of control, absence of noise, vibration, heat, odor, cleanliness and general excellence of design and workmanship." We illustrated the "Electrobat" in the SCIENTIFIC AMERICAN for November 16, 1895. At the Providence race the Electrobat made five miles in 11 minutes 27 seconds, average 2·17, or at the rate of 26·2 miles per hour. The officers of the Electric Carriage and Wagon Company are Isaac L. Rice, president; W. W. Gibbs, vice-president; and the superintendent of the new depot for horseless cabs is Edwin A. Adams.

Electricity from Carbon Without Heat.

In a paper read before the New York Electrical Society Mr. Willard E. Case gave some interesting information and experiments on "Electricity from Carbon Without Heat," a subject which he has been studying for some years. The lecturer described the devices thus far employed to oxidize carbon without heat in the electric battery.

The lecturer had his apparatus with him and performed experiments before the audience. He used a cell of his own invention. Plates of tin and platinum formed the electrodes, and the carbon being oxidized by contact with chemicals, electricity was produced, as was shown by attaching the wire from the cell to a motor. A thermometer applied at various stages showed that no heat was generated; hence, practically, the entire energy of the chemical charge was converted into electricity. Having concluded this experiment, Mr. Case brought out the possibility of the discovery of a method of obtaining electricity from carbon without heat, by following plans analogous to the method employed by nature in the human system. He drew attention to the processes going on in animal organism by which the carbon is oxidized by the instrumentality of the hæmoglobin of the blood, which acts as an oxygen conveyor.

The point Mr. Case specially dwelt upon was that work in the direction of rendering the experiment of practical value lay in the suitable preparation of the carbon for the oxidizing material to act upon.

The hæmoglobin cell was a fine example of what many scientists have, for a long time, insisted upon, namely, that the closer the processes of nature can be approximated, the nearer and quicker they will come to attain their end.

WE learn that the Barnes Cycle Company's large works, at Syracuse, New York, were destroyed by fire on the 4th instant, but, with commendable energy, temporary quarters were immediately obtained sufficient to enable the company to continue the business regularly during the rebuilding of the works. The feature of the Barnes cycle is the frame connection and solid cranks and axle forged in one piece.

An Explosion Over the Subway at Boston.

An explosion of gas which leaked from the two six inch mains which cross the Boston Subway for the trolley cars at the corner of Tremont and Boylston Streets occurred on March 4, killing six people and injuring nearly fifty, some of whom are liable to die. The explosion sounded like the boom of a cannon, and it was followed by smoke and flames which shot up from the intersection of two of the busiest thoroughfares in the city. The explosion occurred just as three cars were close at the intersection of the streets. One car was almost exactly over the center of the excavation when the explosion came.

The whole of the woodwork which is used as a bridge over the deep cutting at this place, was lifted into the air, carrying the car with it and taking along the two horses of a second car. Instantly the air was filled with débris.

The first car, in which most of those that were killed were riding, no sooner fell back on the tracks than it broke into flames. A fire alarm was turned in, and soon a large rescue force was at the scene. Ambulances were also summoned, and one hundred and fifty police were required to keep back the crowd of people. The damage to the buildings in the neighborhood was quite considerable, many windows being broken. The exact cause of the gas explosion is unknown, but it was thought by some that it was started by a spark from the wheels of the electric car in contact with the rails. The mayor of Boston has ordered an investigation.

Tempering a Spring.

It is not every smith who knows how properly to temper a spring. It is not a hard job to some smiths, but other smiths, professional and amateur, claim that it is. In getting ready to temper a spring, one should begin with the forging itself, for if that be not well done, no amount of "know how" can make a successful tempering. The forging should be done with low heats and light blows, and the steel should not be hammered while cold, with heavy blows at least. Avoid making hammer marks in the steel when forging, for, although such marks may be worked out, they do not add to the strength or long life of the spring. A good many failures of seemingly perfect springs could doubtless be traced to this little point in the forging. After the spring has been hammered to size, spend a little extra time in lightly hammering the steel when it is nearly cold—but don't strike hard. The light hammering will toughen the steel and make a better spring. The outside surface or "skin" seems better adapted to spring work where the surface is hammered up, instead of being filed or ground. After the hammering is done, polish the spring with a bit of emery paper. It is best not to put it on an emery wheel, for then the skin above mentioned would be destroyed. Sometimes, however, it is necessary to partly shape the spring by grinding; but let this be done at an early stage of the job, so that the outside skin may be restored as much as possible. When ready for the hardening, there are two ways of doing the heating—either by holding the spring over a clean fire with a small pair of tongs, keeping the spring high up so that it will heat slowly, or by first heating a heavy piece of iron red hot, and then placing the spring on that until the steel is heated.

When the spring is fully and uniformly heated to a light red, plunge into cool, but not ice-cold, water. The amount of twist that is got in the spring by this operation depends on the manner in which the spring is put into the water. If it be put in so that a flat side touches first, the sudden cooling of that side will cause the spring to be pulled out of shape, and held there by the subsequent cooling of the rest of the spring. If put into the water endwise, or straight, there will be but little distortion of the spring. After hardening, polish the steel with a bit of emery cloth until the metal is bright, clean and white, then put a few drops of oil on a bit of paper, light it, and hold under the spring until every portion of its surface is covered with a thick coating of smoke. Next heat the spring slowly, holding it high up over the forge fire until the smoke is all burned off; but it should all go alike. Don't let one part of the spring get so hot that the smoke is all burned off while another part is thickly coated. That means a spring of uneven temper, that will break in short order. When the smoke has been carefully burned off, lay the spring on the ashes of the forge to cool slowly, and in a few minutes it will be ready for work.—Scientific Machinist.

DR. LEWIS HALLOCK, for many years the leading homeopathic physician in this city, died at his residence, No. 34 East Thirty-ninth Street, on March 3. He was ninety-three years old, and up to the time of his last illness a few weeks ago, he was in active practice, and but few of his young associates in the profession were more prompt in answering the calls of his patients, or nimble in ascending the stairs to a sick room. Dr. Hallock was a man possessing rare qualities, and he will be sadly missed by many of the older families in this city.

Science Notes.

Dr. Nansen is to receive the degree of doctor of science from Cambridge University this month.

The Prefecture de Police, in Paris, is reported to be in negotiation with reference to the conversion of the existing horse-drawn prison vans into motor vehicles.

The mountainous country south of Oaxaca, Mexico, has been greatly disturbed recently by severe earthquake shocks, and the people in some of the small villages were so alarmed that they left their homes and went to Oaxaca. The shocks caused considerable damage to property.

Nansen asserts that scurvy can easily be avoided in Arctic expeditions by the use of properly preserved meat and fish, supporting the theory of Prof. Torup, of Christiania, that the disease is due to poisoning from bad meat. Scurvy was not so long ago the usual attendant of all long sea voyages.

The conditions of the heavy motor car competition which is to be held in the neighborhood of Paris, early in July, under the auspices of the Automobile Club de France, have now been announced. The competition is open to all nationalities, and for each vehicle entered an entrance fee of 200 fr. must be paid. Medals and diplomas will be granted to the vehicles which, in the opinion of the judges, best fulfill the conditions of the competition.

Superintendent Knoll, at the Hudson Street Hospital, New York City, recently completed an X ray photograph clearly outlining the brachial artery in the right arm of an adult. This is said to be the first time such a feat has been accomplished. The patient, who was sixty years old, had been suffering from an affection of the arm. The physicians were unable to tell exactly what was the matter. The photograph clearly shows deposits of lime salts in the blood, which has hardened the artery. The treatment of the case was governed accordingly.

A four year old infant prodigy was exhibited recently before the Berlin Anthropological Society. He is the son of a butcher, and at two years of age learned to read without assistance. He knows the dates of the birth and death of all the German emperors and many other noted persons, and their birthplaces, the chief cities of the world, and all great battles. He can read anything in print and can talk intelligently about it, but finds it hard to learn to write and draw, dislikes music, and hates pianofortes. The boy is physically well developed, though not robust.

An interesting report on Mount Kosciusko, the highest mountain in Australia, has been prepared by the Rev. Milne Curran, who is working as a roving geologist under the New South Wales government. Mr. Curran has, after a careful examination, come to the conclusion that the "glacial epoch in Australia," in post-tertiary times, as theorized by Dr. Lindenfeld, has no foundation, as he can find no tangible evidence of glaciers in the present valleys round the mountain. There is no evidence whatever, according to Mr. Curran, of extensive glaciation on the Kosciusko plateau.

"Recently," writes Dr. G. H. Stover to the Medical Record, from Eaton, Col., "having occasion to apply an ice bag to a limited area of the face, and not being near a supply house, I had the patient's husband make a bag from a section of an old inner tube of a bicycle tire. One end was sealed with a bicycle cement and after the cracked ice was put in, the other end was folded over and encircled by a cord. This plan could be used in making ice bags for the face, mastoid, larynx, spine, groin, or in fact for any part where the application of ice to a limited area is desired. Again is 'the bicycle in therapeutics' in evidence."

That petroleum can be produced, or at least imitated, by proper treatment of linseed oil, has been announced by Prof. Sadtler, says the Popular Science News. It was shown that by subjecting this oil to destructive distillation, under pressure, various products identical with certain petroleum hydrocarbons can be produced. This fact is of great significance and importance. It bears directly upon and affords proof of one of two theories regarding the origin of petroleum. These theories are: one, that petroleum is of animal origin, the other that it is of vegetable origin. Possibly, perhaps probably, both are true. Without discussing the theory of animal origin, Prof. Sadtler's results would seem to prove the other.

"Prof. Schmiedeberg, of Strasburg, lately made a very interesting experiment," says the National Druggist, "which not only conclusively demonstrates the existence of an iron hunger in animals, but also indicates disastrous results in the event of the craving remaining unsatisfied. A strong, frolicsome dog, that had suffered the loss of a small quantity of blood only, was fed for a period on pure milk, and little by little became so weak that all evidence of spirit vanished, and, refusing further nourishment, became so thin and weak that his limbs refused to support his body. Just as he seemed on the point of death, a gramme of ferratin was added to his daily allowance of milk; when, instead of refusing, as heretofore, he devoured it ravenously, and in the space of two weeks recovered his normal health and strength."