

A NEW BICYCLE HANDLE-BAR.

A novel manner of mounting bicycle handle-bars has been devised by Mr. Tacitus W. Gaillard, 346 South Fifth Street, Brooklyn, New York city, the special objects of the invention being to facilitate easy adjustment and to render the mountings of the bars secure. To the upper end of the fork-stem a tubular plug socket is fastened, upon the enlarged upper end of which a nut is screwed. The nut serves to clamp the fork-stem and the enlarged portion of the socket rigidly together. From the rear portion of the nut two parallel spring-fingers project downwardly, which are designed to receive a spring portion formed on the bifurcated upward extension of a clamp embracing the upper horizontal bar of the bicycle-frame. When the spring-fingers hold the extension of the clamp, the fork-stem is held steadily and prevented from moving except upon the application of positive pressure.

In the socket of the fork-stem is a plug which carries the handle-bars. The plug is provided with a spring-catch extending through a slot in the socket and through a corresponding slot in the fork-stem so as to engage a stud on the inner spring-finger. Thus the plug is removably held in place. By withdrawing the plug the removal of the handle-bars is facilitated.

The upper end of the plug has two ring-like extensions, between which are mounted the inner ends of the handle-bars, which ends are in the form of toothed segments. Meshing with these segments is a worm, the lower end of which is split, and the parts sprung out to form spring-fingers, which are held friction-tight in a cavity in the plug. The worm at its upper end is provided with a cap, which, when turned, rotates the worm and adjusts the handle-bars. No tool is required. The bars may be adjusted even when the rider is on the wheel.

HANDLING ANTHRACITE COAL.

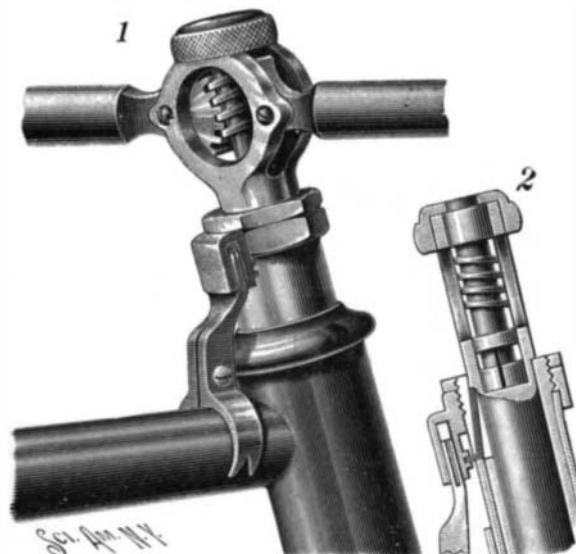
BY WALDON FAWCETT.

The story of the development of the anthracite coal field of Pennsylvania has always been full of attraction for students of commercial and industrial progress, both here and abroad, and its interest has been deepened as time has gone on and the apparent inexhaustibility of certain of the deposits has been demonstrated. There has been slight recognition, however, of how really an important part in the evolution of the anthracite coal trade has been played by the improvement of facilities for the handling and movement of the fuel at every stage of its transit from mine to consumer. Nevertheless, in few industries has the value of the market been so entirely dependent upon an ability to place the commodity within reach of consumers. Finally, the many unique features of the system followed, notably the extent to which the railroads have controlled the mines and the operations of the pool which apportions the quantity of coal to be carried by each road, make the transportation of anthracite the most distinctive phase of the trade.

At the present time there is not a link in the entire transportation chain which connects the mine and the consumer wherein the most advanced and economical methods are not in force. The use of electricity about mines for lighting and other purposes has resulted in the development of electric locomotives for haulage purposes, and the coal is now drawn to the surface by electric engines of from two to fifteen tons weight. These locomotives have from one to three motors, ranging from ten to thirty-five horse power, and each is capable of pulling quite a train of the small cars in use in mines, at a speed ranging from six to ten miles per hour. Even the mine cars have undergone wonderful improvement during the past few years. Steel is largely employed in their construction and improved devices for quick dumping are fitted.

The coal is transported from the mines in the new type of pressed steel car, which is of about 50 tons capacity, and from 20 to 25 of these cars make up a train. In service on the coal-carrying roads are some of the largest and most powerful locomotives ever constructed. Some of these engines weigh close to 125 tons without the tender, and have a wheel base in excess of 24 feet. Locomotives of the type mentioned have a tank capacity of more than 7,000 gallons of water and a coal capacity of some 14 tons.

The railroads which enter the anthracite region are all operated under an agreement as to the basis on which the shipments of coal are to be divided between the various lines. The Philadelphia & Reading Railroad, for instance, which controls nearly a third of all the mining territory, is privileged to carry one-fifth of the aggregate output of the anthracite field. Another

**THE GAILLARD HANDLE-BAR.**

road is apportioned fifteen per cent of the total; several lines are entitled to one-tenth of the aggregate, and so on down to the lesser carrying lines, four or five of which only receive three or four per cent each of the whole yield.

The great bulk of the anthracite mined in the Pennsylvania district is shipped either to New York or Philadelphia, or else northwestward to Buffalo. These three cities are centers of the chief areas of consumption, and consequently serve as distributing points. A considerable portion of the coal consigned to Philadelphia or New York is reshipped, either by rail or coasting vessels, to Boston and other points in New

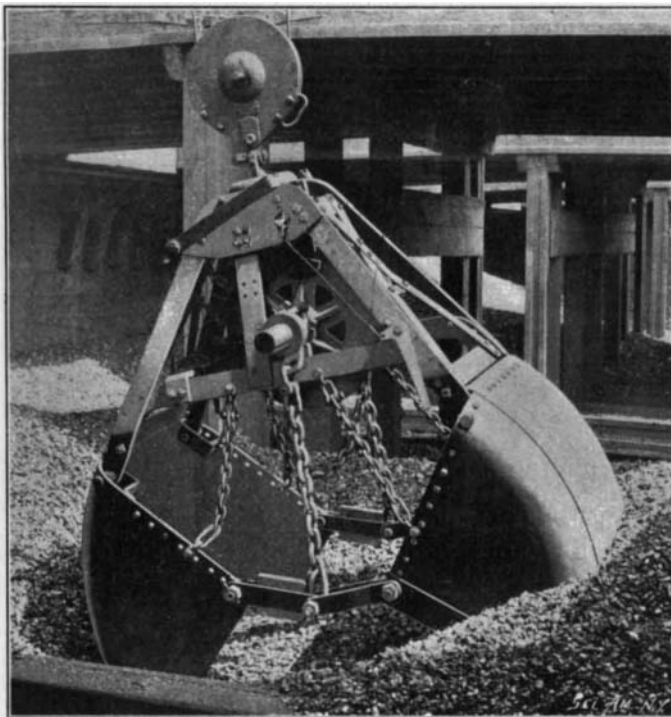
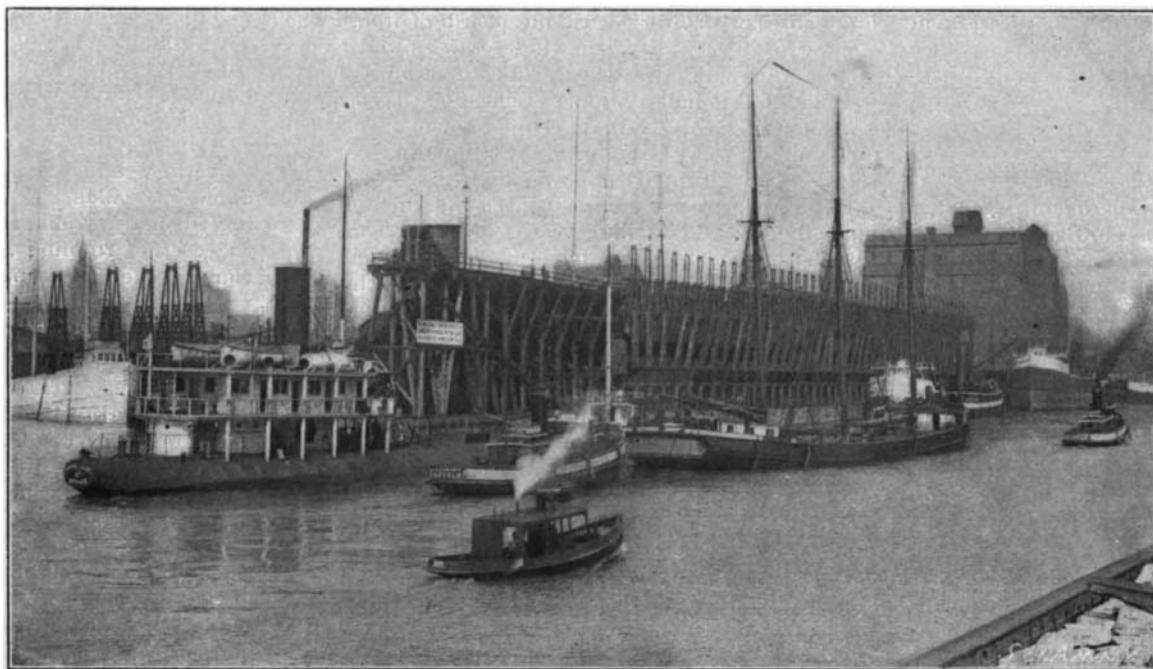
England. Some coal goes south by the same means of transit, but it is a comparatively small proportion of the whole. The port of Buffalo, at the lower end of the Great Lakes, is the gateway through which passes the principal portion of the coal destined for western consumption. From Buffalo heavy shipments are made by lake vessels to Chicago, Milwaukee, Duluth, and other points, and there is also a very considerable traffic by rail.

The receipts of anthracite coal at Boston are somewhat in excess of those of bituminous, and both fuels reach the New England metropolis almost exclusively by water. As an illustration of the preference manifested by the coal shippers for the water route, it may be stated that every year during the past decade in the neighborhood of 2,000,000 tons of anthracite have been received at Boston by water, whereas in no year of which there is a record have the rail shipments exceeded 32,000 tons. The coastwise coal-carrying trade is carried on principally in wooden barges of from 800 to 1,500 tons burden. The construction of craft especially designed for this service has been carried on most actively during the past few years, and last year upward of half a hundred coal-carrying barges were turned out at the shipyards on the Maine and Massachusetts coasts. These barges, most of which are from 200 to 250 feet in length, are towed by powerful towing steamers. One of the best fleets of tugs in this service consists of six vessels, each 140 feet in length and fitted with triple-expansion engines, capable of driving the boat at a speed of 14 miles per hour. There are also numerous four and five-masted wooden schooners in the coastwise coal trade, and within the past few months a six-master had gone into commission. These vessels, all exceeding 300 feet in length, cost in the neighborhood of \$100,000 each, spread 10,000 feet of canvas, and will carry 4,000 or 5,000 tons of coal on a draught of 23 feet.

Keeping pace with the other lines of development in the handling of anthracite is the improvement of the pier from which the coal is transferred to ocean vessels. As representative of modern facilities in this line there might be cited the largest of the coal piers of the Reading Railroad at Port Richmond, near Philadelphia. This structure which is probably the largest coal pier of the kind in the world, is 770 feet in length, 61 feet wide and 44 feet high above mean mud tide. The docks on either side have been dredged to a depth of 26 feet at mean low water, so that any craft may be accommodated. The pier is provided with four tracks and has four berths, two of which are provided with six chutes, each thus enabling four 1,500-ton barges or other craft to be loaded simultaneously. The approach to the piers, an earth-fill, is 1,150 feet in length, and the railroad cars, after being emptied, are run by gravity from the pier to the tracks on which the empty cars are stored. This pier, when taken in conjunction with the other facilities at the port, enables the Reading Company to ship fully 21,000 tons of anthracite coal in 24 hours.

In the loading and unloading of coal to and from vessels, and the rehandling of the fuel under various conditions, there are employed some of the most ingenious types of machinery known to the mechanical world. The primary form of apparatus for transferring the coal either to or from a vessel is what is known as the bridge tramway plant, consisting of long bridges with girders of steel or iron, mounted side by side on suitable rails so that they can be readily moved from place to place. Each machine operates over one hatch of a vessel, and is provided at its front end with a hinged apron of suitable length for extending the trolley tracks of the machine over the vessel.

The hoisting and conveying apparatus, known as the "trolley," runs along a track suspended from the bridge from the end over the vessel to the opposite end over the railroad cars or stock pile. For handling the anthracite there is used a self-filling and automatic dumping grab-bucket which will handle three-fourths of a ship's cargo without hand-shoveling. For shoveling the coal from stock piles to cars or boats there is employed an automatic shovel-bucket which requires no hand-shoveling whatever. One of these novel coal-carrying buckets will usually make a round trip from the hold of a vessel to the extreme end of

**CLAM-SHELL DREDGE UNLOADING COAL FROM BARGE.****TYPICAL DOCK FOR LOADING COAL VESSELS.**

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyright, 1900, by Munn & Co.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LXXXIII.—No. 22.
ESTABLISHED 1845.

NEW YORK, DECEMBER 1, 1900.

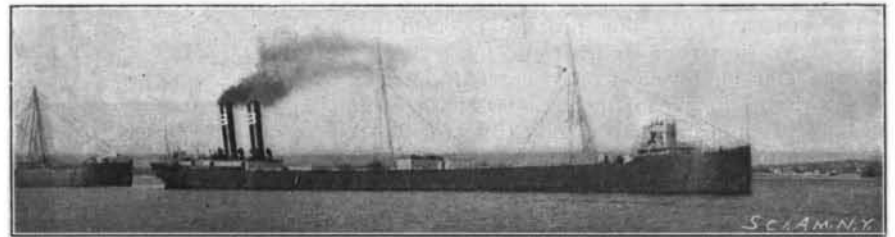
[\$3.00 A YEAR.
8 CENTS A COPY.]



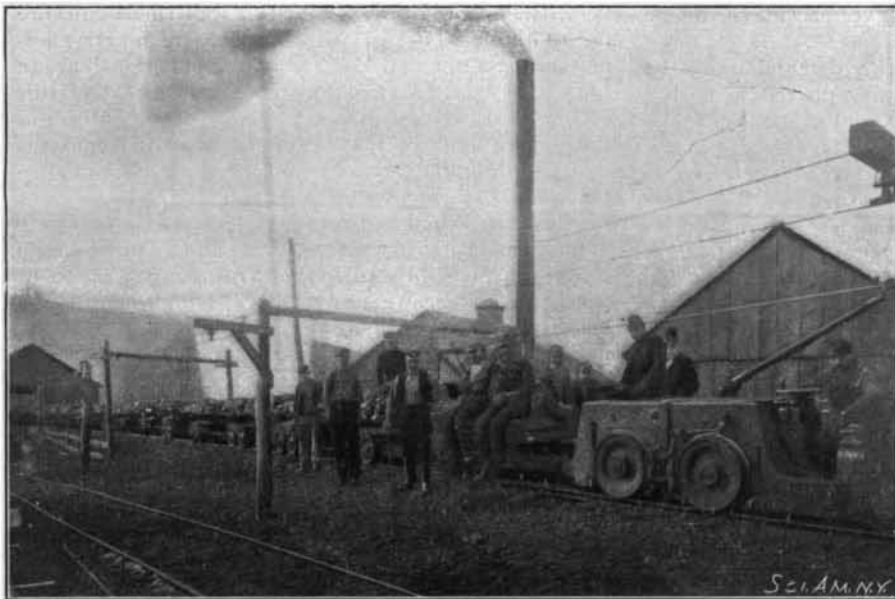
New Coal Car Dumper.



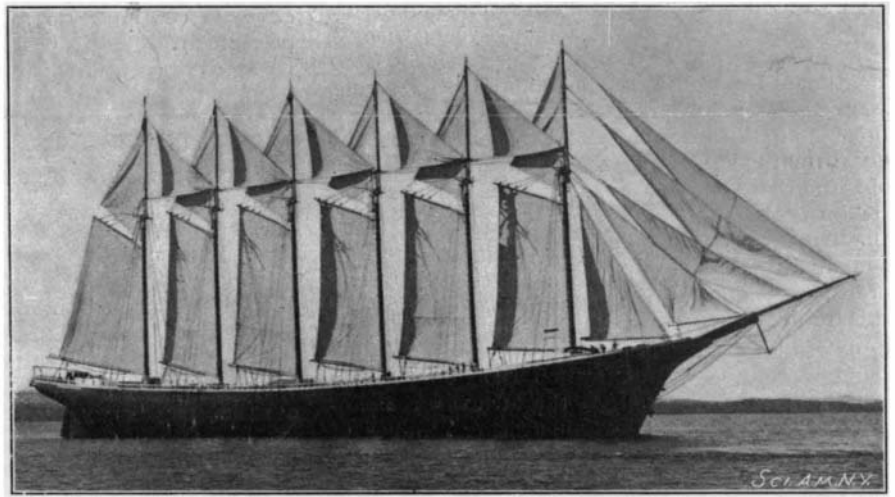
Surface Coal Stripping.



Lake Coal-Carrying Steamer.



Electric Motor and Train—Mine Haulage.



Six-Masted Coal-Carrying Schooner.



Four-Bridge, Coal Frameway for Unloading Anthracite.
HANDLING ANTHRACITE COAL.—[See page 341.]

the bridge and back again in a minute, a distance of six hundred feet in addition to the height of hoist. In actual work a rate of forty-five seconds per trip has been averaged for several hours. The cost of handling the coal by this method varies from seven-tenths of a cent to two cents per gross ton.

The same general form of bridge tramways are also the fundamental feature of the storage and rehandling plants. Balanced cantilever cranes are also, however, used to some extent in the rehandling of coal. At the works of the Bethlehem Steel Company, at South Bethlehem, Pa., for instance, a crane driven by steam, and having a reach of 365 feet, travels between two piles of coal 58 feet high. The coal is brought to the works in cars and dumped into great hoppers, from which it is drawn into tubs, hoisted, conveyed and dumped on the storage piles. The different sizes of coal may thus be kept separate.

At Cheektowaga, New York, and several other places in the United States, there are in service what are known as shed tramway plants especially designed for handling coal from vessels and stocking it under the same roof. The overhead runways on which the trolleys travel from the rear end of the building to vessel at dock front are movable from side to side, inasmuch as the upper supports of these runways are hung from wheels which move on tracks suspended on roof-trusses, thus enabling every portion of the storage space to be reached, and enabling the overhead tramways to move to any position along the front of the dock or in the sheds, to suit the hatch of the vessel or the stock-pile. By this plan the coal is never dumped more than two or three feet. A plant of this kind ordinarily has a storage capacity of a quarter of a million tons and will handle three thousand tons of anthracite per day.

Some coal is loaded into vessels from great bins built directly on the water front and some little distance above the deck of the vessel, so that the coal will slide readily through the adjustable chute through which it gains access to the hold. Finally, there are the various types of car-dumping machines, giant mechanical marvels, which in the space of a minute pick up a loaded coal car, overturn it, emptying its contents in the hold of a vessel and return the empty car to the railroad track. By the employment of one of these machines not only is rapid loading possible, but an entire cargo may be put aboard without its being necessary to move the vessel. With the addition of extra overhead cranes one of these car-dumpers has a capacity of ten thousand tons per day.

A Railway in Ashantee.

Kumasi, the capital of Ashantee, is to be brought into closer communication with England by the construction of a railway to the coast. The work is to be undertaken by a Liverpool firm, and already a party of twenty-seven engineers are on their way to the Gold Coast for the purpose of surveying the country. The line is to be 180 miles in length and of 3 feet 6 inches gage. The route to be followed is a very difficult one, extending through dense bush forest and over broken country. The engineers are to be assisted in the survey work by 1,700 carriers and laborers, to be dispatched and maintained from England. As the survey party proceeds, the work of construction will be carried out, operations being commenced at several places simultaneously. The great difficulty with which the contractors have to contend is the scarcity of labor and food, but it is anticipated that native labor will be forthcoming to the extent of about 10,000 men. The principal object of the railway is to develop the gold mining industry of the country. The land is very auriferous, and when the question of transport between Kumasi and the coast has been facilitated by the completion of this railway, the industry will be rapidly and extensively developed. Many of the West African gold mining companies are interested in the scheme, since it will then be able to reach the Ashantee capital within fourteen days from England.

Peculiarities of Siamese Music.

Profs. Stumpf and Neesen, of the Berlin University, have concluded some interesting experiments regarding the peculiarities of Siamese music. The Siamese musical octave differs from our own in the fact that it comprises seven equal intervals. The sounds, though perfectly harmonious, are somewhat curious. While the Siamese Court Troupe were at the Zoological Gardens in Berlin, these two professors decided to record these musical tones in their natural sound to such exactitude that the faintest variations might be clearly defined. In the earlier experiments the ordinary phonograph was employed, but was proved to be unsatisfactory, owing to the unpleasant constant rasping which always accompanies phonographic reproductions and which in this case destroyed the distinctness of the sounds. A telephonograph was then employed, and the results were all that could be desired. By means of this apparatus the sounds are so clear, and the gradations so faithfully recorded, that it is a difficult matter to distinguish between the actual recital by the troupe and its telephonographic reproduction.

Correspondence.

A Kerosene-fired Automobile.

To the Editor of the SCIENTIFIC AMERICAN:

In a copy of the SCIENTIFIC AMERICAN of November 17, I find you state that our boiler is fired with gasoline. The particular advantage possessed by this company over other makers of steam carriages is that we do not use gasoline as fuel, but in its place use kerosene. You will immediately recognize the importance of this difference, otherwise than which the item is correct, and we thank you for the same.

B. SHERWOOD DUNN, Sec'y and Treas.,
New York Motor Vehicle Company.

November 20, 1900.

A Popular Error.

To the Editor of the SCIENTIFIC AMERICAN:

It is generally entertained that the discharge of ordnance over or near the location of an animal body lying on the bottom or bed of a pond or river will, by the vibratory movement of the water, due to the impact of the discharge, cause the body to rise to the surface; and as a result of this opinion, the discharge of ordnance or of an explosive over a drowned body is usually resorted to, without any reference to the period of its immersion, the temperature of the water, or if the body is mutilated and to what degree; for if it has been but a brief period immersed, is much mutilated and the water is cold, such discharge or explosion over it is wholly and absurdly useless, as the specific gravity of the body is too superior to that of the water for it to rise.

The condition in which an immersed animal body may be raised to the surface by the discharge of ordnance or an explosive over it is this:

If the stomach of the body is intact, and the body not much mutilated, the temperature of the water and the period of its immersion is such as to evolve the gases of decomposition, the body increases in volume; and when its specific gravity is lessened to a degree that it is detained on the bottom only by molecular attraction, the disturbance of the water over it, whether by the action of the wheels or propeller of a steamboat in shoal water, or by the vibration of the water due to any impact on its surface, will disturb this adhesion with the bottom, and the body will rise to the surface.

CHARLES H. HASWELL,

Board of Public Improvements, New York.
New York, October 18, 1900.

Iron Sailing Ships.

To the Editor of the SCIENTIFIC AMERICAN:

I have read with much interest Mr. Waldon Fawcett's article, published in your issue of September 22, on the subject of "American Sailing Vessels." We do not quite understand the author's statement relating to construction of metal ships, as follows: "Early in 1883 there was launched at the shipyard of John Roach, at Chester, Pa., the 'Tillie E. Starbuck,' a full-rigged iron ship, the first metal sailing ship built in the United States, and one of the first turned out anywhere in the world. The 'Starbuck' was also the first sailing vessel in the world to carry iron masts."

I witnessed the arrival at Liverpool about the month of May, 1870, of the American-built bark "Iron Age," which, as her name indicates, was built of iron. The vessel attracted great attention at the time among Liverpool shipping men, as she was said to be the first iron ship to be built on this side of the Atlantic. English-built iron ships were common enough at that date. In fact, the construction of a wooden ship in England was the exception, not the rule. Furthermore, I then saw vessels with not only iron masts, but large ships with every yard on board of iron. The American ship "Amity," of whose crew I formed one, had an iron main lower mast. The three lower masts were painted to imitate iron. I remember the exclamation of a St. George's Channel pilot when he boarded our ship: "Why, Captain, I never saw an American ship before with three iron lower masts."

The author makes another statement which I very much doubt: "The sailing vessels of recent construction, both wood and steel, have made some wonderful speed records, and have easily discounted the performances of that one-time pride of the shipbuilders, the 'Red Jacket,' . . . or of the 'Sovereign of the Seas.'" While the ships of to-day may be fine vessels, I do not believe that they can discount easily passages made by such clippers as the "Sovereign of the Seas," "Red Jacket," and "Flying Cloud," which vessels were built with view to speed, and whose fine models have never been surpassed. Except the fliers of recent date, very few steamers have equaled a famous run of the "Sovereign of the Seas," from noon to noon, on one of her passages to San Francisco.

I am greatly interested in American shipping, and would like very much to hear what passages are made by the big ships and monster schooners of to-day. Also would like to know number of crew carried by the five-masters referred to in article by Mr. Fawcett,

and by that 5,500-ton (cargo capacity) six-master, which, I believe, has since been launched.

WILLIAM OWEN.

Panzos, Alta Verapez, Guatemala, October 20, 1900.

Automobile News.

Many accidents have occurred on account of the tires becoming detached from the steering wheels of automobiles, and too much attention cannot be paid to this matter.

The race from Berlin to Aix-la-Chapelle began August 30 and ended September 2. It rained heavily on the third day of the race, but fifteen machines succeeded in finishing. The net time of the winner was 14 hours 26 minutes and 22 seconds. This time was made with a motor tricycle.

The Touring Club of France is doing a great deal to help along the motor carriage cause by compiling lists of charging stations; and they are using their best endeavors to ascertain, where the plants are owned by private parties, whether they are willing to sell their current for recharging electric accumulators or not, and during what hours they are willing to do so, and a series of questions have been sent to all such parties.

A great improvement in motor tricycles is being introduced by the De Dion firm. The essential difference between the new and the old motor tricycle is that in the former the motor can be worked quite free from the machine, being started by means of the pedals separately, and afterward connected to the road wheels through the medium of a clutch. In the latter it is necessary in starting the engine to propel the machine forward at the same time—a fatiguing process.

The two automobile ambulances of Roosevelt Hospital are very handsome vehicles, and were donated to the hospital. There is room for three reclining patients, and eight can be crowded in if they are able to sit up. The batteries are charged in position, and as their radius of action is 25 miles, there is little danger that they will become exhausted, as the calls are seldom for a greater distance than two or three miles. Powerful brakes can bring the vehicle to a stop within a very few feet, while running at full speed.

Public automobiles in Paris have been taken in hand by the police, and now they are subject in common with cabs, etc., to the official regulations and tariffs. While the exhibition was open, the drivers of these vehicles charged the public prohibitive prices for their use, with the consequent result that they were not regarded with much popular favor. Now the maximum tariff for an automobile carrying four passengers is 40 cents for the "course," and 50 cents per hour inside the city. It is anticipated that this official control of the automobiles will encourage their more general utility in the streets.

Motor car owners using petroleum spirit will appreciate a new form of can for storing purposes, made by a German firm. It claims to be possessed of two valuable features. In outward appearance the can resembles those generally used, but inside there is a pipe which extends from the outlet to the bottom, and is pierced with holes throughout its entire length. Round this pipe is a gauze covering, which acts like the covering of the Davy miners' lamp in preventing flame coming in contact with the spirit. A new form of plug is used, which has a brass cap held in position by a fusible solder, which will melt in case of an outbreak of fire, and so allow any gas generated in the can to be liberated and prevent explosion.

Experiments were recently carried out in France for the purpose of ascertaining the quantity of fuel consumed by automobiles. The course extended from Suresnes to Meulan and back, a total distance of nearly 44 miles. Ninety-six vehicles competed in the trial. The premier position was secured by a moto-cycle, which piloted a quadricycle of 5 horse power, carrying two persons, and which only consumed about 4½ pints of fuel. The Comte de Chasseloup-Laubat, who traveled in a 24 horse power machine, covered the distance in 1 hour 43 minutes with a consumption of about one gallon. All the vehicles succeeded in covering the journey, and the results of the tests prove that the cost of running automobiles is considerably less than is generally supposed.

Infectious Diseases in London.

In the parish of Lambeth (London) within less than three weeks 105 cases of infectious disease were reported to the medical authorities, comprised mostly of typhoid and scarlet fevers. The investigations into the outbreak reveal the distribution of the contagion in a curious manner. The locality affected is inhabited mostly by the artisan class, the wives of whom, after washing their clothes, are in the habit of sending them to some neighbor or neighbors who possess a mangling machine, to have them wrung out or mangled. Consequently, the infected linen taken from one house to another to be so treated contaminated the mangle, which conveyed the infection to other non-infected clothes.