

**THE WAR BETWEEN JAPAN AND CHINA.**

We present herewith one of the characteristic street scenes which have been witnessed daily in Japan during the last few months—Japanese soldiers hastening to the seat of war in China. The vehicle shown is the jinrikisha, a queer-looking conveyance, only used since 1870. It is said they were invented by an American missionary. It is a two-wheeled, hooded conveyance with springs, and is drawn by one or two men, two men being usually employed for fast traveling. On a good road they travel at a speed of about 6 miles per hour. The rate of hire is only about 4 cents per mile.

Japan has achieved a prominent position by her many victories both by land and sea in her war with China. Since the capture of Port Arthur, the great naval and military depot of China on the northerly side of the entrance to the Gulf of Pechili, on November 21, 1894, one army corps has been steadily advancing northward, on the Manchurian route toward Peking, while another, with the co-operation of the fleet, has been making preparations for attacking the great fortress, or series of forts and naval station, constituting Wei-Hai-Wei, which guards the southerly side of the entrance to the gulf. The attack on the latter place began in earnest on December 26, by land and sea, the defense being more spirited than any that has yet met the Japanese advance, and being most actively partici-

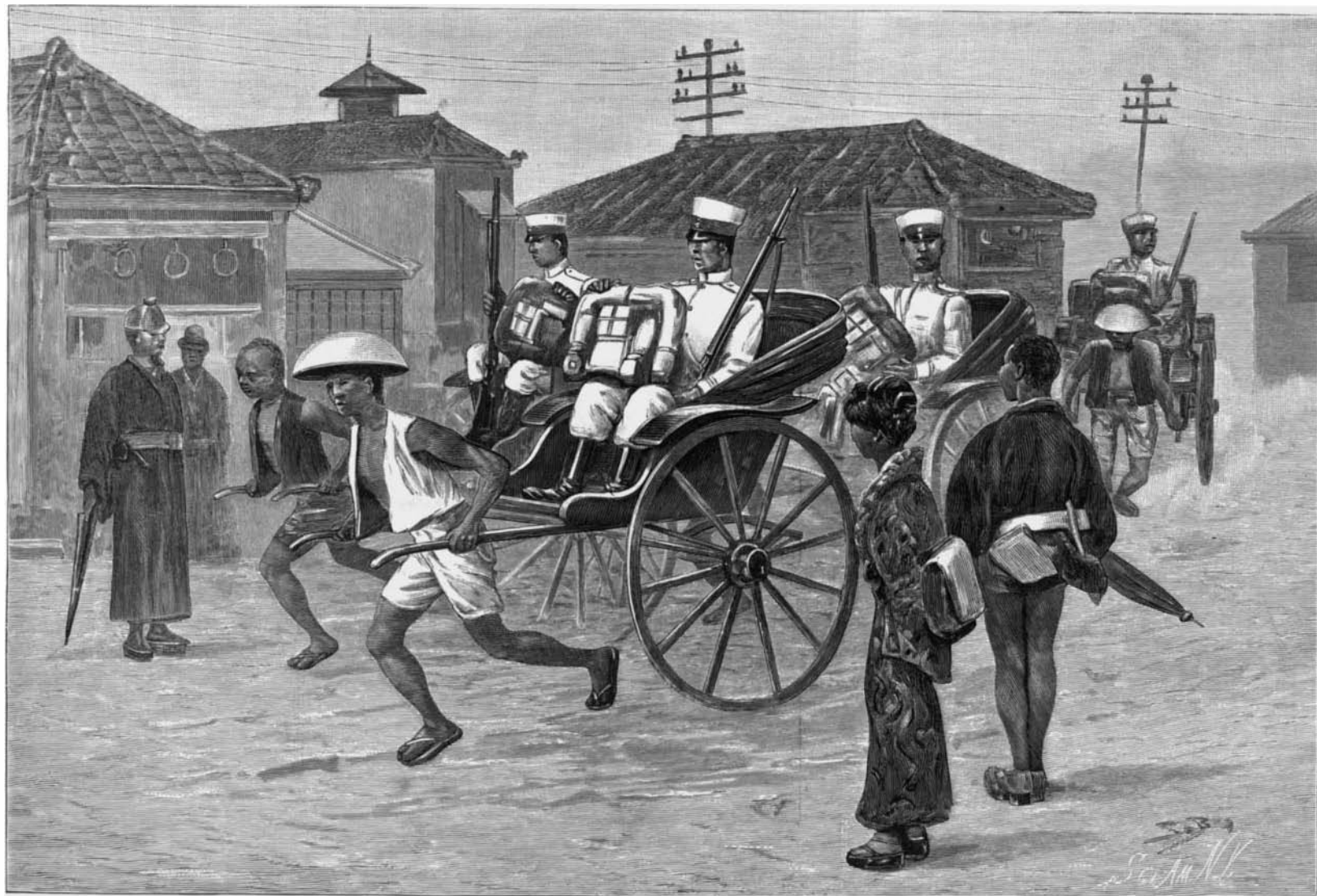
of Japan are well equipped, and the military hospitals provided with all the latest surgical appliances. For our engraving we are indebted to La Ilustracion Espanola y Americana.

**Bicycle Riding.**

The average duration of cycling enthusiasm among the ordinary riding class is three years. The first few months are spent in wobbling around on the pavements, eyes fixed and staring, elbows (and knees for that matter) akimbo, coat-tails dragging on the wheel or fluttering to the breeze. After the first muscle-ache stage has passed we find the enthusiasm augmented to ecstasy, like to that of a child in a swing, and speed and distance seem limitless. Then the country road, and the happiness is supreme. Not only are the senses pleased, but the whole organism rejoices in a condition of physical beatitude. That newly described sense, the muscle sense, contributes its share in this expression of well-being. The locomotor apparatus of man craves exercise as the stomach craves food, and the gratification produces similar good feeling in the respective organs. But such exercise! Clad in porous wool, the whole body is as it were swimming through a sea of oxygen, breathing at every pore. A speed of ten miles an hour means augmented atmospheric pressure of three or four pounds on the ventral surface

and sloping backward so that the weight is received on the tuber ischii, is the least harmful. On the country road one finds a rider thus mounted poising his body delicately on three points of support, viz., handle bars, saddle and pedals. He is never jarred and his extremities or buttocks never grow numb. While we thus advocate the three-point support, we emphatically protest against the scorcher position and especially for young boys. There is no use trying to tell an experienced road rider that he must sit erect. He will tell you that it cannot be done, and will retort by saying that more harm is done to the perineum by erect posture than by the slight forward inclination of the body.

Now for a curtain lecture to the doctors. Ride a wheel for your health. This implies that not all need it. Dress for wheel riding, and don't let your dignity coat-tails fly to the breeze like a jay. When you ride dress accordingly, and try and look trim and carry yourself gracefully. Dignity does suffer when the professional or other gentleman goes paddling along with pantaloons sticking out at ankles, knees hitting handlebars, and everything above the seat flying loose. To ride gracefully means to ride with a minimum of discomfort and fatigue, and if one cannot acquire that art without instruction, by all means go to a training school. The profession should set a good example in this as in all other matters pertaining to physical de-



**JAPANESE SOLDIERS HASTENING TO THE RENDEZVOUS.**

pated in by the Chinese war vessels, torpedo boats, etc. Operations were greatly interfered with by the prevalence of extreme cold weather, and progress was impeded by the fact that many sunken mines and torpedoes had to be removed from the harbor and approaches, or rendered harmless, by the advancing Japanese. The latter, however, kept steadily at their work, and the several forts which constituted the great station have steadily fallen before continued attacks of the combined land and sea forces. The major part of the Chinese navy, including the two principal ironclads, the Ting-Yuen and Chen-Yuen, has also been destroyed. They were both engaged in the great battle at the mouth of the Yalu River, from which they escaped only to be sunk at Wei-Hai-Wei, after about ten days' almost continuous fighting, by the torpedoes sent against them by the Japanese. They were sister ships, and the most powerful vessels in either the Japanese or Chinese service, each having a displacement of over 7,000 tons and belted 14 inch steel compound armor. It is reported that the Chinese torpedo fleet subsequently attempted to escape from the harbor on February 7, but that they were pursued by a flying squadron of Japanese vessels and twelve of them either sunk or driven ashore.

The maneuvering of the Japanese fleet at the battle of the Yalu showed that the Japanese admiral was possessed of a knowledge of tactics that would have done credit to a Nelson. A number of the officers of the Japanese navy studied at Annapolis. The armies

and corresponding decrease of a few pounds below normal pressure on the dorsal surface. The whole spinal tract is thus subjected to pneumatic suction and its circulation thereby stimulated. These are all factors in the spirit of exhilaration experienced by judicious riders. And the cold sponge-bath on reaching home, without which no exercise can contribute its full quota of good, is looked forward to with quite as much zeal of anticipation as is the hearty meal (in waiting).

Now our amateur has reached that condition of development of the special wheeling sense enabling him to adjust himself to the conditions of moving equilibrium automatically, even under very trying conditions; he can endure several continuous hours in the saddle without fatigue, and his great thigh muscles have developed to meet the demands. The ordinary rider has, in say one year, reached the limit of development. If he loves riding because of the physical pleasures, and drinks in the beauties of nature as he speeds over the country, you will find that he never rides solely for distance record, but for real pleasure, and hence does not go beyond his capacity.

But too many ride for the excitement, and their pleasure is in boasting of miles covered. These latter are the three years' enthusiasts. They know almost nothing of the real pleasures of cycling and their enthusiasm is shortlived.

Just a few words as to the saddle about which the laity are exercised. Experience proves that a firm, almost springless saddle, very narrow at the pommel,

development.—The Toledo Medical and Surgical Reporter.

**Decomposition of Glass by Water.**

From a long series of experiments of his own on these subjects, and from the work of others, the author draws the following conclusions:

1. The weathering of glass is caused by the decomposing action of the atmospheric moisture. The carbonic anhydride of the air does not act directly on the glass, but only on the alkaline products of the aqueous decomposition.
2. Dry carbonic anhydride is without action on dry glass.
3. There is no proof that water can be retained by glass, except when it enters into chemical combination therewith.
4. The weathering of glass and the decomposition of glass by water are similar processes, and are both preceded by the taking up of water into the glass molecule.
5. The surface changes caused by weathering are comparatively slight with good glass.
6. The action of water on weathered glass is only temporarily more rapid than it is on new glass.
7. Glasses (lime glasses) are more hygroscopic and weather more easily, the more easily they are attacked by water.
8. Even after long action of water, glass is still capable of becoming weathered.—F. Foerster.

**New French Steamers.**

Arrangements are said to be well advanced for the construction of two new French Transatlantic liners. These new vessels, which will come next to the latest Cunard liners Campania and Lucania in point of size, are, it is stated, to be named Alsace and Lorraine. The new steamers are to be 557 ft. 9 in. long and 59 ft. beam, and at 26 ft. draught the displacement will be 13,600 tons. Now the Campania is 600 ft. and 65 ft. beam, while the American liners are 527½ ft. and 63 ft. beam. The Alsace and Lorraine are larger than any non-British steamer. They will have a sea speed of 20 knots, but it has gone forth that they are to beat the Campania and Lucania in ocean steaming. The cost is put by the French Transatlantic Company themselves at from \$3,750,000 to \$4,000,000, and the company have approached the government with the view of securing some guarantee of financial return in the future. They point to the advantage of such vessels as auxiliary cruisers, apart from commercial gain, and seek directly, as compensatory guarantee, that the government should rearrange the service from Havre and Bordeaux to Colon, giving the company a 10 years' concession. On this route two of the present Atlantic steamers would be placed to make Guadeloupe 8½ days distant from Bordeaux, Port of France 9 days, Cayenne 13½ days, and Colon 14 days. This is equal to an acceleration of three sea miles per hour on the present service, and the advantage to French colonial trade would be appreciable.

**A NOVEL BICYCLE FRAME.**

A new feature in bicycle construction is being introduced involving the method of connecting the tubes of the frame. The system of construction is protected by patents of Charles O. Barnes.

The connections, as shown by the accompanying sketch, consist of two punched and formed-up pieces of 18 gauge steel arranged to extend around the inner side of the head tubing until they meet, and at the same time both projecting from the tube at the desired angle to form a circular stud over which the connecting tube can be fitted and brazed in position. Small angle pieces are added, as shown. The pieces used in this manner act as a re-enforcement to both tubes, and being pointed off in the smaller one, obviate any possibility of crystallization and breaking of the tubes. The usual method of connecting the sections of the frame is by drop-forged outside pieces, which are necessarily much heavier and make the frame look more cumbersome, while with the Barnes method the connections are all on the inside, thus relieving the frame of any outside projections.

Another important feature of the new Barnes bicycle is the method of adjusting and holding the handle bars and the seat post. In the case of the former there is a small hexagon cap screw on top of the bar which constitutes the only outside appearance of the fastening. When the handle bars are raised to the desired height, the tightening of this cap screw draws a circular wedge up inside of the handle bar post, which,



FRAME CONNECTIONS AND RE-ENFORCEMENTS OF THE BARNES BICYCLE.

being slotted, is expanded and held firmly in position. The seat post is adjusted and secured in a similar manner.

It will be seen from this description of the novel features that it has been an object to as far as possible relieve the machine of any outside projections and drop-forged frame connections.

A company to be known as the Barnes Cycle Company has recently been organized for the manufacture of this wheel, and has fitted up a large factory at Syracuse, N. Y., for that purpose. The company has gone into the business on a large scale, and intends to build

only high grade bicycles, using tool steel cones and ball cases and the best material obtainable throughout.

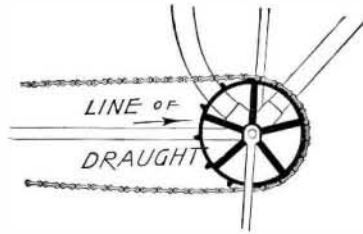
**KEATING BICYCLE.**

The Keating bicycle, manufactured by the Keating Wheel Company, Holyoke, Mass., claim to have been the first to put on the market a fully guaranteed light weight roadster. They have in past years placed upon the market the following weights: 35, 32, 25, 21; and



THE KEATING BICYCLE FRAME.

finally for the present year a 19 pound wheel has been produced. To those interested in wheeling this is an interesting bit of history, and it does not seem likely that a road wheel can be made much below the last named weight. The Keating wheel is characterized by a special shape of frame with a very long wheel base, 45 inches, and narrow tread, by straight tangent spokes, convertible pedals and dust-proof bearings. The frame possesses as its distinguishing peculiarity a curved center brace, shown in the two illustrations annexed. The idea of this is not only to bring the rider to a better position with reference to his work,



THE KEATING CRANK BRACKET AND CONNECTIONS.

but to give a greater resistance to the draught of the chain upon the frame. This draught is resisted by the bent portion of the center brace, avoiding a transverse strain, and we find in this feature one of the few original features of the frames of the year.

Like other high grade wheels, it uses the finest crucible steel for the hubs. In all respects and details it is highly characteristic and is pre-eminently a wheel of original construction. For ladies, both drop frame and diamond frame wheels are made, the latter weighing but 19 pounds and being designed for rational costume. This wheel, the company states, is the only one supplied to the European trade. The drop frame ladies' wheel weighs 4 pounds more. They also make for ladies the straight tube drop frame. All their wheels are absolutely guaranteed for a year.

One of our cuts shows the diamond frame, the other shows the crank bracket connections on a larger scale.

**The Paris New Sewer Main.**

The new sewer main of Paris, which crosses from Clichy to Asnieres underneath the Seine, was formally dedicated recently. It is the first portion of an enormous enterprise which will take away all the sewage of Paris from the waters of the Seine. The work was begun in 1889, and will require fourteen years or more to complete. The difficulties encountered, especially under the river proper, were many and took a long time to overcome. The river, forming its bed in remote times, upheaved the soil for a considerable depth. Crevices filled with alluvial matter, quicksands, calcareous rocks, conglomerates and very hard silex were met within a few feet of each other. The machinery employed is similar to that used in America with great success at the St. Clair tunnel, namely the Beach Hydraulic Tunneling Shield, an American invention now generally used

throughout the world for earthwork tunneling. As quick as the shield advanced, the huge iron rings forming the tube were adjusted. The length of the tunnel under the Seine is 1,543 feet; its diameter, 8 feet 6 inches. Another highly interesting subaquatic structure is the Mersey tunnel, connecting Liverpool with Birkenhead. It is 10,660 feet long, 26 feet wide and nearly 20 feet high. The drainage is performed by a sewer as long as the tunnel itself, ending in a pit on either side, wherefrom the water is raised by pumps having a capacity of 6,000 gallons per minute. The ventilation is very effective; a duct connected with

the main tunnel by slanting shafts leads to a large fan wheel above, which draws all smoke, gas, etc., out of the tunnel, while at the same time fresh air is forced below.

**Alkaloids of Cacti.**

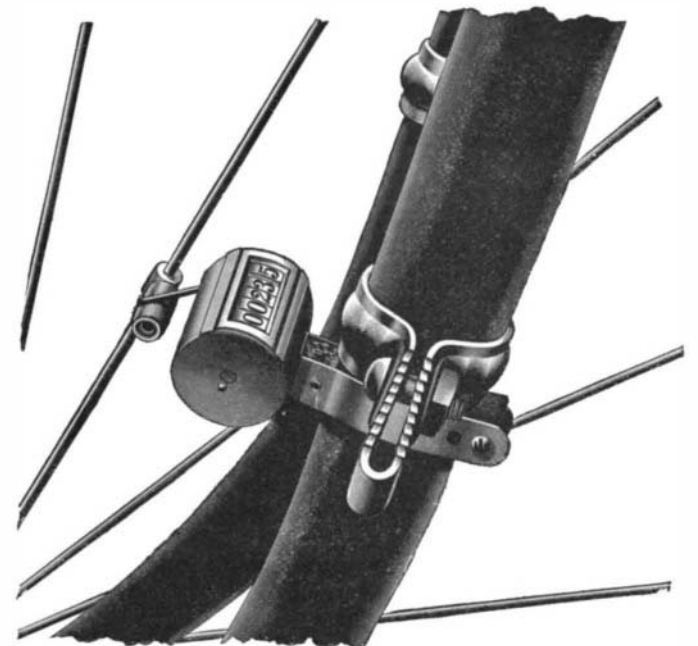
Before the Physiological Society, Berlin, Prof. L. Lewin gave an account of some experiments made with an alkaloid obtained from a North Mexican cactus called "Peyotl." It is well known that this plant has an intoxicating action, and in large doses produces sleep and a state of nervous excitation accompanied by a so-called "power of prophesying," similarly attributed to the sulphurous exhalations of the temple at Delphi. Small doses of the alkaloid when given to frogs produced tetanic cramps and a much increased reflex irritability, analogous to strychnine; but with this difference, that by carefully apportioning the dose the effects were permanent for several days. Similar results were obtained with rabbits, and Prof. Lewin regarded the new alkaloid as specially adapted to further the study of the nature of tetanus. In rabbits it was noticed that during each paroxysm of cramps, the blood vessels of the ears were widely distended. The speaker had also found alkaloids with powerful actions in many species of cactus hitherto regarded as harmless by botanists, notably one closely resembling curare.

**THE U. S. CYCLOMETER.**

The U. S. Bicycle Cyclometer, a cut of which accompanies this article, is a very compact and light one—lightness being a sine qua non with wheelmen of the present day. It weighs one ounce, is one inch long and seven-eighths inch in diameter. Its registry terminates at 10,000 miles, and it can be set back to zero or other figure at any time. As shown, it is attached to the front forks so as to be read from the saddle. To facilitate this, the figures are arranged in one straight line, the extreme right hand figure giving tenths of a mile. The instrument is shown in the cut as reading 237½ miles. It is attached to the front fork by a thin clamp, so that, if hit by anything, it has a good chance of escaping injury. Instead of glass, mica is used to cover the face of the figure drums. This obviates danger of breakage, conduces to lightness, and the mica, if injured, is easily replaced. Phosphor bronze is used for the wearing parts and the case is German silver. This makes it practically water-proof. If any dust should get into the case, it settles to the bottom, out of harm's way.

It is accessible for repairs or cleaning by removing one end of the case, when the whole movement comes completely out. The simplicity of the mechanism makes it easily cleaned.

Each cyclometer is tested by being run to a 400 mile registry, at a rate corresponding to 50 or 60 miles an hour. They are made for 26, 28, and 30 inch wheels, and by changing one piece, at a nominal expense, the same instrument can be standardized for any size of wheel. In the cut, the cam attached to one of the



THE U. S. CYCLOMETER.

spokes of the wheel is shown as it is on the point of moving the cyclometer arm.

This cyclometer has been patented, and is manufactured by Bean & Lang, Fond du Lac, Wis.

**Varnishing Metal.**

The objects are dipped in a colorless pyroxylin varnish and then heated in a current of air at 80° C. until the varnish is thoroughly dry, when they are immersed for a few seconds in a two per mille alcoholic solution of alizarin, followed by a wash in water, to change the color from the original light yellow to a golden red.