

**Hardness of Metals.**

F. Auerbach's definition of hardness is given for the case of plastic bodies, including metals, by the limiting pressure per unit surface, attainable between a lens and a plate of the same substance, says Science Abstracts. In the case of metals the deformation cannot be observed with the same facility as in the case of transparent bodies, but the surface of contact may be measured by covering the lens with a thin layer of lampblack. This is only necessary at small pressures, since at great pressures the deformed area retains its shape. A complication is introduced by the fact that the hardness is considerably influenced by small impurities, as well as by the elastic and thermal history of the metal. The author gives the following table of the hardness of various fairly well-defined metals, as compared with minerals:

Steel.....	361	Quartz.
Copper (hard).....	143	Apatite.
Bronze.....	127	
Brass.....	107	Fluorspar.
Gold.....	97	Calcsp.,
Copper.....	95	
Silver.....	91	Boracic Acid.
Aluminium.....	52	
Lead.....	10	Gypsum.

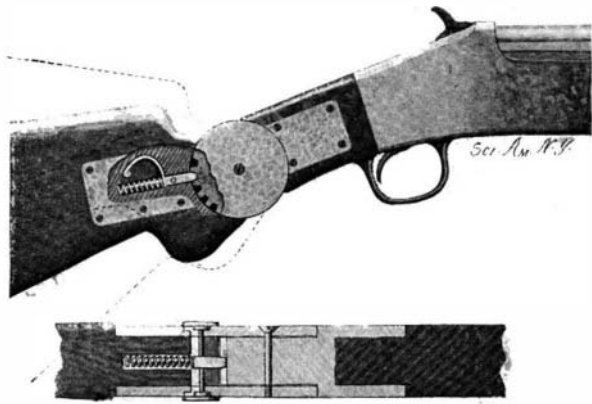
The aluminium was alloyed with 6 per cent copper. The bronze was an alloy of 15 parts copper, 2 parts zinc, and 1.5 tin. The brass contained 2 parts copper to 1 of zinc.

**Shipping at Nagasaki.**

Consul Harris, of Nagasaki, February 9, 1901, reports the launching, on the 26th ultimo, of the steamship "Kaga Maru" from the Mitsu Bishi Dock Yard and Engine Works, of that city. This vessel was constructed under the shipbuilding encouragement act of the Japanese Government and Lloyd's rules, class 100, A1, and was built to the order of the Nippon Yusen Kaisha (Japan Mail Steamship Company) for its American line. The materials used in its construction were purchased in England, and the keel was laid on the 20th of March, 1900. The ship is to be completed and delivered in March, 1902. A description follows: Type, 3 decks; material, steel; length over all, 459 feet; beam, 49 feet 2 inches; depth, 33 feet 6 inches; gross tonnage, 6,240 tons; displacement, 11,800 tons; draft, 25 feet; dead-weight capacity, 6,820 tons; engines, twin-screw, triple-expansion; boilers, cylindrical, four in number; indicated horse power (estimated), 4,500; speed, 15 knots.

**THREE RECENTLY PATENTED NOVELTIES.**

Three interesting inventions which have been patented in the United States within the last few months are an adjustable gun-stock, a combined rocking-chair and cradle, and a single-wheel vehicle.



**AN ADJUSTABLE GUN-STOCK.**

The gun-stock is the invention of Mr. Joseph N. Zoeller, a resident of St. Matthews, Ky. Within the stock an adjusting-head is pivoted and attached to the grip. The head is provided with peripheral teeth, between the spaces of which a bolt, held in the stock, may enter. A manipulating device is provided for the bolt, which device is passed to the outside of the stock for convenient operation. To change the inclination of the stock, the bolt is carried out of engagement with the adjusting-head. After the grip has been moved the bolt is allowed to enter the most convenient space between the teeth to hold the stock and grip as adjusted.

Samuel S. Arnold, of Toronto, Canada, is the inventor of the combined rocking-chair and cradle. The upper and lower bars connecting the rockers of the chair are grooved to receive the corresponding bars of a cradle provided with a rocker at one end. Pins limit the movement of the cradle. When not in use the cradle can be pushed under the chair.

Perhaps the most curious invention is Mitchell R. Heatherly's single-wheel vehicle. Our illustration shows the construction so plainly that an extended description is hardly necessary. Broadly, the contrivance consists of a curved tongue pivoted to the harness, and a single wheel carried by the lower end of the tongue. Above the axle of the wheel are stirrups for the rider or driver, if we prefer to call

him so. Suitable handles are provided on the tongue, which are to be grasped for security. The tongue, it should be observed, is so connected with the harness that it will adapt itself to the motion of the horse. Mr. Heatherly lives in Mundell, Kans. His vehicle is designed to take the place of the bicycle and to be used on race courses.

**The Development of Wireless Telegraphy in England—Its Proposed Adoption in the Post Office.**

Some months ago, when the utility and widespread advantages of Marconi's invention were conclusively established, a Departmental Commission of the English Post Office was formed to consider the merits of the system and the advisability of its adoption throughout the British postal service. The report of this



**COMBINED ROCKING-CHAIR AND CRADLE.**

commission is now complete, and it is stated to relate favorably upon the scheme in its general principle.

The result of this commission consequently portends a great revolution of the English telegraphic service. For several months past the telegraph authorities have been endeavoring to satisfactorily cope with the exigencies of the rapidly increasing telegraph traffic, but the country is so comparatively small, and the congestion of the traffic so acute, that practically no headway has been made toward the solution of the difficulty. If Marconi's system were employed the possibility of blocks on the lines would be entirely obviated, since each telegraph office would have its own synchronized receiver, and only the transmitter corresponding with that receiver would be able to establish communication therewith. Then, again, in stormy weather widespread damage is caused to the wires, frequently destroying communication, while in connection with Marconi's system it has been proved to work better in boisterous weather. These salient characteristics have impressed the commission, and have no doubt appreciably influenced their favorable decision.

Yet the scheme will have to be well prepared, since its innovation is attended with numerous difficulties, some of which can only be obviated by Parliamentary measures. For instance, the British Post Office has a monopoly in any system of telegraphy, and it is only natural to expect that they will endeavor to enforce these rights in the present case. In this event Marconi will be prevented from establishing independent installations without the official license. It is generally believed that at the present time the Post Office does actually claim the monopoly of wireless telegraphy in the British Isles, and that Marconi has not yet received the necessary license to install his system. This belief is somewhat supported by the fact that the English government will not permit wireless telegraph communications to be transmitted from a point less than three miles from the shore. This fact was established at the inauguration of the system upon the mail packet service between Dover and Ostend, when the authorities would not permit the establishment of a land station at Dover. The Post Office is awarded this monopoly by act of Parliament, and it is practically certain that if necessary they will enforce that prerogative. But such a contingency is hardly likely to arise. Marconi has placed himself at the disposal of the commission and has extended them every assistance in his power, in order that the advantages of the system might be thoroughly understood. That the system will be nationalized there is not the slightest doubt, as in the cases of the tele-

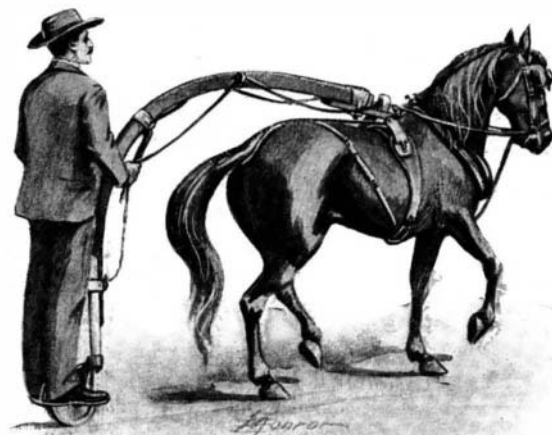
phone and the District Messenger Agency of London.

For once England is desirous of leading the way. Negotiations have already been opened with one or two of the European powers, concerning the idea of establishing the system partially, if not entirely, upon the Continent. By this means the cables will be dispensed with, and the international messages transmitted through the air. Of course there is the question of expense, because such a radical revolution could not be effected except with a great outlay. Yet the system is cheap to install, for the cost is limited to the purchase of transmitters and receivers. Wires, poles, and cables are entirely dispensed with. It will even be unnecessary to erect the lofty pole in connection with the apparatus, since Marconi has invented a cylindrical appliance which performs the same functions with equal satisfaction, as described in a recent issue of the SCIENTIFIC AMERICAN.

Another instance of England's desire to encourage the utilization of the system is proved by the decision of the Admiralty to equip all the vessels in the fleet with the apparatus. Several ships are already supplied, but those which are yet deficient in this respect are being fitted with all possible speed. In a few weeks' time the report of the commission will probably be published, together with the suggestions for acquiring the system from Marconi without interfering with the legality of his patents. Certainly the action of the British authorities will be followed with keen interest by the other nations, and should Great Britain decide upon its immediate introduction other nations will be compelled to do likewise.

**Demand for Blood-Oranges in Germany.**

Consul Hughes writes from Coburg, April 26, 1901, as follows: There is a great demand in Germany for the so-called "Italian blood-orange." The popular idea here is that this fruit is colored, not by nature, but by injections of some artificial vegetable dye. To discover the truth or fallacy of this belief, several well-known German chemists have been experimenting, first, to find out from the blood-orange itself if its color is due to artificial means, and, secondly, to change the common Italian orange into a blood-orange by injections of different kinds of coloring matter. The experiments, however, have not been attended with success. It was found that no single injection of any solution would color more than one part of the orange, and that if several injections were made, the fruit was likely to decompose very quickly. The theory was then advanced that the coloring was produced by watering the roots of the trees with a blood-red veget-



**A CURIOUS VEHICLE.**

able solution. It is needless to say this experiment was as barren of results as the first.

**The Current Supplement.**

The current SUPPLEMENT No. 1330 has many articles of general interest. The Racing Yacht "Independence" is accompanied by two illustrations, showing the bow and the remarkable rudder. "Protection of Ferric Structures," by M. P. Wood, is a continuation of a most important paper. "Resistance to Death Among Insects" is a most curious natural history article. "Recently Discovered Greek Masterpieces" is accompanied by a number of engravings made from photographs showing the remarkable nature of the find. "Packing Goods for Foreign Markets," which was commenced in SUPPLEMENT No. 1329, is concluded in this issue and shows how goods of all kinds should be packed for export.

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