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A BRAKE THAT WORKS.

The public is indebted to The Daily Mail, of London, for introducing, through its Geneva correspondent, an engineer, who is credited with an invention of a "mechanical brake" which stops a train that is running at 50 miles an hour within a distance of 20 yards. Good! But what about the passengers? A train running at the rate of 50 miles an hour covers 73 1-3 feet in a second; and to stop a train moving at this speed in 20 yards means that it must be brought to a full stop in 4-5 of a second. When we remember that, in an end-on collision, it takes several seconds for the momentum of the train to expend itself in telescoping car into car, one is moved to ask what would be the condition of the living contents of a passenger car that was brought to a stop in a fraction of the time that it takes to bring the last car of a telescoping train to rest?

WHOM THE GODS WOULD DESTROY THEY FIRST MAKE MAD.

The interference of the trades unions with the British workmen, with its consequent disastrous effect in the competitive market, has become such an old story as to render repetition unnecessary; but particular attention should be drawn to the latest testimony in this direction, which is given by Sir Hiram Maxim and relates to an occurrence in the Vickers-Maxim establishment. As related in The New York Sun, it seems that the organization had decided that a certain gun attachment should occupy a day and a quarter in the making. When the firm introduced a special machine to manufacture this piece, the men still continued to turn out only one attachment in a day and a

A German mechanic who happened to apply

rk was placed in charge of one of the machines and turned out thirteen of the attachments in a single day. Verily Whom the Gods would destroy they first make mad.

THAT MESSAGE FROM MARS.

It has been stated by an authority, whose weight will be determined by the mental attitude of his readers, that the day is near at hand when we shall be able to communicate with the other planets and preferably with Mars. It seems that in searching for a suitable location for a laboratory in which to conduct experiments in the wireless transmission of energy, Nicola Tesla found the desired conditions at a point some ten miles from Pike's Peak, at an altitude of several thousand feet above the sea. During the eight or nine months wherein Mr. Tesla was busy in the rarefied atmosphere of his laboratory, he seems to have produced some very spectacular effects; for, whereas in his New York laboratory, he was able to produce electrical discharges only 16 feet in length, and of 8,000,000 volts pressure, he here gradually "learned how to confine electrical currents of a pressure of 50,000,000 volts; how to produce electrical movements up to 110,000 horse power," and that he finally succeeded in "obtaining electrical discharges measuring from end to end 100 feet and more." Yet, in spite of his familiarity with 50,000,000-volt currents, Mr. Tesla did not disdain to study "certain feeble electrical disturbances which, by their character, unmistakably showed that they were neither of solar origin nor produced by any causes known to" him "on the globe." After deep thought upon the subject, he has finally "arrived at the conviction, amounting almost to knowledge, that they must be of planetary origin."

It would be interesting, and possibly vastly entertaining, to be supplied with the process of ratiocination by which Mr. Tesla deduces from the existence of certain puzzling electrical disturbances his "conviction, amounting almost to knowledge," that these disturbances had been launched at our particular planet from some other planet (preferably Mars), that was desirous of intercourse. Signor Marconi has suggested that these disturbances (which seem to have worked with such brilliant results upon Mr. Tesla's imagination) were due to atmospheric electricity which is especially active at such a high altitude as that of Mr. Tesla's laboratory; and Sir Norman Lockyer pertinently asks why, if electrical energy had been transmitted from Mars, it should have made its presence manifest in Colorado only; since all magnetic observatories in the world would have been simultaneously aware of it?

That some of the planets may be inhabited is possible, and there is nothing in our present knowledge of electricity absolutely to forbid the hope that in some future day we may learn how to fling forth intelligible electrical impulses into inter-planetary or even inter-stellar space; but it will certainly need something more than mere observations of some unexplained electrical impulses on a Colorado mountain to prove to a demonstration either the one proposition or the other.

CONTINENTAL CRITICISM OF THE 16-INCH GUN.

If we are to believe the artillery expert of the Krupps, and a German artillery officer who writes in a recent issue of La Revue Technique, American estimates of the extreme range of which the new 16-inch gun will be capable, are altogether too sanguine. The accepted maximum range of this weapon, as calculated by Major James M. Ingalls, the head of the Artillery School for Officers at Fort Monroe, is 20.9 miles; but the German expert denies that the gun can range further than 16 miles, while the writer in La Revue Technique claims that the maximum range of our new army gun is only about two-thirds of Major Ingalls' estimate, or from 14 to 15 miles. The latter estimate is arrived at by the "method of vertical speeds expressed as functions of the times of flight." With all due deference to these foreign criticisms, we pin our faith to Major Ingalls' estimate, for we cannot forget that, on a previous occasion, when the English artillery officers, before firing the celebrated "Jubilee" shot, invited the artillery experts of the world, including Major Ingalls, to estimate the exact range of the shell, it was found after the shot was fired that while the American expert had plotted the fall of the shot only a few hundred feet short of the actual distance, the other calculations placed the point of fall at a distance varying from 1,500 yards to some miles short. When the gun is finished, it will be interesting, as a verification of the theories of ballistics, to fire an experimental shell from this weapon, as was done with the 9.2-inch gun in England, and at a later date with the 9.45 Krupp gun at the Meppen proving ground.

THE TUNNELING CRAZE.

For some occult reason the idea of tunneling beneath straits or estuaries possesses a strong fascination for a not inconsiderable section of the public. We are all familiar with the proposed English Channel tunnel, which for half a century or more has been a favorite theme of the financial promoter; and the proposed tunneling beneath the Irish Channel has been brought persistently into prominent notice, in spite of the fact that it is manifestly doomed to failure as a financial undertaking. The latest tunnel proposal is that of a certain M. Berlier, who believes that if a double track line, 25 miles long, were carried beneath the Straits of Gibraltar, at a cost of $25,000,000, the outlay would be amply justified by the volume of traffic which would pass from continent to continent.

It is positively amusing to note the naiveté with which this gentleman assures the public that, as the depth of the sea at this point does not exceed something over a thousand feet, the construction would be perfectly feasible. Apart from the fact that from 160 feet to 180 feet is the limit beyond which it is impossible to carry on excavation under the compressed air system, a consideration which alone would prevent the construction of such a tunnel, there is the fact that the excessive grades which would be necessitated by the depth of the tunnel would render the cost of the operation abnormally high. This cost, taken with the heavy fixed charges, would render the scheme a losing venture from the very outset.

THE ENLARGEMENT OF THE WHITE HOUSE, WASHINGTON.

The American public is confronted just now with an architectural problem that calls for the exercise of rare judgment and good taste in its solution. We refer to the proposed enlargement of the Executive Mansion of the United States, which for a long period of years has been popularly and affectionately known as the White House. No architect is qualified to undertake the task of enlarging and improving this structure who is not fully alive to the historical and sentimental associations from which it takes much of its character. The building itself carries a dignity which is due to the fact that, architecturally, it is true to the period and taste of the age in which it was designed, and built; and any changes which are made, to be in perfect taste, should preserve this inherent simplicity and dignity, and carefully avoid any of the meretricious embellishments which too frequently vulgarize our modern structures. If there ever was an architectural task that called in the highest degree for the truest artistic instinct, it is this work of remodeling and enlarging the home of our Presidents. The American Institute of Architects have sounded a note of warning, to which the nation will do well to take full heed. Without casting any reflections upon the architectural designs that are turned out by the army officers who are responsible for the government buildings, we must confess that the particular plan that has been drawn up for the enlargement of the White House conforms neither in general scope, nor in detail, to the requirements of the case as we have outlined them above. There is nothing to be lost and everything to be gained by moving slowly in a matter of this importance. The capital city of the nation is not so profusely enriched with evidences of the architectural genius of this country that it can afford to add one more to the many lost opportunities, of which too many of the buildings and statuary of the city are a permanent record.

SPEED RECORDS OF THE BICYCLE FOR 1900

Although we have, many of us, lost the old-time enthusiasm in the bicycle, the really wonderful performances last year of riders who were paced by motor-cycles, are well worthy of a passing notice. From a perusal of the record table lately issued by the International Cyclists' Union, the authority of whose timings is quite unimpeachable, we gather the following facts: Although none of the records made in 1899 for a distance of a mile or under were surpassed, except that of ¾ of a mile with a flying start, all the records for distances from 1 mile up to 634 miles have been exceeded by a considerable margin, the great increase in speed in the longer distances being due to the introduction of improved motor-cycles for pacing the riders. The record of a quarter of a mile with a flying start stands, as it did in 1899, at 20 seconds and for 1 mile at 1 minute 22 2-5 seconds. Late in October of this year a rider covered, for the first time, a distance of 40 miles within the hour, the exact distance ridden being 40 miles 327 yards. Another rider, in an attempt at the twenty-four hour record, covered 183 miles in six hours, 349 miles in twelve hours and 634 miles in twenty-four hours. The speed of a quarter of a mile in 20 seconds is equal to a speed of 45 miles an hour, which is higher than the average speed, including stops, of any but a few express trains running today in this country. Such phenomenal speeds as these are rendered possible only by the pacing machine, and that they are made at all, proves that on level surfaces, the atmosphere affords by far the largest of the resistances encountered by a bicycle at speeds of over 12 to 15 miles an hour.

TRANSMITTING SIGNALS THROUGH THE SEA.

Experiments have recently been carried out by Prof. Elisha Gray, the object of which was to devise some apparatus by which the well-known power of water to transmit sound might be turned to practical account in the transmission of signals. The investigation was suggested to Prof. Gray by Mr. A. J. Mundy, of Boston, who collaborated in experiments, which have apparently culminated in a highly successful test, made on the last day of the century. This test was carried out in a vessel, which was especially furnished for the purpose with a well-hole opening directly through the center of the boat, and extending 20 feet below the sea level, in which was suspended an 800-pound bell of the kind that is used for ordinary fog signaling. Suitable mechanism was provided to enable the operator to ring the bell, making as many strokes as he might desire. It was found that at distances of a mile, or slightly more, the sound of the bell could be distinctly heard without the use of a receiving apparatus, the sound traveling through the water and passing through the sides of the ship into the hold of the vessel. An ear trumpet, the mouth of which was sealed by a tin diaphragm, was attached to the lower end of a length of gas pipe, and submerged 6 feet beneath the water, the inner end of the pipe terminating within the vessel; and with this receiver the submerged bell could be heard at a distance of 3 miles. For distances beyond this a special electrical receiver was used, the submerged part of which was connected with a common telephone receiver, installed within the ship. In a signed statement, to which were attached the names of the inventors, and of representatives of the navy and the merchant marine, it is stated that when the submerged bell was struck, the sounds were heard through the electrical receiver at distances of from 1½ to 12 miles in the open sea.

The value of this invention is readily perceived. Its first application undoubtedly would be in such dangerous localities as are now provided with the ordinary fog signal which, although it has been heard at as great a distance as 15 miles, may at times be inaudible at short ranges, because of the unfavorable con-