Correspondence.

Bicycling Problem.

To the Editor of the Scientific American:

I have been riding bicycles of various kinds for fifteen or twenty years, and now I believe I have discovered why beginners on a wheel invariably run into any object they may wish to avoid. My wife is just learning to ride, and my opportunities for observation have suddenly widened; but it was while riding alone that I found what seemed to me to be a rational explanation of what has been always more of a joke than a serious matter.

On approaching an object which is to be avoided, a person instinctively leans away from it as far as possible; and to preserve the balance the bicycle must be tipped toward the obstacle. This inclination, alone, of the wheel will cause it to work in the wrong direction; but more than that, if the person straightens up ever so little—and it is hard to sit long at such an angle—he will, unless he is expert, throw the center of gravity of combined wheel and man over on the other side from the one on which he was leaning, so that the front wheel must be turned, sending him in the very direction he wished to avoid. As a result, the now frightened person probably leans still farther away and the whole process is repeated, sending him straight into the very obstacle he wished to clear.

This theory occurred to me, while riding on a narrow walk in a high transverse wind. I found myself leaning into the wind as far as possible, as though to brace myself, with the result that at the first unconscious effort to straighten up, I went off the sidewalk. I resolved then to relearn bicycle riding, and thereafter to try leaning the other way.

Perhaps there is nothing new in this idea, but if there is, it may be of interest to you.

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Motors and Alcohol in Germany.

M. E. Mayer made a communication recently to the Wurtemburg section of the German Engineers' Association relating to the consumption of an alcohol motor. A society has been formed in Germany with a view of encouraging the use of alcohol in industrial applications, and this society has engaged itself to furnish, under certain conditions, alcohol at 90 per cent for the average price of $4.55 per hectoliter (26.4 gallons), which makes the price per kilogramme equal to .054 cent. It is found that 1 kilogramme of alcohol produces 6,000 calories, while a kilogramme of petroleum, costing .0506 cent gives 10,000. According to the calculations, therefore, the use of alcohol seems less favorable by 80 per cent. In the practical tests with a motor of 14 horse power it was shown that an alcohol motor only consumes 68 per cent of the heat units needed in a petroleum motor to produce the same power. The reason lies in the amount of water contained in the alcohol which gives a less abrupt expansion and also permits a higher compression, and thus gives a more advantageous utilization of the heat. According to the latest trials, the cost of the alcohol was but 22 per cent higher than that of petroleum for a given power. This is partly due to the fact that the society has recently lowered the price of alcohol to $3.50 per car load of 5,000 kilogrammes (11,000 pounds).

The Current Supplement.

An important geological article on the Dinosaur beds of the Grand River Valley of Colorado opens the current Supplement, No. 1377. Our new colonial possessions in the Pacific have received no little attention in two entertaining articles, the one on the vegetable products of the Hawaiian Islands, and the other on the weights and measures used in the Philippines. William A. Del Mar presents a very thorough and fully illustrated account of the making and testing of incandescent lamps. The article is very explicit and clear in every respect. A concise and yet complete resume of electro-chemical products is made the subject of an article by Samuel Sheldon. The making of borax is a subject that will probably be of interest to technological readers; so will articles on lac and the art of lacquering, and artificial silk. Selected formulæ, trade notes and consular notes will also be found in the Supplement.

An adequate idea of the high value of a modern Atlantic liner may be gathered from the fact that the insurance value of the North German Lloyd steamship "Kaiser Wilhelm II.," now in course of construction at the Vulcan shipyard, Stettin, is $1,591,150. This represents only the launching value of the bare hull. A further insurance sum of $3,549,480 is required to cover the ship for the first trial trip, while the company require a total sum underwritten on completion of the vessel of $6,175,000. The risk of launching, river work and trials is to be covered by the policies.

Engineering Notes.

About 3,100 miles of narrow-gage railroad are to be built in Spain at a cost of $50,000,000. The scheme is one of the greatest that Spanish statesmen have devised to secure better transportation facilities. Spain's inadequate railway facilities are due not so much to the indolence of her people as to the topographical formation of the country. The mountains offer an obstacle to railway building; and the rivers are too small and swift for many steamers. Freight and passenger rates are high. About 3½ cents per mile is charged for 400 miles. The speed of passenger express trains never exceeds 27 miles per hour. Ordinary trains never make more than 15 to 20 miles an hour. So costly is freight transportation that it is cheaper to carry goods from England to Spain than it is to ship them from Saragossa to Barcelona.

The United States Mint gives in exchange gold coin for gold bullion, no charge being made for the coinage of the bullion; but a charge is made for the copper added in making an alloy of the proper standard, or 900 fine, that being the fineness of both gold and silver coin, says The Mining and Scientific Press. All unrefined gold bullion, unless it be foreign coin, must be refined or parted, for which a charge is made in accordance with the fineness of the metal. Upon fine gold—that is, bullion over 990 fine in gold—no parting or refining charge is made. Seigniorage is the actual difference between the face value of the coin and the market price of the metal in the coin. As the market price of the gold in a gold coin equals its face value, there is no seigniorage upon the coinage of gold. In all United States silver coins it is different. In the silver dollar, containing 412½ grains of metal, 371¼ grains of which is pure silver, if the market price of an ounce (480 grains) of silver is 60 cents, and the government puts in the dollar 371¼ grains of silver, then the difference between the market value of 371¼ grains of silver and the amount of silver which the dollar will purchase is the seigniorage.

A special writer for Leslie's Weekly recounts in a recent issue some of the observations he made while traveling over the Trans-Siberian Railroad. He says the road has been engineered so that it runs through the richest part of the territory. The name Siberia stands for all the Asiatic dominions of Russia except Transcaucasia, Transcaspia and Turkestan. It is at present divided into the following provinces: Western Siberia, including the governments of Tobolsk and Tomsk, in the basin of the Ob River. Its area is 42,000 square geographical miles. The southern part of these regions, lying immediately east of the Urals, stretches far south toward the Khirgiz Steppe Borderland and the region known as Baraba. Over an area twice as large as Japan, this vast Siberian plain is composed of black earth and has scarcely a rock or stone. This black earth, or chernoziom, is the real treasure of Siberia, and makes the western plain the granary of Russia. Wheat, rye, oats and barley are grown in large quantities; crops of many fold were reaped last year. The two things that militate against the crops are the late frosts and the want of snow in winter. But when riding through the wheat fields in June the land seemed as rich and prosperous as Dakota. For hundreds of miles, even up as far north as Tobolsk, at fifty-nine degrees, nothing but grain fields growing green were seen. Winter wheat is seldom sown, but spring wheat is sown from April 10. Frosts in the wheat area generally begin in September. The land is tilled by the fallow-land system.

For some time past the comparative shallow depth of the water at the various ports of the sea of Azoff has attracted the serious attention of the Russian government. First class steamers cannot secure proper accommodation, with the result that cargoes have to be unloaded by lighters, thus incurring great expense and delay. The Straits of Kertch are only about 45 feet in depth; at Tagonrog the depth is only 7 feet 6 inches, while Marignople is inaccessible owing to a great sandbank, which reduces the depth of water to about 5 feet at the maximum. The Russian government has sought to overcome the difficulty by dredging the various ports, but the results achieved are disappointing. The authorities now propose to construct a barrage across the Straits of Kertch, thus raising the water level of the Sea of Azoff. The width of the straits between the Crimean shore, and the Tusla promontory is 10,823 feet, but of this total width only a little over 4,000 feet, giving an average depth of 27 feet, can be utilized. The construction of an embankment 51,480 feet in length is now contemplated, which will provide several large central basins with sufficient depth of water to accommodate large first class steamers. The total cost of the scheme is estimated at 9,800,000 roubles, approximately one-third of which will be expended as compensation to private individuals. The authorities propose to recoup themselves, however, by the levy of dues upon all ships passing through the straits. The completion of such a scheme will tend materially to increase the shipping traffic with the Azoff ports.

Electrical Notes.

At the meeting of the American Institute of Electrical Engineers to be held at Great Barrington from June 18 to 21, it is said that Marconi will for the first time make inland long-distance wireless telegraphic tests. The tests will be made on the second day of the convention. Besides Marconi, Tesla and Edison are expected to be guests of the Institute.

The retardation or load coils invented by Prof. M. I. Pupin and described in the Scientific American have been put into practical use on a line of about 1,000 miles in length. Three long-distance lines between Chicago and New York have been fitted with the load coils. It is said that the loudness of transmission has been increased by about a hundred per cent. Prof. Pupin hopes that by the use of his coils it will soon be possible to carry on a conversation between New York and San Francisco.

The bids opened by Gen. Greely, Chief Signal Officer, for wireless telegraphy systems to be used by the United States government in Alaska, have called forth tenders from six firms. Among the bids comes one from Germany for the Slaby-Arco system. The other bidders were the Marconi Company of London, England; Foote, Pierson & Co., New York; the American Wireless Telegraph and Telephone Company, of Philadelphia; the De Forest Wireless Telegraph Company, of New York, and Queen & Co., of Philadelphia.

M. Abraham, in an article on the theory of the propagation of electric waves along wires in Annalen der Physik, distinguishes two cases, in the first of which the return current is a pure conduction current, and in the second of which displacement currents also come into action. Ordinary telegraphy and telephony belong to the first category, and space telegraphy to the second. In oscillations of the Hertzian order it depends upon the distance between parallel conductors whether dielectric return currents come into play. The author discusses the relation between the conditions of propagation and the electromagnetic energy of the waves. He proves, among other theorems, that in stationary electromagnetic oscillations in a field bordered partly by perfect reflecting surfaces, while through the remainder plane homogeneous waves import and export energy, the mean magnetic energy equals the mean electrical energy. In the case of wire waves, the effective and apparent internal inductances are identical, and when the return circuit is metallic, and, therefore, the values of the apparent capacity and apparent external inductance are real, these values are identical with the values of the effective capacity and the effective external inductance derived from the field energy.

A simple instrument has been tried experimentally on the government telephone exchange in Stockholm for about a year, to indicate to the subscriber whether the operator is listening to the conversation. Bridged across the subscriber's line and connected to it by a double pole switch is a current detecter whose middle point is earthed. The center point of the operator's receiver at the exchange is earthed through the "engaged-test battery" in the ordinary manner. Thus, when the operator switches in her telephone through her listening key, a current is sent over both lines in parallel, through the above-mentioned subscriber's indicator, and to earth, and the subscriber knows that the telephone operator is on the line. The indicator itself has two astatic needles, on whose common axis an aluminium disk is placed with red, black and white crosses painted upon it. This disk moves behind a black painted shutter. When any current is passing through the indicator the black cross is behind a cut of corresponding shape in the shutter, and when the operator is listening, the red or white cross shows. In this way, when the communication is through two exchanges, the connections can be so arranged that the white cross indicates that the operator at one exchange is listening, and the red cross that the operator at the other exchange is in circuit. This instrument is said to have worked well on the Stockholm system and to have been popular among subscribers.

German Substitute for Petroleum.

Consul Worman reports from Munich that, according to the newspapers, a Hamburg chemist has discovered a fluid which, when added to ordinary water, produces a liquid that cannot be distinguished from petroleum. It can be used for lighting as well as for heating purposes. When burned in a lamp with an ordinary wick, it gives an extraordinary white light of double the strength of a petroleum flame. The fluid is not explosive. A company, it is said, has been formed in London for the exploitation of this discovery. In our opinion, the exceptional efficiency of this mysterious liquid must be taken with a pinch of salt.

The new Edison storage battery is now on the market commercially. It has been officially announced that the plant for its manufacture at Silver Lake, N. J., has been completed and that the company is ready to take orders.