HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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(9441) G. C. asks: 1. Is there any purely geometrical method for constructing a line equal to one-quarter a given circumference? A. A line equal to the quarter of a circumference cannot be exactly determined by geometrical methods. Approximately, the quarter circumference is equal to 0.7854 times the diameter. 2. What is the function of the globe on an open arc lamp? A. The globe on an open arc lamp is useful in catching the pieces of hot carbon which are frequently projected from the lamp, and which have been the cause of fires. It also prevents the wind from blowing the arc. 3. Why does a bicycle stand up more easily when moving than when still? A. A moving body tends to maintain the plane of its motion. For this reason a flat plate can be thrown and made to glide through the air a long distance, and a stone may be made to scale along the surface of water. A bicycle stands up while in motion for the same reason. The larger the wheel, the firmer it stands. Those who rode the old high wheels say that they were much more rigid against tipping over sideways than the lower wheels in use at the present time. 4. What would occur in the water column of a siphon if all atmospheric pressure were suddenly removed? A. If the pressure of the atmosphere were removed, water could not be raised in a siphon or a lifting suction pump. If a siphon were running and the air pressure were suddenly removed, the water would suddenly drop out of both legs, the stream breaking at the top and falling down both sides. 5. Does not a voltaic current consist of two opposite charges flowing in opposite directions in the same wire at the same time, just like the charges of a lightning stroke? A. No one knows in which direction the voltaic current flows through a wire. It may flow from what we call plus to minus, or in the opposite direction. It is a conventional matter to say that the current flows from plus to minus. It cannot flow both ways at once, since that would make the current similar to an alternating current. 6. Could a person deflect an appreciable portion of a street-car current by placing the ends of a thick copper wire at different points on a rail? If not, why? A. No appreciable portion of a street-car current would be deflected through a wire placed on different portions of a street-car rail, because the resistance of the wire would probably be greater than that of the rail between the ends of the wire. 7. If one should take a compound bar made of five metals of different conductivities for sound, and give it one tap upon the end, would he hear at the other end five separate taps? A. This question is indefinite. If a compound bar is made by putting five different metals together end to end, a blow given on one end would be transmitted through the bar, passing with different velocities through the several metals, and but one sound would be heard at the further end. If five several bars be placed side by side, and the ends of all be tapped at the same moment, the sound would travel through each with the proper velocity, and if the bars were long enough, these sounds would separate appreciably from each other, and be heard as separate sounds at the farther ends of the bars. 8. What is the highest ratio of weight to strength which can be obtained in an electro-magnet? A. The highest ratio of weight to strength in an electro-magnet is obtained when the iron is completely saturated with magnetism. The limit practically is reached when there are 140,000 lines of force per square inch of polar surface. If, however, by "strength" you mean lifting power, the practical limit is reached at about 150 pounds per square inch of polar surface. Though the lifting power may be increased beyond this amount, the cost of the strength is much in excess of the cost below saturation. The highest figure given by Thompson in his table is 230.8 pounds per square inch of polar surface. We presume considerable more has been lifted, but we have no data at hand above this point. 9. How does a locomotive gain tractive power by adding more drive-wheels, when according to physics the friction is independent of the amount of surface in contact? A. The "friction of bodies is directly proportioned to the pressure," is Morin's first law. What you have stated is the second law of friction. In designing locomotives, it is the weight on the wheels which governs the number of wheels by its limit, which is about 20,000 pounds on each driving wheel in the heaviest engines, and varies to as low as 7,000 pounds per driver. The addition of drive wheels to an engine without adding to its weight, or transferring the weight on the truck to the added wheels, does not add to the tractive power of the locomotive.

(9442) E. N. M. asks: Will you tell me how to make a permant steel magnet? I have been looking over your catalogue, and I find nothing that enlightens me on the subject? A. To obtain a good steel magnet, it is necessary in the first place that the steel shall be adapted to this purpose. High tool steel is usually specified for permanent magnets, but if it contain a certain percentage of manganese it cannot be used. Some grades of cast steel, mild plate steel, and spring steel take magnetism well, but do not retain it well. Some prefer Jessup's and others Stubs' steel. Select a close-grained rolled steel, heat it to a cherry red, and plunge it into water or oil. It will be tempered glass hard. If put in edgewise, it is less liable to be curved by unequal cooling. It is not necessary to temper the whole length of the bar. If the two ends are hard, the center may be left soft. It is easier to temper the whole at once. There are two modes of magnetizing a bar magnet. If you already have a strong magnet, you may draw it along the bar from end to end, pull it off, return in a curve to the place of beginning, and pass it along the bar many times. Do the same with the different sides of the bar. Ten to fifteen times on each side will be sufficient. If you have a dynamo or a good battery at hand, wind a coil of insulated copper wire with an opening large enough to allow the bar to be passed freely through the coil, and pass the bar to and fro from end to end several times while the current is flowing in the coil. For the current of a battery use No. 14 or No. 16 wire and 30 to 50 turns. For a dynamo current the same coil may be used, if the coil is put in series with a lamp. It will be made too hot by the current if put on short circuit.

NEW BOOKS, ETC.

DIE ELEKTRISCHE BÜHNEN UND EFFEKT-BELEUCHTUNG. By Dr. Th. Weil. Vienna and Leipsic: A. Hartleben's Verlag, 1904. 16mo.; pp. 256. Price $1.25.

The book deals with theatre stage illumination. The author has treated a very special branch of electricity in an admirable manner. The subject is of growing importance, and each new theatre is better than the last as regards the electrical installation. We can recommend this book.

AMERICAN METER PRACTICE. By Lyman C. Reed. New York: McGraw Publishing Company, 1903. 8vo.; pp. 196. Price $2.

This book will be found useful both to the central station manager and to the consumer of electricity. It describes the principles and methods of construction of typical American meters, and contains, among others, chapters on the "General Management of the Meter Department" and on "Reading Meters," chapters of value to the two classes of men above mentioned, respectively.

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Rug, A. Petzold	37,060 to 37,066
Spoon, souvenir, W. M. Davis	37,058
Spoons, forks, or similar articles, handle for, S. Stohr	37,059
Stove, J. P. Ouerbacker	32,067

TRADE MARKS.

Ale, porter, and beer, Lembeck & Betz Eagle Brewing Co.	43,085
Apparel, certain named wearing, Consumers Clothing Co.	43,075
Barytes, J. T. Williams & Sons	43,098
Battery cells, dry, National Carbon Co.	43,117 to 43,120
Bedsteads, brass and iron, Marion Iron & Brass Bed Co.	43,122
Beer and malt tonic, Central Consumers Co.	43,086
Candy, Ramona Candy Co.	43,087
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Clothing, certain named, H. R. Stoepel	43,109
Dentifrices, Prophylactene Chemical Co.	43,096
Fabric cleaning preparations, textile, G. Eisenkramer	43,079
Flour made from wheat, S. Logan	43,084
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Furniture, certain named aseptic hospital, Kny-Scheerer Co.	43,121
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Liniments, S. D. Confer Medical Co.	43,094
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Medical compound employed in the treatment of hogs, J. F. Abel	43,097
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Medicine, certain named, Solurol (Thymic Acid) Co.	43,089
Medicine to promote development of pure blood, W. N. Ley	43,088
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Pencils, lead, E. Faber	43,074
Printing plates, apparatus for making stereotype, Campbell Printing Press and Mfg. Co.	43,105
Publications, certain named, McClure, Phillips & Co.	43,073
Remedies for hay fever, headache, and catarrh, F. S. Kelly	43,092
Remedy for certain named diseases, Tuckapaw Medicine Co.	43,093
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Tools, pneumatic, Ingersoll-Sergeant Drill Co.	43,107
Underwear, certain named, Cooper Mfg. Co.	43,076

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"Anona," for cigars, cigarettes, tobacco, and chewing gum, M. Hyman Cigar and Importing Co.	11,284
"Aromatic Ginger Ale," for ginger ale, Schmeltzer Bros.	11,286
"Club Kola," for a beverage, Liquid Carbonic Co.	11,288
"Columbia," for shirt waists, Rand Bros.	11,280
"Dope, a Tonic for the Nerves," for a beverage, W. H. Weatherly	11,287
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"Heptol Splits," for mineral water, Crompton & Sons Litho. and Ptg. Co.	1,037
"McCall Patterns," for patterns, McCall Co.	1,038
"Nor-din," for cement building blocks and machinery for making same, Cement Machinery Co.	1,039

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