## Notes and Queries.

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 This is for our information and not for publication.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.

**Buyers** wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

**Special Written Information** on matters of personal rather than general interest cannot be expected without remuneration.

**Scientific American Supplements** referred to may be had at the once. Price 10 cents each.

**Books** referred to promptly supplied on receipt of price.

**Minerals** sent for examination should be distinctly marked or labeled

(8815) W. H. T. asks: How is gas made from water? Is there a book that would enable a foundry foreman to learn how to make an analysis of the iron in his castings? A. Briefly described, water gas is produced by blowing steam through a layer of brightly glowing coal; the water is decomposed, and the coal is consumed; the gases coming off are a mixture of hydrogen, carbon monoxide, and hydrocarbons, with small amount of carbonic dioxide, and variable amount of nitrogen. When the coal cools off too far to further decompose the water vapor, this is shut off, and air is blown through until the coal again burns brightly and is ready for more steam. While the air is blown in, the gases are allowed to escape up the chimney, as they have no value as illuminant, and in fact would not burn at all. The water gas as it comes from the producer has very little illuminating power. This is imparted to it by enriching with benzine.—There is no book which would explain to anyone not a chemist how to determine the amount of iron in brass or other castings. Such work must be done by a chemist. All books on analytical chemistry of the metals describe methods for this, but would be unintelligible to any person except a regular chemist.

(8816) R. G. P. asks: Are there any chime music boxes with a set of bells on them? How does the name chime get its name? A. The word chime comes from a Latin word, meaning bell, and also cymbal. Music boxes are made with sets of bells in them.

(8817) E. G. P. asks: How can a scratch be removed from the top of an oak table (highly polished)? A. If the scratch is only a slight, superficial one, it can usually be removed by rubbing with a rag soaked with crude oil. If a deep scratch, it will be best to rub down the whole top of the table with powdered pumice and crude oil, and then revarnish.

(8818) G. P. O. wishes a process for galvanizing such as is done on the base boards for stoves. A. The article to be galvanized is first thoroughly cleaned by dipping in weak muriatic or sulphuric acid, and is then thoroughly dried. After this it is plunged in a bath of molten zinc, wherein it becomes coated with a layer of zinc, being what is known as galvanized. The surface of the molten zinc must be kept clean by sprinkling with powdered sal ammoniac and skimming off the dross from time to time.

(8819) G. G. G. asks: How can I gild or mottle edges of books, to resemble as nearly as possible those gilded by publishers? A. To gild the edges of books, they are first trimmed smooth, then sized with egg albumen (white of egg) and gold leaf then applied. When dry it is burnished with agate burnisher. For mottling, a very thin solution of gum arabic is prepared in a tray, and the different colors are then shaken in or combed in. A half dozen or so of the books are held securely and evenly together, and the top, bottom and front edges are successively dipped in lightly, and the excess of color is each time blown off. Successful mottling is quite expert work.

(8820) W. J. D. asks: 1. Is there any method by which soft coal can be made into brick or lump form by mixing with other substances or by itself. A. The powdered or crushed soft coal can be pressed into bricks and then be partially coked to give strength. If the coal alone will not adhere sufficiently well on pressure, it can be mixed with pitch, and then partially coked. 2. Can the ordinary 150 deg. test kerosene oil be clarified to prevent the strong smell while burning in a lamp or wick oil stove? A. A good quality of kerosene will not give much odor in burning in a lamp or wick oil stove, if care be taken to keep the wick well trimmed, and to adjust so that it will burn without smoke. There is no way of further purifying kerosene oil, as to make it burn without odor.

(8821) P. C. asks: We have a dynamo of 110 volts and 25 amperes. I want about 20 pieces of good red-hot wire 1 inch long and no matter how thick, for special use. I intend to make them hot from the above-mentioned dynamo. Can you inform me what is the best

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EVOLUTION OF THE AMERICAN LOCOMOTIVE.—By Herbert T. Walker. A valuable series by a member of the National Railway Museum Committee. The locomotive from 1825 to date is described and illustrated by careful drawings, great attention being given to historical accuracy. 21 illustrations. SCIENTIFIC AMERICAN SUPPLEMENTS 1112, 1113, 1114. Price 10 cents each. For sale by Munn & Co. and all newsdealers.











material to make the wire from to keep hot for days and months? A. Platinum is the only material which can withstand red heat for any length of time without being destroyed by oxidation.

(8822) E. L. C. asks: 1. If a vessel sinks in five miles of water, will she go to the bottom? If not, why? I think she will; the others think not. A. If a vessel begins to sink, it must continue to sink till it reaches the bottom. If it is compressed by the pressure of the water as it goes down deeper and deeper, it becomes still heavier with reference to the water than it was at the surface, and at the surface it was heavy enough to sink. At greater depths it will be able to sink faster, since the water is not compressed to any extent at greater depths than it is near the surface. If anything can sink at all in water, it will go to the bottom before it stops. 2. If a man gets into a tank of water resting upon a pair of scales, and floats upon the water, will the scales register the man's exact weight in addition to the weight of the tank and water? Will it make any difference whether he floats or lets himself sink? The tank sides are high enough, so that no water can overflow. A. The balances will show the weight of the man in addition to the weight of the tank and the water. When the man gets into the water, the water rises in the tank; that is, it becomes deeper. It is exactly the same as if more water were poured into the tank. No one would doubt that the scales would show more weight if 100 pounds of water were put into the tank. Why not when 100 pounds of man are put in. This question has traveled for a century in various forms around the world.

(8823) S. B. M. asks: Will you kindly settle the following arguments? Practically the same principle is involved in all three, and of course the velocity of the cannon ball in the first is absurdly small, but that is granted for the sake of the argument. 1. A train is running east ward at a speed of 100 miles an hour. Mounted on the front of this train is a cannon. From the cannon is fired a projectile with a velocity of one hundred miles an hour westward; i.e., in a direction opposite to the motion of the train. A holds: 1. That the projectile will move over the top of the train with a velocity of 100 miles an hour. 2. That its velocity with regard to the ground is nil; i.e., through space it has no velocity. 3. That a rifle ball will reach the ground in just as short a length of time when fired at a high velocity as if it were dropped from the muzzle of the gun with no lateral velocity, granted of course that the ground is level and the bore of the gun is parallel to the ground. B holds: 1. That the projectile will move over the top of the train at the rate of 200 miles an hour. 2. That with regard to the ground it has a velocity of 100 miles an hour westward. 3. That this is not true. A. In your various propositions regarding relative motion, the one whom you designate as A is right and B is wrong. Such problems are applications of Newton's Three Laws of Motion, or rather of the first and second laws. These laws are to be found in all school textbooks of physics. The cannon mounted upon the train which is running 100 miles an hour is carried eastward by the train with a velocity of 100 miles an hour, and sends its projectile westward with a velocity of 100 miles an hour. It should be plain that a ball which moves east and at the same time west with the same velocity will be at rest with reference to the earth below it. The train moves away under it. The ball would drop vertically upon the roof of the train, or upon the earth below from the muzzle of the gun, if the train could run from under it before it had time to fall upon the roof. The rifle ball shot horizontally will fall toward the ground as really and with the same velocity as if it were dropped vertically. See Newton's Second Law. Gravitation produces its effect, whether it acts at the some time with other forces or acts alone. This is the reason why a ball which is projected upward returns to the earth again. All objects not supported fall toward the center of the earth in exactly the same manner, since gravity produces its effect upon all alike. It matters not how they are moving under the action of other forces. II. An elevator falls down a shaft at the rate of 50 feet per minute; a man drops after it at the rate of 60 feet per minute. A holds that the man will strike the elevator with the same force as if the elevator were stationary and he were dropping 10 feet per minute. B holds that he will strike it with less force. A. A man who strikes an elevator which is moving ten feet per minute slower than he moves will strike it with a velocity of ten feet per minute, and give a blow proportional to his weight and his velocity. III. The same thing as II. (a) A train is moving at the rate of 30 miles an hour; on the same track a train is following at 40 miles an hour; (b) they are moving at the same speeds on parallel tracks. A holds that (a) the second train will strike the first with the same velocity or force as though the first were standing still and the second struck it going at the rate of 10 miles an hour; (b) that the second train will pass the first at the rate of 10 miles an hour—will take as long to pass it as though it were standing still and the second

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BICYCLE TIRE REPAIRING.—THE Mending of Single Tube Tires.—A practical article illustrating the method of inserting patches and plugs with pliers and pluggers, together with rubber band plugging and the use of puncture bands. 9 illustrations. Contained in SUPPLEMENT 1102. Price 10 cents. For sale by Munn & Co. and all newsdealers.

going at 10 miles an hour. B holds (a) that the second train will strike with less force and (b) that it will take longer to pass the first train. A. The swifter train will pass the slower train as if it were standing still and the swifter had a velocity equal to 10 miles per hour, the difference of the two velocities. All these answers are based upon the supposition that the resistance of the air is excluded from the problem, as is usually done in such cases. This is not necessary, however, in these answers, since it is stated in the questions that a certain definite velocity is attained, the resistance of the air being one of the elements in attaining the velocity.

## INDEX OF INVENTIONS

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**January 27, 1903,**

AND EACH BEARING THAT DATE.

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