

glasses? I often see objects in my glasses reflected from behind me, one very clear reflection and the other dim to the right of the right eye and to the left of the left eye. I have also noticed my own reflection in the same way in a looking glass when held close to the face, but not when held at a distance of a foot away. A. There are two surfaces of every lens or mirror of glass coated on its back. Both of these surfaces reflect light from behind and to the side of the one wearing the glasses. If it is lighter in front than at the back, one does not notice these reflections and the images they form; but if it is dark in front and light behind the person, one can see the objects behind him. He may even see a double reflection of the same object, one from the front surface and the other from the back surface of the glass. One may easily amuse himself by experimenting in order to learn how much he may see in his glasses in this way.

(10376) S. A. H. asks: A friend makes the statement that a wagon wheel in motion moves faster at the top than at the bottom or portion on the ground. Is this the case? A. To answer the question, "Does the top of a wagon wheel move faster than the bottom?" it is necessary to define the word "move." When that is done it becomes evident that the question is very indefinite. A rotating wheel moves with the same velocity in every part, as measured in degrees of the circumference. If it did not it would break in pieces. The wheel has another motion as a whole along the road. In this respect the wheel moves all together and therefore with the same velocity. Still another motion is that of any point of the wheel with reference to a line on the ground. At one moment a point on the rim of the wheel is in contact with this line; it then rises till it is the entire diameter of the wheel above the line, and then descends till the point is again in contact with the ground. The wheel has meanwhile gone a distance equal to its circumference. The point has risen in a cycloid and moved down again in the same kind of curve. At any moment the point of the rim which is coming down to the ground is also coming to rest as viewed from that point of the ground. It touches the ground for an instant and moves up again. Since it was descending and now is ascending it is evident that between the two it must have come to rest. Since it is at rest for the instant it is in contact with the earth, that point is a center of motion, the hub is moving with a certain rate and the rim at the top is moving twice as fast as the hub in a forward direction. Now the front point of the rim is moving vertically down and the rear point is moving vertically upward at the same moment. This is one of the perpetually recurring questions. We have answered it hundreds of times. We have published notes upon it many times. Among recent notes, see Notes and Queries in Vol. 92, Nos. 16, 20, 25; Vol. 93, No. 2, price 10 cents each.

(10377) W. L. S. writes: I notice your answer to queries, No. 10297, in issue of January 19, 1907, and also remember substantially the same answer to a question about a year ago—that water would not burst barrels in freezing if the barrels were open at one end. On the contrary, they will burst in very cold weather, as I know from experience. For twenty-five years I was engaged in milling in southeast Missouri and for ten years had to get new barrels or repair the old ones every spring. At last I put in each barrel a piece of straight-grained wood about 2 x 2, with a hole 3/4 inch bored through it about half the distance from the bottom to top of barrel. This piece of wood was allowed to extend 3 or 4 inches above the barrel. After putting in these pieces of wood our barrels would last, and hold water, for five or six years, and would freeze solid during the winter without injuring the barrels.

(10378) F. B. asks: How many pounds pressure would I get on a 12-inch pipe, running to a turbine, with a tank of water holding one and one-half million gallons of water, with a ten-foot fall? How many horse-power would I gain with every ten-foot fall through the same pipe? How many horse-power will it require to lift a six-inch stream of water 100 feet with the best pump, and will it take twice as much power to lift a 12-inch stream the same height? A. You would have 41-3 pounds per square inch pressure at the turbine. It is possible to obtain 5 horse-power from the 12-inch pipe, and the same for each additional 10-foot fall. It will require about 12 horse-power to fill your 6-inch pipe at full flow, and four times as much power for a 12-inch stream with four times as much water.

(10379) C. N. M. asks how to make tracing cloth. A. 1. Boiled linseed oil (bleached), 10 pounds; lead shavings, 1/2 pound; zinc oxide, 2 1/2 pounds; Venetian turpentine, 1/4 pound. Boil for several hours, then strain, and dissolve in the strained composition 2 1/2 pounds white gum copal. Remove from the fire, and when partly cold, add oil of turpentine (purified), sufficient to bring it to proper consistency. Moisten the cloth thoroughly in benzole and give it a flowing coat of the varnish. 2. Varnish the cloth with Canada balsam dissolved in turpentine, to which may be added a few drops of castor oil, but do not add too much, or it will not dry. Try a little piece first with a small quantity of varnish. The kind of cloth to use is fine linen; don't let the varnish be too thick.

NEW BOOKS, ETC.

**PUNCHES, DIES, AND TOOLS FOR MANUFACTURING IN PRESSES.** By Joseph V. Woodworth, M.E. New York: The Norman W. Henley Publishing Company, 1907. 8vo.; pp. 483. Price, \$4.

This book has been written and compiled by a practical man for the use of all practical men who are interested in the working of sheet metals, designing and constructing of punches and dies, and the manufacturing of repetition parts and articles in presses. This book is doubtless the last word in the literature of the subject. It deals with the vast field of metal work, and does so in a clear, concise, and thoroughly practical manner. It treats of the fundamental principles of construction, and the numerous methods of procedure in practice. It is very well illustrated.

**QUASI-PUBLIC CORPORATION ACCOUNTING AND MANAGEMENT.** By John F. J. Mulhall, P.A. Boston: Corporation Publishing Company, 1906. 8vo.; pp. 199.

The evolution of business into corporate form, which is so large and important a phase of our modern social structure, necessitated a corresponding change in the methods of accounting and management. This is especially true of quasi-public corporations. The scarcity of data bearing on the accounting and management of such corporations led to the writing of this book. It should be of interest to those interested in corporations in an administrative or executive capacity, and especially to the accountant. It includes books, forms, and methods necessary for the proper organization and management of a business, and the recording of all essential details of Revenue, Operation, Maintenance, and Construction.

**ROCKS OF CAPE COLVILLE PENINSULA, N.Z.** By Prof. Sollas, F.R.S. With Introduction and Descriptive Notes by Alexander McKay, F.G.S. Vol. II. 4to.; pp. 215.

**LA TELEGRAPHIE SANS FIL ET LA TELEMANIQUE A LA PORTE DE TOUT LE MONDE.** By E. Monier. Preface by Dr. E. Branly. Paris: H. Dunod et E. Pinat, Editeurs, 1906. 12mo.; pp. 115.

**PHYSICAL ECONOMICS.** By Erastus Eugene Holt, A.M., M.D., LL.D. Chicago: Press of the American Medical Association, 1906. pp. 29.

**LOOKING FORWARD. The Phenomenal Progress of Electricity in 1912.** By H. W. Hillman. Northampton: Valley View Publishing Company, 1906. 12mo.; pp. 320.

**REPORT ON THE ADMINISTRATION OF THE DEPARTMENT OF STREET CLEANING OF THE CITY OF NEW YORK.** Adopted by the Board of Aldermen, 1906. 8vo.; pp. 136.

**ELEMENTS OF MECHANICAL DRAWING.** In Two Parts. By Alfred A. Tittsworth, M.Sc., C.E. New York: John Wiley & Sons, 1906. 8vo.; pp. 130. Price, \$1.25.

**ECONOMICS OF ROAD CONSTRUCTION.** By Halbert Powers Gillette. New York: The Engineering News Publishing Company, 1906. 12mo.; pp. 49. Price, \$1.

INDEX OF INVENTIONS

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AND EACH BEARING THAT DATE

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