

telephone line that is bracketed to an electric light pole, in the following way, would amount to anything? The electric wires are tied in on glass insulators, and 10 feet down a telephone line (running at right angles to electric wires) is tied in on glass insulators. A. If the current flowing in the electric light line is alternating, we should expect to hear a buzzing sound in the telephones connected to the same posts, even though the telephone wires are 10 feet away. Induction will act through greater distances than that. 2. Some one said that more or less current leaked across the glass. Is that so when the voltage is 2,200? A. There is more or less leakage across glass insulators with high voltages. In wet weather there is often considerable leakage.

(9220) P. G. W. asks: 1. Why is it that ice, with salt, freezes cream more quickly than ice alone? A. The action of a freezing mixture of salt and ice is due to the fact that salt is dissolved very readily in water, and liquefies ice very rapidly. Now, ice cannot melt without it gets heat from some other matter, any more than iron can. The freezer is arranged so that the heat which melts the ice is taken from the cream, and the cream is frozen. That is the action of freezing ice cream. 2. Would a thermometer register lower in this combination than in ice alone? A. The temperature of ice melting in the air is 32 deg. Fahr. With a mixture of salt and ice in the proportions of 2 of ice to 1 of salt, a temperature of 0 deg. Fahr. can be produced. It was in this way, it is said, that the zero of the Fahrenheit scale was fixed.

(9221) W. R. C. asks: Will a person standing on platform scales on an elevator register more than his normal weight when elevator is ascending and less when elevator is descending? A. A person would register more than his weight in the case stated while the elevator was accelerated, that is, gaining speed in ascending. When the speed became uniform, the scales would register the correct weight. In descending, the scales would register less than the correct weight while it was gaining speed, and show correct weight while it was moving at a uniform speed.

(9222) C. A. P. asks: 1. Is there such a power as suction? A. In the ordinary use of language there is such a power as suction. It may be explained that the effect is due to a secondary power; the elasticity of the air or other gas in the air pump, or the presence of the atmosphere in the suction water pump; but still, the use of the term supposes something to which the term corresponds. To argue that there is no force of suction is to play with words. 2. What causes an induction motor to change its direction of rotation when any two of its terminals are reversed? Please give me names of books which treat these two subjects fully. A. It is only true of a three-phase motor that it can be reversed by transposing the supply connections to any two terminals of the motor. In the case of a two-phase, four-wire motor, the connections of either one of the phases may be transposed, but not any two terminals. The reason is that the direction of the rotation of the field must be reversed to reverse the direction of rotation of the rotary part. Sheldon's "Alternating Current Machines," price, \$2.50, treats the induction motor very fully.

(9223) O. N. P. asks: Would you kindly answer me in your paper the following questions? 1. A and B being two points on a seashore with 180 sea miles between them, can I establish a wireless telegraphic communication between A and B without intermediary stations? A. It is entirely possible to send by wireless telegraph to a distance of 180 sea miles. Mr. Marconi has sent messages from the sea to northern Europe across the British Isles, the North Sea, and then more land. 2. If intermediary stations are necessary, how many? A. No intermediate stations are necessary if the transmitting and receiving apparatus be sufficiently powerful and delicate. 3. What would be the electromotive force necessary at A and B to operate the wireless telegraph? A. We are not able to give a definite statement as to the electromotive force required. 4. What would be the height of the antennae? A. Poles of 100 to 250 feet have been used. It is now claimed that recent discoveries have rendered such tall poles unnecessary. Of that we have no definite knowledge.

(9224) E. A. J. asks: Will you kindly state in Notes and Queries just where the north magnetic pole is located? If near Hudson Bay, is it one point? Or does it encircle the globe? If it encircles the globe, how does the needle act when north of that circle? If one point, how does the needle act when east, west, or north of that point? Does the North Star have any attractive influence on the magnetic needle? A. We do not know the exact location of the north magnetic pole. It was located very nearly in 1831 by Ross on the island of Boothia Felix. An expedition is making the effort to find it again. In two or three years, more will be known concerning the matter. The pole is a point. On all sides of it a magnetic needle will point toward it. On it all directions are south. On the pole there is but one point of the compass. That is south. Around it, it is north in any direction. The North Star does not affect the earth's magnetism.

# A "Nine-Year-Old" Earning His College Course



LEWIS FRICKE is a nine-year-old Indiana boy who makes money each week by selling THE SATURDAY EVENING POST. He recently wrote to the publishers: "There are three big concerns here employing thousands of people. I went to the superintendent of the largest one and asked whether he ever let boys sell things there. He said, 'No.' I told him I was sorry, and asked him to take a copy with my compliments. The next week I went back and asked him how he liked it. He said, 'Bully! I guess you can leave it here each week.' Then I said, 'I am working for a prize; don't you think you can let me go through the works at the noon hour?' He said, 'Well, I guess it is a good thing for the men—go ahead.' I got more than 50 regular customers. Then I went to the next place and by working the same plan got 40 more.

"At the third place the gentleman looked at THE POST and said, in a sort of 'chesty' way, 'I am not sure that this is the highest form of literature.' I said: 'I am not, either, but I guess it's a heap better than anything published in this vicinity.' Another gentleman who was there laughed very loud, and both bought copies. The next week he introduced me to the head of one of the departments as 'Mr. Fricke, the personal representative of Benjamin Franklin,' and told him to help me along, and I got another lot of customers.

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### NEW BOOKS, ETC.

RECENT RESEARCHES ON THE VOICE. By Prof. E. W. Scripture. Reprint from the Medical Record, February 28, 1903.

A RECORD OF THE MELODY OF THE LORD'S PRAYER. By Edward Wheeler Scripture. Reprinted from Die Neuern Sprachen.

Prof. Scripture has made a most interesting psychological study of the words of the Lord's Prayer by means of recording instruments. It will appeal to all of those who are interested in either acoustics or psychology.

ELECTRICIAN'S MANUAL OF DIAGRAMS. By E. W. Smith. Philadelphia: Philadelphia Book Company. 1902. 18mo Pp. 79.

This little book of diagrams will prove very useful to the beginner in electricity, and will be specially useful to locksmiths and others who have occasion to do small electrical repairs.

TWELVE PLATES ON PROJECTION DRAWING. By Oswald Gueth, M. E. New York: Spon & Chamberlain. 1903. Small quarto, 12 plates. Price 75 cents.

The author is instructor in mechanical drawing at Cooper Institute, New York, and is eminently qualified to deal with the problems proposed.

L'AIR LIQUIDE—SA PRODUCTION, SES PROPRIETES, SES APPLICATIONS. Par Georges Claude. Preface de M. d'Arsonval. Paris: Vv. Ch. Dunod, Editeur. 1903. 8vo. Pp. 125. Price 70 cents.

This interesting volume details some new and curious experiments with liquid air. It is illustrated by engravings taken directly from the experiments.

HOW TO BUILD A LAUNCH FROM PLANS. By Charles G. Davis. New York: Forest and Stream Publishing Company. N. D. 16mo. Pp. 159, plates. Price \$1.50.

More than half the joys of boating are found in building one's own boat by one's own labor and skill. This book will help, the author hopes, to make the way a little smoother for the amateur than he found it when he tried to build his first boat. The instructions are common sense, and the plans and details are clear and concise. With the aid of this book we see no reason why any amateur should not be able to make a satisfactory launch.

THE RESISTANCE AND POWER OF STEAMSHIPS. By W. H. Atherton, M.Sc.,

and A. L. Mellandy, M.Sc. Manchester, England: Technical Publishing Company, Ltd. 1903. 16mo. Pp. 200, 64 illustrations. Price \$2.

The topic is admirably discussed by the authors, and in addition to the subject of the resistance and power of steamships, the subject of the fouling of ships has also been dealt with very fully, because of its important influence on the actual resistance of sea-going ships. The book describes the latest experimental apparatus, and cannot help but prove of the greatest possible value to marine designers and shipbuilders.

THE WORLD'S COMMERCE AND AMERICAN INDUSTRIES. Graphically Illustrated by 86 Charts. Prepared by John C. Macfarlane, A.M. Philadelphia: The Philadelphia Commercial Museum. 1903. 8vo. Pp. 112. Price 50 cents.

The graphic method shows more clearly than statistics alone could do what proportion of the world's trade belongs to each of the principal nations, and the relative importance from a manufacturing standpoint of the leading cities of the United States. It is a most useful pamphlet, and is most admirably compiled.

ENGINEERING PRELIMINARIES FOR AN INTER-URBAN ELECTRIC RAILWAY. By Ernest Gonzenbach. New York: McGraw Publishing Company. 1903. 8vo. Pp. 71. Price \$1.

The electrical engineer is often handicapped when he starts to lay out an electric railway. The investment is heavy, and no mistakes can be tolerated. The present volume is intended to show the way in which certain conditions were to be met in a certain case, together with the reasons which led up to the recommendations and plans submitted. It is believed that by the aid of this book economies can be effected which will diminish the total investment per mile of track, and also the operating expenses per car mile. The author warns the electrical engineer not to put a young company under the financial burden of an elevated equipment and country road income.

READING ARCHITECTS' DRAWINGS. Practical Suggestions for Young Mechanics. New York: David Williams Company. 1903. 16mo. Pp. 28. Price 25 cents.

While it may be argued that facility in reading drawings is best acquired by becoming proficient in the practice of architectural drafting, which offers the student an insight into the preparation and reading of drawings, there are, nevertheless, in the articles reprinted in this little book, many valuable

hints and suggestions, which will serve to assist those who have not had the advantage of careful training in that direction.

HOME MECHANICS FOR AMATEURS. By George M. Hopkins. New York: Munn & Co. 1903. 12mo. Pp. 370, 326 engravings. Price \$1.50 postpaid.

This valuable work will prove of interest to all who are desirous of obtaining a knowledge of the mechanical art. It deals with the subject in a most comprehensive manner, and all readers of "Experimental Science" know that the late George M. Hopkins' treatment of subjects was most lucid, and the present volume is no exception to this rule. The book begins with an easily-constructed wood lathe and instructions for using the same. Then follow Woodworking on a Lathe; Work Bench and Tools for Woodwork; Whittling; The Different Shapes of Saw Teeth and the Way They Cut; and Wood Carving. The Second Part of the volume deals with Household Ornaments, and describes how to make Home-made Grills and Gratings; Wall Ornaments; Pseudo-Ceramics; Stained Glass and Objects of Wire Cloth; A Japanese Portiere; Repoussé; Making of Bas-Reliefs; Ornamental Iron Work for Amateurs; Some Things in Wire; Some Things in Burnished Brass; and the Forming of Plaster Objects. The Third Part deals with Metal Working, and begins with the Sawing of Metals. Then follow Soldering, Grinding, and Polishing; Silver Work; Instructions about Drills and Drilling. Then comes hints concerning Centering and Steadying; Chucking; Metal Turning; Chasing and Knurling; Rotary Cutters; An Easily-made Slide Rest; Index Plates; Gear Cutting; Hints on Model Making and Metal Spinning. The Fourth Part is devoted to the subject of Model Engines and Boilers. The Fifth Part considers the subject of Home-made Meteorological Instruments. The Sixth Part describes Telescopes and Microscopes and How to Make and Choose Them. The Seventh and last part is devoted exclusively to Electricity, and the subjects are Batteries; An Electric Chime; Electrical Cabinet; A Simple Electric Motor; and a number of other easily-constructed motors are considered. Then follows a description of an Electric Furnace, and an Electric Printing Telegraph and the Telephone. The book is one which will commend itself to both old and young, and will make an admirable Christmas present.

PORTLAND CEMENT SIDEWALK CONSTRUCTION. Based Upon the Experience of Many Successful Contractors. Compiled by B. D. Peery. Chicago: Cement and Engineering News. 16mo. Pp. 27. Price 50 cents.

