— The Scribners will publish immediately a small book by George W. Cable, entitled "The Negro Question," containing the address delivered by the author on Washington's Birthday before the Massachusetts Club in reply to the memorable speech by the late Henry W. Grady; also several open letters by Mr. Cable on this subject.

— The Scribners will issue shortly the first of a series of interesting memoirs of "Three Famous French Women," translated from the French of M. Imbert de Saint-Amand, by T. S. Perry. The subject of the first volume will be the Empress Josephine, and will be entitled "The Wife of the First Consul." Other works will follow on Marie Antoinette and the Empress Marie Louise.

LETTERS TO THE EDITOR.

Means of increasing the Accuracy of locating Vessels at Sea.

IN looking over some meagre accounts of the recent meeting of the International Maritime Congress, I failed to find any mention of a very important branch of navigation to which my attention was attracted some years ago. I refer to the question of the present accuracy of the instruments for determining the position of a ship at sea, and the steps that must be taken in order to improve this accuracy. The reasons that make this an important matter are so obvious that it is not necessary to catalogue them. I need only say that in approaching any coasts, dangerous reefs, shallow waters, and, in the case of sailing-vessels, the paths regularly frequented by steamers, it is of the greatest importance to be able to locate the ship's position with all the accuracy attainable.

In 1881 Professor W. A. Rogers, the eminent American astronomer and physicist, read a paper before the Naval Institute at Annapolis, published in the "Proceedings" of the institute, bearing the title "The Co-efficient of Safety in Navigation." This paper is spoken of by Commander P. F. Harrington, U.S.N., as being "remarkable for the extent and thoroughness of its investigations, and valuable in the application of its results to the practice of navigation. . . . Its practical conclusion and warning ought to be impressed upon every man who is permitted to lay a vessel course."

In this paper Professor Rogers shows the various errors which enter into the determination of a ship's location at sea; and he determines, finally, an average error and a possible error of position from a large number of observations, as shown by logs of vessels in various quarters of the globe. Upon his inquiring of a number of sea-captains as to the limits within which a ship's place can be ordinarily determined, most of them said a mile was the limit, some few said half a mile, and only one man gave so high an estimate as five miles.

The chief sources of error seem to be those pertaining to the compass, chronometer, and sextant. For the compass, Professor Rogers does not come to any very definite conclusion; at least, no numerical estimates of error are made.

A discussion of the rates of a large number of chronometers shows, that, for a chronometer of average excellence, at the end of twenty days an average error of 3.6 miles must be expected, and an error of 11.5 miles must be looked out for. The error of the chronometer increases with the time occupied in the voyage; and a discussion of the errors of one hundred chronometers by Mr. Hartnup of Liverpool (and probably no more capable man has ever examined into the matter) showed that at the end of a voyage of twelve months the error in one of the ship's positions was 524 miles. Another extreme instance cited is the case of Lord Anson's voyage around Cape Horn, in which one ship "actually made land on the wrong side of the continent, the error of position being over 600 miles."

For the sextant observations it is difficult to determine the limit of accuracy; but "the average error of a single observation at sea is not far from 3 miles, and the average co-efficient

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Publications received at Editor's Office, March 17-22.

EARL, A. G. The Elements of Laboratory Work. London and New York, Longmans, Green, & Co. 179 p. 12°. $1.40.

ELECTRICS, Practical: A Universal Handy-Book on Everyday Electrical Matters. London and New York, Spon 135 p. 18°. 75 cents.

GEDDES, P., and THOMSON, J. A. The Evolution of Sex. New York, Scribner & Welford. 322 p. 12°. $1.25.

HURST, J. T. Spon's Tables and Memoranda for Engineers. 10th ed. New York, Spon. 140 p. 48°. 40 cents.

MAYCOCK, W. P. Practical Electrical Notes and Definitions, for the Use of Engineering Students and Practical Men. London and New York, Spon 130 p. 24°. 60 cents.

NEW YORK State Board of Health, Eighth Annual Report of the. Transmitted to the Legislature Feb. 27, 1888. Albany, Troy Press Co., pr. 348 p. 8°.

——Same. Ninth Annual Report Transmitted to the Legislature Feb. 26, 1889. Albany, Troy Press Co., pr. 609 p. 8°.

SPRAGUE Electric Railway & Motor Co., Applications of Electro-Motive Power by the New York, Sprague Co. 47 p. 8.°

——Stationary Motors, Facts about the. New York, Sprague Co. 31 p. 8°.

STREET Railway Companies, To Managers of. New York, Sprague Electric Railway and Motor Co. 26 p. 8°

TAYLOR, I The Origin of the Aryans. New York, Scribner & Welford 339 p. 12°. $1 25

TUNZELMANN, G. W. de. Electricity in Modern Life. New York, Scribner & Welford. 272 p. 12°. $1.25.

In the accompanying engraving is shown the latest pattern of improved portable blacksmith forge, made by the Buffalo Forge Company. The distinguishing features of this forge are, easy lever and swivel movements; steady powerful blast for heavy work, and even, light blast for light work; no dead centre to overcome in starting; all of which are important factors in the successful working of a forge. The bearings, which are of hardened steel and of more than ordinary length, deserve comment also. By referring to the illustration, which shows the No. 0 size, it will be seen that the forge has a large fan-case. 14 inches in diameter, which affords a maximum blast with a minimum expenditure of power. A point of importance is that the blast continues some little time after a stroke is made, sufficient to allow the operator to work upon the iron quite a while before it ceases.

This forge is also arranged for belt attachment, for general use in large shops where power is used. When run by belt, a cut-off for the blast is provided, which permits of the fire being regulated to any required degree.

The A. B. C. Electric Motor.

ONE of the latest additions to the long list of small electric motors now in the market is shown in Fig. 1. It is made by the A. B. C. Motor Company of this city, and embodies some of the ideas of Mr. Brown of that company.

The A. B. C. motor is designed so as to obtain, with a small expenditure of current, a maximum amount of magnetism, and to produce a machine that will do its work at a high rate of efficiency over a wide range of power, and at a moderate and constant speed under all loads. The field-magnets are laminated, permitting the use of sheet iron, a form in which soft, pure iron can be obtained of uniform quality. The several laminated sections, as shown in Fig. 2, are bound together, not by means of bolts passing through them in the usual manner, but by an arrangement of rods fitting into the notches shown, which are formed by the die in the outer edges of the plates. By means of this construction any irregularity caused by inexactness in the separate punching of holes is rendered impossible. The field-magnet has but one coil, and consequently no yoke is necessary in its construction. The field-magnet is ample in cross-section, and as short as possible, the entire space between the limbs being filled by the coil and the armature. This form of construction gives a magnetic circuit of very low resistance.

The armature is thoroughly insulated, and can be removed very quickly if necessary. The brushes, being at the top, can

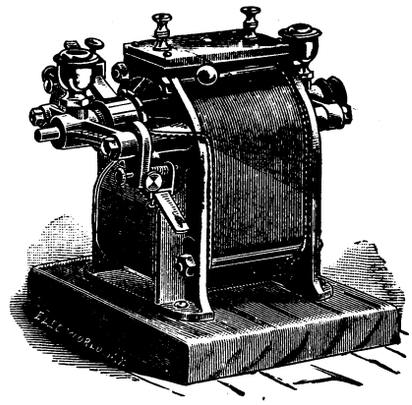

FIG. 1.

also be readily inspected; and, the armature being elevated, it is not necessary to place the motor on a special base when required for fan purposes. The mechanical construction of the

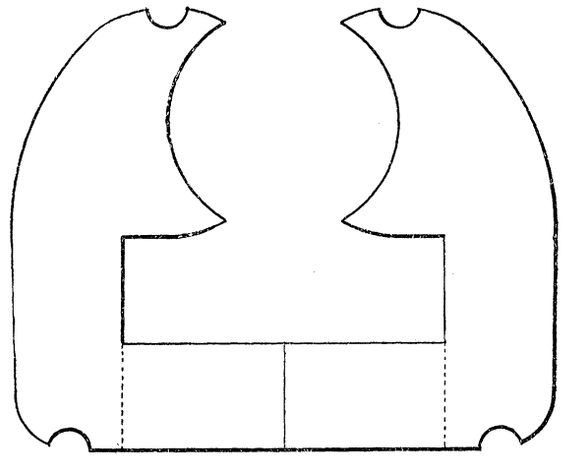

FIG. 2.

motor throughout has been carefully attended to, and all the details of the motor have been well worked out.