with the main circuits there should be run an auxiliary continuous current circuit from the central station, of a capacity of, say, ten per cent of the power to be supplied. This continuous current would have two uses: in the first place, it would excite the field-magnets; and, in the second, it would start the motor. This last could be accomplished by having a commutator on the motor-shaft that would reverse the current through the armature every time an armature coil passed a pole. Now, by a simple switch, we could first turn on the continuous current, which would start the motor, and then, when the armature had reached its proper number of revolutions, we could turn the handle a little further, and make the alternating circuit through the armature, at the same time breaking the continuous circuit.

To prevent the stopping of the motor on the sudden application of a load, there should be some form of friction-pulley on the shaft that would turn just before the motor had passed its maximum possible work.

The easiest way to decide which of the possible forms of motor is best, is to experiment on them all. It is not necessary to experiment on a number of motors of each form; but if we make suitable observations, and know how to draw deductions from our results, we can tell very closely, from experiments on one motor, what are the capabilities of the type.

GAS-ENGINES AND WIND-MILLS FOR ELECTRIC LIGHTING.—Up to the present there have been few private houses supplied with electric lights. The central stations have been placed in the more crowded business portions of the towns, and lights have not been distributed at great distances from them. There are other reasons why incandescent lights have not been more rapidly introduced: the general public has not had sufficiently brought before it the advantages of electric lighting over gas from an artistic and hygienic point of vlew; it has been considered mainly from the standpoint of cost as compared with gas. In many cities gas is supplied over extended areas, embracing sometimes the suburbs for miles around. For the more wealthy suburban inhabitants it would be easy to light their houses by electricity, using a gas-engine for power, and employing a storage-battery in connection with the dynamo. Some figures obtained at the late electrical exhibition in New York will be of interest. We find, if we consider a five-foot gas-burner as giving a light of 16-candle power, that 130 feet of gas supplied to a gas-engine will give as many incandescent lamps, these being fed directly from the dynamo, as would 150 feet of gas burned directly. If we use a storage-battery, and allow it 70 per cent efficiency, we have 30 incandescent lamps using 186 feet of gas, to 150 feet for the gas-burners. To the expense of the electric light, moreover, we must add the interest on the plant, depreciation, breakage of lamps, etc. These items will perhaps double the expense of the electric light. The cost could, however, be reduced if two or three people living close together would use the same plant: it could be still further reduced if cheap fuel-gas could be supplied for the engine. As far as cost goes, then, the electric lights supplied in this way would be more expensive than gas; but for people of means, the greater beauty of the light, and its healthfulness, together with the many smaller offices the electricity could be made to perform, would repay the increase in cost. Where there is no gas, it has been proposed to use wind-mills. Mr. A. R. Wolff states that a properly constructed wind-mill will govern itself for all velocities of wind exceeding six miles per hour; further, that on the average, for at least eight hours out of twenty-four, the wind exceeds this velocity. "Total calms in excess of two days' duration are practically unknown in the United States." If these figures are correct, it is evident that we can use wind-mills in connection with storage-batteries for supplying light to country houses. It should be borne in mind, however, that isolated plants of this kind must have a capacity very much greater than the mean power required; and in this case, where we may have calms of two or perhaps three days' duration, the capacity must be sufficient to last over this time. Counting the interest and depreciation, and the breakage of lamps, it will probably be found that the cost will be greater than that of oil; but there is no comparison as regards convenience and beauty, and it is probable that the wind-mill will be used as a source of power for lighting the houses of rich country people.

## ETHNOLOGY.

### Christmas Customs in Newfoundland.

THE Rev. Moses Harvey of St. John, Newfoundland, describes in the *Montreal Gazette* an interesting Christmas custom observed in Newfoundland. Formerly, he says, at this season, 'mumming' was carried on to a large extent; but the practice at last became an intolerable nuisance in the streets, and was put down by law. Firing salutes on Christmas Day, once a general custom, has also been prohibited, to the greater comfort of every one. A curious custom prevailed here on St. Stephen's Day (Dec. 26). It was called 'The Burying of the Wren.' Bands of boys and youths, with some rude musical instruments, went about the streets on that day carrying a green bough, to which were fastened ornaments of colored paper and either a dead bird or the figure of one. They called at the doors as they made their rounds, and sang a rude doggerel, of which the following was the burden: —

"The wren, the wren,
The king of all birds,
On St. Stephen's Day
Was caught in the furze.
Though he is little,
His honor is great,
So rise up, kind lady,
And give us a treat.
Up with the kettle
And down with the pan, —
A penny or 'tuppence'
To bury the 'wran.'"

The contributions thus levied by the youngsters were spent in the purchase of cakes and sweetmeats.

The custom is now almost extinct, but some faint and forlorn attempts are still made by a few boys to keep it up, and in a few years it will probably pass into oblivion. It is curious to find that a similar ceremony was once practised in the Isle of Man. In Waldron's works, published in 1711, in describing the Isle of Man, the author says, "Here, on the 24th of December, towards evening, all the servants have a holiday. They go not to bed all night, but ramble about till the bells ring in all the churches, which is at twelve o'clock. Prayers being over, they go to hunt the wren, and, having found one of these poor birds, they kill her and lay her on a bier with the utmost solemnity, bringing her to the parish church, and burying her with a whimsical kind of solemnity, singing dirges over her in the monks' language, which they call her knell, after which Christmas begins." It is evidently the same ceremony, in an altered form, that is practised here. What is its origin, how it came here, or whether it is kept up elsewhere on this side of the Atlantic, is not known.

## BOOK-REVIEWS.

*Harvard Reminiscences.* By ANDREW P. PEABODY. Boston, Ticknor. 12°. $1.25.

THIS work, by the venerable professor of Christian morals at Harvard College, will be of much interest to graduates of the college, both younger and older, and by no means devoid of interest to the general reader. The author's reminiscences relate to the time when he was undergraduate, theological student, and tutor, but do not cover the period of his professorship, which he has now held for so many years. The state of things at Harvard in those olden times was so different from the present, that we can hardly repress a smile as we read of it. Thus, Dr. Peabody tells us that a student's room was usually destitute of all the means of comfort, and even of the tokens of civilization; that carpets were almost unknown, and friction matches entirely so; and that the entire furniture of the room, except the feather-bed, would not have sold for more than ten dollars. The relations between professors and students is described as one of mutual hostility; the students, in particular, considering the faculty as their natural enemies. As regards study, Dr. Peabody thinks that the best scholars did more work, and the poorer ones less, than they do now. The administration of the college affairs is described as loose and unbusinesslike until the elevation of Josiah Quincy to the presidency, when a thorough reform was carried out under that distinguished leader, whose pre-

vious experience as member of Congress and mayor of Boston had eminently fitted him for the work. Dr. Peabody gives many interesting accounts of the modes of teaching and lecturing pursued by the professors of whom he speaks, some of which are full of suggestiveness even now. He gives his personal recollections of nearly seventy men who held offices in the college, with excellent sketches of character and interesting anecdotes; and, though some of those of whom he speaks were hardly known outside the college, not a few had a national reputation. It is hardly necessary to add that the venerable author writes, as always, clearly and with hearty nterest in his subject.

*The National Sin of Literary Piracy.* By HENRY VAN DYKE. New York, Scribner. 16°. 5 cents.

THIS pamphlet is a vigorous protest against the absence in this country of an international copyright law, and against the unwillingness of our people up to this time to enact such a law. There is nothing in the author's argument that is specially new; but the moral principles involved in the subject have seldom been exhibited with greater force and clearness than they are here. Mr. Van Dyke's essay was originally a sermon, and the mere fact that a sermon on the subject could be preached to a popular audience is proof that public interest in the question is already awakened. The author treats the subject from a moral standpoint, maintaining that we have no more right to take a foreign author's work without paying him for it than we have to take any other man's work, literary or otherwise, in the same way. He treats as irrelevant the argument, sometimes adduced by the opponents of international copyright, that the American people want cheap literature. "The question is," he remarks, "how do they propose to gratify that desire, fairly or feloniously? My neighbor's passionate love of light has nothing to do with his right to carry off my candles. The first point to be determined is one of righteousness." He holds, however, that the republication of foreign works is not only wrong, but injurious to our own people, both by hindering the growth of our national literature, and by helping to weaken the national conscience. The book will be found interesting by all who are interested in the subject, and, if read by the right persons, can hardly fail to have some effect on public opinion.

*Chemistry, Inorganic and Organic.* By CHARLES LOUDON BLOXAM. 6th ed. Philadelphia, Blakiston. 8°. $4.50.

THE appearance of the sixth edition of Professor Bloxam's well-known work follows closely upon the announcement of the death of the author. The general character of the work, its elaborate display of experiment, and practical intent, are the same as in previous editions; but much of the text has been re-written, and the whole revised and passed through the press under the author's own supervision. Much new matter has been incorporated (some of date even so late as the recent isolation of fluorine), and the part which deals with organic chemistry has been recast with a view to bringing theoretical relations more clearly to light. The technological applications of organic chemistry receive considerable attention, and the subject of explosives. In the previous editions, the work has been a favorite, particularly with practical men and students of applied chemistry. The present edition is an improvement upon its predecessors, and a fitting memorial of its lamented author.

*Benjamin Franklin as a Man of Letters.* By JOHN BACH MCMASTER. Boston, Houghton, Mifflin, & Co. 16°. $1.25.

FRANKLIN'S name has always stood side by side with that of Washington; and there are no other Americans, except perhaps Lincoln and Grant, whose deeds and character are equally well known to the mass of their countrymen. But Franklin's greatness was chiefly in the fields of politics and science, and it is chiefly as politician and scientist that he is generally known; while his strictly literary works, except the autobiography, are much less read than those of many men who, on the whole, are his inferiors. Yet his literary merits are not slight, and the influence of his writings on the opinions and tastes of his contemporaries was great. He was not only the author of the autobiography and of several scientific papers, but he was also the first great American journalist; and in all these capacities he deserves grateful remembrance. It was necessary, therefore, that in a series of works devoted to American men of letters he should have a prominent place, and the sketch of his literary work which Mr. McMaster has written is in most respects worthy of its theme. It gives, perhaps, too little space to the political papers which Franklin wrote so abundantly, and which often had great influence on public opinion and on the course of events. Many paragraphs, too, of Mr. McMaster's work are filled with mere lists of articles that Franklin wrote; and these passages could well have been spared in favor of something more important. Nor do we find so good an account of the development of Franklin's mind and character as we could have wished. Yet, in spite of these defects, the book gives an interesting account of Franklin's writings, with a mass of details relating to his life, his business, his associates, and, in short, every thing connected with his literary work. The result is a work which, as an account of Franklin's place in literature, is not likely to be surpassed.

Franklin's career has always been an example and an incentive to boys and young men that have had to struggle upward from humble beginnings, and deservedly so; for, considering the times in which he lived, his success in politics and science and literature, as well as in acquiring a fortune, was indeed surprising. Mr. McMaster, however, agrees with all other good judges, that Franklin's morality was not of a high order, and that in this respect his life and his philosophy are not what might be wished. "His philosophy," our author remarks, "was the philosophy of the useful; the philosophy whose aim it is to increase the power, to ameliorate the condition, to supply the vulgar wants, of mankind. . . . Morality he never taught, and he was not fit to teach it" (pp. 277, 278). With regard to his electrical discoveries, Mr. McMaster expresses the opinion that Franklin was considerably indebted for valuable hints to his friend Ebenezer Kinnersley; but he does not specify the particular contributions that Kinnersley made to the subject. The author points out, too, in another place, that the plan for a union of the Colonies, which Franklin proposed at Albany at the beginning of the French and Indian war, was borrowed from Daniel Coxe, who had proposed the same plan many years before, when Franklin was a boy. Mr. McMaster's judgment on Franklin considered as a writer only is likely to be generally accepted, and is in brief as follows: "The place to be allotted Franklin among American men of letters is hard to determine. He founded no school of literature. He gave no impetus to letters. He put his name to no great work of history, of poetry, of fiction. Till after his day no such thing as American literature existed. . . . His place is among that giant race of pamphleteers and essayists most of whom went before, but a few of whom came immediately after, the war for independence. And among them he is easily first" (pp. 272, 273).

*A Text-Book of Inorganic Chemistry.* By VICTOR VON RICHTER. Tr. by Edgar F. Smith. Philadelphia, Blakiston. 12°. $2.

IT is not surprising, however much to be deprecated, that the elementary literature of branches of knowledge like chemistry, which, constantly expanding, are frequently brought to public notice, and so made attractive to the popular imagination, should be perennially deluged by the products of the misguided passion for authorship; nor ought it to be unexpected that the great majority of the many text-books of chemistry, general and applied, which come to the light, should shortly disappear utterly from the notice of an intelligent public. The occasional varying of the usual monotony by the appearance of a work of real value to student and instructor, which proves its claim to appreciation by survival in the competition with its fellows, is refreshing. Richter's text-books are of this sort, and the volume before us represents the third American edition, based upon the fifth edition of the German original.

The scheme of development follows the order of the 'periodic law,' and the introduction of theory is gradual and opportune. Thus the reader is brought directly into contact with the laws of definite and multiple proportions and the conception of atoms and molecules only when the demonstration of the properties of the halogens leads to the point. So, also, the questions of valence and structure wait the presentation of facts with sufficient fulness to