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-