

continued and earnest experiment such as will certainly command success. As we have before pointed out the conditions to be fulfilled by a conduit system are exacting in the extreme, and one reason perhaps that they have not been more successfully grappled with may be, that the growth of the business has been so rapid where overhead construction has been permitted, that little time has been available for experiment. When overhead construction is unattainable, we are confident the conduit will be provided.

THE introduction of electricity in the arts and as a necessity of every-day life, has been the means of giving an immense impetus to the development of power producing mechanism. The ideal power of course is that of falling water, and the facility with which the electric current can be transmitted by metallic conductors has made it possible to utilize some of these natural sources, which otherwise would have been unattainable. The immediate future will, no doubt, see more of this development carried out; but for any considerable distance the heavy cost of wire and loss in transmission make their utilization more expensive than the consumption of coal upon the spot. Various kinds of engines have been devised for the production of power—petroleum engines, gas engines, hot air engines, and so forth. They are, to a certain extent, useful for small powers up to say 10 or 15 h. p., but above that, too expensive and complicated. It is the steam engine that has so far held undisputed sway, and the machines of magnificent proportions that are in use in driving steamships, and in our largest factories and electric works, are examples of what may be accomplished in the way of development when inventive skill and sufficient means go hand-in-hand. But enormous powers have now become such a necessity that, perfect though the steam machine may be, there still remains an enormous margin of profit by the accomplishment of even a small percentage of saving when taken in the aggregate. The far-seeing engineer is even now casting about to see if perchance there is not a new method of evolving motive power from Nature's resources that shall be under sufficient control. A few years back an effort was made to utilize a mixture of bi-sulphite of carbon and petroleum. If the promoters could have utilized the strength of the smell of that mixture, it would have been an immense success, but after poisoning half the town the affair was abandoned as a failure. To look with a prophet's eye into the future, it does seem possible that the enormous power locked up in some of the modern explosives might be tamed and brought sufficiently under control to develop a cheap and useful power. The tremendous energy contained in the gases liberated by the detonation of gun cotton or nitro-glycerine would be capable of doing yeoman work if imprisoned and used expansively in the modern cylinder. It would be ticklish stuff to handle while the experiments were in progress, and might possibly require a continuous supply of inventors before any measurable degree of success was attained, but if it were possible to secure the main bulk of materials against explosion, allowing only the atom required for each stroke to be separated safely and used, the rest would present no more difficulty than is met with in the ordinary gas engine. It might be possible to use reservoirs of unmixed material, each in themselves harmless, but capable of great explosive force when combined only in quantities necessary for use stroke by stroke in the engine. It is just possible that this suggestion of ours may be irreverently received by our engineering readers, and that they may prefer to pin their faith on their old reliable friend, the steam boiler, and say that with all its faults they love it still, and that for their part they decline to change their designation of steam engineer for that of dynamiter; but this is a rapid age in which we live, and we may yet see some such development of power-producing mechanism. What an advantage it would be in the way of portability, for instance, for a locomotive to start out with a painfulful of fulminate instead of twenty tons of coal and water, while its possibilities on the ocean would be limitless. He will be a hardy pioneer in the field of invention, however, who undertakes the solution of this enticing problem.

THE question of the desirability of municipalities operating their own electric light plant is one that is just now attracting considerable attention. Extravagant claims have been made in the past of wonderfully cheap lighting, and these claims obtained considerable currency amongst the uninitiated, and were largely

quoted by municipal economists until their true nature was shown up. This was done in the able paper read before the National Electric Light Association at its last summer meeting, by Mr. M. J. Francisco, of Burlington, Vt. The paper was the result of careful and thorough investigation of the circumstances surrounding the actual operations of municipal lighting in nearly every case in which the plant was then owned and worked by the municipality itself. It was found that invariably a certain amount of the cost of operating, and frequently the fuel and supplies, were charged to other departments of civic expenditure, hence the apparently low price at which lights were produced. Perhaps steam to run the dynamo was taken from the waterworks boilers, in which case the extra fuel was ignored and thus made a charge on the water department, and employees whose names appear on the civic pay sheet for entirely different purposes have been told off to perform parts of the work connected with the lighting outfit. By means such as these the advocates of municipal ownership have been able to show wonderful results on paper; but one or two recent cases of the willingness of municipalities to transfer the lighting plant to private parties have tended somewhat to dispel the illusion. In large cities where political influence is a factor, there is no doubt that a private company can furnish the light cheaper and better than the municipality itself. Level-headed citizens recognize this fact, and there is a tendency to curtail the powers of corporations in the matter of owning and operating industrial enterprises of any description whatever. In smaller towns and villages, the case is somewhat different. There is usually an individual who is a sort of Pooh-Bah of village politics—he is constable, caretaker of public offices, lamplighter, probably sweeps out the village school, and rings the bell; he is pound-keeper, and is vigilant in keeping the geese off the public street. He is expected to fill in his time repairing sidewalks, and probably has to do the digging when any of the forefathers of the hamlet come to be laid in their long, narrow bed. When the patriarchs commence to agitate the electric light question, it is at once considered that as this ubiquitous genius will not have the coal oil lamps to fill and light, his valuable services can be made available to look after the electric lamps, and the old man at the little pumping house down by the creek, who runs the town waterworks from eleven till one every day to fill up the citizens' barrels, can be kept out of mischief by running the dynamo at night. By thus taking the worth of their princely salaries out of the hides of these pampered officials, there is no doubt the community has the advantage by a cent or two per night over the man who would otherwise make a business of supplying electric light. There are quite a few small places in Ontario which adopt this method, and at first sight it would seem to be an argument in favor of municipal control. But follow it out to its logical conclusion and see what it means. If for the sake of saving a few cents the town utilizes its resources to drive out the electric light man who would pay his taxes like a good citizen and consume the storekeeper's supplies, why not save a few more by running out the baker, and have the town clerk in the intervals of his arduous duties bake the town bread, and supply it to the townspeople at cost? It might also be found that the shoemaker or tailor were making a little profit out of what they did for the people, therefore fire them out, and have a municipal shoemaker or tailor who might, when not otherwise employed, make himself generally useful by keeping the cows off the grass or pumping the requisite quantity of water into the town milk-pail. If the principle were followed out, as we said before, the town would degenerate into a commune, or a simple co-operative society of a few families where profits of any kind were unknown, and business enterprise entirely knocked on the head. The idea of these municipalities is (and there is one not a thousand miles from Toronto to-day figuring the same way) to do a commercial business with public resources, and it can have only one ending, and that is to drive away legitimate business enterprise and investment which might bring grist to the municipal mill. Some towns go to the other extreme, and will bonus a new enterprise, which is just as great a mistake in the other direction. If a business has any vitality, it will thrive without this pampering, but it is worse than folly for any community to kill off a new enterprise like the introduction of electric light and its concomitant industries by competition fostered by the expenditure of public monies, often at a loss to the municipality interested.