

ELECTRIC TRANSMISSION AND ELECTRIC DRILLS FOR MINES.*

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WHEN we see that in the neighborhood of a number of our mines the fuel supply for motive power is, or is nearing to become, a question of grave concern, and that this is heightened through the burning off of valuable timber by careless and unwise men, or through accidental igniting of the dry bush by the sparks of the locomotives, or even through lightning in the course of thunder-storms, then we are very vividly reminded to look for another medium that can drive the machinery and apparatus in our mines. Now, what can impress itself more quickly on us than the numerous falls of our creeks and rivers, whose roaring and thundering has become to many of us, who roved around this country so often, a familiar music, and which has lulled us many a bright night into the arms of Morpheus. How often has that little dream-god shown us these wild rushing waters harnessed into useful occupations, and how long will it be ere these dreams materialize and we shall have every one of these at present useless spending powers utilized for the benefit of one or another of our industries? But before I proceed with this subject I take this opportunity of warning our people of this vandalic destruction of the forest by fire, or we shall experience the consequence, that in a few years most of the little creeks and rivers, and with them the lakes small and large, will dry up, and we will be deprived of the present very convenient way of travel, and the cheap medium for power. One who has known this country for years has seen, with regret, the diminishing and disappearing of many of our water courses. Even Lake Superior is lower by nearly twenty-four inches since I first knew it, and this is principally caused by the burning off of the forest.

I mentioned above that we have numerous falls in our country from which we could derive motive power, and I do not exaggerate when I say that I know of nearly a hundred in the districts of Rainy River and Thunder Bay, some of considerable size and beauty. Many of them are right in our gold mining region, others in close proximity, and others again further off, but many so conveniently situated that they would not cause a great outlay of capital in transmitting the electricity profitably to the mines. We all know that distance is nowadays no great obstacle since improved machines and a better insulation are at our disposal. Even as early as 1891, at the time of the Frankfurt electric exhibition, the first long-distance power transmission of 110 miles in length proved a success, for the loss was only 26 per cent., although different pressures from 65 to 28,000 volts were tried; and now we talk of distances of 500 miles and losses of only 10 to 15 per cent. Distance has to be considered only, then, when the consumption of power in a mine is small and it is within easy reach of cheap communication. The question will arise, then, if it would not be more economical and convenient to use a different motive power, produced either with gasoline, or better yet, refined or crude petroleum, for instance with a Diesel motor.

The advantages of long-distance transmissions are specially noticeable when high voltages are transmitted for large industrial centres, or for the distribution of power among a greater number of mines, situated in close proximity, or for a mine far off from the sources of fuel. But, as I said above, it is very questionable if it

will be always advantageous for a single mine to go to the great expense of establishing water power and transmitting it from afar to the workings. This has to be determined in every instance by closely figuring all the different conditions. We have, therefore, to consider transmission for greater distances, and such for electricity generated at the time.

Now let us suppose, for instance, that we needed a large amount of h.p. for different machines, and wish to sell our surplus power to others, and know we can get this power from a rather distant waterfall. We take also for granted that utilization of this fall and the establishing of the primary motor here the turbine or any other water wheel causes no difficulty whatever; therefore, the next thing to be taken into account would be the dynamo, that is, has it to be a direct current or an alternating current machine? Now we know we need a greater number of h.p., the distance is not inconsiderable, and we wish the current to do different work. In this case the only acceptable machine for us would be the alternating dynamo, because the direct current machine has a limited transmission of only about 2,000 volts, and this current cannot be divided in the manner we wish. This is different with the polyphase current, which can easily be transformed into direct current of any strength which we might desire, or charged into as many motors as its pressure will permit. I come now to the second question: the production of electricity by some other medium than water and directly at the mine. The building of dams, the paying of pipes, and the erecting of a power-house with all its machinery and other installations near a waterfall for the transmission of electricity over a long costly wire, is rather an expensive thing, and not every owner is in the fortunate position to indulge in such expensive enterprises. We conclude, therefore, to buy a Diesel petroleum motor, which offers the most convenient and economic way to solve that problem. Also in this case the dynamo is a polyphase current machine, is coupled directly to the primary motor, and the generated electricity transmitted to the transformer and thence to the electric motors driving the various machines.

This mode of generating electricity will prove in many instances more advantageous and economic than the first system, for what we spend more in petroleum to run the motor we save again in wages for attending to the different machines and line of wire, and also on interest of capital expended, and not less so on loss of time in repairing, in telephoning from the mine to the power house at the falls, and I have a right to mention it, a saving of power in the shorter transmission. These are considerations of much importance, which will, I have no doubt, decide in many instances the choice between the two systems of primary power, especially in places where railroad or water communications are near at hand and the freights reasonable.

A mine which is in the fortunate position of having electricity as motive power should make use of its advantage and drive with electric motors everyone of its machines or works. The great convenience which accrues out of such an installation is obvious when we consider the difficulty which we experience often in transmitting the power of the steam boilers and engines, be it steam, air, or rope transmission, to our various mine workings. I might mention, however, that machines which need more than 50 horse-power would be better driven by a generator of their own, because the switching in and out of large motors would cause inconvenient

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