

thickness of the joint, thoroughly caulked, and leaving the sleeve finished in position as shown in detail on the longitudinal sectional elevation, Figure 3. The work of caulking in the lead wool was begun at 6 a.m., December 20th, and carried on continuously until finished, and the water again turned on about 7 p.m. of the same day, making the total time that the conduit was out of service approximately 36 hours. The pipe was tested for leakage when the water was turned on and found to be tight.

Special home-made caulking tools were used in placing the lead wool in the joint. The men who actually made the repairs worked in two shifts of five men and foreman for each; two hours in and two hours out of the conduit, the same men working in this was from start to finish of the job. The men were all from the regular working force of the company, and were selected for their known qualities of endurance, and to their faithfulness is due very largely the successful completion of the job in so short a time.

To Chris McGarry, the general foreman in charge of the work, great credit is due for the careful and complete manner in which he carried out the plans, and provided for all emergencies likely to arise in such an undertaking.

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SHOULD FEDERAL AID BE GRANTED TO ASSIST TECHNICAL EDUCATION?

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The modern world needs technical education. "To make well and to sell cheap" is the working creed of the great nations. "To make well" means more to-day than it meant a hundred years ago. Knowledge has put forces of nature into subjection. Science, mathematics, and art have transformed all industrial activities. They have made old trades more exact and scientific, as witness the trades of the woodworker, metal worker, textile worker, and engineer. They have created new high-grade trades—the trades of the art worker, chemist, electrician, and that vast army of tradesmen who minister to the comforts of our homes and leisure hours. While the trades demand more knowledge, the shop tends to teach less. The old apprenticeship system is disappearing. The machine replaces the man. All work becomes standardized and automatic. The workman, limited in functions and mechanical in attainments, quickly attains his full industrial stature and as quickly degenerates. Over every phase of modern industry is written large the demand, "More knowledge," and side by side with it appears the response, "Less opportunity." Here lies the need of technical education.

What is the world's need is in a special sense Canada's need, and what is the need of the man at the bench or counter is in a special sense the need of the captain of industry or the consulting engineer. Canada's raw materials are widely distributed and difficult of access. Her motive power is unlimited, but remote from urban centres. Her problems of transportation are greater than those ever yet solved by six million people. And she is exposed to the competition of the greatest industrial nation of modern times. Here lies Canada's special need of the highly-trained expert.

But technical education is expensive. No two nations and no two educationists agree as to its form and content: it is still in the realm of experiment. Experiments are proverbially expensive. They consume material under conditions that are not commercial. They have to do with hordes of students whose fee-paying powers are limited, and with teaching plants as varied as the trades and as unstable as machine shops.

Who will bear the expense? In Europe the burden rests with varying stress upon the trade guilds, the manufacturers, the municipalities, and the State. Everywhere the

State's proportion of the burden steadily appreciates. In America, next to the municipalities and the State, the philanthropists are the fairy god-mothers of technical education. Here, too, the State assumes a steadily increasing proportion of the cost of maintenance.

It would be far from generous to belittle the splendid benefactions of such men as Sir William McDonald, but Canada's needs in this matter of technical education cannot be met by her philanthropists. Nor should the municipalities be expected to meet them. These needs are national, not local. In any case the burden would be too great for the municipalities. It remains, then, for the State to take up the burden.

Now, the State may mean the Province or the Dominion. The Province, let it be confessed, cannot do much. Its revenues are limited, and they are strained to the breaking point by recent subventions to elementary education and to instruction in agriculture. The Dominion, on the other hand, has buoyant revenues collected from the people of all the Provinces. It has a splendid asset in Crown lands purchased at the expense of all the Provinces. Finally, it has a dominant interest in such national issues as commerce and industry.

But the Dominion has been cautious, not unreasonably cautious, perhaps, in recognizing its duty in these premises. Education, it has pointed out, is, in the term of the B.N.A. Act, a Provincial, not a Dominion interest. It is unwise to disturb the Constitution. Interferences with Provincial rights have not been happy in results. Federal aid to education in one form would be a grave precedent as regards all other forms. And so the Federal publicist has been cautious!

Let us look at this caution from the other side. The United States Government aids technical education in the various States, and does not find it difficult to separate one form of education from another. The Dominion Government itself aids certain forms of technical education in the Provinces, and has not found grave difficulties in the precedent. Grants in aid of technical instruction would not be unhappy interferences with Provincial rights when all Provinces and all classes in the Provinces welcome those grants. Moreover, grants-in-aid need not involve interference with Provincial control. They do not involve interference with State control in the United States, or with Cantonal control in Switzerland. The Constitution should be sacred, but it must change with the centuries. Canada's Constitution has already been changed for interests scarcely as important as technical education.

But would Federal aid to technical education be a violation to the British North America Act, and would it require a change in that Act?

In the terms of the B.N.A. Act trade and industry are Federal interests. Technical instruction belongs to trade and industry. Is it not, therefore, a Federal interest? The Dominion maintains a splendid type of instruction in engineering in the Military College at Kingston, and defends such technical instruction as attaching naturally to militia and defence, which is a Federal interest in the terms of the Constitution. It maintains experimental farms, dairy stations, and cold storage centres, with bulletins to instruct the people in the operations of these agencies, and defends this technical instruction as attaching naturally to agriculture, which in its larger phases is a Federal interest in the terms of the Constitution. It goes even further. In commercial agencies in the world's great trade centres, and in national expositions and world expositions, it aids or organizes magnificent agencies in the development of industrial intelligence—a form of technical education which attaches logically to trade and industry, and is a Federal interest. Surely it would not be altogether unnatural, or illogical, or illegal, to recognize all instruction in the arts and crafts as within the sphere of trade and industry, and to that extent a Federal interest.

Even if technical instruction were a thing apart, attaching itself to education proper and not to trade and industry, the Federal Government could still aid it and be