

NOVA SCOTIA MINERALS AND RECONSTRUCTION

A. E. CAMERON

THE title of this paper is: "Minerals and Reconstruction", it is *not* "Minerals and Rehabilitation". To my mind the word "rehabilitation" is one which involves that the returning soldiers, sailors and airmen are to be absorbed into our life as it exists now. They will not want to be transformed to fit this old mould. There is a proverb which says you cannot put new wine into old bottles. They are to be the new wine of our existence. To my mind our problem is to construct the new bottles for the new wine.

A Basis of Reconstruction

The fundamental basis for the life of any community, be it country, province, city or hamlet, has to be the natural resources of the area. Therefore the fundamental basis for reconstruction must be the natural resources as we know them, and as we have them when we start the reconstruction programme. What are they? What do we know about them? What more should we know about them? How have we treated them? Are some over-developed? Are some being wasted? What can we do with them? The answers to these questions will give us at least an indication of the road to be followed for our reconstruction.

Natural resources of any region are of two general classes: the human and the material. The human resources of the community are you and I and the other people. We should all take a greater interest in each other collectively through our franchise and, individually, by supplying or assisting to supply from our own ability something for other people.

The material resources are—fisheries, agriculture, forests and minerals. Our subject deals with the last one only, but actually we cannot look at these resources independently of one another; they all interlock, and one cannot get on without the other. You and I depend for our existence not on any one of them but upon them all. The fisherman cannot get along without the food that agriculture gives him, or without the salt that minerals give him, or lumber for his boats. Agriculture cannot get along without minerals and fertilizers, or lumber, or

machines—the product of the minerals. Production from the forests requires food and machines. Minerals' industry requires food and lumber, other minerals and the machines made from them. All of us need products from all of the natural resources, and our material welfare will increase as the products of them are made available to us.

I have said the inherent wealth of the community, be it country, province, city or hamlet, lies in the natural resources around them; they should be used by and conserved for the use of the people of the community, with such surplus taken as will purchase the other needs of the community that it cannot produce for itself.

There are two ways by which we can take that surplus. We can take a maximum amount in a minimum time. By so doing we tend to rob the future of the community for our own immediate gain. We can take only that amount which will wholly satisfy our needs, or, perhaps better still, take that amount which we can calculate as not robbing the future. This method will give a continuing prosperity to the community. Which is to be preferred? Maximum production with quick wealth for a few and then abandoned communities, or controlled production based on the productive capacity of the resources with long continued existence to the community?

To my mind, systematic planning based upon ascertainable facts is the fundamental need before we can talk very much about reconstruction. Conservation is an important part of reconstruction. Now let us see what we know about the mineral resources of Nova Scotia, what we can do with them, and what part they can play in the future.

First of all, we have to face the fact that mineral wealth is a wasting asset. Once production starts, the end of a given mining operation or productivity from a given deposit is in sight. Given the proper information, it is possible to forecast with reasonable accuracy the life expectation on an established rate of depletion; if we increase the rate of depletion, we must decrease the expected life. A community will invariably develop around the operation. The size of that community and its life will depend upon the rate of depletion. Surely it is obvious that, if continued community prosperity is the desired end, then controlled production is the way to obtain it. For mineral development there should be systematic planning based upon all the ascertainable facts, if maximum return to the community is to be realized.

What of the mineral wealth of Nova Scotia?

The major mineral developments of the past are well known. They are: coal, iron and steel, gold, gypsum, limestone, salt, and, in recent years, barite. There have been a number of others of lesser value, but none have developed into a recognized industry supporting a recognized community over a period of years

Production trends of these minerals during the past indicate the rate of depletion, and are the best guide for the probable level of development or production that can be expected in the future. Beyond that we must look for increased prosperity through greater utilization ourselves; by putting more work into them and thereby increasing their value; by processing them locally and reducing waste wherever possible.

* * * * *

Coal

Coal was first mined in Nova Scotia by the French prior to 1763, but only on a small scale. Real development began late in the nineteenth century. By 1900, production had reached to a figure slightly in excess of 3,600,000 tons per annum. In 1906 it was over 6,500,000. Since then it has fluctuated up and down, with a high point of over 8,000,000 tons in 1913, and a low point of slightly over 3,600,000 in 1925. We can say that, on the whole, production of coal from Nova Scotia coal fields has been stabilized at about 6,500,000 tons. Maximum productive capacity is probably not over 8,000,000 tons.

Coal production comes from four counties, Cape Breton, Inverness, Pictou and Cumberland. Although production has been relatively stable over the last twenty-five years, it has not all come from the same mines. Not a year goes by but some mine dies, increased production from the remaining or some new mine takes its place. If the new one is close at hand, the same community continues to benefit; otherwise, the community dies. The Mines Report for 1924 shows 55 mines reported production; that for 1942 gives 46. Only 18 are common to both lists. 37 mines have died since 1924, and 28 have been born. In 1924 2,480,000 man-shifts of work were required to produce 5,570,000 tons of coal, or 2.25 tons per man-shift. Wartime conditions of 1944 are not, perhaps, a fair comparison. In 1940 3,401,000 man-shifts produced 7,736,000 tons or 2.27 tons per man-shift.

Manpower requirements are relatively stable. There will be replacements within the manpower. We cannot expect a

greatly increased number of men to be employed producing the coal.

Coal mining can be expected to continue as the back log of mineral industry of Nova Scotia, but a great expansion is not to be expected.

The finished products of one industry are the raw materials of another. Coal is the raw material for a coking plant, and coke is one of the raw materials for iron-making. The coal industry of Nova Scotia can continue to produce for a long time coals suitable for coking, and the coke plants, besides giving metallurgical coke for iron and steel making and a smokeless fuel for domestic use, can form a source of raw materials for other industries: toluol, xylol and other chemicals, raw materials for pharmaceuticals and dyes, ammonia for fertilizers, gas for furnaces. Some of these are now in production and must continue after the war. If prewar costs of production can be reestablished, more of these can be produced. They will require labor and make new jobs, the new industries based on coal.

* * * * *

Iron and Steel

Production of iron in Nova Scotia dates from early settlement. For many years it depended upon local ores as a source of iron. It was not until the huge reserves of good grade iron ore were discovered in Newfoundland that the iron and steel industry really became established as the second most important, if not now the most important, industrial development based on mineral resources. The iron deposits of Nova Scotia were sufficient to supply the needs of an industry that used 90,000-100,000 tons a year in 1895. They could not produce the 800,000-1,000,000 tons required annually now. If they could, the ores would have been used long ere this.

There are iron ore deposits in Nova Scotia that can produce from a few to several hundred thousand tons of ore. They can and will be used to supplement the imported ores as time goes on. The expenditures necessary to bring them into production are great in comparison with the cost of getting ores elsewhere.

That does not mean that there is not ore that could now be used. There are places where a small operation may be able to produce ores for special purposes in the steel-making process. Material that is now needed, because of the costs of importing them from places far away. If sufficient care is taken in planning, they could be made into self-sufficient, though small, production units. They should pay wages for the work done. They are not likely to repay large capital expenditures.

The bulk iron ore itself no longer comes from Nova Scotia, but Nova Scotia coal fields supply the necessary fuel for reduction, and one and a half tons of coal are required for every ton of steel produced. The steel industry cannot get along without the Nova Scotia coal fields. Iron ore moves to the coal, not coal to the iron mines. We can expect the iron and steel industry to continue, even though there are no large deposits of iron ore in the Province.

The war demands have increased the production of pig iron and steel at Sydney, and have developed new products, a plate mill and special steels. These are definite additions to the mineral industry of the Province, and will produce the raw materials for other industries: plate and rolled shapes for shipbuilding, structural steels for bridges and buildings, rolled and cast shapes and special steels for machinery manufacture. In the years that are gone, the Robb Engineering Works at Amherst were of worldwide renown for their engines and machinery. There is no inherent reason why steel ships built of plate, and rolled shapes made in Nova Scotia and equipped with engines built in Nova Scotia, should not sail the seven seas.

The iron and steel industry has a waste product—slag. Actually it forms nearly half of the material put through the plants. They are wasted, but valuable products can be made from them.

Blast furnace slag makes good concrete aggregate. If blown with air or steam, it makes light weight insulating material. Pressed blocks and shapes make ideal building materials. The Department of Industry has seen to it that experiments are under way on this material now.

Steel furnace slags contain phosphorus, an essential ingredient in fertilizers. They contain lime, and all our farm lands need lime and phosphorus. The National Research Council at Ottawa, the Department of Agriculture at Ottawa and at Halifax, and the Department of Mines have all joined in a study of the use of this material for soil improvement. It may not take the place of fertilizers; added with fertilizers, it should aid in increased production from the farm lands of Nova Scotia.

Gypsum

No other Province in Canada, possibly no area of similar size anywhere, has as great quantities of good quality gypsum as Nova Scotia. Production has steadily increased over the years,

until in 1939 it amounted to 1,377,000 tons. Only 7,500 tons were processed in the Province. The rest was exported as raw gypsum, and the work of processing done by other people. All gypsum products used in Nova Scotia now, except some calcined gypsum, come from other sources, some of them prepared from our own raw material.

The industry is now a war casualty because of shortage in shipping. When it revives, Nova Scotia initiative can see to it that the material is processed as well as quarried in Nova Scotia. In the processing lies security of the community, employment, and payrolls.

Always associated with the gypsum is another mineral, anhydrite. It is gypsum without water. It has been used in the past to a limited extent, being shipped to the southern states as a fertilizer for peanuts. It has potential value. Investigation is underway now at the Nova Scotia Technical College to find ways of using it in our Nova Scotia economy.

* * * * *

Salt

At Malagash, Nova Scotia, is the only salt mine in Canada. There is every reason to believe that large bodies of salt lie underneath the surface near Amherst. Salt is needed in the fisheries, in agriculture, on our dining-room tables. It forms the raw material for many heavy chemical industries; soda ash, needed in the aluminum and glass industries; chlorine, needed in all our civic water purification and for the bleaching of pulp in paper making; caustic soda, used in soaps, in the plastic industry and other ways; calcium chloride, hydrochloric acid, and many other products and processes.

Given a knowledge of the abundance and quality of salt, industries can be built on it, and they are long enduring, give permanence to communities, and are the source of raw materials for other processes and products.

The salt industry is developing at Malagash. Production has been handicapped by impurities and the need of careful mining. These have restricted the markets for the product. Recent careful and scientific research work undertaken at Ottawa, assisted by the Department of Industries at Halifax, has overcome this handicap, and large reserves of salt are now available for development. Other bodies of salt in the same mine have been shown by Provincial Government drills to contain valuable amounts of potash and magnesium. These

can be recovered and put to use. They are not being wasted. They have still to be developed.

The salt resources of Amherst are being further studied. They were first reported in an oil drill hole put down in 1931 near Nappan. They were further proved by a diamond drill hole this summer. The salt is there. Nova Scotia industry and initiative can see to it that maximum use is made of it.

Gold

Gold mining in Nova Scotia is another war casualty. In 1938 it reached a new peak of 28,500 ounces; in 1942, it was down to 11,300 ounces. We have yet to find a large gold mine in Nova Scotia. The great majority of the occurrences are in narrow veins, and the values are spotty. Surface or outcrop values have been extracted. Values at depth will have to be searched for, and the exploration and development of these need care and courage. The future of gold mining in Nova Scotia will depend upon the value of gold and upon sound mining engineering. Given these, there is every reason to believe that communities can be developed and thrive.

Petroleum

Nova Scotia is not without potential resources in petroleum and natural gas. Several areas have attracted the attention of oil operators in the past, and there is a considerable revival of interest now. It can be safely predicted that intensive exploration will be underway within another year. Success in these endeavors will mean much to the industrial development of the Province.

* * * * *

As I said earlier, there are other minerals in Nova Scotia. Many, yes, practically all of them, have been studied in the last few years. Manganese, tungsten, fluorspar, talc, diatomite, fire clay, dolomite, building stones, moulding sand, clay wares! All have had some development in the past, some, particularly the earthy minerals—dolomite, limestone, building stones, fire clay, etc.—are essential raw materials for other greater industries and, therefore, have had continuing production. One or two, particularly dolomite and limestone, have potential possibilities as a source of new industrial development. The others have not as yet shown promise of being able to compete with cheaper outside sources even under the impetus of war demands.

They have all been looked into during the last few years

by the Province, by the Dominion, and by private corporations. Undoubtedly some of them have possibilities for small scale operation. They will not carry a large overhead. They will not support a large capital structure. If properly planned, however, they should be able to pay their way and give a community living to a limited number of people.

I can briefly refer to a few possibilities in this respect:

First, there are dolomites in Nova Scotia that are suitable for the manufacture of rock wool, a fibrous product valuable as an insulating material. A local industry based on this material would succeed, if Nova Scotians would use the product and thereby support the industry. Insulating material in private dwelling construction always pays for itself. Local enterprise to advance the capital and local willingness to use it in preference to imported material will make a continuing industry new to Nova Scotia.

The second is glass. There is a yearly demand of about 30,000,000 bottles for various purposes in Nova Scotia now; milk, beer, beverages, drugs, etc. Raw materials are sand, soda ash, lime and minor amounts of other minerals or materials derived from minerals. A small local industry should be able to get along on a production of 5,000,000 assorted bottles annually. Again, Nova Scotia enterprise to advance the capital and Nova Scotia willingness to use the products will make a continuing industry.

Third, I have shown that phosphorus is present in the steel furnace slags; ammonia, that is, nitrogen, is available from the coking of coals, and potash is available in the salt deposits at Malagash. These, phosphorus, nitrogen and potash are the essentials for mineral fertilizers. The sources of raw material are available. Initiative and cooperation, by Nova Scotians, should put them to use.

What is needed with these is initiative and enterprise: a thorough study of their possibilities and a development based on them. Not looking for fat profits and quick return on investment, but for a satisfaction arising from a continuing community life for the owners and the workers.

The productivity of our mines may not increase. The products of that productivity can be made and should be made by us. What we need is industrial initiative within ourselves to take those products we have and make more out of them. Nova Scotia should process and fabricate. Keep that work at home, and thereby enlarge the community payrolls and improve the material prosperity.