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Opportunities in Canada for Research

*Valuable Fertilizers Are Wasted—New Method of Briquetting
Peat—Substitutes for Gasoline—Conservation of Heat—Chemical
Research—Many Kinds of Fish, Valuable for Food, Neglected*

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SINCE my communication, a year ago, in *The Monetary Times*, on this subject, the changing conditions, then in process, throughout the world, resulting chiefly from the war, and affecting not only industry, but the mental attitude of the people towards current problems, have led to many new promising opportunities for research in the different departments of industry, and have emphasized the importance of others. A year of experience has also raised the question as to how best research can be practically carried out.

Presently research has been practically relegated to a committee, with headquarters at Ottawa, but whose members are scattered over the Dominion, and not every one of whom is known to be a specialist in research work. The ground to be covered, geographically speaking, is vast, the number of lines in which investigation, requiring expert knowledge, can be made, is large, and it is not possible, under present arrangements, for any one individual, however high his attainments in his past special work have been, to grapple with the situation. The original suggestion made to the government still commends itself—that the work of research should be commenced, under a committee, by directly utilizing the extensive laboratories of McGill, Toronto and Queen's Universities—each in the special lines for which it was equipped and in which it was already doing effective work in research; that special experts in these lines, with post-graduate assistants, devoting their whole attention to the work, should be employed in each university; and that all work should be co-ordinated by the committee, in order that each laboratory should have before it only those problems which it could efficiently undertake.

From this as a beginning, the research investigations could be extended to other institutions, especially in the industrial centres, which, in time, provided the necessarily large equipment; or, as in Great Britain, the government could aid with grants, through the research committee, any institution which was grappling with a special industrial problem of great interest to the country. Thus, our Canadian industries could, in a larger way, have trained expert knowledge placed at their disposal in overcoming difficulties which often present themselves, or in seeking new and improved methods of manufacturing, or in discovering and adapting to industrial uses, the numerous possibilities which are stored away among the vast re-

sources of this country. At the same time, in the post-graduate assistants, men would be specially qualified as experts, who will be invaluable in the laboratories, which must accompany all the great manufacturing and mining establishments of the future. This suggestive plan can still be carried out. The cost to the government would be a bagatelle. The German State Governments have for a great many years in the past expended vast sums annually on their universities, especially in research on industrial lines, and it is claimed that whatever position that empire has attained in commerce, manufacturing and agriculture, as well as in the army and navy, is due to the direct work of its universities, and the men who have been trained there.

The two problems which have, this winter, entered deeply into the public mind, are those of food for ourselves and the allied nations, and fuel for domestic, manufacturing and transportation purposes. Food is chiefly an agricultural problem, involving, not so much increased areas under cultivation, as our governments appear to imagine, but much larger production on existing areas, through more fertilizing of the land and better cultivation. What have our farmers to say when the average production in Scotland, for ten years past, has been, of wheat over 39 bushels and of barley over 35 bushels per acre, as against the averages for Canada last year of 16 bushels of wheat and 23 of barley?

With the lower prices here than in Scotland, the question may well be asked, "Does grain farming pay?" And yet, Prof. Zavitz tells us that at the Guelph Farm, 55 and 59 bushels of barley have been obtained to the acre by the use of fertilizers. Our clear need is cheap, concentrated, standardized fertilizers, which divested as far as possible of all unnecessary associated matter, can be transported at low cost over the long railway journeys to the farms. In pursuance of this, our chemical and mining laboratories should further investigate the problems of separating the potash from our abundant feldspars, the phosphates from their associated rock, ammonia sulphate from the peats, nitric acid from the coke oven products, and of other sources of fertilizers; whilst they may well examine further into the extraction of nitrogen from the air, which, under present methods, requires too much power to be economical, not only in this process, but in view of the many other industries needing hydro-electric power.