

which they feel the need for scientific help, and the sincerity of their desire to help forward any promising movement in every possible way. The farmers, no less than the manufacturers, and particularly the younger men, recognize their ignorance of many things essential to their success, and their realization of problems requiring scientific aid is a hopeful augury for a well-considered scheme. Without exception I found them willing, and even enthusiastic, when it was suggested that they should help themselves by contributing funds for the work and by actively helping it forward with their time and brains. Nor is this really surprising when one considers the position in which thoughtful men find themselves. The day of the pioneer is almost over. The men who broke in the soil gave place to a generation of empirical farmers and pastoralists who made good with the powerful aid of a natural and virgin fertility in the soil. To-day the third generation realizes that Nature's bank has a balance which may be exhausted like their own; that her capital must be carefully husbanded and put out wisely to the most profitable use; that more intensive cultivation brings its own difficulties of infection and disease; that increasing crops must find markets overseas which are in the grip of international competition and where the prize goes without favour to the best product with the most regular supply. Year by year the problem becomes more complex, and if nations are to be free from the anxieties of war their energies will be devoted to the arts of peace and to the increased competition that must inevitably follow. The manufacturer finds the artificial stimulus of war conditions has left him with a capacity for production beyond his power to use. The hard conditions in Europe are forcing down the prices of articles imported here. The rapidly growing wealth and population of the United States of America enable them to produce with ever-narrowing margins of profit. Rich and poor nations alike are pressing science more and more systematically into their service, and the manufacturer here is growing anxious. In these conditions the starting of new industries calls for the utmost circumspection, and, above all, for sound scientific, technical, and economic guidance. The younger men naturally fear ever a temporary set-back to the present prosperity with more apprehension than those who have come through bad times in the past and have built up reserves of capital and experience, and, broadly, the younger men are right, for the conditions are very different to-day, and the power of the State to help more limited in range. The heroic policy of a Vogel is impossible even if it were attractive. What is needed and, unless my judgment is profoundly astray, what the industries want is a steady long-sighted policy of help and advice from the State in a national movement for the co-operative attack on scientific problems similar to that successfully initiated here in the marketing of products overseas. Side by side with the traditional tendency to lean on the Government as an ever-present help in time of trouble there is undoubtedly an instinctive feeling, which I believe to be sound, that the problem of industry must be solved by the industries themselves. But they want help and guidance.

16. If this be so, it may be possible on the foundations of a widespread popular instinct to lay the basis of a gradually extending and developing service without too severe a call upon the resources of the taxpayer—a service guided and encouraged by a central organization and clearing house of moderate size which will make the utmost use of all good work wherever it is being done, will stimulate team-work not only between farmers and between manufacturers for their common good, but also team-work between the scientific workers in the University colleges, in endowed institutions like the Cawthron or the New Zealand Institute, and in the scientific establishments of the Government itself. Imbued with this spirit the new organization would start with a careful review of all the productive work at present being done, would seek to bring it within the ambit of a carefully considered plan without destroying the initiative of independent organizations, and would consistently avoid centralization until it became obvious to all concerned that centralization had become necessary in the interests of efficiency and economy. And the centre, if centre there had to be, for some important block of work would be the best centre for that particular work, and by no means necessarily nor probably the seat of Government. Thus would local interest be best maintained and the influence of the scientific service felt throughout the Dominion.

17. These are the basic ideas that lie at the root of the proposals submitted in the following paragraphs.

For the sake of convenience of reference, the following sections deal respectively with—III, the primary industries; IV, the secondary industries; V, certain State scientific services; VI, the other State scientific services, and particularly those of the Department of Agriculture; VII, the organization of the new central scientific service; VIII, miscellaneous recommendations; IX, summary of recommendations.

18. It may be added that valuable reviews have been made in the past by various bodies and persons of the need for some organization of scientific work in the Dominion, of the existing State services, and of possible methods of organization, but it is not proposed here to traverse this ground again, to discuss their merits, or the reason for the failure of some of them to secure general support. But there are passages in certain of these documents which appear to me to be specially relevant to the present inquiry and to bear directly on the recommendations I propose making. Accordingly they are reproduced in Appendix A to the present report, with the necessary dates and references.

### III. THE PRIMARY INDUSTRIES.

19. There is a widespread appreciation of the importance of science systematically applied to the primary industries, and manufacturers are concerned to show that they agree in the prior claims of these industries. This acknowledgment has been repeatedly made in conversations and speeches to which I have listened. The most cursory examination of the national balance-sheet shows the dependence of the country's purchasing-power, and consequently the prosperity of the secondary