

industries, which are confined to home markets, upon a favourable balance of external trade. This balance is provided by the primary industries, and during a period of falling prices can only be secured by increased export. At the present moment, when prices are sagging, the farmer is naturally anxious to use any means likely to help him to avoid losses in his crops or to increase the productivity of his land, his sheep, or his cattle.

20. The problems and difficulties with which a young country is faced are so numerous, the cost both in time and money of an adequate attack upon them so material, the supply of competent scientific workers so difficult to come by, that a wise policy must perforce establish an order of priority in the subject selected for investigation. All the problems may be important, and even urgent, but in scientific work nothing is more wasteful and more likely to impair public confidence in its value than the attempt to cover a wider field than the available money and men can compass efficiently. On the other hand, one problem successfully solved often leads systematically to the solving of others, and it always reacts on others by drawing attention to the methods which have made for success. It is better to postpone or abandon an investigation than to attempt it in conditions that place a number of loose ends unexplored though recognized as vital to a solution. As in military affairs, the width of the attack must be determined by the strength of the forces at disposal. Moreover, tinkering not only induces lack of confidence, it leads in turn to spasmodic effort. Effective work in science is only possible when there is some assurance that plans can be carried through to the end within the limits once laid down. The failure in England to discover the cause and cure for foot-and-mouth disease has been almost entirely due to a neglect of these considerations. If it is impossible for the Dominion to grapple simultaneously with all the difficulties which science can help to remove, she must select the fields in which the need is most urgent for her principal efforts, and be content to go slow elsewhere. I have no doubt that the primary industries and those which directly serve their needs must be given the first place. Even so, it will be necessary, on financial grounds alone, to secure the utmost assistance from the industries concerned in support of the work. But there are other and deeper reasons for seeking and welcoming this aid. The active help of those whose prosperity will be directly affected by the work is greatly to be desired as a means of educating them in the methods as well as the limitations of science, and as a means of gradually building up a reasoned appreciation of its value in their lives. This will make for a steady national policy—and a steady policy is a condition precedent to success.

21. The most serious difficulty in any plan for a systematic organization of effort on behalf of the primary industries is the shortage of well-trained and competent workers. There is as yet no institution in the Dominion of University rank devoted to the training of leaders in these industries and to the prosecution of research, which is an essential part in the training for leadership. As the committee of the Auckland Institute well pointed out in a report on the co-ordination of science and industry issued in 1916, the worst trouble is to be found in the weakness of the educational provision. It was not within my order of reference to study the educational system of the Dominion, but the supply of competent investigators depends so entirely upon what is being done to produce them that I could not altogether neglect this aspect of the question. (*Cf.* "Report of Royal Commission on University Education in New Zealand," page 42, para. 2.) My impression, based on a visit to the Government Farm of Instruction at Ruakura and to Lincoln College institutions, which represent two necessary types of agricultural school below that of a University, leads me to the conclusion that science, especially on its practical and experimental side, receives even in these grades of institution less than its due attention. At Ruakura there are no science laboratories, though there is instruction in science. At Lincoln the laboratories are less well-found and maintained than is desirable, and, with the exception of the valuable work in wheat-breeding and grass-selection, the standard and efficiency of the work in science seem to me to fall below that necessary for young men, some of whom are intending to become teachers of agriculture.*

22. But the principal gap is on the University plane. Without a college of the highest rank devoted to investigation and teaching, no systematic approach to the scientific problems of the primary industries will be possible. Particular difficulties may be dealt with by individual workers in science at the University colleges and other institutions such as the Cawthron Institute at Nelson, or by the scientific staff of the Department of Agriculture, but the number of qualified men available will remain too few unless workers are imported from overseas, while the advances of knowledge will remain partial and sporadic in the absence of a body whose duty it is to envisage the whole field without the limitations necessarily imposed upon local organizations, or the embarrassments, both administrative and political, which must beset an executive Department of State. The respective spheres of an agricultural college of the first rank and of a State Department of Agriculture are admirably defined in a report of the Special Legislative Commission appointed by the State of California in 1921 (pp. 60, 61). The passage was drafted by the Director of Agriculture and the Dean of the College.

"The Commission found no better working arrangement in any State than the agreement between Director Hecke and Dean Hunt, which is set forth below:—

"The State Department of Agriculture should exercise executive and regulatory powers. The College of Agriculture should devote its energies to research and education, both resident and non-resident. It is quite certain that it is not in the interest of the public welfare that it should be charged with police duties. It is the function of the executive branch of the State, whose head is the Governor, to enforce the laws relating to agriculture through the Director of Agriculture and his subordinates, and those relating to forestry through the Commission of Forestry. The functions of the University, and hence of the College of Agriculture, are investigation and teaching. The college

* Since writing the above my attention has been called to the "Report of the Board of Agriculture on Agricultural Instruction in New Zealand," 1925, pp. 9, 10, and 15, in which recommendations are made to meet these defects.