Grants Committee, and the Universities have co-operated in promoting a full development of 'system'. From time to time the Commissioners have provided aids for able students at critical points, and they have already found it possible to move upward one of their scaling ladders.

The Royal Commission has been, in its years, prospector, promoter, patron—patron in the centuries-old sense of extending wise guidance and limited assistance to persons or projects that appeared capable of furthering science or the arts, or of stimulating inventions or industries. In the nature of things the ideas of the Commissioners have occasionally been too much in advance of the time to secure effective response. Yet, when prospects improved and the idea still seemed good, it was tabled again with any modification that seemed desirable.

It has been so with the realisation of all that was implied in their aim—a Locality—the establishment of varied central institutions in the area pegged out nearly eighty years ago. The realisation of this part of their aim has been slow, and time has altered the conditions—alike as to purposes and as to methods. The substantial elements are taking shape, but it is fully realised that they must retain elasticity.

F. G. OGILVIE.

Progressive Agriculture.

AN unusual and interesting example of successful co-operation between industry and agriculture is portrayed in the jubilee volume issued to commemorate fifty years' work of the Blanchisserie et Teinturerie de Thaon,* in the Vosges. After the annexation of Alsace and Lorraine, France found herself bereft of several of her most important bleaching establishments, and in 1872 a society was formed to establish the industry at Thaon in the Vosges, M. Armand Lederlin being installed as the first director. The difficulties to be overcome were great, as the selection of the site had to be largely determined by the presence of abundant water free from chalk and iron, so essential for bleaching purposes. This was the first industry to be established in a purely agricultural area, and, from the beginning, it has also been the centre of agricultural demonstrations seeking to aid the peasants and workmen to get the best results from their land. The success of the venture was primarily due to M. Armand Lederlin, an impassioned agriculturist and a great industrial worker, whose work was carried on by his son, M. Paul Lederlin, who succeeded him as director in 1909. Their endeavours have raised the status of a little country village, numbering only 555 inhabitants in 1870, to an important township of 8000 people, prosperous in industry and also in agriculture.

After 1903 many other allied establishments were acquired, until at the present time about ten thousand workpeople are employed, dealing with some two million metres of material per day of eight hours. The Thaon Blanchisserie is probably the most powerful firm in Europe for the treatment of textiles. Throughout its history a very close association has been maintained between the heads of the firm and local social and municipal life. Housing problems, questions of public hygiene, the moral and intellectual development of the personnel, libraries, insurance, and organisations to reduce the cost of living, represent but a few of the activities which are supported and encouraged by the Blanchisserie.

Before the foundation of the firm, the chief industries of the district were cattle-raising and potato-growing, a little oats and rye also being cultivated. M. A. Lederlin was inspired by the work of the Rothamsted and Woburn Experimental Stations in England, and of M. George Ville in France, to strive to introduce the new ideas of the utilisation of chemical fertilisers for the improvement of crops, with the view of increasing the prosperity of the district. His aims and interests were primarily local, being intended to determine what varieties of agricultural plants were most suited to the district, but the results ultimately attained wider significance as the scope of the experiments extended. The jubilee report recently issued is intended to prevent the results of the earlier experimental work from falling into oblivion, and generous support from the Blanchisserie has facilitated the reproduction of many tables and photographs.

From 1879 until 1919 continuous agricultural experiments, carefully laid out, were carried on by M. Armand Lederlin, and when he gave up the work by reason of age his son proceeded to carry on another series of somewhat different scope. The aim is still to be useful to the Department of the Vosges, and the produce of the plots is sold to the personnel at prices often below the cost of production. The chief immediate aim is now to improve cattle and crops by numerous experiments on selection and acclimatisation. In connexion with the experimental farm, potatoes are the most important crop, for they are well suited to the soil and are also the source of the starch of which so much is used in the industry, the whole production of 2000 tons of potato starch per annum being absorbed by Thaon and its daughter establishments.

Unsuccessful attempts have been made to establish another potato, *Solanum commersoni*, which provides edible aerial parts suitable for cattle food, and comes up year after year without replanting, from portions of the root left in the soil. There is also a model dairy farm, with land specially cultivated for cattle food, a horticultural society with a very high standard of production, nurseries for raising conifers and deciduous trees for street

* Hoffmann, P., et Deboffe, J. (1930?). Cinquante ans de travaux sur l'agriculture et sur l'horticulture, 1877–1927. (Paris: J.-B. Baillière et Fils.)

planting, and apiaries to encourage local beekeeping, while laboratories have been equipped to deal with the various chemical and biological problems associated with plant growth.

The latter part of the report gives a detailed account of the results of the experiments. An interesting feature is the agronomic soil map of Thaon, showing the areas lacking in certain essential plant nutrients, with some land containing too much nitrogen. In this connexion is given a detailed table of the necessary manuring for various crops in different parts of the Thaon area. Thirty-seven per cent of the whole area is in woods and forests, the rest being chiefly potatoes, with some wheat, oats, beetroot, and carrots. The experiments on these crops embrace tests on variety, adaptation and acclimatisation, transmission of disease by seed, problems of selection and the degeneration of species, as well as the effect of manurial treatments. In the latter connexion the action of disinfectants and accessory elements, such as sulphur and manganese, is receiving attention.

The problem of weed eradication has been dealt with experimentally in this district, as charlock is a very serious menace to the crops. Many sprays have been tried out, the results varying as usual with the weather, but excellent results and increased crops are claimed from the use of sulphuric acid, as much as thirty-five per cent increase over the control being obtained. Special systems of crop rotation are also suggested to mitigate the pest.

The value of the agricultural section of the report would have been much enhanced if the conclusions from the many years' experiments had been collected and summarised, as it is generally necessary to go laboriously through the work of several years to gain information on any special point of interest. Apart from this, the authors are to be congratulated on the production of a volume setting forth so clearly the working out of a sociological problem which offered special and unusual difficulties that have been successfully overcome by MM. Armand and Paul Lederlin, with the co-operation of their staff. W. E. B.

Obituary.

PROF. G. N. STEWART.

NEWS has been cabled from Cleveland, Ohio, of the death of George Neil Stewart, the well-known physiologist. Born in 1860 in London, Ontario, whither his parents had temporarily migrated from Lybster, Caithness, Stewart, while yet a child, was brought back to Great Britain. He entered the University of Edinburgh in 1879 and graduated M.A. four years later with honours in mathematics, having meanwhile acted as assistant to Tait, the professor of physics. During the session 1883–84 he was Mackay Smith Scholar and in 1887 received the degree of D.Sc. But physics did not hold Stewart for long. He turned his attention to medicine and graduated M.D. in 1891, receiving a gold medal for his thesis. Then followed a year's post-graduate study in Berlin, after which Stewart was appointed senior demonstrator of physiology at Victoria College, Manchester. In 1889 he became George Henry Lewes student in physiology at Cambridge, a position which he held until 1893, meanwhile acting as examiner in physiology in the University of Aberdeen and taking the then recently established Diploma in Public Health of Cambridge. Several months during 1892 were also spent in the physiological laboratory in Strasbourg.

Migrating in 1893 to the United States, Stewart spent some months as a voluntary research worker with Prof. Bowditch at Harvard University, who then nominated him for the chair of physiology at the Medical School of the Western Reserve University, Cleveland, Ohio, which was one of the first of the medical schools west of the Alleghany mountains to abandon the proprietory system, establishing in its place a full-time staff in the laboratory subjects. During the next nine years, Stewart found in Cleveland every opportunity to develop his subject both in teaching and research, the first evidence of his success being the publication in 1895 of "A Manual of Physiology with Practical Exercises". It can truthfully be said that his admirable book marked an epoch in the teaching of physiology, for it succeeded in showing how formal exposition could be interwoven with practical work. The student of medicine under Stewart learned his physiology by doing experiments which were carefully chosen and planned so as to form the basis for the more or less informal lectures which were grouped around them. Many of the practical courses in experimental physiology in the American schools are patterned on those outlined in Stewart's book, which passed through eight editions, of which the last appeared in 1918. It was largely through Stewart's influence that Western Reserve Medical School was among the first to follow the example of Johns Hopkins in raising its entrance requirements to three years in an academic college, thus making a combined arts and medicine course of seven years' duration. This scheme in a somewhat modified form has since been adopted by the majority of medical schools in America.

In 1903, Stewart was called to the University of Chicago to succeed Jacques Loeb in the chair of physiology, but here he stayed for only four years, being enticed back to Cleveland to organise and direct the department of experimental medicine which was established in memory of H. K. Cushing, whose son, Harvey Cushing, is the well-known professor of surgery in Harvard. In this position Stewart found full scope for his untiring and painstaking research work in various fields of experimental medicine, the results of which have appeared from time to time in numerous papers, published mainly in the *American Journal of Physiology*, the *Journal of Pharmacology and Experimental Therapeutics*, and the *Journal of Experimental Medicine*. These papers along with those of his associates have been issued in eight volumes (1911–1926) of