

The experiments were carried out with cherry laurel, *Phaseolus lunatus*, and germinating almond, and instead of using boiling dilute alkali to kill the plants, as in former experiments, concentrated salt solutions boiling at 110° were employed; in this way the plant enzymes were more rapidly destroyed, with the result that the amount of hydrogen cyanide indicated was thereby considerably diminished. It is thus considered probable that free hydrogen cyanide does not occur as such in the plant.

#### REPORT OF THE DEVELOPMENT COMMISSIONERS.

THE second report of the Development Commissioners, for the year ended March 31, 1912 (Wyman and Sons, price 8d.), was issued recently. It will prove convenient to review the report briefly under the chief headings contained therein.

*General Position of Commissioners and Principles of Action.*—As previously announced, the Commissioners cannot themselves make grants or loans, do not possess executive powers, and must receive applications through Government departments before reporting to the Treasury. It is gratifying to learn that the recommendations of the Commissioners have been adopted in all cases of importance. Owing to the fact that money must be entrusted to some suitable body, difficulties have arisen with regard to canals, roads, and some other matters coming within the scope of the fund, but it is expected that such difficulties will ultimately be overcome. The system of block grants has been adopted, which, though entailing some delay, is held to secure greater efficiency.

Although existing expenditure is not to be relieved, and local contributions are required, it is felt that authorities which have spent freely in the past should not be expected to find so large a proportion of the total sum to be expended in their areas as authorities which have been less enterprising.

The principle of loans is adopted for schemes expected to give a direct return ultimately. In some cases, such as afforestation, advances will be made on condition that the extent of the operations be varied according to the state of the labour market, so that some relief of unemployment may result. This does not apply to such part of the 325,000*l.* allotted to farm institutes as may be required for erecting buildings, these being urgently necessary.

The principle that the fund must not be used to benefit private individuals directly creates difficulties in the case of canals, estate afforestation, and light railways; for grants are here debarred, although private profits are associated with public benefits of an important kind. A different view must be taken of applications from public authorities for money to be applied in loans or grants to individuals, e.g. to fishermen. Such loans or grants would appear to be legitimate if they place individuals in a better position to help themselves, as in the case of advances enabling fishermen to acquire motor-boats.

The Commissioners consider it their duty to recommend expenditure when and where most likely to be remunerative with reference to the economic development of the United Kingdom as a whole, even though this may appear unfair to certain localities. The provision of harbours for steam-drifters, for example, is regarded as more important than the development of small centres employing more antiquated methods of catching fish

*I. Agriculture and Rural Industries.*—Three chief lines of action are reaffirmed as those of greatest importance, i.e. scientific investigation, research, and education as means of improving the quality and increasing the amount of agricultural products; supply of information regarding new crops and industries to cultivators for enabling extended practice; improvement of commercial methods by promotion of cooperation.

It is considered that pure research is not a local matter, and that it must be continuous and concentrated. Hence the selection of a comparatively small number of centres for research in the eleven main branches of agricultural science. It is recognised that research and education should be in close touch with one another, and although the fund is to be devoted to economic development, the Commissioners feel that when subsidising research the canon of apparent economic value should be cautiously applied.

In addition to grants to institutions, a sum of 3000*l.* per annum (probably to be increased to 5000*l.*) is reserved for individual investigators much on the lines adopted for the 4000*l.* per annum entrusted to the Royal Society for distribution. In this way it will be possible to utilise individual research ability wherever found. For purposes other than research England and Wales are to be divided into twelve provinces, each with its agricultural college providing the highest kind of agricultural education, demonstrating the results of research, and giving advice to farmers. The lower grades of instruction and advice will be provided by the farm institutes. The Commissioners consider that such an institute should possess two essential characteristics: first, the provision of shorter, simpler, and cheaper courses than those given at colleges; secondly, that it should serve as the headquarters of the county staff. A very large amount of elasticity is regarded as desirable, and there need be no "material embodiment in bricks and mortar." The general lines approved closely resemble those advocated at the cooperative conferences held between the governors of the Royal Agricultural College, Cirencester, and representatives of several county authorities in 1911.

Flax, hemp, tobacco, and beet are cited as crops requiring full investigation in order to determine whether they can be made a commercial success in this country.

The existing voluntary societies are to be utilised in organising cooperation, largely because "cooperation is particularly the kind of movement to which it is essential to retain the enthusiasm of voluntary workers." Considering the enormous amount of dairy and other farm produce imported, it is distressing to learn that "the question of agricultural cooperation in Ireland is unfortunately complicated by political differences." Other directions of activity include the continuance of light horse breeding schemes, the establishment of a cattle-testing station, and of a national poultry institute.

*II. Forestry.*—One guiding principle is here adopted, i.e. that "education and the provision of technical advice are the best lines of advance for the immediate present." This general idea is given effect by the recognition of five centres in England and Wales (Oxford, Cambridge, Cirencester, Bangor, and Newcastle), with suitable provision for Scotland and Ireland. Why the Commissioners consider that Oxford and Cambridge should be equipped for "higher education in forestry," and the other three centres for "forestry education of a simpler kind," is a mystery, without some reason for believing that the education so far given at Oxford and Cambridge has been

superior to that obtainable elsewhere. The two older universities are also to be the chief centres for research.

The Commissioners further approve of loans to local authorities for afforestation of suitable land, e.g. water catchment areas.

Some advance has been made in matters comprised under the remaining headings of the report, namely:—

III. *Land Drainage and Reclamation*.—One Irish scheme (Owenmore) approved.

IV. *Rural Transport*.—Considering the vital importance to small holders and others of this matter it is astonishing to find that only a very few applications, all Irish, have been received. No grants were recommended.

V. *Harbours*.—The Commissioners make a number of important recommendations, on the lines indicated in an earlier part of this review.

VI. *Inland Navigations*.—Technical difficulties retard this direction of advance, but loans are recommended for improvement of the Stort and Upper Medway.

VII. *Fisheries*.—Substantial grants to various authorities are recommended, partly for scientific research, and partly for improvement of harbours, and other purposes. Concessions to Irish fishermen by way of loans are also recommended.

VIII. *Miscellaneous*.—An application by the Meteorological Office was not entertained.

IX. *Compulsory Orders for the Acquisition of Land*.—Only one small and unimportant order has been made.

Within the limits of our space it is impossible to deal with the last part of the report, which is devoted to finance, but it is stated that in all cases the Commissioners "have tried to follow sound principles of finance and administration, to take a broad view of the questions involved, and to avoid any haphazard and spasmodic distribution of public money."

The Commissioners may be congratulated on having made very considerable progress during the year, and the principles of their action appear to be fairly sound, though they are somewhat handicapped by the unusually small proportion of scientific experts to be found among them. It is, however, very gratifying to know that the whole time of Mr. A. D. Hall is in future to be given to development work. Now and then we find that a sound principle advocated is not worked out satisfactorily in practice by the responsible authority. For example, on p. 11 of the report we read that the grants available from various resources "will provide for utilising to the full the energies of the Agricultural Colleges in teaching, in research, and in giving technical advice to farmers on practical difficulties involving problems which are beyond the scope of either an experienced agriculturist or even a member of the County Staff." Yet a grant of 1000l. per annum for advisory work in horticulture and agriculture has been made to the University of Bristol, none of which has been allocated to the associated Royal Agricultural College at Cirencester, the pioneer institution, accustomed to give the kind of advice contemplated for nearly seventy years. The progress made as regards cooperation and rural transport is disappointingly slow, considering the great importance of these for enabling farmers to cope with foreign competition, but the Commissioners can scarcely be blamed for the delay. Ultimately, we may hope to see a substantial reduction in the enormous sums paid to foreign countries for agricultural products.

RECENT PUBLICATIONS ON THE FERTILITY OF THE SOIL.

RECENT inquiries have shown that the fertility of agricultural land in Europe has very materially increased owing to the use of commercial fertilisers and green manuring, but it has often been stated that this increase is effected at the expense of virgin lands. Mr. Coventry therefore instituted an inquiry in India to see if there is any evidence of a progressive decline in fertility there. The results are published in vol. vii. of *The Agricultural Journal of India*, and show that the average of productivity may have become lower, but this can be entirely explained by the fact that inferior lands have been taken into cultivation on account of the great agricultural prosperity and expansion brought about under British rule. When allowance is made for this it is seen that the fertility is not declining, but rather tends to increase.

It is, however, undeniable that phosphoric acid and potash are removed from the soil in the crop and transferred to the centres of population. Impoverishment of the virgin soils necessarily takes place, although the productiveness is not affected until lack of these particular nutrients becomes the limiting factor in crop production. This position has been reached in parts of the United States, and has induced Prof. Whitson and his colleagues at the Wisconsin Experiment Station to undertake a valuable set of investigations on the effect on the soil of rock phosphate, which fortunately is readily obtainable. In the admirable surveys of Wisconsin now being made by Dr. Weidman it is shown that continued cropping has caused phosphate exhaustion, which can be remedied by dressings of rock phosphate.

The other side of the question, the increased phosphorus supply to land near cities, is very well seen in many parts of England, and has recently been strikingly illustrated by Messrs. Hughes and Aladjem in a paper in *The Agricultural Journal of Egypt* (vol. i., part ii.). Analysis of soils taken from various places in the Delta showed that certain spots were much richer in phosphates than usual, although in other respects the soils were fairly uniform. Detailed examination of one of these cases showed that the authors were working on the site of an ancient city where a considerable population had existed for a period of at least four thousand years before the Arab domination. To supply such a population and the animals belonging to it with food must have required the produce of a large area, while the refuse of the city would be used as manure only on the nearer land. The city and its population have long since vanished, but the concentration of phosphoric acid in the soil remains an indelible record of the past:—

Distance from the centre of Kom, kilometres ...	0-1	1-2	2-3	3-4	4-5
Total phosphoric acid, per cent. ...	0·34	0·29	0·26	0·22	0·22
Easily soluble phosphoric acid, per cent. ...	0·086	0·069	0·065	0·051	0·036

Nitrogen compounds are also transferred, like phosphorus compounds, but they take part in a perpetual cycle in which the nitrogen of the air plays a part, so that the accumulation and depletion processes are both limited. Much work is being done on this cycle; in particular, investigators in all countries are finding that addition to the soil of easily oxidisable organic substances, such as sugar,