groups in the soluble nitrogen fraction. Microbiological methods, partition chromatography, bacterial decarboxylases, and electrodialysis are all being used for the separation and estimation of individual amino acids. The key amino acids are aspartic and glutamic acids, which with their amides, asparagine and glutamine, represent more than half the total amino acid content of the soluble fraction. The basic amino acids are present in only small quantities, and it is obvious that the green-leaf proteins possess a quite different amino acid structure from that of the soluble fraction.

A limited programme of work on the rye-grass akaloids has been undertaken during the year in order to work out better methods for large-scale extraction and purification. The preparation of relatively large quantities is necessary for the determination of the chemical structure of the alkaloid, and when that is completed it will be possible to investigate its precursors and degradation products in rye-grass leaves.

SEED RESEARCH

The use of various stains to determine viability in dormant or slow-germinating seeds acquired considerable importance during the war. The technique has been applied to Chewing's fescue seed, with the result that germination can be determined in forty-eight hours instead of twenty-one days as in the standard test. The studies are being extended to other small seeds of economic importance, and are expected to be of considerable benefit in the treatment of seed of high moisture content.

A long-term study has been begun of the development, maturation, and ripening of seeds of perennial rye-grass and white clover, with special reference to changes in moisture content, increase in dry weight, and stage at which the seed acquires its germinating-capacity. The investigation, which must extend over several harvests, will provide basic information of the type which has proved so valuable with the cereal grains. Correlated with this work is the determination of influence of temperature on the equilibrium moisture content of small seeds and relative humidity of the atmosphere. No real advance in the problems associated with harvesting, storage, and retention of viability of small seeds can be made until this fundamental information has been assembled.

The viability tests on which all this work is based is being done under conditions most favourable for germination, conditions which bear little relation to germination in the field. Studies are in progress to determine the physical conditions, particularly acidity and salt concentration, which are necessary for germination and establishment.

HORMONE-TYPE WEEDKILLERS

Two methods for the estimation of minute quantities of 2, 4-D have been worked out, a biological one making use of the inhibition of seed-germination and a physico-chemical one using the ultra-violet absorption spectrum. They are useful both in field studies and in determining the amount of weedkiller absorbed in the tubing of spray equipment.

MICROBIOLOGY

The fermentation tank and ancillary equipment were installed by June, 1948, and a number of successful fermentations, using *Penicillium chrysogenum*, have been carried out. As was expected from the experience of overseas workers, a host of teething troubles have been encountered, but these have been overcome. The Laboratory has now a versatile pilot scale fermentation plant which can be utilized for practically any type of industrial fermentation.

Some 450 specimens of the endemic species of *Polyporaceae* and of fungi on native woods have been collected, of which 324 are maintained in culture. Tests for antagonistic properties have been carried out on 288, but only 15 cultures give reasonably good inhibition zones.