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AGRICULTURAL CHEMISTRY.

An Important Science.

How It Helps the Farmer.

By Professor J. A Prescott, of the Waite Agricultural Research Institute.

It has been recognised for a great number of years that the greatest single contribution that science has so far made to agriculture has been the discovery of artificial fertilizers.

This fact for a while made agricultural chemistry practically synonymous with agricultural science, and it was not until the beginning of the twentieth century that the botanist took a hand in the development by plant breeding, the study of plant diseases, and more recently still the study of healthy crops and of pastures in the field itself. In fact, in many quarters it was said that the day of the chemist was past, and the day of the botanist, and particularly the plant breeder, had arrived.

Nevertheless, chemistry still remains as the most important single science underlying the modern practice of agriculture.

In the domain of artificial fertilizers the chemist is particularly active; never has there been in the history of agriculture such a choice of fertilizers as is available to-day, and every year adds to their number. The development of the synthetic nitrogen industry is particularly important in this respect, and fertilizers prepared from atmospheric nitrogen are being produced in increasing quantities every year. Furthermore, the price of these fertilizers has been reduced to four-fifths of the pre-war values, a very important factor in extending their use to new crops and in new systems of rotation or pasture management.

Apart from the use of fertilizers, the agricultural chemist is interested in soils, in the feeding of farm stock, and in the preparation and testing of insecticides and fungicides. The introduction of the copper carbonate dry pickle for wheat has made it necessary not only for the chemist to take a hand in its manufacture, but for the agricultural chemist proper to devise new methods for testing the efficiency of the various brands turned out by the different manufacturers.

Trouble Curing Research.

Much of the work of the agricultural chemist to-day lies in the diagnosis and curing of trouble of various kinds—a type of research, which is very common in a rapidly developing applied science. In Australia we have quite a number of instances of this type of investigation in relation to soil work. Two or three will suffice as illustrations. In the Western Wimmera district of Victoria a number of soils have long given trouble to wheatgrowers. Within quite recent years the trouble has been diagnosed, and a cure found. By treating these soils with gypsum, wheat yields are appreciably increased, in one case at Goroke from 16 bushels to 27 bushels.

Another case of soil trouble is illustrated by the case of the oat disease at Mount Gambier recently investigated at the Waite Institute by the chemist, working in partnership with the plant pathologist. As a result of proper diagnosis, it has not only been found that the trouble is due to a manganese deficiency, and is hence curable by the use of manganese salts as fertilizers, but also that the disease is identical with one well known in Europe, and that it occurs in quite widely separated localities, not only in South Australia, but also in Western Australia.

A third example of such work is afforded by the surveys of irrigation settlements being carried out at the present time. In this case the cause of low fertility is in general much more complex, and a final verdict can hardly yet be given.

PROFESSOR J. A. PRESCOTT.

Such trouble-curing research is, in general, more spectacular than the steady march of investigational work, which is adding to that sum total of scientific knowledge, which is the basis of sound farming practice.

Classification of Soils.

In some cases a new conception in pure chemistry may be found to have an immediate bearing on agricultural chemistry. Such a conception as the hydrogen in concentration of the soil, which 10 years ago was only just beginning to make itself felt among the most advanced of agricultural chemists, has now become an essential part of the armoury of the district officer and the advisory chemist. By means of this conception, it has already been found possible to classify the soils of South Australia, according to their need or absence of need for lime.

The most progressive of farmers are invariably rarely in need of advice as to how to carry out their general run of farm operations. In the matter of the art and science of farming they are well up to date. Research, to help such men, must be directed to a more complete understanding of the processes taking place under different conditions of cultivation and soil treatment. As an example of changing viewpoints may be taken the process of bare fallowing.

Probably there is no single farming operation, which is so well understood by the practical man, or the results of which are so beyond doubt, as this well established Australian practice, and yet on the scientific side there is much still to be learnt. What exactly takes place in the soil during the process of fallowing? The usual explanation is threefold; in the first place soil moisture is conserved: in the second, nitrates are produced by bacterial action; and, in the third place, weeds and some plant diseases may be controlled.

Moisture Conservation Theories.

Within the last two or three years, our ideas on moisture conservation in the field have received a number of shocks. Water does not move in the soil quite as we have been led to expect, and we have had in some cases to reconsider our theories, and to go back to our field experiments. We would like to know more concerning these changes in the soil. In Western Australia work has just been started on the changes in the availability of phosphoric acid and other plant foods, as caused by fallowing.

If, in the past, we have over-emphasized the importance of moisture conservation, particularly in areas receiving more than say 18 inches of rain, then a proper assessment by means of systematic research should help the skilful farmer to a better understanding of what his process of fallowing really means, and we can rely upon him to see that some advance in practice is made. New discoveries in this connection would also lead to the planning of new field experiments, and the introduction of different rotations suggested by these.

Ultimate Purpose of Research.

Sir John Russell, in one of his recent lectures in Adelaide, reminded us that apart from his efficiency as a farmer, a man ignorant of the science of his profession is like a blind man before a beautiful landscape. The ultimate purpose of research must be not only greater efficiency in production, but also a better understanding, and a life of greater interest for the farmer himself.

Erudite Families

Mr. S. Talbot Smith, who was interested in the paragraph devoted last week to the academic distinctions won by the Chapple family, has been good enough to point out that there was a close race for pride of place in this respect between the Prince Alfred College clan and the family of the late Mr. and Mrs. Gavin F. Gardner. An examination of the Adelaide University records confirms his statement.

The Gardner family consisted of two sons and five daughters, and four out of its seven members secured University degrees. Mr. George Gardner, Mus. Bac., is organist and choirmaster at St. Peter's College. His brother was the late Dr. John F. Gardner, M.B., B.S., of Richmond, Victoria. Mrs. C. Viner Smith, of College Park (formerly Miss Edith Gardner), and Mrs. J. E. McGlashan, wife of Dr. McGlashan, of Claremont, Western Australia (formerly Miss Mary Gardner), are both Bachelors of Arts.

A fifth member of the family—Rita, now the wife of Dr. Keith McEwin, of Balaklava—had compelted three years of the medical course before her marriage. Altogether a very fine family record.

NEWS 12. 9. 28

FORESTRY SCHOOL

Fine Canberra Building

GREAT NATIONAL WORK

With the completion recently of the first academic year of the Australian School of Forestry at Canberra, there is opportunity to review the practical work of training the staffs of the forestry departments of the six States, for that is the purpose for which the school was established.

Originally discussed in 1911, the school was not started until 1926, when, in the absence of suitable buildings at Canberra, advantage was taken of an offer of the University of Adelaide to have the school there.

In April, 1927, however, a fine building was opened at Westridge, three miles west of Canberra, with Mr. C. E. Lane-Poole as acting principal.

The curriculum provides for a two-year course in pure forestry, at the end of which period successful students are awarded the Commonwealth forestry diploma. Applicants for entrance must be graduates of an Australian university or matriculated students who have had a minimum university course of two years in science.

Ideal Site

Field training occupies an important position in the course. Therefore, the site is ideal, as in the immediate precincts are a fine arboretum and an extensive nursery, which supplies planting stock for the whole of the Federal Territory.

A most salutary object lesson is provided in the interior of the school building itself. Australian timbers have been used throughout, and a handsome effect has been obtained. Here is concrete evidence that, given proper discrimination in selection, local woods can compete successfully with foreign material.

The school contains a spacious museum, library, two lecture rooms capable of seating 50 students, well-equipped laboratory, drafting room, and rooms for the principal, lecturers, and typist. In the museum a range of commercial woods of the world is being gradually built up in addition to an extensive herbarium of Australian timber species and an entomological collection.

During the two years of the existence of the school 14 students have completed the course.

Various Branches

It is proposed that the school shall be a branch of a Commonwealth Forestry Bureau, other branches of which will deal with research, territorial forests, and co-operation with the States.

In research work it is proposed to initiate investigations into three divisions of forestry, comprising sylviculture, management, and protection. Sylviculture means the study of not only each timber species from seed to sawdust, but its behaviour in different sites, its reactions to different environmental conditions of climate, soil, and vegetation.

The territorial forests department of the bureau will cover all the forests of the Federal territories, which territories extend over an area of 432,000,000 acres.

Scientific forestry management is important to Australia, which has forest estate of 24,500,000 acres.

It will be readily understood that trained men cannot be imported continually from overseas. Indeed, such a state of affairs would be a reflection on Australia. Work of great importance and magnitude awaits the trained forester in the Commonwealth, for he is faced with the problem of regenerating timber areas depleted to the verge of exhaustion. Therefore, the Forestry School is supplying a real and pressing need.