

onstrated that the most profitable method of applying phosphates is in the form of superphosphate. The amount to be used with greatest profit depends on the rainfall, (2) the soil, (3) the thoroughness of cultivation.

districts of light rainfall, e.g., the Lee, light dressings have been used in past, e.g., 30 to 40 lb. But even in the driest portion of the Mallee, e.g., Carpy, field experiments have shown definitely that 60 to 90 lb. may be used with advantage.

soils rich in calcium carbonate very dressings are required, for reverse is probably very rapid on these soils. As on limestone soils in South Australia 1 1/2 to 2 cwt. are regularly used, and dressings have a stimulating effect on the quantity and quality of the subsequent grazing.

inally, the amount which can be probably used depends on the thoroughness of the cultivation methods. With in-creased cultivation the level of produc-tion is always low, no matter what qua-ntity of seed is used or how much fertiliser applied. Liberal use of fertilisers can-

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### TRAINED FORESTERS.

In the report of Mr. Lane Poole (Commonwealth Forestry Adviser) outlining the position of the forestry industry in Australia, reference was made to the lack in the State Forestry Departments of trained foresters, which he considered quite as serious as the lack of money. It was mentioned that the number of fully trained men was:—Forest Department of New South Wales, none; Victoria, two; South Australia, none; Tasmania, none; Queens-land, one; Western Australia, six. It was learned in official sources yesterday that this statement regarding South Australia is inaccurate, as there are four men connected with the Forestry Department who have University degrees, independent of several other men with superior qualifica-tions.

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Our Hobart correspondent cabled on Thursday evening:—Professor F. Wood Jones, Elder Professor of Anatomy at the Adelaide University, delivered the R. M. Johnston memorial lecture to-night before a distinguished gathering of the Royal Society, over which the Governor of Tas-mania (Sir James O'Grady) presided. Professor Wood Jones took as his sub-ject "Some aspects of mammalian toilet." The lecture was founded to perpetuate the memory of R. M. Johnston, for many years Government Statistician in Tas-mania, and a leading authority on a wide range of scientific subjects.

NEWS 7-5-25

### Lecture by Dr. Heaton

"The Gold Standard, the case for and against," is the title of a lecture to be delivered by Dr. H. Heaton in the Public Library Lecture Room, Institute Building, North terrace, on Monday. The lecture has been arranged by the Adelaide University Commerce Stu-dents' Association.

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Sir Henry Braddon (superintendent in Australia of Dalgety & Co.) left by yester-day afternoon's express for Sydney.

The Hon. G. R. Laffer is confined to his home at Belair by a severe attack of gastric influenza. He will be un-able to attend to his Parliamentary duties for some time.

son depends very largely on its organic portion. Deprive the soil of its organic matter and you have rock dust, and what farmer would care to farm a soil made of pulverised bricks?

The presence of organic matter in ample quantity is a guarantee that the soil can be made productive. Organic matter greatly increases the water-holding capacity of the soil, vastly improves its texture and mechanical condition, and is the material round which all biological activities in the soil are centred. The superior productivity of virgin land as compared with land cropped with cereals for several generations is a matter of common obser-vation. Were the differences in production due to mere loss of mineral matter, we could easily restore the soil to its pris-tine fertility by the application of artificial fertilisers.

The difference in fertility is largely due to the depletion of the organic matter in the cropped soil. The organic matter might be restored in three ways—(1) Application of stable manure; (2) ploughing in of green manures; (3) pasturing the land and feed-ing down forage crops with stock. The two former methods are impracticable on wheat farms. The introduction of pasture into the rotation or the feeding down of forage crops with sheep is, however, en-tirely practicable.

Systems of crop rotation that can be recommended in the light of present know-ledge are the following:—

1. For the dry mallee areas—(1) Wheat, (2) pasture, (3) bare fallow.
2. For the Wimmera—(a) (1) Wheat, (2) oats, (3) fallow; (b) (1) wheat, (2) oats, (3) pasture, (4) bare fallow; (c) (1) wheat, (2) oats for grazing, (3) bare fallow.
3. For the Western District—(1) Wheat, (2) oats, (3) green forage, e.g., peas, rape, or oats fed to sheep.

The rotations prescribed for the mallee and Wimmera require a minimum of labor, and are well adapted to areas where the rainfall is not heavy and the land is held in fairly large areas. In most districts, the grass and herbage which spring up spon-taneously from the wheat stubbles are not of high grazing value, especially where well worked fallows are included in the rota-tion, for the object aimed at in follow-ing is to suppress all herbage and allow the wheat crop undisputed possession of the soil. That this fact is recognised is seen by the practice often followed in the Wimmera and Western District, where, instead of reeling on this adventitious her-bage springing up on the wheat stubbles, a crop of Algerian oats is sowed in on the wheat stubbles in March and April to provide winter grazing for sheep.

In the areas of more liberal rainfall, something more than one crop in three or four years is possible. Here peas, rye and vetches, rape, mustard, kale, Sudan grass, Japanese millet, or mixed forages can be grown successfully in addition to cereal crops, and in these cases wheat should be grown in alternation with forage crops and for feeding down on the land with stock. Wherever such forage crops can be grown in regular rotation with wheat, the maintenance of fertility can be assured.

A green forage crop obtained 9.5 per cent. of its total solid matter from the carbonic acid gas of the air. When the crop is fed to stock, the greater portion of the organic matter is returned to the soil. As the amount of green forage produced is usually many times greater than the total amount of herbage on the unculti-vated wheat stubbles, it follows that the feeding down of forage crops is the best corrective for the loss of organic matter which is an inevitable consequence of bare-fallowing a soil in a hot, dry climate. Crop rotation has other advantages, apart from the question of maintaining the fertility of the soil.

Crop rotation leads to more healthy crops. Take-all, flag smut, and other fun-goid diseases, are much less common on land on which a regular cropping sequence is maintained. It enables the farm work to be better distributed through the year,

more sheep to be kept, and it assures a heavy wheat yield.

The association of sheep with wheat-growing presents many advantages. The sheep utilise roughage on the farm which could not be otherwise used for profit. They do well in the stubbles of the wheat crop, utilise the herbage of the lay land, and keep the fallow clean and well con-solidated.

They work in well with wheat, for the maximum demands of a flock of ewes with their lambs are made when there is a flush of spring herbage, and the lambs are usually sold before the grass begins to go off. They utilise the herbage on the fallows, and assist in bringing about that consolidation of the seed bed so necessary for a successful wheat crop. This is of importance in country which is light in character. They assist in maintaining the fertility of the farm, for much of the phos-phoric acid, potash, and nitrogen found in the herbage is returned to the soil in the droppings of the sheep. This is especially true of a flock of mature animals.

They add to the profits of the farm on account of the relatively small amount of labor and attention required by the farm flock in comparison with the actual money returns. The high prices ruling for both mutton, fat lambs, and wool, the rapid development of the frozen meat trade, and the rise of country cool stores, make it essential for a wheat-grower to keep sheep in order to extract the maximum net profit from his farm.

The number of sheep that can be kept on a wheat farm is a question that cannot be easily settled. The stocking capacity of the farm can, however, be readily determined. The number of sheep that can be carried through the worst season of the year—autumn and early winter—deter-mines the number that can safely be car-ried throughout the year. This, of course, implies that if the stock can be carried over the worst portion of the year, much feed must necessarily be wasted at the best time of the year, i.e., spring and early summer. If we judge a wheat farm by this test, we should find its carrying capacity very limited. It must always be borne in mind that the conditions on the farm are very different from those on the station. The mainstay of the station pro-perty is the permanent native grasses and the annual growths of weeds and grasses which may have established themselves throughout the native pasture. On the wheat farm the rooted grasses—permanent native grasses—are destroyed in the pro-cess of fallowing, and the pastures there-fore consist mainly of weeds and annual plants.

In addition there are, of course, the wheat stubbles, and such herbage as may grow on the fallow. While, therefore, the stock-carrying capacity of the station land may be estimated with a fair degree of accuracy, the carrying capacity of the wheat farm will be a very variable quan-tity, and largely dependent on the nature of the season. The handling of a flock on the relatively small area of the wheat farm needs a good deal of experience. Station sheep are often not moved through-out the year. On a wheat farm, the pad-docks must be cultivated in rotation, and we could not expect to carry successfully a flock of sheep continuously grazing on the relatively small area of land left out for pasture. To stock a wheat farm to full capacity, it is desirable to have rela-tively small fields, and it is probable that four 50-acre paddocks would carry double the number of sheep that could be car-ried on one 200-acre paddock.

With the establishment of the fat-lamb industry on a sound and profitable basis, and the high prices ruling since the war for wool—both crossbred and Merino—keeping of sheep on the wheat farm has become a matter of great importance.

The wheat-grower has a choice of oper-ating in two ways: (1) the purchase of store sheep for fattening; (2) the keeping of a small flock for raising fat lambs or the production of wool.

If at any time he has available a good grazing area, he can buy store sheep and fatten them, and realise the profit which normally results from the difference in price between store and fat sheep. Usually, however, the wheat-grower is not advan-tageously placed to profit by this some-what speculative form of enterprise.

The best practice to follow is to keep a flock of ewes in numbers adapted to the carrying area of the farm at the lean period of the year, and raise crossbred lambs for disposal in spring. The usual practice is to buy two or four toothed crossbred ewes from station-bred flocks, to mate these with early maturing British breeds of rams, and after taking, say, the annual crops of lambs, to fatten the ewes for market. The relative merits of the different breeds lie beyond the scope of this article. We merely emphasise herethe necessity for associating sheep with wheat. The highest profits, and ulti-mately the cleanest crops and best wheat yields, will be obtained on those farms where sheep are constantly used to graze

fodder crops and pastures, clean up the fallows, and consume the greater part of the stubbles.

### Rational Use of Seed.

In order to get the best results from early fallowed, carefully worked, properly rotated, rationally manured land, the seed sown should be the best the farmer can secure.

The first requirement is to secure vari-eties suited to the district. The farmer has a large number of varieties to select from, and he should study carefully the yields of experimental plots conducted by the Department of Agriculture, and even test a few varieties on a small scale. The experience of farmers in the district, and the results of district experiments, will be invaluable in arriving at a selection of say, two or three types.

He should endeavor to raise his own seed, and occasionally secure seed from the Department of Agriculture or the agri-cultural colleges. These institutions have the time, the experience, and the facilities for producing high-grade, select-bred, graded seed. The seed for the farm area should be sown in the cleanest and best worked area of the farm. It is the usual practice to begin seeding with the latest maturing type, and complete the seeding with the early-maturing types, and to in-crease the dressing of seed and manure as the seeding season progresses.

Experiments have shown that it pays to grade wheat for seed.

A good grader removes weed seeds, grains of other cereals, rubbish, damaged and cracked grain, and thus separates material of considerable commercial value for feed, but of negligible value for seed. The graded residue is more prolific than the ungraded product.

Finally, seed wheat should always be pickled, either with bluestone (1 1/2 lb. to 10 gallons of water), formalin (1 lb. of formalin to 45 gallons of water), or with powdered copper-carbonate (1 to 2 oz. per bushel of seed).

In a consideration of the value of farm-yard manure due allowance must be made for more than the actual commercial value of its fertilising ingredients. It must be clear that the fertility of the soil is de-pendent upon more than the addition of so-called plant-foods. For instance, the humus content, which is one of the most important factors in fertility upkeep, can be largely depleted by the production of annual crops which are almost entirely removed. In order to be quite clear on the position one must first recognize that there is a distinction between what are known as manures and those termed arti-ficial fertilisers, the chief difference being in respect to the other important func-tions of, for example, farmyard manure. For while an organic manure supplies plant-food, it also aids in the general im-provement of plant-foods already in the soil to a very marked degree, while the artificial fertiliser as a rule only furnishes plant-food.

Another important factor of all fertile soils is texture, and here again farmyard manure exerts a very beneficial influence. The mechanical and physical benefits de-rived by soil from an addition of such manure are very important. The benefits extend alike to light and heavy soils. In light soils organic matter—frequently so deficient, and which no amount of arti-ficial fertiliser can make up for—is ap-plied by farmyard manure, while at the same time the latter assists consolidation and retention of moisture. The advantages of heavy clay soils, although in a different direction, are no less marked. It makes their working much easier by opening the soil-mass to the beneficial influences of warmth, aeration, and oxidation. It will therefore be realised that farmyard manure is unique in its effect, and that it must be given credit for more than its actual commercial value as a plant-food.

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### ELDER CONSERVATORIUM ASSOCIATION.

The inaugural meeting of the Elder Conservatorium Association will be held on Monday evening next in the south hall of the Conservatorium. Important business will be considered, including the election of officers, the arrangement of future meetings, and a general discussion of the aims and objects of the association. Already several hundred past and present students have signified their intention of joining, and it is anticipated that the association will exercise an important influence in the cause of music in South Australia. All who are interested are not only requested to be present, but to forward helpful suggestions to the pro-cessional secretary, Mr. George Pearce.

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