whether it will command a higher price. These questions must be answered in the affirmative before the manufacture of pulp from flax can be profitably undertaken in New Zealand. It has been claimed that the pulp would have a special value—

(1) For the manufacture of special grades of paper, electrical-insulation paper, card index, &c.
(2) As a strengthening agent, mixed with short-fibred pulps, for paper-manufacture.
(3) For the manufacture of rayon or other similar material.

The only method by which these points can be determined is by preparing high-grade pulp on a semi-commercial scale, and submitting bulk samples to prospective users. This could be done by any group of men who desired to form a company for a moderate outlay, by utilizing the technical service of some reputable pulping laboratory in Great Britain or Sweden, with arrangements for supervision. If paper and other manufacturers agree that flax-pulp so prepared has special properties, as it quite possibly may have, and are prepared to pay a definite price considerably in advance of that of the best chemical wood-pulp, intending manufacturers of flax-pulp could be sure of their position. Without such authenticated knowledge, so-called estimates of profits obtainable by pulping are mere opinions or guesses.

MINERAL CONTENT OF PASTURES.

SIXTH ANNUAL REPORT OF THE MINERAL CONTENTS OF PASTURES INVESTIGATION AT THE CAWTHRON INSTITUTE.

During the past year investigations concerning the control of bush sickness have been continued at Glenhope. In addition, detailed studies have been made concerning the intake of iron by different plants grown in pots under controlled conditions. Samples of legumes and grasses have been collected from different soil types in the Nelson Province, and have been analysed for iron to ascertain what variation in iron content occurred in different species of pasture plants, and the effect of soil type on the iron intake of the plant. Some work has been done concerning the effect of fertilizers and lime on the iron intake of plants, but so far little noticeable effect has resulted from any treatment applied.

Another important investigation dealing with pastures has been the effect of lime and fertilizers on the production of an old-established pasture compared with that of a new pasture sown with pedigree lines of grasses and clovers.

Bush-sickness Investigations.

In the last annual report comment was made on the excellent results which had accompanied the drenching of sheep with Nelson soil, held on bush-sick pastures at Glenhope. Sheep receiving a drench of Nelson soil twice a week have continued in perfect condition, and now nearly two years since the commencement of the experiment, show not the slightest symptom of bush sickness, and could at any time during the last four months have been sold as prime fat sheep. The other sheep which received drench treatment of ferric ammonium citrate, Onekaka limonite, or which remained without drenches, went off quickly in the spring of last year, and by midsummer not one out of the nineteen which were started in these groups remained alive.

The drench experiments have been extended by the introduction of a new line of hoggets taken from healthy country. The sheep were divided into three groups and have received ignited Nelson soil, Whangarei limonite, and a new sample of Onekaka limonite. In each case the drench treatment appears to have proved beneficial, for even as late as the middle of April no symptom of bush sickness has appeared among these sheep. The average live weights of the sheep in these three groups on the 14th April were 97·8 lb. per head for ignited Nelson soil; 100·8 lb. per head for the sheep receiving Whangarei limonite; and 100·5 lb. per head for those receiving the fresh sample of Onekaka limonite.

These three groups will be carried through the winter and coming spring on their respective drench treatments in order to ascertain whether any alteration in health of stock occurs. The average live weight of the older sheep which have received unburnt Nelson soil for two seasons was 141 lb. per head on the 14th April.

Iron Content of Plants.

In previous reports comment has been made on the inaccuracy of many published figures in relation to the iron content of plants, owing to soil contamination. As a result of the much greater iron content of soil as compared with plants, a mere trace of soil contamination is sufficient to increase greatly the figures for iron in plants determined by chemists. Dr. H. O. Askew has made a survey of the iron content in pasture species and mixed samples of pasture taken from different locations in the Nelson Province. Although great care was taken in the collection of the samples, in a few cases the figures determined are under suspicion of being affected by soil contamination. Excluding cases where soil contamination was definitely known to occur, samples of mixed pasture collected from six locations in the Nelson District gave an average iron figure of 0·009 per cent. Fe on the dry basis. The average manganese content for the six samples was 0·104 per cent. The variation found in the iron content of the six pastures mentioned above was 0·0075 per cent. Fe, lowest, and 0·111 per cent. Fe, highest.

Further analyses have been made of the iron content of three pastures at Glenhope taken at intervals during the grazing season. The three pastures comprise typical unhealthy pasture subject to bush sickness, and two healthy pasture types in the vicinity. The average figures for iron in the case of these three pasture types has been found again to be very similar, the figures being 0·006 per cent. Fe for the unhealthy pasture, and 0·006 and 0·007 per cent. respectively for the other two pasture types. These figures for iron are very low in every case, and give no support to the theory that the sole cause of bush sickness is a low percentage of elaborated iron in pasture plants. The average figures for manganese on the three pasture types mentioned above were 0·031 per cent. for the unhealthy pasture, and 0·025 per cent. in the case of the other two types.