production occurred, a maximum for the spring being attained during the period 9th to 16th October, with a yield of 23·5 lb. of dry matter per day. After this date until the 18th April the amount of rainfall was the deciding factor in maintaining pasture growth on the plots. During periods of drought yield on all the plots approached one another closely at a lower level. As might be expected, the yield of pasture was maintained for some time after the incidence of drought, and likewise did not rise to a new maximum for some weeks after the conclusion of the drought period.

(3) Fertilizer treatment greatly increased the yield of pasture in certain cases. On this pasture superphosphate used alone gave little benefit, a slight increase, mainly for the autumn period of pasture-production, being effected. Ammonium sulphate used alone or in combination with either superphosphate or superphosphate and potash gave a relatively great increase in yield of dry matter. For the period 20th September to 1st November, which probably covers the whole period of benefit resulting from the application of 1 cwt. ammonium sulphate per acre, the following increases in production of dry matter per acre over the untreated plots were noted: Superphosphate (2 cwt.), 63·1 lb.; ammonium sulphate (1 cwt.), 317·4 lb.; superphosphate (2 cwt.), ammonium sulphate (1 cwt), 350·6 lb.; superphosphate (2 cwt.), sulphate potash ($\frac{1}{2}$ cwt.), ammonium sulphate (1 cwt.), 401 lb.

The major effect from the use of ammonium sulphate occurred during the first three weeks after its application when applied on the 19th September under Nelson climatic conditions. At the commencement of the following season ammonium sulphate applied on the 8th August exerted a beneficial effect on yield for a period of nearly two months. Taking the figure of 22·5 lb. of dry matter to be the production requirement of a 7-cwt. dairy cow in milk, it would appear that the application of 1 cwt. of ammonium sulphate per acre provides on this pasture an increased stocking of approximately one-third cow per acre for a period of at least six weeks.

In the case of the plots receiving the complete treatment of superphosphate, potash, and ammonium sulphate the greatest increase in yield for the early spring period was effected. The yield of these plots was well maintained throughout the remainder of the season. Where ammonium sulphate was used either alone or in combination with superphosphate clovers were adversely affected and the yield for the midsummer and autumn periods was thereby reduced. The highest yield for the season was secured from the plots receiving the complete manure—5,274 lb. of dry matter per acre, against 4,241 lb. for the untreated plots. The inclusion of potash in the manurial programme resulted in a gain of 816 lb. dry matter per acre over the plot receiving super plus ammonium sulphate.

(4) The percentage of dry matter in the grass clippings varied considerably during the growing season. Rain or dew on the grass at time of cutting frequently reduced the percentage of dry matter to the low figure of 12–14 per cent. Excluding cases where the grass was known to be wet, the percentage of dry matter in the clippings varied from 16·0 to 21·4. The average percentage of dry matter for the whole season varied on different plots from 18·11 to 18·82.

(5) The yield of dry matter in the pasture clippings was much less than that in the hay crop grown during a corresponding period. The ratio of yield of dry matter in the pasture clippings to that in the hay crop was remarkably constant on different plots, varying only from 22·1 to 23·8 per cent. During the growth period of the aftermath crop the average daily production of dry matter from the pasture clippings was very similar to the daily average yield of dry matter in the aftermath crop, the percentage varying from 80 to 100.

For the full period represented by the hay and aftermath crops the yield of dry matter from the pasture clippings varied from 41·8 to 48·2 per cent. (on different plots) of the total dry matter in the combined hay and aftermath crops.

(*b*) *Effect of Season and Fertilizer on the Chemical Composition of Hay, Aftermath, and Pasture.*—This section of the investigation deals with the seasonal variations in the chemical composition of pasture and with the effect of fertilizer treatment on its composition. Chemical analyses of the hay and aftermath crops have also been made, so that a complete comparison is available of the composition of pasture regularly mown with that of the hay and aftermath crops.

The most striking features of the chemical work are as follows: Striking variations in the composition of both treated and untreated plots on the Richmond pasture occur during the season. In the case of the percentages of soluble ash, nitrogen, and potash, maximum percentages for the first half of the season are attained in the October period of growth. A great reduction in the percentages of these constituents occurs during November and December. The percentages of soluble ash and nitrogen then rise rapidly during January and February. In the March period the percentages of these two constituents remain stationary or drop a little. In the April period the percentage of nitrogen rises again, but the percentage of soluble ash remains at the previous level or tends to fall.

In view of the fact that the general tendency of curves plotted for the important chemical constituents in the pasture, both on untreated and treated plots, is the same, there can be no doubt that factors other than manurial treatment greatly influence the chemical composition of pasture during the growing season. The great drop in the percentages of soluble ash and nitrogen appears to be associated with droughty soil conditions during November and the greater part of December. Heavy rains were experienced towards the end of December, resulting in a plentiful supply of soil moisture during January. A great increase in the rate of growth in January might account for the increased percentages of several constituents which were obtained during this period. It does seem probable, however, that a progressive change in the flora of the plots also exerted a marked effect on the chemical composition of the pasture during the January and autumn periods of growth. The percentages of phosphoric acid and chlorine have a somewhat similar trend during the season on both treated and untreated plots. The highest percentages of these constituents occurs in the pasture during October, and then falls rapidly during the early summer. A minimum percentage occurs in the December period, after which a slight increase (more marked in the case of chlorine) takes place.