know, but one would think that the headlands would grow roots, if not hops.

Dressing. — I despair of conveying a clear idea of this important operation to my readers. It is done in early spring, by a woman, generally, and a careful woman, too, if such a one can be found. The hill is to be opened with a small hoe (2½ inches), a little below the crown, and the earth cleared away between the sets, which will be found swollen out to four times their original size. These should be cut off between the crown of the hill and the first joint, for it is round the set close to the crown whence the best and most fruitful bine starts. The earth is then drawn back again, and a mark made to show where the hill is.

(To be continued.)

We have received the Memoranda of the Rothamsted Experiments for 1893 and 1894, no results for 1893 having been issued last year. We notice that the rainfall at Rothamsted, as measured in the large gauge of one-thousandth part of an acre, was 24·08 in. in the harvest year 1892-3, and 29·55 in. in 1893-4. In the field which had grown barley forty-three years in succession up to last year the greatest yield was 46½ bushels on the plot dressed annually during the greater part of the time with 275 lbs. of nitrate of soda, 400 lbs. of silicate of soda, 200 lbs. of sulphate of potash, and 100 lbs. each of sulphates of soda and magnesia. During the first six years of the experiment 400 lbs of salts of ammonia were used, and during the next ten years 200 lbs., instead of the nitrate of soda. In 1893 on this plot the yield was only 33½ bushels, but in that season the greatest yield, 43½ bushels an acre, was given by the plot dressed annually with 14 tons of farmyard manure. These are both very costly dressings, and a much more economical result was 41 bushels an acre obtained last year of the plot which received 275 lbs. of nitrate of soda and 3½ cwt. of superphosphate, as compared with 31¼ bushels in 1893. Where the nitrate only was used the yields fell to 14¾ bushels for 1894 and 14½ for 1893, showing the value of superphosphate for the barley crop Where the application of 200 lbs. of ammonia salts took the place of the nitrate of soda, 3½ cwt. of superphosphate being also applied, the yield was 34⅞ bushels in 1894 and 18⅓ in 1893, showing the inferiority of the salts of ammonia to nitrate of soda in both a wet and a dry season. In the field which had grown wheat continuously for fifty-one years up to last year the greatest yield was 49 bushels an acre, obtained on a plot dressed annually with the quite unremunerative mixture of 500 lbs. of ammonia salts, 3½ cwt. of superphosphate, 200 lbs. of sulphate of potash, and 100 lbs. each of sulphate soda and magnesia. In 1893 on the same plot the yield was only 21⅝ bushels, or less than one-half of the yield in 1894. But the heaviest crop of wheat in the dry year 1893, 34¼ bushels an acre, was gained on a plot dressed annually with 14 tons of farmyard manure. The wheat experiments are so complicated, and some of the mixtures have been altered so often, that it is difficult to ascertain which has been the most economical dressing. Almost the only clear case of a comparatively moderate dressing applied on a plot which has been cropped regularly (some parts of the field having been treated specially in recent years to kill weeds) and dressed the same since 1884 is one which has received 275 lbs. of nitrate of soda 3½ cwt. of superphosphate, 200 lbs. of sulphate of potash, and 100 lbs. each of sulphates of soda and magnesia, which yielded 43⅜ bushels per acre last year, and only 17⅛ in 1893. A curious result was shown last year in the trial of wheat grown after wheat since 1850 against wheat grown after fallow, in both cases without manure. The wheat after wheat gave 18 bushels, against 15½ after fallow. In the preceding year the former gave only 9¾ bushels and the latter 13½. In all but nine out of forty four years the fallow wheat gave the greater yield, but the difference was not nearly sufficient to make good the loss of half the land. That is to say, an acre growing wheat continuously has yielded a great deal more in a course of years than an acre half cropped and half fallowed.

MARK LANE: *Prices current; Jan. 13th*

	s.	s.
WHEAT, per 504 lbs.; British		
White	26	30
Red	25	29
London flour per 280 lbs.	25	—
Barley, foreign	15	44
Malting English	30	38
Grinding	16	21
Oats, English per 8 bushels	15	27
White pease	32	36
FOREIGN.		
Wheat – Manitoba	27	29
Canadian white pease	27	28

London Cattle market, Oct. 14th:
Milch cows, per head.. £15 to £23

BEASTS.	s.	d.
Scotch	4	6
Herefords per stone of 8 lbs	4	4
Welsh (*runts*) " "	4	2
Shorthorns " " "	4	2
Fat cows " " "	3	6
SHEEP.		
Small Downs " "	5	8
Half breds " "	5	6
Calves " "	5	4
Pigs " "	3	6

BUTTER.	s.	s.
Fresh, (Finest factory) per doz. lbs.	14	15
English Dairy-butter, fresh	10	13
Irish (creamery)	116	
Danish	116	
CHEESE.		
Cheshire per 112 lbs	74	80
Cheddar, finest	56	66
BACON.		
Irish	47	
Canadian	38	
Hams, Danish	54	
American	54	
Irish, small	100	
HAY, per load of 2016 lbs.		
Prime meadow	90	
" clover	92	
STRAW, per load 1296 lbs.		
Best	42	
HOPS from 40s. to 105s. per 112 lbs	40	110

Prices of Pigs at Calne.

Present prices for prime pigs, in lots of not less than 10, on rail within 100 miles of Calne :—

Prime Stores.	*Thickness of fat in any part of the back.*	*Price per sc.*
6sc 10lbs to 9sc 10lbs.	9½ inches and under	7s 0d
Under 10sc 10lbs.	Not exceeding 2½ in.	6s 6d
Under 11sc 10lbs	Not exceeding 2¾ in.	6s 0d
Under 12sc	Not exceeding 3 in.	6s 0d

Any pigs outside these limits of their value.

Half-truck—12 pigs. Whole truck—25 pigs.

CHAS. & THOS. HARRIS, & Co.,
Limited, Calne, Wilts, Eng.

THE ROTHAMSTED FEEDING EXPERIMENTS.

THE EXPERIMENT WITH PIGS.

Let us next see whether experiments with pigs lead to similar conclusions. The pig requires much less bulk in his food than the ruminant. His food, and especially his fattening food, consists, weight for weight, of a much larger proportion of digestible or convertible constituents, and contains very little effete woody fibre. Thus, while the food of oxen and sheep is composed principally of grass, hay, straw and roots, with a comparatively small proportion of grain, leguminous seeds, or other concentrated foods, that of the pig consists largely of grain or other seeds, which contain a comparatively small amount of indigestible woody fibre and a large proportion of starch or other digestible carbohydrate and nitrogenous matters which are almost entirely in the condition of albuminoids. It is true that the pig consumes also more or less of starchy tubers or saccharine roots, which contain a considerable proportion of their nitrogen in other forms than albuminoids. *But the more rapidly he is fattened the larger is the proportion in his food of starchy grains or other ripened seeds.*

Notwithstanding the much more concentrated and digestible character of the food of the fattening pig, he consumes a much larger quantity of dry substance in proportion to his weight than either the ox or the sheep. Under these circumstances he yields much more increase, both in proportion to a given live weight within a given time, and to a given amount of dry substance of food consumed. This is clearly illustrated in Table 69 (p. 258), which shows as an approximate average that per 100 pounds live weight per week the fattening ox will consume about 12·5 pounds of dry substance of food and yield 1.13 pounds of increase; the sheep will consume about 16 pounds of dry substance of food and yield 1.76 pounds of increase; while the pig, on the other hand, will consume about 27 pounds of dry substance of his more concentrated food and yield about 6.43 pounds of increase. Indeed, compared with oxen or sheep, the liberally fed fattening pig will consume much more food in excess of that required for the respiratory function and for mere maintenance, so that the amounts of nonnitrogenous matters consumed for a given live weight whithin a given time represent in less proportion the respiratory requirements, and in a greater proportion those for increase.

Numerous feeding experiments have been made at Rothamsted with pigs. In 1850, series 1, with 12 pens; series 2, also comprising 12 pens, and series 3, with 5 pens, and subsequently a fourth series of 4 pens was made. The general plan was to give, in one or more pens, food of high or of low percentage of nitrogen, as the case might be, ad libitum; then in others to give a fixed and limited amount of food of low percentage of nitrogen, and, ad libitum, a food of high percentage; or a fixed and limited amount of food of high percentage of nitrogen, and, ad libitum, a food of low percentage, and so on; and as the ad libitum food always supplied much the larger proportion of the total ration, the animals fixed their own consumption, according to the composition of the foods and to their own requirements, including those both for respiration and maintenance, and for increase.

The foods of high percentage of nitrogen consisted in most cases of an equal mixture of bean and lentil meal, that is, of highly nitrogenous leguminous seeds; andd those of low percentage were, in most cases, either maize meal or barley meal. In some, however, either *pure starch or pure sugar* was given. The details of the foods, the weights, and increase of the animals, and of the amounts of the various foods and of their nitrogenous and nonnitrogenous constituents consumed per 100 pounds live weight per week, and to produce 100 pounds of increase in live weight, have been given and fully discussed in various papers. (1)

The conclusion drawn from the results of the various experiments with pigs was that, in their case, as in that with sheep, it was the supplies in the food of the available nonnitrogenous, or total organic, constituents, rather than those of the available nitrogenous substance, that regulated the amount consumed, both by a given live weight within a given time, and to produce a given amount of increase. The point is, however even more clearly brought to view by the graphic representation of the results given in the colored diagrams facing page 316.

In explanation of them it may be stated that nitrogenous substance is represented by black, nonnitrogenous by yellow, and total organic substance by red. The upper diagram (I) illustrates the relative amounts of the respective constituents consumed per 100 pounds live weight per week, and the lower one (II) the amounts consumed to produce 100 pounds increase in live weight Each of the thirty columns represents the results of a separate experiment or pen.

The first nine columns show the results of experiments 1 to 8 and 12, of series 1: the next twelve those of the twelve experiments of series 2; the next five those of the five experiments of series 3; and the last four those of the four experiments of series 4. It may be added that there were three pigs in each pen of series 1, 2, and 4, and four in each pen of series 3.

The plan of the diagrams in other respects will be best understood by giving an example. Take, for instance, the amounts of nitrogenous substance consumed per 100 pounds live weight per week, as represented in black in the left hand division of Diagram I. The lowest amount so consumed throughout the thirty experiments was in pen 5, and that amount is taken as 100, and as the standard by which to compare the amounts consumed in the other pens, and it will be seen that in the case of this pen 5 the coloring does not extend above the base line, which is numbered 100 in the column of figures given at each side of the diagram.

(To be continued.)

(1) On the Composition of Foods in relation to Respiration and the Feeding of Animals (Rept Brit. Assoc for 1852), Pig Feeding (Journ.Roy Agl. Soc. Eng., 14 (1853), p. 459).
