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# Memoranda of the Field Experiments at Rothamsted: May 1879



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## Experiments on Permanent Meadow Land; the Park

### Rothamsted Research

Rothamsted Research (1880) *Experiments on Permanent Meadow Land; the Park* ; Memoranda Of The Field Experiments At Rothamsted: May 1879, pp 8 - 8 - DOI: <https://doi.org/10.23637/ERADOC-1-243>

THE PARK.

EXPERIMENTS WITH DIFFERENT MANURES ON PERMANENT MEADOW LAND.

The Land has probably been laid down with Grass for some centuries. No fresh seed has been artificially sown within the last 40 years certainly; nor is there record of any having been sown since the Grass was first laid down. The experiments commenced in 1856, at which time the character of the herbage appeared uniform over all the Plots. Excepting as explained in the Table, and in the foot-notes, the same description of Manure was applied year after year to the same Plot. As a rule, the second crop was fed-off by sheep having no other food, the object being not to disturb the condition of the manuring. A given number was allotted to each Plot, according to the amount of produce, penned upon a portion of it, and the area extended, day by day, until the whole was eaten down. Frequently, however, the animals suffered considerably; and in 1866, 1870, 1873, and 1874, the second crops (and third, if any) were cut, and spread on the respective Plots. In the twentieth season, 1875, the second crops being unusually heavy, and the weather favourable, they were, for the first time, cut, weighed as hay, and removed. In 1876 they were cut and spread on the Plots. In 1877 and 1878 the second crops were again made into hay, weighed, and removed; and it is intended, in future, to adopt this plan, whenever the weather will permit.

(Area under experiment, about 7 acres.)

Plots.	Manures, per acre, per Annum.	PRODUCE PER ACRE, WEIGHED AS HAY.												
		Average per Annum. (First Crops only.)					Twenty-second Season, 1877.					Twenty-third Season, 1878.		
		10 Years, 1856-65.	10 Years, 1866-75.	20 Years, 1866-75.	First Crop.	Second Crop.	Total.	First Crop.	Second Crop.	Total.	First Crop.	Second Crop.	Total.	
1	(1856-63, 8 years, 14 tons Farmyard Manure, and 200 lbs. Ammonia-salts; 0: average produce 49½ cwt. } (1864 and since, 200 lbs. Ammonia-salts alone; average produce (12 years, 1864-75) 38½ cwt. } (1864 and since, unmanured; average produce (12 years, 1864-75) 32½ cwt. } Unmanured, continuously	45½	37½	43	42½	20	62½	30½	17½	48½	30½	17½	48½	1
2	3½ cwt. Superphosphate of Lime (a)	41½	32	36½	32½	16½	48½	21	15½	36½	21	15½	36½	2
3	3½ cwt. Superphosphate of Lime (a)	42½	20	21½	21	17½	38½	16½	13½	30½	16½	13½	30½	3
4	3½ cwt. Superphosphate of Lime (a)	25½	21½	22½	27½	18½	46½	19½	15½	34½	19½	15½	34½	4
5	3½ cwt. Superphosphate of Lime (a)	33½	30½	32½	42	20	55½	32½	21½	54	32½	21½	54	5
6	400 lbs. Ammonia-salts	30½	22	26½	26½	20	46½	17½	18½	36	17½	18½	36	6
7	1856-68, 13 years, 400 lbs. Ammonia-salts; average produce 30½ cwt. } (1869-78 300 lbs., Sulph. Potass., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwt. Superphos.; av. prod. (7 yrs., 1869-75) 31½ cwt. }	31½	30½	30½	37½	19½	57½	37	18½	55½	37	18½	55½	7
8	1856-61, 6 years, 300 lbs. Sulph. Potass., 200 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 3½ cwt. Superphosphate	33½	30½	35½	45½	24	69½	35	22½	57½	35	22½	57½	8
9	1856-61, 6 years, 300 lbs. Sulph. Potass., 200 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 400 lbs. Ammonia-salts	53½	48½	51	54	22	76	56	24½	80½	56	24½	80½	9
10	1856-61, 6 yrs. 300 lbs. Sulph. Potass., 200 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwt. Superphos., and 400 lbs. Ammonia-salts	52½	39½	46½	43½	25	68½	41	22	63	41	22	63	10
11	1856-78 300 lbs., Sulph. Potass., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 3½ cwt. Superphosphate	61½	59½	57½	60½	48½	109½	51½	41½	93	51½	41½	93	11
12	Unmanured continuously	25	22½	24	19½	25½	44½	16½	16	32½	16	16	32½	12
13	1856-78 300 lbs., Sulph. Pot., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwt. Superphos., and 400 lbs. Ammonia-salts	55½	59½	57½	56	29	85	55	29½	84½	55	29½	84½	13
14	550 lbs. Nitrate of Soda (a), 1858-78 300 lbs., Sulph. Potass., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 3½ cwt. Superphosphate	53½	60½	57	56	19	75	48	15½	63½	48	15½	63½	14
15	1858-75, 18 years, 550 lbs. Nitrate Soda	36½	35	35½	33½	18	51½	25½	21½	46½	25½	21½	46½	15
16	1876-78 300 lbs., Sulph. Potass., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 3½ cwt. Superphosphate	45½	47½	46½	54½	20	75	42½	20½	63½	42½	20½	63½	16
17	275 lbs. Nitrate of Soda, 1879 500 lbs., Sulphate Potass., 100 lbs. Sulphate Magnesia, and 3½ cwt. Superphosphate	34½	33½	33½	33½	16	49½	27½	14½	41½	27½	14½	41½	17
18	275 lbs. Nitrate of Soda	21	33½	32½	40½	19½	60	34½	17½	51½	34½	17½	51½	18
19	Mixture supplying the quantity of Potass., Soda, Lime, Magnesia, Phosphate acid, Silica, and Nitrogen, contained in 1 ton of Hay (commencing 1865)	..	..	38½	42½	19½	61½	39½	17½	56½	39½	17½	56½	19
20	275 lbs. Nitrate of Soda, 280 lbs. Sulphate of Potass., and 3½ cwt. Superphosphate (commencing 1872)	..	..	36½	46	16½	62½	42½	14	56½	42½	14	56½	20

(a) "Ammonia-salts" - in all cases equal parts Sulphate and Muriate of Ammonia of Commerce.  
 (b) The "Superphosphate of Lime" is, in all cases, made from 200 lbs. Bone-ash, 150 lbs. Sulphuric Acid Sp. gr. 1.7 (and 10).  
 (c) Plots 6, 8, and 10, had, besides the Manures specified, 2000 lbs. Sawdust per acre per annum for the first 7 years, 1856-1862, but without effect.  
 (d) 200 lbs. 1856-63 inclusive.  
 (e) 500 lbs. in 1862 and 1863.  
 (f) Only 400 lbs. in 1859-60-61.  
 (g) The application of Silicates did not commence until 1862; 9 years (1862-1870), 200 lbs. Silicate Lime, and 200 lbs. Silicate Soda; 1871, and since, 400 lbs. Silicate Soda.  
 (h) 550 lbs. Nitrate of Soda is reckoned to contain the same amount of Nitrogen as 400 lbs. of "Ammonia-salts."  
 (i) The manures specified were first applied in 1859 (previously, 1856-7 and 8, Sawdust only).  
 (j) Averages of 8 years, 10 years, and 18 years, as these experiments did not commence until 1858.  
 (k) Averages of (1 year), 10 years, and 11 years, as the experiment only commenced in 1865.  
 (l) Averages of 4 years only, 1872-75.