ROTHAMSTED RESEARCH

Report for 1973 - Part1

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ROTHAMSTED EXPERIMENTAL STATION

REPORT FOR 1973 PART 1

Field Experiments Section

G. V. Dyke

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FIELD EXPERIMENTS SECTION

G. V. DYKE

Field Plots Committee

The field experiments at Rothamsted, Woburn and Saxmundham are controlled by the Field Plots Committee: G. W. Cooke (Chairman), G. V. Dyke (Secretary), J. McEwen (Deputy Secretary), L. Fowden, I. J. Graham-Bryce, J. M. Hirst, A. E. Johnston, F. G. W. Jones, J. R. Moffatt, R. Moffitt, J. A. Nelder and C. P. Whittingham.

TABLE 1

Number of plots in 1973

	Grain	Roots	Hay	Total
Full scale plots (yields taken):				
Classical experiments:				
Rothamsted	372	151	208	731
Saxmundham	—	—	80	80
Long-period rotation experiments:				
Rothamsted	444	264	108	816
Woburn	318	308	16	642
Crop-sequence experiments:				
Rothamsted	508	78	294	880
Woburn	511	450	—	961
Saxmundham	136	—	—	136
Annual experiments:				
Rothamsted	1207	464	—	1671
Woburn	260	192	—	452
Saxmundham	54	—	—	54
Totals:				
Rothamsted	2531	957	610	4098
Woburn	1089	950	16	2055
Saxmundham	190	—	80	270
Total	3810	1907	706	6423
Full scale plots (no yields taken):				
Rothamsted				764
Woburn				322
Microplots:				
Rothamsted				1675
Woburn				576
Saxmundham				220
All plots total				9980

Table 1 shows the number of plots on the three farms; the total is almost exactly equal to that of 1972. The number of plots of grass increased mostly in crop-sequence experiments lasting two or more years. Cereal plots decreased at Rothamsted but increased a little at Woburn.

Field Experiments Section

Members of the Section, working from Committee decisions, produced randomisations, plans and tables of quantities needed for the field experiments. We also continued our work of demonstrating the field experiments to visitors and arranging for them discussions

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or lectures by members of departments. We also helped 29 students and schoolchildren by providing information for 'projects'.

Small-plot experiments

The Small Plots staff undertook all agricultural operations on 35 experiments, involving 1030 plots, and some operations, many of which were very time-consuming, on 20 others.

A difficult spring and a bigger programme than in previous years over-stretched their resources at times, but all work was completed satisfactorily in the end.

Because of a general increase in the number of small-plot experiments, some of them occupying the same land for several seasons and many of them involving potatoes (which we avoid growing more than once in four years), 3 ha more land (in Long Hoos) has been set aside for small-plot experiments. The irrigation main has been extended to serve this area and a small pump has been installed in the pumphouse at the Farm to provide the small rates of flow appropriate to small-scale experiments.

The modified Claas 'Compact 20' combine harvester bought in 1972 seemed to work well. An experiment on barley tested its performance in harvesting plots of lengths of 1·5, 3·0, 6·1 m with three rates of N and compared it with that of the farm's 'Sampo' combine. Both machines performed well under all treatment conditions.

A second experiment, also on barley, indicated that the quantity of grain delivered by the Claas when harvesting a poor-yielding plot varied slightly according to the yield of previous plot harvested; the greater the yield of the previous plot the less grain was recovered from the later plot. This may be because the table and threshing mechanism are better scoured when a large bulk of straw is cut. When harvesting plots with large yields, the performance of the combine was not affected by the previous plot.

Later in the season the Claas combine was successfully modified for the stationary threshing of grain maize cobs. Other cereals can no doubt be threshed similarly. The increasing demand for specialised spraying has necessitated the building of a second model of the Wilson small-plot sprayer. An extension has been added to the Garden Plots building, mainly to house the combine harvester.

Annual summary of yields from standard experiments at Rothamsted and Woburn

Winter wheat. Yields of wheat (Cappelle) on the Broadbalk plots in the 1973 season were generally similar to those of 1971, less by 0·5–1 t grain/ha than in 1972 (Table 2). In 1973 on the section that has grown wheat each year since 1952 wheat given FYM outyielded the FYM plots of other sections where the crop was lodged. Castor meal gave an exceptionally good yield in 1973 where wheat followed potatoes and beans; the reason is not known. In all three seasons (unless lodging was involved) FYM has yielded more wheat than any fertiliser treatment. Unfortunately several experiments that provided good comparisons of yields between seasons have been modified or terminated and no others have taken their place. There are, however, several series of experiments that are sited each year on fields similar in past cropping and manuring; on these 1973 yields were generally good except where the crops lodged because of excessive N. A few plots gave outstandingly good yields. In the variety trial following a two-year break from cereals the three best plot-yields (10·5, 10·3, 9·6 t/ha) were probably the best yields we have ever recorded; all came from new varieties (Maris Huntsman and Maris Templar). If these yields are adjusted to allow for the better growth at the edges (due to the paths) they are about 8 t/ha (64 cwt/acre). Cappelle gave several plot-yields of 8 t/ha.

On the Woburn Ley–Arable wheat (Cappelle) had to be resown in November. There was much lodging (this was general in wheat following well-manured potatoes) and

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TABLE 2

Broadbalk Wheat; yields of crops from selected treatments

Grain, t/ha

Treatment	1973 (a)	1973 (b)	1973 (c)	1972 (a)	1972 (b)	1972 (c)	1971 (a)	1971 (b)	1971 (c)
None	2·4	3·7	1·2	3·4	3·1	1·6	2·5	3·1	2·1
N2	4·9	5·5	2·1	5·8	3·6	3·2	5·4	4·1	3·3
PKNaMg	3·1	4·1	1·3	4·2	4·0	2·1	2·6	3·8	2·5
N1PKNaMg	5·5	5·9	3·1	6·2	5·6	4·7	4·9	4·7	4·5
N2PKNaMg	6·0	5·0	5·1	6·6	6·4	5·3	6·4	5·1	6·0
N3PKNaMg	3·9	4·6	4·5	6·5	5·6	5·0	6·0	5·3	5·7
N4PKNaMg	3·7	4·1	5·0	6·0	6·0	5·1	6·0	5·4	5·3
N2P	5·4	4·6	3·1	6·6	5·2	4·1	5·1	3·0	4·2
D	5·7*	5·2*	6·1	8·0	7·6	6·3	6·9	7·3	6·5
DN2	4·3*	4·1*	5·9	6·9	6·9	3·8	4·9*	6·1	4·9*
R	6·9	4·6	3·6	6·2	7·0	4·6	5·7	5·2	4·6
Mean of all plots	5·3	5·0	4·2	6·3	5·7	4·6	5·5	5·0	4·9

(a) Wheat after potatoes, beans
(b) First wheat after fallow
(c) Continuous wheat since 1952

Symbols: N1, N2, N3, N4 = 'Nitro-Chalk' at 48, 96, 144, 192 kg N/ha
P = Superphosphate annually, at 73 kg P_2O_5/ha
K = Sulphate of potash annually at 110 kg K_2O/ha
Na = Sulphate of soda annually, at 16 kg Na/ha
Mg = Sulphate of magnesia annually, at 11 kg Mg/ha
D = Farmyard manure annually, at 35 t/ha
R = Castor meal annually at 96 kg N/ha

* Badly lodged

TABLE 3

Woburn Ley–Arable experiment

Wheat, second test-crop (Cappelle), grain, t/ha

Previous cropping	1973 N (kg/ha) 0	63	126	189	Mean	1972 Maximum yield*
L(P)	5·6	5·3	4·2	3·3	4·6	5·1 (63)
L(A)	4·8	4·2	3·5	3·0	3·9	5·2 (63)
S(P)	4·7	4·5	3·5	2·8	3·9	5·4 (63)
S(A)	4·5	3·8	3·2	2·6	3·5	5·0 (126)
AH(P)	5·1	5·2	4·6	3·8	4·7	5·0 (126)
AH(A)	5·2	4·3	3·8	3·1	4·1	5·3 (63)
AR(P)	4·9	4·4	3·8	3·3	4·1	4·8 (126)
AR(A)	4·8	5·0	4·2	3·2	4·3	5·5 (63)

* Kg N for maximum yield in parentheses

Symbols: L = 3-year ley
S = 3-year sainfoin
AH = Potatoes, rye, hay
AR = Potatoes, rye, carrots
(P) = Rotation permanent
(A) = Rotations in rotation; symbol indicates last rotation

Basal dressing: 58 kg P_2O_5, 58 kg K_2O/ha

applied N mostly decreased yields (Table 3). Maximum yields (with none or 63 kg N/ha) were about the same as those of 1972. As in 1972 (Table 4) leys grown in the current cropping cycle failed to increase yields but those grown five years earlier gave 0·4 t extra grain. In 1973 the residual effect of chloropicrin and aldicarb applied to the preceding potatoes was a consistent small decrease. Lodging, however, lessens the value of all comparisons in 1973.

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TABLE 4

Woburn Ley–Arable experiment

Wheat 1973, grain, t/ha

Cropping 1964–66	Mean of maximum yields 1973
L, S	5·4
AH, AR	5·0
Difference	+0·4
Cropping 1969–71	
L, S	5·2
AH, AR	5·3
Difference	−0·1

Symbols: L = 3-year ley
S = 3-year sainfoin
AH = Potatoes, rye, hay
AR = Potatoes, rye, carrots

Basal dressing: 58 kg P_2O_5, 58 kg K_2O

On the Woburn Intensive Cereals experiment (Table 5) best yields of continuous and rotation wheat were similar to those of 1971, better than 1972 by about 1 t/ha. Less N was needed for maximum yield in 1973.

TABLE 5

Woburn Intensive Cereals experiment

Wheat (Cappelle), grain, t/ha

	1973 Kg N/ha				1972	1971
	63	126	188	251	Maximum yield*	Maximum yield*
(i)	4·5	5·1	4·5	4·1	3·8 (251)	5·0 (188)
(ii)	2·9	3·4	3·4	3·2	2·6 (188)	3·8 (188)

* Kg N for maximum yield in parentheses

(i) After ley, potatoes
(ii) Continuous wheat since 1966

Basal dressing: 126 kg P_2O_5, 251 kg K_2O/ha

Annual experiments at Woburn produced many plot-yields of 8–9 t/ha, mostly from Maris Huntsman.

To sum up: we have few comparisons between wheat yields of 1973, 1972 and 1971 on standard experiments but it seems that, despite a few exceptionally good plot-yields, 1973 was, on average, about equal to 1971 and rather poorer for wheat than 1972. Some yield was lost in 1973 because of lodging.

Barley. Yields of Julia barley on the Hoos Classical experiment were much like those of 1971 (less than in 1972) except that lodging lessened yield where FYM or PKNaMg with much N were applied (Table 6). Yields without applied N were less than usual. Many small patches of barley on plot 221 (P and 144 kg N/ha) lost their green leaf prematurely; the cause of this trouble (which has been noted occasionally in recent years) is being investigated. As in recent seasons barley after the two-year break yielded little more than barley after barley provided plenty of N was applied. Silicate of soda gave

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TABLE 6

Hoos Barley experiment

Yields of selected treatments (and effects of Si), barley (Julia), grain, t/ha

	1973	1972	1971
Treatment			
None	0·8	1·9	1·6
N1	1·2	3·1	2·3
N2	1·3	3·6	2·7
N3	1·4	4·1	2·4
PKNaMg	1·0	1·6	2·0
N1PKNaMg	3·5	4·0	3·8
N2PKNaMg	4·9	5·7	5·9
N3PKNaMg	5·1*	6·5	5·9
D	6·0	6·1	5·0
DN2	5·7†	6·2†	4·8†
Effect of Si:			
Plots without P	+2·0	+1·1	+1·7
Plots with P	+0·7	0·0	+0·9

Symbols: N1, N2, N3 = 'Nitro-Chalk', at 48, 96, 144 kg N/ha
P = Superphosphate annually, at 73 kg P_2O_5/ha
K = Sulphate of potash annually, at 110 kg K_2O/ha
Na = Sulphate of soda annually, at 16 kg Na/ha
Mg = Sulphate of magnesia annually, at 11 kg Mg/ha
Si = Silicate of soda annually, at 448 kg/ha
D = Farmyard manure annually, at 35 t/ha

* Part lodged
† Badly lodged

2 t/ha more grain where superphosphate is not applied, in the presence of P it gave 0·7 t/ha; these effects are similar to those of 1971 and much more than in 1972.

On the Residual Phosphate Rotation experiments on Sawyers I and Great Field IV differences in yields of barley between seasons were mostly small; 1973 was slightly better than 1971, about equal to 1972 (Table 7).

TABLE 7

Residual Phosphate Rotation experiments

Barley (Julia), grain, t/ha

P_2O_5 (kg/ha) as superphosphate	Sawyers I			Great Field IV		
	1973	1972	1971	1973	1972	1971
None	5·0	5·5	4·9	4·2	4·3	3·6
376 in 1960	5·9	5·6	5·2	4·0	4·3	3·1
63 annually	6·1	6·2	5·8	4·7	4·4	4·6

Basal dressing: 100 kg N, 63 kg K_2O/ha

TABLE 8

Woburn Intensive Cereals experiment

Barley (Julia), grain, t/ha

	1973 kg N/ha				1972 Maximum yield (N)	1971 Maximum yield*
	50	100	150	200		
(i)	4·8	5·0	5·0	4·6	6·0 (150)	4·8 (200)
(ii)	3·6	4·8	4·7	4·7	5·4 (150)	4·6 (200)

* Kg N for maximum yield in parentheses
(i) After ley, potatoes
(ii) Continuous barley since 1966

Basal dressing: 126 kg P_2O_5, 251 kg K_2O/ha

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Best yields of barley on several annual experiments were between 6·5 and 8·0 t/ha, corresponding to field-scale yields of about 6 t/ha (48 cwt/acre).

On the Woburn Intensive Cereals experiment best yields, which were obtained with less N in 1973, were 0·2 t more than in 1971 but 0·6–1·0 t less than in 1972 (Table 8).

At Woburn one experiment (a variety trial) gave several plot-yields of 6–7 t/ha; other experiments yielded at best about 5–6 t/ha.

Barley, like wheat, seems to have given yields about equal to those of 1971, rather less than in 1972. Yields on some experiments were limited by lodging.

Beans. On Broadbalk and Hoos Barley best yields of spring beans in 1973, which were given by FYM or PKNaMg, were about 4–4·5 t/ha, about 0·5 t better than 1972, nearly 2 t better than 1971 (Table 9). On Barnfield, however, where beans have been grown

TABLE 9

Yields of beans (Maris Bead) from selected treatments of the Classical experiments

Experiment	Treatment	Grain, t/ha 1973	1972	1971
Broadbalk (i)	None	2·6	2·5	2·0
	N2	2·4	2·8	1·5
	N2P	1·4	1·2	0·5
	PKNaMg	3·8	3·6	2·7
	D	4·2	3·6	2·6
Hoos Barley (i)	None	—	2·4	—
	P	—	2·2	—
	KNaMg	—	3·2	—
	PKNaMg	—	3·3	—
	None (R)	3·8	3·2	1·8
	P (R)	2·1	2·9	1·4
	KNaMg (R)	3·6	3·1	1·7
	PKNaMg (R)	4·5	4·0	2·4
Barnfield (i)	None	1·6	3·1	1·3
	P	2·2	3·5	1·8
	PNaMg	2·1	3·7	1·6
	PKNaMg	2·3	3·6	1·6
	D	2·3	3·7	1·2
	DPK	2·9	3·6	1·3
(ii)	None	0·5	3·0	0·3
	P	0·6	3·3	0·4
	PNaMg	0·7	3·4	0·3
	PKNaMg	0·8	3·0	0·4
	D	2·6	2·7	1·6
	DPK	3·0	3·5	0·7

(i) No simazine. (ii) With simazine

Symbols: N2 = 'Nitro-Chalk' at 96 kg N/ha
P = Superphosphate annually, at 73 kg P_2O_5/ha
K = Sulphate of potash annually at 110 kg K_2O/ha (Broadbalk and Hoos Barley), 275 kg K_2O/ha (Barnfield)
Na = Sulphate of soda annually at 16 kg Na/ha (Broadbalk and Hoos Barley); agricultural salt annually, at 88 kg Na/ha (Barnfield)
Mg = Sulphate of magnesia annually at 11 kg Mg/ha
D = Farmyard manure annually at 35 t/ha
(R) = Residues of castor meal last applied 1967

continuously since 1967, yields without FYM were much less than in 1972 and only a little more than 1971. With FYM (which saved the crops from damage by simazine) yields were better, on average about 0·7 t less than 1972 and 1·5 t more than 1971. No other useful comparisons are available.

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Potatoes. With FYM or PKNaMg and much N, potatoes on Broadbalk and Hoos Barley yielded well in 1973, roughly as much as 1971 and 5–10 t/ha more than 1972 (Table 10).

TABLE 10

Yields of potatoes (King Edward) from selected treatments on the Classical experiments

Total tubers, t/ha

Experiment	Treatment	1973	1972	1971
Broadbalk	None	13·5	10·8	7·8
	N4	14·5	8·1	9·2
	PKNaMg	21·7	16·2	9·6
	N8PKNaMg	49·2	38·8	45·6
	D	47·1	40·2	36·2
	DN4	48·8	41·4	49·4
Date of planting		6 April	19 April	3 April
Hoos Barley*	N6	16·0†	19·1	18·8
	N6PKNaMg	41·6†	36·9	36·6
Date of planting		6 April	19 April	2 April

Symbols: N4, N6, N8 = 'Nitro-Chalk' at 96, 144, 192 kg N/ha
P = Superphosphate annually at 73 kg P_2O_5/ha
K = Sulphate of potash annually at 110 kg K_2O/ha
Na = Sulphate of soda annually at 16 kg Na/ha
Mg = Sulphate of magnesia annually at 11 kg Mg/ha
D = Farmyard manure at 35 t/ha

* All with residues of castor meal, last applied 1967
† N8 in place of N6 in 1973

On Broadbalk for the first time PKNaMg plus 192 kg N yielded more than FYM with 96 kg N; potatoes given only N yielded much more than in 1972 or 1971, but on Hoos the differences were small.

The two Residual Phosphate Rotations gave anomalous yields of potatoes in 1973. Great Field IV (formerly old grass) gave smaller yields than Sawyers I (old arable) in contrast to 1972 and 1971 (Table 11). The large dressing of P given in 1960 had no effect in 1973 and the heaviest annual dressing (now a little less than recently) gave much smaller increases than usual.

On the Woburn Ley–Arable yields of test-crop potatoes (Maris Piper) without fumigant averaged 5 t/ha more than in 1972, and about 5 t less than the exceptional yields of 1971 (Table 12). Chloropicrin and aldicarb increased yields by an average of 5 or 6 t in 1973 and 1972 but by about 15 t in 1971.

TABLE 11

Residual Phosphate Rotation experiments

Potatoes (Majestic), total tubers, t/ha

P_2O_5 (kg/ha) as superphosphate	Sawyers I 1973	Sawyers I 1972	Sawyers I 1971	Great Field IV 1973	Great Field IV 1972	Great Field IV 1971
0	29	17	24	20	23	28
376 in 1960	28	24	23	17	28	28
172 annually*	37	39	42	21	44	46

Date of planting (both fields):
9 April 1973
20 April 1972
7 April 1971

* 188 kg/ha in 1972 and 1971

Basal dressing: 251 kg N, 251 kg K_2O/ha

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TABLE 12

Woburn Ley–Arable experiment

Potatoes, first test-crop (Maris Piper), total tubers, t/ha

	1973		1972		1971	
	O	F	O	F	O	F
L (P)	60	63	54	56	60	73
L (A)	56	60	46	55	63	76
S (P)	54	63	52	55	72	85
S (A)	50	59	48	54	65	75
AH (P)	50	58	43	51	50	67
AH (A)	58	63	49	56	56	85
AR (P)	50	52	42	48	46	58
AR (A)	58	60	46	51	64	79
Date of planting	9 April		29 March		30 March	

Note: Sub-plots of AH, AR that received fumigant to treatment-crop potatoes have been omitted.

Symbols: O = no fumigant
F = chloropicrin at 450 kg/ha plus aldicarb (at 6·7, 5·6, 11·0 kg/ha in 1973, 1972, 1971) in current year
L = 3-year ley
S = 3-year sainfoin
AH = potatoes, rye, hay to 1971, potatoes, barley, hay, 1972, 1973
AR = potatoes, rye, carrots to 1971, potatoes, barley, barley 1972, 1973
(P) = rotation permanent
(A) = rotations in rotation; symbol indicates last rotation

Note: plots of treatments AH, AR have carried potatoes more frequently than those of L, S since 1938

Basal dressing: 255 kg N, 255 kg P_2O_5, 393 kg K_2O/ha (with additional K_2O to certain plots)

Leys (of grass or sainfoin) in the cycle before the present one (i.e. leys in 1965–67) gave some substantial increase in yield (for example, where grass was grown in 1970–72, comparing the first two lines of Table 12, grass in 1965–67 gave increases of 4 t without fumigant in 1973, 3 t with it).

On the Woburn Intensive Cereals experiment potatoes (Majestic) yielded more than in 1972 or 1971 (when yields were roughly similar), by about 12 t/ha after wheat, about 5 t after barley (Table 13).

TABLE 13

Woburn Intensive Cereals experiment

Potatoes (Majestic), total tubers, t/ha

After Classical experiments on:	1973	1972	1971
Wheat	48	36	35
Barley	48	41	46
Date of planting	7 April	18 April	30 March

Basal dressing: 134 kg N, 114 kg P_2O_5, 228 kg K_2O/ha

Our evidence of recent seasonal differences for potatoes is (as for other crops) not fully adequate, but it seems that potatoes in 1973 generally yielded about 5 t/ha more than in 1972 and probably about the same as in 1971.

Garden clover

The test of nitrogen and magnesium fertiliser ended in 1972 and both nutrients were applied basally in 1973. To make the site even, plots that did not receive magnesium in previous years were given a corrective dressing of 500 kg Mg/ha. The mean total yield from three cuts was 5·5 t dry matter/ha. (McEwen)

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Irrigation, nitrogen fertiliser and sucrose for field beans

A microplot experiment tested all combinations of the following on spring-sown field beans (Minor):

(1) none, irrigation (total 11 mm) for three weeks from start of flowering,
(2) none, 150 kg N/ha, as 'Nitro-Chalk', just before flowering,
(3) none, 150, 450 kg sucrose/ha, applied as foliar spray divided between three applications at weekly intervals from start of flowering.

It was intended to limit the moisture deficit in the irrigated beans to 12 mm. Deficits up to 60 mm developed because of trouble with the equipment.

Storms in July caused severe lodging throughout the experiment. Despite this yields were excellent. Untreated plots gave 5·5 t grain/ha. Both irrigation and sucrose slightly lessened yield. Nitrogen increased yield by 0·5 t on unirrigated plots but did not affect yield on irrigated plots. (McEwen)

Aldicarb and health of spring beans

In 1972 seed was saved from plots of field beans (Maris Bead and Minor), which had received either aldicarb at 4·5 kg or none. The crop of Maris Bead grown in 1972 was infected with both stem eelworm (*Ditylenchus dipsaci*) and the seed-borne viruses Broad Bean Stain Virus (BBSV) and Echtes Ackerböhnemosaik Virus (EAMV). Both eelworm and virus infections had been greatly lessened but not eliminated by aldicarb. The stock of Minor had no noticeable infections.

In 1973 seed from the four stocks saved from the 1972 plots was sown with a fresh test of aldicarb at 5·0 kg or none. The mean yield of Minor was 4·0 t grain/ha and that of Maris Bead 3·3 t/ha. Treatment with aldicarb in 1972 did not affect yields in 1973 but the fresh treatment increased the yield of Maris Bead from 2·6 to 3·9 t/ha but did not affect yield of Minor.

The large increase by aldicarb on Maris Bead is not readily explicable. Stem eelworm infection affected only 14% of the plants on untreated plots, lessened to 1% on treated plots. Virus spread was not fully controlled—from an initial average 0·3% infection 39% of plants were infected in July on untreated plots, 27% on treated. (Corresponding figures on Minor were 25 and 27%.) The main virus vector *Apion vorax* was not controlled by aldicarb but the number of adult *Sitona lineatus* was lessened.

It was evident that aldicarb at the rates used in this experiment could neither free a stock from stem eelworm or seed-borne viruses nor maintain the health of a clean stock exposed to these pathogens. (McEwen, with Cockbain, Plant Pathology Department and Hooper, Nematology Department)

Maize for grain at Woburn

The experiment started in 1971 (*Rothamsted Report for 1972*, Part 1, 254) was continued.

Plots not treated with dazomet gave 5·4 t grain/ha; 450 kg dazomet/ha increased the yield to 6·1 t. The greatest yield (6·5 t) was given by dazomet with 100 kg/ha N as 'Nitro-Chalk'. (Barnard with Hornby, Plant Pathology Department)

Staff

Elisabeth Hind went to Zambia as biometrician to the Department of Agriculture. Linda C. Brown of the Land Resources Division (Overseas Development Administration) spent five weeks in the Section; she has since gone to Saint Helena as agronomist.

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Barnard took part in a 'middle management course' run jointly by the Science and Agricultural Research Councils; later he visited Holland on a study tour organised by the Maize Development Association.

P. J. Macfarlan, who retired recently from the Ministry of Agriculture, Fisheries and Food, has been working part-time in the Section.

A. C. Pattison joined the Section from the Soil Microbiology Department on 1 January 1974.

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